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BRIDGING THE EMPATHY GAP: EFFECTS OF BRIEF MINDFULNESS TRAINING ON
HELPING OUTGROUP MEMBERS IN NEED

A dissertation submitted in partial fulfillment for the degree of Doctor of Philosophy at Virginia
Commonwealth University

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Acknowledgments

First, I could not have done this work without the unconditional love and companionship of my wife Sarah. Her patience and understanding during my training as a psychological scientist cannot be measured and have given my work meaning. Also, I thank my two daughters, Abigail and Katharine. Watching them grow and develop into the compassionate people they are has been so encouraging and fun. My family has truly brought me happiness in life.

I thank the chair of my dissertation committee and mentor, Dr. Kirk Warren Brown, for his guidance and dedication to my training as a psychological scientist. He has truly challenged me to become a damn good scientist and pursue questions that I am passionate about. I also thank my committee members, Drs. Scott Vrana, Zewelangi Serpell, Jennifer Joy-Gaba, and Christopher Reina, for their candid, constructive feedback and encouragement. I would also like to express my humble gratitude to Dr. Linda Zyzniewski; she has been a true friend and mentor in my time at VCU, and I owe much of my success to following her example. Also, I thank Drs. Wendy Kliewer and Jeffrey Green for their kind references, support, and insight while I was on the job market. A special thank you to my collaborators and friends, Athena Cairo and Jackie Moloney. Athena's research questions are some of the most creative that I have ever encountered, and I am lucky to have her as a collaborator. I treasure Jackie's friendship and support through our comprehensive exams and every other hoop we have jumped through pursuing our degrees at VCU.

I thank the amazing administrative support staff in the Department of Psychology at VCU. Joanne Biggs, Eli Christman, Stephanie Hart, Yin Huang, Corey Martin, and Peter Stauffer provided tremendous support in grant financial management, participant recruitment, equipment purchase, intervention scheduling, and occasional social support when this project became stressful. I also thank the Mind and Life Institute for their support and awarding me the Francisco J. Varela Award to fund this dissertation research, and the VCU Graduate School for the Doctoral Dissertation Fellowship for personal funding to focus on my dissertation. Any views, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect those of the Mind and Life Institute or the VCU Graduate School. Also, a special thank you to Drs. Paul Condon, Jenny Gutsell, Mickey Inzlicht, and Fadel Zeidan for their consultation when designing this project.

Finally, I would like to thank my research assistants that made this project possible. I could not have done this work without Jazmin Anderson, Marguerite Armanyous, Jessica Baksch, Kandyce Beecher, Anmanat Boparai, Daniel Bustamante, Antoine Calfat, Savannah Clements, Bridget Condron, Lauren Curran, Kana Danzey, Mone't Durden, Courtney Fields, Evan Flynn, Feben Gebrehiwot, Regine Henderson, Emily Ho, Shawn Hosteter, Destinee Jackson, Matt Lee, Stuart Lytle, Jordan Martin, Suzanne Merritt, Anu Narayanan, Denise Perry, Alexandra Radloff, Savannah Sargent, Jordan Schramm, Radhika Sharma, Caroline Smith, Justin Tubbs, Catherine Wall, Antoinette Waller, Elizabeth Williams, and Paul Wilson.

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Abstract

BRIDGING THE EMPATHY GAP: EFFECTS OF BRIEF MINDFULNESS TRAINING ON HELPING OUTGROUP MEMBERS IN NEED

By: Daniel R. Berry, M.A.

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

Virginia Commonwealth University, 2017.

Major Director: Kirk Warren Brown, Ph. D., Associate Professor of Psychology

Witnessing others in need can be felt similarly to experiencing it oneself (*empathy*) and motivates assistance of those in need (*prosocial action*). It is well-documented that empathy can occur automatically, but when those in need are not members of a social ingroup, empathy and prosocial action are undermined. One major ingroup—outgroup division in American and in other countries is based on race. Although most condemn racial discrimination, empathy and prosocial action are often lower, however unintentionally, in interracial contexts. In light of this empathy gap, it is important to identify psychological factors that could bolster empathy and prosocial action toward racial outgroup members in need. This dissertation asked whether *mindfulness training* – cultivating present-centered, receptive attention to one’s ongoing experiences –increases social sensitivity toward racial outgroup members, and is based on pilot research indicating that a brief mindfulness induction increased empathy and prosocial action in such contexts.

Healthy, self-identifying White women were randomized to either a brief (4-day) mindfulness training or a structurally-equivalent sham mindfulness training. Pre-post

electroencephalographic measures of empathy toward video stimuli of outgroup members expressing sadness was assessed via prefrontal alpha frequency oscillations (i.e., frontal alpha asymmetry). Pre-post scenario-based spontaneous prosocial action toward Black individuals in need, and pre-post 14-day ecological momentary assessment (EMA) of empathy and prosocial action toward Black individuals (and other races) were conducted. Mindfulness training was expected to increase EEG- and EMA-based empathy toward Black individuals in need, as well as increase prosocial action toward such individuals in scenario and daily life (EMA) contexts.

Opposite of what was hypothesized, MT reduced post-intervention empathic simulation, relative to ST, as measured by frontal alpha asymmetry. Consistent with hypotheses, however, MT increased empathic concern for outgroup members expressing sadness during video stimuli observation, and increased post-intervention scenario-based prosocial action. However, the hypothesis that MT would predict increases in pre- to post-intervention daily EMA-based prosocial action was not supported. Providing somewhat convergent evidence, trait mindfulness predicted more frequent pre-intervention scenario-based and daily prosocial action toward outgroup members; trait mindfulness was not related to pre-intervention video-based EEG and self-reported empathy outcomes. Together these results suggest that mindfulness can enhance some indicators of empathy and prosocial behavior in interracial contexts. Mechanisms and implications of the findings are discussed.

Introduction and Review of the Literature

Ultimately, peace is... about attitudes, about a sense of empathy, about breaking down the divisions that we create for ourselves in our own minds and our hearts that don't exist in any objective reality, but that we carry with us generation after generation. (Obama, 2013)

Intergroup conflict has had a devastating impact on societies and cultures throughout history, contributing to more than 210 million deaths in the 20th century, 170 million of which were civilian deaths (Cohen & Insko, 2008). At the heart of this issue, perceiving psychological separateness between “us” and “them” is psychological kindling for intergroup neglect, prejudice, discrimination, and full-blown aggressive conflict (Cikara, 2015). Social and political movements have inspired popular, scholarly, and scientific interest in ameliorating intergroup tension, and as a means to this end, social psychological approaches converge on identifying and cultivating psychological factors that bolster prosocial attitudes and actions across social and cultural lines (Dovidio & Gaertner, 2000; Kelman, 1997; Pettigrew, 1998). Specifically, scientists have identified several factors successful in fostering intergroup prosociality including: (1) considering future interactions with outgroup members (Axelrod, 2006; Insko et al., 1998, 2001), (2) cultivating intergroup trust (Insko, Kirchner, Pinter, Efav, & Wildschut, 2005), (3) re-categorization of individuals into a superordinate group (Sherif, 1988; Wolf, Insko, Kirchner, & Wildschut, 2008), and most germane to the present study, (4) cultivating empathy for the outgroup (Batson & Ahmad, 2009; Malhotra, 2005; Shechtman & Basheer, 2005; Stephan & Finlay, 1999).

Empathy entails sharing and understanding others' emotions (Tomasello, 2009). When predicaments befall others, humans express an innate and learned capacity to empathize with

them and to show them kindness and care (de Waal, 2008). Perhaps in part because seeking and maintaining long-lasting social relationships is a basic psychological need (Deci & Ryan, 2000), empathy is often expressed unintentionally and even toward strangers (Preston & de Waal, 2001). Empathy is a proximal promoter of *prosocial action* (Davis, 2015), behavior intended to ameliorate others' suffering. Yet contemporary examples abound of individuals failing to empathize with and help others in need. Although most condemn discrimination and endorse egalitarian attitudes, intergroup contexts are frequently marked by an "empathy gap" in which empathy and prosocial action are less frequently expressed toward outgroup members (Cikara, Bruneau, & Saxe, 2011). Consistent with this, Decety and Chaminade (2003) suggest that before empathic responses can be made a person in need must first be perceived to be "like" or "similar" to a prospective helper. Researchers have suggested that rather than creating interventions that focus on simply increasing empathy, interventions could reduce or eliminate failures of empathy and prosocial action by reducing the perceived psychological distance between members of one's social ingroup(s) and outgroup(s) (Zaki & Cikara, 2015). Implicit to the promotion of empathy and the prosocial actions that follow is the quality of attention paid to the person with whom one is interacting (Goleman, 2015). Further, Barrett-Lennard (1981) pointed out that an "empathic attentional set" is necessary for successful intergroup interactions, in which one "opens him- or herself in a deeply responsive way to another person's feelings" (p. 92).

But how does one "deeply" attend to the other? Despite theoretical perspectives asserting the importance of attention in empathy and prosocial action (Latané & Darley, 1970), a relative paucity of empirical studies has examined attentional quality in these domains. *Mindfulness* offers particular promise in the study of intergroup prosociality, for several reasons. First,

mindfulness entails a heightened capacity for careful – one could even say, *unconditional* (Chödrön, 2000) – attention to internal and external stimuli from moment to moment (Baer, 2006; Brown & Ryan, 2003). A growing body of research from the cognitive sciences indicates that gains in sustained attention, executive attention, and other indicators of well-functioning attention capacities accrue with mindfulness training (MT; Jha, Krompinger, & Baime, 2007; Lutz, Slagter, Dunne, & Davidson, 2008; Slagter et al., 2007; Tang et al., 2007; van den Hurk, Giommi, Gielen, Speckens, & Barendregt, 2010). Second, MT fosters a temporary suspension (or at least a greater awareness) of automatic thoughts, emotions, and behaviors (Analayo 2003); as I will soon discuss, automaticity is one factor that hinders prosociality, particularly when it involves unquestioned identification with a social group or category (Tajfel, 1982). Third, there is initial indication that MT has positive social, including prosocial consequences (Condon, Desbordes, Miller, & DeSteno, 2013; Rosenberg et al., 2015). Fourth, training in mindful attention may be more transferable to social contexts than other attention training methods (Tang & Posner, 2009). Finally, nascent research has shown that brief MT, as well as variation in dispositional mindfulness, the tendency to deploy mindful attention in one’s daily life, can promote prosocial emotions and actions toward ostracized strangers, dissimilar others, and racial outgroup members (Berry, Cairo, et al., 2017; Berry, Brown, et al., 2017). Therefore, mindfulness provides a fitting lens through which to examine the role of attentional quality in intergroup prosociality. With this research as background, rigorous research is now needed to examine the role of MT on intergroup prosociality with active, structurally-equivalent control conditions in a randomized controlled trial (RCT). To address this, the present study pitted 4-day MT against a structurally-equivalent sham meditation training (ST), both slightly adapted from Zeidan and colleagues (Zeidan et al., 2011; Zeidan, Johnson, Diamond, David, &

Goolkasian, 2010; Zeidan, Johnson, Gordon, & Goolkasian, 2010). The overarching purpose of the study was to understand whether training in mindfulness can increase empathy and prosocial action toward racial outgroup members. A comparison to ST was designed to help distinguish the effects of relaxed breathing and placebo influences (e.g., the belief that one is meditating) from the actual practice of mindfulness.

The present research builds upon findings from Gutsell and Inzlicht (2012) and others that examined the influence of outgroup status (defined by race) on an electroencephalographic (EEG) indicator of empathy. Recent research on the ‘mirror neuron system’ (Rizzolatti, Fadiga, Gallese, & Fogassi, 1996) reveals that humans ‘match’ others actions, emotions, and mental states by merely observing them as they engage in these behaviors and psychological states. Several researchers have postulated that EEG indicators, including *mu* rhythms and frontal alpha asymmetry frequency oscillations, are modulated by mirror neuron somatosensory inputs during emotion and action observation (e.g., Cochin, Barthelemy, Roux, & Martineau, 1999; Gutsell & Inzlicht, 2012; Holz, Doppelmayr, Klimesch, & Sauseng, 2008; Keuken et al., 2011; Lepage & Théoret, 2006; Muthukumaraswamy, Johnson, & McNair, 2004; Oberman, Pineda, & Ramachandran, 2007; Perry et al., 2010; Pineda, 2005). Moreover, recent research has linked these EEG indicators to higher levels of trait empathy (Hooker, Verosky, Germine, Knight, & D’Esposito, 2010) and to performance on emotional empathy tasks (Pineda & Hecht, 2009). Of interest to the present research is the widely-studied asymmetry in the alpha band of the EEG frequency spectrum, which indexes differences between left and right prefrontal cortical activation essential for information related to reward and punishment (Davidson, 2004). Early research found that higher activity in the left (relative to the right) prefrontal cortex is associated with approach-related emotional states and traits, including happiness and anger; and that higher

right (relative to left) prefrontal activation is associated with avoidance-related emotional states and traits like fear and sadness (Davidson, 2004; Harmon-Jones, Gable, & Peterson, 2010).

More recently, Gutsell and Inzlicht (2012) found that self-identifying White individuals evidenced higher right frontal alpha asymmetry scores while observing video stimuli of racial outgroup actors expressing sadness, relative to observing White actors expressing sadness. This effect was exacerbated by racial prejudice against Black individuals, as measured by the Symbolic Racism 2000 Scale (Henry & Sears, 2002), and appears to reflect lower ‘matching’ of emotional states with racial outgroup members. The present study attempts to extend the findings of Gutsell and Inzlicht (2012) by understanding the role of MT, relative to ST, in attenuating the empathy gap in an interracial context, as indexed by higher right frontal alpha asymmetry scores among White adult participants, a neural marker of psychological ‘matching’ or empathizing with others’ sadness (Gutsell & Inzlicht, 2012) – in the present study, racial outgroup (Black) individuals.

Another goal of this research was to examine whether MT, relative to ST, increases prosocial action (i.e., helping behavior) of White participants toward Black individuals. This study aims to extend the findings of Condon et al. (2013), who showed that MT increases the frequency of scenario-based helping behavior toward strangers. This study also seeks to extend the results of Berry, Cairo, et al. (2017), which showed that those scoring higher in dispositional mindfulness provided more frequent scenario-based helping of racial outgroup members in need. Similar to empathy, helping behavior is often lower in interracial contexts (Saucier, Miller, & Doucet, 2005). The present study will extend this research by examining MT-induced pre-post changes in scenario-based helping behaviors (cf., Condon et al., 2013; Latané & Dabbs, 1975);

in doing so the magnitude of the pre-post changes in prosocial action can be separated from dispositional proclivities for prosocial action.

In addition to the proposed laboratory-based measures of empathy and prosocial action, end-of-day ecological momentary assessment (EMA; Shiffman, Stone, & Hufford, 2008) of empathy and prosociality will be captured pre- and post-training; specifically, empathic concern – an emotion congruent with the perceived welfare of a person in need (Batson et al., 1987) and a proximal promoter of helping behavior (Davis, 2015) – will be measured. Second, end-of-day EMA indicators of helping behavior frequency (Rameson, Morelli, & Lieberman, 2012) will assess helping behaviors toward Black individuals (and racial ingroup and other racial outgroup members) in need. These end-of-day measures have been previously used to capture spontaneous prosocial action toward strangers and acquaintances (Morelli, Rameson, & Lieberman, 2014) and this study will extend these results by querying about the race and ethnicity of the individuals that were helped.

I anticipate that MT, relative to ST, will begin to close the empathy gap in interracial contexts, as indexed by front alpha asymmetry in response to video-recorded expressions of sadness by Black actresses (Primary Aim 1). Further, I predict that MT, relative to ST, will increase the frequency of helping behavior toward Black individuals (and other racial outgroups), as indexed by EMA recording (Primary Aim 2). In the sections that follow I provide a rationale for these aims before detailing the study in which I propose to examine the effects of MT, relative to ST, on empathy and prosocial action in intergroup contexts. First, I will discuss briefly social identity theory (SIT) and in more detail the attendant psychological consequences of group membership in intergroup contexts, namely reduced empathy and prosocial action toward outgroup members. Thereafter, I will describe simulation theory, a social neuroscience

approach to empathy; this section will integrate simulation theory with SIT by describing intergroup deficits in empathy. After discussing the neuroscientific and behavioral consequences of social group membership I describe how mindfulness that may help to enhance prosociality in intergroup contexts. Finally, nascent research will be presented showing that mindfulness can attenuate defensive attitudes and reduce prosocial emotion and action toward outgroup members.

Intergroup Cognition and Emotion: Underpinnings of The Empathy Gap

Belonging to a cohesive social group has its benefits, not the least of which that group membership is necessary to one's survival (Brewer & Caporael, 2006). Membership in cooperative groups allows for reciprocal exchange of food and other tangible resources, provides potential mates and protection from threat, and promotes the dissemination of cultural values and knowledge (De Dreu, Balliet, & Halevy, 2014). Furthermore, group membership fosters psychological and social well-being (e.g., Baumeister & Leary, 1995). Although the benefits of group membership are legion, feeling that one belongs to a group is typically accompanied by less willingness to cooperate with, empathize with, and help those who do not belong (Cikara et al., 2011) and can even foster neglect of, and/or aggression toward social outgroup members (Tooby & Cosmides, 2010).

As social beings, individuals are embedded within the broader worldviews of their social and cultural groups, these worldviews reflecting values, ideals, and beliefs about the world and the role of the individual and social groups within it. Group identity valorizes ingroup members, encourages reciprocal exchange and trust, and provides a source of shared meaning among members of the ingroup (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). But conflict and tension arise when this shared meaning is threatened or attacked. Contemporary and

historical examples abound of individuals and groups derogating or aggressing against rival groups when they threaten ingroup worldviews and social identity.

Social Identity Theory and Reduced Prosociality toward the Outgroup

Social Identity Theory (SIT; Tajfel, 1974; Turner, Brown, & Tajfel, 1979) is based on the supposition that categorizing oneself into a group is a sufficient and necessary first step toward ingroup favoritism and intergroup conflict. The theory distinguishes between personal identity, which entails how people think and feel about their unique traits, and social identity thusly: Tajfel (1981) defines social identity as “the part of an individual’s self-concept which derives from his knowledge of his membership in a social group together with the value and emotional significance attached to that membership” (p. 255). Brewer (2001) continues: “social identification involves affective and evaluative processes that are above and beyond cognitive classification. The affective significance arises from the felt attachment between the self and the ingroup” (p. 21). Only when one incorporates the group into their social identity can intergroup neglect and tension arise.

SIT posits that individuals are motivated to enhance and maintain self-esteem by achieving positive ingroup distinctiveness - the tendency to perceive one’s social ingroup as *distinct* from and *better* than other outgroups (Tajfel, 1982). Even among individuals assigned to “minimal groups” that are created on an arbitrary basis (in the lab, for example), distinctions are made between “us” and “them” and are especially exaggerated when they favor the ingroup (Tajfel, 1978). Favoring one’s ingroup(s) promotes positive interactions among ingroup members, but can also have detrimental downstream consequences to the harmony of intergroup relations. “Privileging members of our group, by correlation, de-privileges those who do not belong to it” (Ricard, 2015, p. 277). We perceive members of our ingroup(s) to be

heterogeneous and thus worthy of careful attention; outgroup members are perceived as homogenous, and we often neglect their psychological complexity (Haslam, 2006), relying on cognitive shortcuts about their traits, goals, intentions, and behaviors to inform the social interaction (Park & Judd, 1990). This neglect of outgroup complexity is exacerbated and maintained by (a) the belief that groups are essential; (b) members of groups all have something underlying in common that distinguishes them from other categories; and (c) social categories are viewed as biological categories, akin to differences between species (Rothbart & Taylor, 1992).

Empirical evidence from social psychology and social neuroscience on the disregard of outgroup members' psychological states consistently supports the foregoing theoretical accounts of SIT, suggesting the presence of an empathy gap for outgroup members. Importantly, this psychological disregard occurs in processes necessary for the promotion of empathy. Evidence from fMRI research indicates that individuals perceived to be low on both competence and warmth (e.g., homeless individuals and those addicted to drugs) are perceived as “disgusting” and “less than human” (so-called “extreme outgroups”; Harris & Fiske, 2006). It has been shown that all social group members except those from extreme outgroups elicit activation in the medial prefrontal cortex (mPFC), a brain region associated with social cognition abilities (Amodio & Frith, 2006; Ochsner & Gross, 2005). Stimuli depicting extreme outgroup members also produced greater activation in the insula and amygdala, areas associated with disgust (Murphy, Nimmo-Smith, & Lawrence, 2003). But outgroup members do not need to be viewed as extremely low on competence and warmth to be neglected. For example, in a study described to participants as “exploring learning about groups,” Van Bavel, Packer, and Cunningham (2008) randomly assigned self-identifying White participants to one of two novel groups dubbed the

Leopards or Tigers. Participants then completed a learning task while lying in an fMRI scanner in which they associated face stimuli of other ostensible participants into one of the two “big cat groups”. Group membership was indicated simultaneously with the presentation of the face stimuli. Face stimuli were of 12 Black and 12 White individuals, and 6 stimuli of each race were assigned to one of the big cat groups to rule out the possibility that sociodemographic factors (and not the arbitrary group assignment) produced any neural differences between the group assignments. During a second phase of the experiment, participants were presented the same face images but with group membership identification removed. Results showed lower activation in neural areas associated with positive emotional processing, including the amygdala, fusiform gyri, orbitofrontal cortex, and dorsal striatum when viewing outgroup members’ faces, relative to ingroup members’ faces. These results are important in the context of the present study, as interracial interactions are often unintentionally marked by a lack of positive emotion (Cikara, 2015). Thus, it is not merely that outgroup members are unfavorably regarded; social interactions with strangers are often positive (Baumeister & Leary, 1995) but this positive emotion appears to be bounded by social ingroup status.

An abundance of research on outgroup neglect also shows deficits in the recognition of outgroup members’ emotional states. A meta-analysis of emotion recognition across cultural and social lines found an ingroup advantage of emotion recognition in facial expressions within nations, regions, and cultures (Elfenbein & Ambady, 2002). When others’ emotions are recognizable, individuals react less strongly to the emotional expressions of racial outgroup members (Weisbuch & Ambady, 2008), and lower activation in the neural pain matrix is evidenced when witnessing racial outgroup members in physically painful contexts (Xu, Zuo, Wang, & Han, 2009) and emotionally painful contexts (Mathur, Harada, Lipke, & Chiao, 2010).

Being a fan of a particular sports team presents a strong ingroup—outgroup division among fans of rival teams. Attenuated responses in the neural pain network are associated with lower costly helping (offering to take the place) of rival soccer fans receiving shocks and also increased neural activation in the nucleus accumbens (Hein, Silani, Preuschoff, Batson, & Singer, 2010), a neural structure associated with states of pleasure and Schadenfreude (Cikara et al., 2011; Cikara, 2015). Avenanti, Sirigu, and Aglioti (2010) demonstrated empathy deficits toward Black Italians among White Italians in sensorimotor contagion, a corticospinal response that is automatically activated during physical pain observation.

Deficits in empathy and helping behavior toward outgroup, relative to ingroup members are not necessarily consequences of innate motivation to favor the ingroup; rather, such deficits appear to be culturally learned (Chiao & Mathur, 2010). Higher self-reported racial prejudice predicts lower sensorimotor cortex activity, which is necessary for mimicking and understanding the behavior of others (de Waal, 2008) and for empathizing with them (Pineda, 2005), in intergroup contexts and specifically for culturally disliked groups such as Blacks in Italy (Avenanti et al., 2010) and South Asians in Canada (Gutsell & Inzlicht, 2010). Thus, intergroup empathy and prosocial action deficits may be linked to both innate and learned processes. Taken together these results suggest that neural indicators of empathy are undermined in intergroup contexts and appear to be due to culturally learned biases.

In light of the proximal role of empathy in promoting prosocial action (Batson et al., 1987; Davis, 2015), attenuation of empathy in intergroup contexts should also lead to less frequent helping behavior. Indeed, recent research (Kunstman & Plant, 2008) and a meta-analysis (Saucier et al., 2005) show that in some contexts people are less likely to help outgroup members in need than members of one's social ingroup(s). Specifically, Saucier et al. (2005)

demonstrated that lower helping behavior toward racial outgroup members is more likely to occur when the ability to override discriminatory behavior is inhibited by pairing the race of the person in need with a social context wherein one is expected to help less, namely in contexts where help is difficult, time consuming, or dangerous; when responsibility to help could be attributed to other prospective helpers; or when one endorses a prejudiced self-concept (Dovidio & Gaertner, 2000). In most circumstances, however, racial outgroup helping frequency is statistically equal to that of ingroup helping.

Simulation Theory: Neural Bases of Empathy

Humans have an innate and learned ability to empathize with and understand the mental states of other. But how does one come to understand the other? Although many theoretical approaches to empathy exist, most converge to suggest that before we coordinate social behavior we first *simulate* the mental states of others by drawing on our own previous mental and emotional experiences in similar circumstances (Singer, Critchley, & Preuschoff, 2009). The discovery of the mirror neuron system in monkeys (di Pellegrino, Fadiga, Fogassi, Gallese, & Rizzolatti, 1992) and its homologue in humans (Fadiga, Fogassi, Pavesi, & Rizzolatti, 1995) has been the starting point for empirical research and generation of theory to understand empathy through a neuroscientific lens. Studies of the human mirror neuron system have consistently shown that every time one observes someone performing an action, we *automatically* recruit the same neural motor circuits as when we act out that behavior ourselves (Preston & de Waal, 2001). A now classic finding in social psychology shows that humans unconsciously mimic postures, behaviors, and facial expressions of strangers (Bargh & Chartrand, 1999), and in so doing build social bonds with the other that often lead to helping them (Chartrand & Lakin, 2013; van Baaren, Janssen, Chartrand, & Dijksterhuis, 2009). Simulation theory (Gallese, 1998)

similarly suggests that empathy is based on simulating an adversely affected person's mental state by activating mirror neuron circuits dedicated to perceiving that state in one's own body. Initial findings suggest that neural simulation and behavioral mimicry are part of a family of downstream responses modulated by activity in the human mirror neuron system (Hogeveen, Chartrand, & Obhi, 2015).

Depending on circumstances individuals commonly simulate affective and/or behavioral states of others, and to some extent somatic states can be simulated as well. For example, Singer et al. (2004) demonstrated that neural circuits that modulate affective responses to one's own pain, which include bilateral anterior insula (AI) and rostral anterior cingulate cortex (ACC) regions of the brain, are also active when observing another's pain. However, Singer et al. (2004) did not find that those observing pain simulated or "felt" the somatic and/or physical sensations to understand their pain. It does appear that one simulates the affected person's emotional distress on the other hand. A recent meta-analysis that included 32 fMRI studies of empathy for physical and emotional pain provided further support for the contention that empathy is based on simulating others' emotional distress, and also provided greater statistical power than the single aforementioned study (Singer et al., 2004) to test the apparently smaller effect sizes of simulation of somatic pain (Lamm, Decety, & Singer, 2011). The researchers showed that (consistent with the study by Singer et al. (2004)), activity in the AI and ACC in response to others' pain (both emotional and physical) was greater than chance. Inconsistent with Singer et al. (2004), however, the researchers found that when participants observed physical pain stimuli (e.g., another person's hand caught in a door), neural areas specific to pain sensation in the same part of the observer's body (e.g., areas of the premotor cortex) were simultaneously activated; this indicates that at least to some extent, one-to-one mirroring of the

pain of others is necessary (or at least occurs) in empathy for physical pain. Together these findings shed light on the positive association between neural simulation and empathy.

Incipient research indicates that neural simulation of even social pain can promote prosocial action toward individuals in need. Masten, Morelli, and Eisenberger, (2011) recorded fMRI responses of participants observing another ostensible individual being excluded in an online ball-tossing game (Cyberball; Williams, Yeager, Cheung, & Choi, 2012). The canonical version of Cyberball was designed to exclude participants and record concurrent neural and/or subjective responses to the exclusion; Williams and Jarvis (2006) suggested that this ball-tossing paradigm could be used for examining behavioral indicators of discrimination in interracial contexts and empathy for others who were excluded in the game environment. Based on correlational evidence showing empathy for vicarious exclusion (Wesselmann, Bagg, & Williams, 2009), Masten et al. (2011) hypothesized that social exclusion would evoke activation in brain areas involved in the emotional experience of pain (i.e., AI and ACC) and in mentalizing, or inferring another's mental state (i.e., precuneus, VPPFC, and TPJ). The latter neural activation was hypothesized on the basis that in the Cyberball environment one cannot directly see the emotional pain of others as they are being excluded. Thus, understanding the context itself may serve as a sufficient instigator of empathy. Masten et al. (2011) found increased activation in the VPPFC, precuneus, AI, and ACC in participants observing Cyberball exclusion. Importantly, activity in these neural regions partially mediated the relation between trait empathy and prosocial actions, namely the extent to which participants showed kindness and comfort to excluded individuals in emails later written to them. These results are consistent with those of Lamm et al. (2011) discussed earlier, as neural areas of the shared pain network and

neural areas associated with representing or simulating the mental states of others' emotional distress predicted greater kindness toward another person.

Reduced simulation toward dissimilar others and outgroup members. The automaticity (e.g., Preston & de Waal, 2002) of neural simulation of other's physical, emotional, and social pain notwithstanding, top-down cognitive influences of perceived similarity and group membership can thwart simulation. Such a phenomenon is not surprising in light of previously detailed literature that precursors of empathy (e.g., emotion recognition) are often undermined in intergroup contexts. What is more, intergroup interactions are said to be stilted by an empathy gap in which empathy is lower (e.g., Cikara et al., 2011) and prosocial actions less likely (Saucier et al., 2005) than when one is interacting with a familiar other or an ingroup member. One example of this comes from the research on empathy for social pain. Using the same fMRI Cyberball paradigm as by Masten et al. (2011), Meyer et al. (2013) found heightened activation in the shared pain network (AI & ACC) when witnessing a close other being socially excluded, but witnessing a stranger being excluded activated neural regions associated with thinking about or imagining the mental states of others (precuneus, TPJ, & VPM). Thus, empathic simulation of close others appears to entail direct sharing of emotion, whereas simulation of strangers seems to entail mentalizing or inferring how the other is feeling. Further, the shared pain network activation in the close other condition was positively correlated with self-reported closeness, or connection, felt with the close other. More generally, several phenomena related to empathy, including the understanding of others' emotions, appear to involve or be based on perceived self-other overlap, taking into account both neural and psychological evidence (Decety & Sommerville, 2003; de Waal, 2008; Preston & Hofelich, 2012).

Beckes, Coan, and Hasselmo (2013) examined statistical associations between neural areas active while participants received shocks themselves or witnessed either a close friend or stranger receiving shocks. Associations between self-threat and friend-threat in neural areas that included the AI were statistically significant, but self-threat – stranger-threat associations were nonsignificant. This study was one of the first to use neural activation to a pain stimulus that individuals experienced themselves as a basis for understanding empathic simulation of another person’s response to the same pain stimulus. These findings are important because they illuminate the possibility that variation in familiarity with the affected person is a moderator in the empathic process. Specifically, when one perceives greater overlap between oneself and another, empathic responses appear to “map on” to or more directly simulate one’s own experiences of the same event. Several studies have demonstrated greater readiness to simulate the physical, emotional, or social pain of similar or familiar, relative to unfamiliar, others (Chen, Lew, Hershman, & Orlander, 2007; Hein & Singer, 2008; Lamm et al., 2011; Singer, 2006).

Electrocortical (EEG) Indicators of Neural Simulation

As previously mentioned, several studies have linked EEG indicators to neural simulation or human mirror neuron activity (e.g., Cochin et al., 1999; Gutsell & Inzlicht, 2012; Holz et al., 2008; Keuken et al., 2011; Lepage & Théoret, 2006; Muthukumaraswamy et al., 2004; Oberman et al., 2007; Perry et al., 2010; Pineda, 2005). The most commonly used indicator of neural simulation is *mu suppression*, an EEG frequency oscillation within the alpha frequency band (9 – 11 Hz) over central EEG electrode sites (Cochin et al., 1999; Gastaut & Bert, 1954) and is believed to tap mirror neuron-modulated electrocortical activity in the sensorimotor cortex (Pfurtscheller & Aranibar, 1979).

Mu suppression is elicited in contexts involving motor activity (Pineda, 2005). For example, participants are typically asked in studies of mu suppression to engage in some motor activity themselves to form a baseline measure; then each one watches another individual engage in the same activity. Woodruff, Martin, and Bilyk (2011) implemented a finger-tapping task in which participants watched videos of others tapping their fingers to their thumbs and then performing this activity themselves; this motor task elicited mu suppression in both conditions and differences between self- and other-induced mu suppression scores were negatively correlated with trait empathy. Tasks involving motor simulation often compare self-generated mu suppression to other-generated mu suppression, similar to the physical pain empathy task previously described in Beckes et al. (2013).

In a study designed to test whether interracial interactions could reduce mu suppression, Gutsell and Inzlicht (2010) asked participants to grasp a glass of water placed on a table in front of them while EEG was recorded. Thereafter, they watched videos of White (racial ingroup), Black, South Asian, and East Asian individuals (racial outgroup members) performing this same action during EEG recording. The researchers hypothesized that the White participants would show statistically different self vs other mu suppression discrepancies in the other-race (outgroup) condition. They did in fact find that self-generated versus outgroup-generated mu suppression was significantly different, whereas self-generated versus ingroup-generated mu suppression was not significantly different. These results indicate that the automaticity of empathic may be attenuated in response to stimuli depicting outgroup members. However, mu oscillations appear to be limited to the study of simulation of motor behavior, and are not modulated by the expression of emotion (Gutsell, 2014). As will be discussed next, alpha

asymmetry frequency oscillations have been shown to be a more reliable EEG-based indicator of emotion simulation.

Alpha asymmetry as an indicator of neural emotion simulation. Alpha asymmetry frequency oscillations represent a recently-recognized indicator of emotional simulation (Gutsell & Inzlicht, 2012) and are the EEG measure of interest in the present study. Alpha asymmetry is an EEG-based measure of the relative activation in left and right prefrontal cortices, which are essential for the processing of reward- and punishment-related stimuli (Davidson, 2004). Activity in the left prefrontal cortex (PFC), relative to the right PFC, is associated with approach-related emotions like happiness and anger, whereas right PFC activation, relative to left PFC activation, is associated with avoidance-related emotions like fear and sadness (Davidson, 2004; Harmon-Jones et al., 2010). These neural responses have been measured with alpha asymmetry scores - specifically, left minus homologous right activations over frontal electrode sites (Davidson & Fox, 1982). Higher right cortical activity, indicated by a negative alpha asymmetry score, is thought to be indicative of trait-like negative affective styles (Wheeler, Davidson, & Tomarken, 2007) and can also evoke state negative affect, for example in response to negative emotional films (Davidson, Ekman, Saron, Senulis, & Friesen, 1990). Higher left cortical activity, indicated by a positive alpha asymmetry score, is also indicative of trait-like affective styles, but are more often positive in valence (Wheeler et al., 2007); higher left alpha is associated with approach-related positive affective states like happiness (Gable & Harmon-Jones, 2008), but it is also associated with negative approach-related states like anger (Harmon-Jones & Sigelman, 2001). Even though alpha asymmetry is most understood in the context of one's own emotional reactivity to evocative stimuli, recent work has shown that alpha asymmetry is also sensitive to vicarious stimuli of others experiencing emotional pain (Gutsell &

Inzlicht, 2012). This is because the prefrontal cortices are active during the experience and expression of emotion and not the perception of emotion (Davidson, 2004). Thus, alpha asymmetry responses, which are modulated by prefrontal cortical activity, are considered an index of the experience of vicarious emotion ‘matching’ and not merely the perception of such matching.

Gutsell and Inzlicht (2012) capitalized on this principle of alpha asymmetry by testing whether observing others express sadness in videos depicting racial outgroup members, relative to racial ingroup members, would attenuate prefrontal cortical activity associated with simulating the emotional experience of another person. As in Gutsell and Inzlicht (2010), responses to racial ingroup and outgroup members expressing sadness were compared to self-generated expression of the behavior; more specifically, during scalp-recorded EEG assessment participants were asked to think about a personally sad experience they could vividly remember. The researchers hypothesized that there would be significant differences in self-generated and outgroup member-generated right alpha asymmetry responses to sadness, and found this pattern of results (and did not find differences between self-generated and ingroup-generated differences in right alpha asymmetry). Self-reported racial prejudice for Black Canadians (Henry & Sears, 2002) showed a positive (but nonsignificant) trend relation to the difference between self-generated and outgroup-generated right alpha activation. Moreover, self-reported empathy, as measured by the Empathy Quotient (Baron-Cohen & Wheelwright, 2004), showed a marginally significant negative association with the difference between self-generated and outgroup-generated right alpha activation. Consistent with the research suggesting that empathy is a facilitating factor in the reduction of outgroup discrimination, these results suggest that those higher in trait empathy may show a smaller gap between self-generated sadness and simulated

sadness of outgroup members. Although these moderating effects of racial prejudice and empathy were nonsignificant, Gutsell and Inzlicht (2012) suggested that the smaller sample size in the study ($N = 30$) might have contributed to a lack of sufficient statistical power to reject the null hypotheses.

Summary

The findings presented in these sections, in accord with Social Identity Theory and Simulation Theory, reveal that belonging to a social group is a starting point for empathic neglect of (and in some cases conflict with) outgroup members. This neglect is apparent in emotion recognition deficits (Elfenbein & Ambady, 2002). Furthermore, putatively automatic empathic processes (de Waal, 2008) that rely on modulation of the human mirror neuron system, and simulation of an affected person's mental state (Gallese, 1998), are often undermined in intergroup interactions (Gutsell & Inzlicht, 2012). Thwarting basic empathic processes evident in neural simulation could be the basis for more complex deficits in the subjective experience of empathy and engagement in helping behavior (i.e., the empathy gap; Zaki & Cikara, 2015), which putatively underlie intergroup aggression and conflict (Cikara, 2015).

The present research asks: how can we begin close the empathy gap between in- and outgroup members? As previously stated, Barrett-Lennard (1981) suggests that an "empathic attentional set" in which one "opens [them]self in a deeply responsive way to another person's feelings" (p. 92) is required for harmonious intergroup interactions. Social psychologists (Latané & Darley, 1970) and others (Goleman, 2015) have suggested that paying careful attention to others is indeed a necessary precondition for empathic processes that can lead to prosocial action. Perhaps because paying attention to an affected other appears self-evident in

the empathic process, however, cultivating the *quality* of attention paid to the other has been overlooked as a possible determinant of empathy and prosocial action.

Recent research by Berry, Cairo, et al. (2017) showed that both dispositional variation in, and training of mindful attention may offer a lens through which we can study specifically *how* one might pay attention to others to cultivate empathy and prosocial action. Specifically, mindfulness has been canonically characterized as a quality of *receptive* attention to what one is presently experiencing (Anālayo, 2003; Brown & Ryan, 2003), and importantly, nascent research shows that MT can increase prosocial emotion and action toward others (Condon et al., 2013; Rosenberg et al., 2015). Drawing upon the centuries-old practice and more recent science of mindfulness, I propose that the inherent receptivity of mindful attention helps to set the stage for prosociality across social and cultural lines.

Mindfulness and Intergroup Prosociality

As discussed in the previous sections, simulation theory suggests that individuals automatically simulate the physical, emotional, and/or social pain of another person. However, studies from social neuroscience support the postulate of SIT that suggests perceived separateness between oneself and others (and between “us” and “them”) fosters cognitive and emotional disregard for the outgroup (Haslam, 2006; Park & Judd, 1990; Tajfel, 1974; 1978, 1982). Empathic simulation is lower toward unfamiliar others (Beckes et al., 2012; Meyer et al., 2012) and in racial outgroup contexts (Aventati et al. 2010; Gutsell & Inzlicht, 2010; Gutsell & Inzlicht, 2012). What is more, empathic simulation is enhanced when one reports feeling closer to an individual in pain (Meyer et al., 2012), and is dampened when one endorses racially prejudiced attitudes (Aventati et al., 2010; Gutsell & Inzlicht, 2012). Thus, these deficits in empathic simulation (as well as in empathic concern and prosocial action) appear to be a

consequence of social identification (e.g., Cikara et al., 2011), which fundamentally divides “us” from “them”. Zaki & Cikara (2015) propose that because the psychological underpinnings of the empathy gap appear to be based on perceived in/outgroup separateness, identifying psychological factors that attenuate the perceived separateness between self and others may catalyze empathy in intergroup interactions.

The interpersonal benefits of mindfulness have been highlighted by the religious and philosophical traditions from which the concept is derived, which emphasize the importance of disengaging from the often automatic, self-centered concerns that help to preserve the perceived psychological distance that separates “us” from “them” and thereby inhibit interpersonal sensitivity and meaningful connection with others (e.g., Brown, Berry, & Quaglia, 2017; Leary & Terry, 2012; Trautwien, Schmidt, & Naranjo, 2014). Broadly consistent with this, a recent meta-analysis found a moderate effect size of MT on salutary interpersonal outcomes ($\bar{r} = 0.44$; Sedlmeier et al., 2012), though studies are still few. In the following sections I discuss how mindfulness can reduce unintentional biases that often occur outside of our conscious awareness and that may in turn reduce empathy and prosocial action toward outgroup members. These automatic biases are a consequence of social identification in particular, a process that has been shown in previous sections to reduce empathic simulation, empathy, and prosocial action. Thereafter, I discuss theoretical and empirical evidence for how mindfulness can mitigate the perceived separateness between oneself and others, which may cultivate (or at least reduce the social identification processes that dampen) empathic simulation. Finally, I discuss direct evidence of mindfulness on prosocial emotion and action in intergroup contexts.

Mindfulness Reduces Automaticity

The capacity to be mindful stands in stark contrast to much of our daily experience, in which we operate on automatic pilot without much awareness of what we are doing or experiencing (Bargh & Chartrand, 1999). We easily drift into mind wandering (Killingsworth & Gilbert, 2010) and when provoked or stressed, we often act and react automatically (Kang, Gruber, & Gray, 2013). In states of automaticity, awareness operates in service to automatic thoughts, feelings, desires, and behavior.

One example of the pervasiveness of automaticity and its deleterious effects on our social well-being comes from research on priming. Primes are previously presented stimuli that activate concepts and influence the thoughts, emotions, and behaviors that follow (see Bargh & Chartrand, 2000 for review). Primes are most impactful when one mistakenly attributes the downstream consequences of primes to self-generated, volitional thoughts, feelings, judgments, or behavior (Loersch & Payne, 2011). In a classic demonstration of this, Schwarz and Clore (1983) phoned participants on either rainy or sunny days to query about their global happiness and life satisfaction. On average, life satisfaction and happiness were lower on rainy days, but when participants were asked “by the way, how’s the weather there?” the weather’s effect on the ratings was less potent.

Mindfulness is thought to allow a clear, moment-to-moment glimpse into what one is thinking, feeling, or doing, in which events are “seen” without dominance by conceptual thought (Olendski, 2005). This mindful stance allows one to notice mental processes as they arise, or to notice the psychological effects of those processes on one’s experience and behavior, and then slow, interrupt, change, or override these automatic cognitions, emotions, and behaviors. Levesque and Brown (2007) demonstrated that for those lower in basic dispositional

mindfulness, implicit (generally nonconscious) autonomy orientation was significantly positively associated with day-to-day autonomous motivation; more mindful individuals, however, showed higher day-to-day autonomous motivation regardless of implicit autonomy orientation. These results indicate that among those lower in implicit autonomous orientation, mindfulness tempered the unconscious tendency to associate the self with low volition or choicefulness. These findings are consistent with mindfulness theory concerning automaticity in showing that a predisposition toward this state of mind was associated with less automatized, more choiceful behavior on a day-to-day basis.

Implicit attitudes are based on automatic associations between two or more constructs in memory (Greenwald & Banaji, 1995), and a considerable amount of research in this area has been conducted on social attitudes and behavior. Coming into contact with a representative of a social group for which a stereotype schema is present automatically activates attitudes about them (e.g., Devine, 1989), and these attitudes have a number of often unintended consequences detrimental to intergroup interactions, ranging from discriminatory hiring decisions (Rudman & Glick, 2001), to more frequent shooting of ambiguously threatening outgroup members (Correll, Park, Judd, & Wittenbrink, 2002). Implicit bias, which often influences behavior outside of one's awareness, also impacts prosocial actions in interracial interactions. Stepanikova, Triplett, and Simpson (2011) tested this hypothesis by measuring racial attitudes on the race-based Implicit Association Task (IAT; Greenwald, McGhee, & Schwartz, 1998) prior to an opportunity to engage in generosity toward a racial outgroup member. More specifically participants were randomized to believe that they were playing the dictator game (Eckel & Hoffman, 1996) with either a self-identifying White or Black individual. The results indicated that among White

participants, greater implicit racial bias against Black individuals was correlated with lower generosity (i.e., monetary donation) to ostensible Black individuals.

Growing research interest in the contemplative science community on attenuating implicit bias has sparked systematic study of the effects of mindfulness and related meditative practices on implicit attitudes. Kang, Gray, and Dovidio (2014) demonstrated that non-Black adults receiving 6-week loving-kindness meditation (LKM) training that incorporated mindfulness meditation as a basis for cultivating sensitivity toward others (Salzberg, 2011), relative to those in a loving-kindness discussion group, showed reduced implicit bias against Black and homeless individuals, as measured by the IAT. Stell and Farsides (2016) found that among White participants even brief (10-min) LKM afforded lower automatic activation of, and greater conscious control over implicit racial biases against Black individuals on the IAT. The latter researchers found that positive emotions toward the outgroup mediated the effect of LKM on implicit racial bias reduction.

The meditation training in these studies was multimodal in form, including directing participants in how to be more sensitive toward others, but there is evidence that a mindful state itself reduces implicit bias. Lueke and Gibson (2015) asked whether deploying mindful attention could reduce implicit race and age biases. Participants were randomized to receive a very brief (10-min) mindfulness training or a matched control training prior to completing the race and age IAT. Results showed that MT decreased implicit race and age bias, presumably because mindfulness weakened automatically activated associations on the IAT. These studies of implicit bias suggest an altered form of intergroup interaction that begins with open or receptive presence to the other.

Mindfulness reduces social identification. Theory and research also indicate that mindful attention can reduce social identification (Berry, Cairo, et al., 2017; Berry, Brown, et al., 2017), an automatic process that categorizes individuals, separates “us” from “them” (Tajfel, 1982), and activates stereotypes about social outgroups (Devine, 1989). As Brown and colleagues discuss (Brown, et al., 2017; Brown et al., 2008), social identity is a dynamic construct that involves identification with particular attributes, roles, group memberships, and worldviews that are consistent with appraisals that one has made over time (Brown et al., 2008; Gilbert, 2005). The lay view of identity entails that one maintains a coherent and consistent view of the self that is separate from others (Metzinger, 2003). Interpersonal and intergroup interactions can be viewed as interactions between self-representations of those individuals that are mediated by, or filtered through each person’s internalized views of self and other (Brown et al., 2008; Leary, 2002). When mindful attention is brought to self-representations and other thoughts as they arise, change, and fade away, the ephemeral nature of such processes can be “seen”, affording a dis-identification with them (Berry & Brown, in press; Brown, et al., 2016; Brown et al., 2008). Thus, when mindful, one may be “freer” from the automatic actions and reactions that drive prejudiced thinking (Bargh & Chartrand, 1999; Devine, 1989), that is underlain by perceived separateness between “us” and “them” and reliably reduces empathy and prosocial action (Cikara et al., 2011; Stepanikova et al., 2011).

As stated earlier, mindfulness has been theorized to help close the psychological distance between self and others (e.g., Trautwein et al., 2014). If mindfulness fosters dis-identification from self-representations, then it may also enhance the perceived similarity between self and others more readily than states of mind marked by inattentiveness to automatically activated ingroup/outgroup attitudes that commonly arise in intergroup interactions. Thus, if empathy,

particularly empathic simulation, and prosocial action are promoted by perceived similarity, mindfulness could be expected to foster empathic simulation and prosocial action in intergroup contexts. In the next section I turn to nascent evidence supporting this claim.

Mindfulness Increases Empathy and Prosocial Action

Prosocial emotions and actions crucially begin with careful attention to the person in need (Latané & Darley, 1970). Although implicit in theories of prosociality, quality of attention is a largely overlooked determinant of prosocial emotion and action. But in prosocial contexts attention is a nuanced phenomenon, requiring attention to the present situation so as to notice the person's predicament, and also "tuning in" to one's own internal somatic and affective responses to that situation. The latter quality of attention (so-called interoceptive awareness) is thought to be the basis for understanding another's predicament and their emotional and mental states (Singer, Critchley, & Preuschoff, 2009). Thus, carefully attending to one's own internal responses as they arise could provide a starting point for empathic simulation.

A recent cognitive neuroscience approach to empathy and prosocial action suggests that developing interventions to cultivate empathy be geared to engaging attention so as to "tap into" pre-existing dispositions or "sources" of empathy (i.e., the ReSource model; Bolz & Singer, 2013). Specifically, these authors suggest that empathizing with others is based on (a) attending receptively to the affected person, (b) taking their perspective, and (c) attending to one's own emotional and mental states that arise and that are based on one's previous experiences in similar circumstances. Bolz & Singer (2013) further posit that practicing mindfulness may offer an optimal psychological approach to cultivate all three of these capacities, because mindful attention is inherently receptive to both external and internal stimuli. When attention to such stimuli offer the opportunity to simulate the affected other's mental state, the receptive nature of

mindful attention may allow for clearer understanding of the other without presupposition of their experience based on stereotypical thought.

Nascent theory and research supports the contention of the ReSource model that states of mindfulness optimize capacities necessary for the cultivation of empathy that leads to prosocial action. First, mindfulness has been characterized as unconditional (Chödrön, 2002) and equanimous (Desbordes et al., 2015) attention to what one is presently experiencing. Thus, a state of mindfulness could be an exemplar of the attentional receptivity that is needed to cultivate empathic simulation. Second, dispositional mindfulness has been associated with higher trait perspective taking (Beitel, Ferrer, & Cecero, 2005), and MT has been shown to increase trait perspective taking (Birnie, Speca, & Carlson, 2010). Third, MT has been shown to enhance interoceptive awareness (Bornemann, Herbert, Mehling, & Singer, 2015). Most importantly, and perhaps as a consequence of cultivating these three factors described in the ReSource model, MT promotes empathy (Berry, Cairo, et al., 2017); Rosenberg et al., 2015) and prosocial action toward strangers (Berry, Cairo, et al., 2017); Cameron & Fredrickson, 2015; Condon et al., 2013; Lim, Condon, & DeSteno, 2015) – these being individuals who are often shown fewer kindnesses than shown toward “known” others. In light of these findings suggesting that MT promotes interoceptive awareness and that MT attenuates social identification processes that reduce empathy and prosocial action toward outgroup members, I propose that these prosocial benefits should extend into intergroup interactions.

Preliminary evidence for this proposition has been gleaned from three experiments by Berry, Brown, et al. (2017), in which participants were randomized to listen to a very brief (10-minute) audio-recorded MT or a structurally-equivalent attention control training, or to receive no instruction, and then witnessed a person with a dissimilar personality (Study 1) or race

(Studies 2-3) being ostracized (excluded) in an online ball-tossing game (Cyberball; Williams, Yeager, Cheung, & Choi, 2012). Relative to those in the control conditions, MT participants reported higher empathic concern for the victim (and lower empathic anger toward the perpetrators). MT participants also wrote more comforting emails to the victim and included them more often during a later ‘all play’ Cyberball game. Empathic concern mediated the effect of MT on helping behavior outcomes, suggesting that a state of mindful attention fostered more empathy and subsequently, more helping behavior.

The Present Research

To reiterate, in interracial interactions there is a reliable empathy gap between racial in- and outgroup members (Cikara et al., 2011; Cikara & Van Bavel, 2014; Zaki & Cikara, 2015). This empathy gap can be seen in lower empathic simulation, attenuated neural responses to sadness stimuli (Gutsell & Inzlicht, 2012), and in less frequent prosocial action (e.g., Saucier et al., 2005). Contemplative scholars have long emphasized the role of MT in prosociality (Davidson & Harrington, 2002) and such training may confer prosocial emotions and actions by reducing psychological boundaries between self and others (Brown et al., 2008; Brown et al., 2016; Leary & Terry, 2012; Trautwein et al., 2014). Mindfulness appears to reduce implicit racial biases (Lueke & Gibson, 2014) that can inhibit prosocial action (Stepanikova et al., 2011). Mindfulness also appears to reduce self-oriented social identification (e.g., Brown et al., 2016) that attenuates outgroup emotion recognition (Elfenbien & Ambady, 2002), empathy (e.g., Cikara et al., 2011), empathic simulation (Gutsell & Inzlicht, 2010; 2012), and prosocial action (Saucier et al., 2005). In addition, brief MT has been shown to promote empathy and prosocial behavior (Berry, Cairo, et al., 2017); Cameron & Fredrickson, 2015; Condon et al., 2013; Lim, Condon & DeSteno, 2015; Rosenberg et al., 2015). Finally, initial evidence suggests that

mindfulness promotes empathy and prosocial behavior in interracial contexts (Berry, Cairo, et al., 2017). This research provides a rationale for the present study aims examining the effect of MT, relative to ST, on empathy and prosocial action in interracial interactions.

In the present randomized controlled trial, I attempted to extend this prior research showing that mindfulness can increase empathy and prosocial action toward others by asking whether adult White participants randomized to a 4-day MT or to a structurally equivalent ST would show increased intergroup empathic simulation and empathic concern, and a greater frequency of prosocial action toward Black individuals. Training-related change in empathic simulation was assessed with right frontal alpha asymmetry scores in pre- and post-training lab sessions in response to video stimuli depicting ingroup (White) and outgroup (Black) members expressing sadness, and in comparison to self-generated sadness (cf., Gutsell & Inzlicht, 2012). In addition, a commonly used self-report measure of state empathy (Batson et al. 1987) assessed pre-post training changes in empathic concern for the individuals in the video; measures of personal distress and empathic sadness (Batson et al. 1987; Batson et al., 1991) – two emotions that are less reliably associated with prosocial action (Davis, 2015) – were also included in pre-post sessions to test the specificity of the mindfulness – empathic concern relation. Regarding prosocial action, two previously used scenarios that are designed to elicit such action (Condon et al., Latané & Dabbs, 1975) served as lab-based *in vivo* indicators of helping behavior frequency toward Black individuals. These scenarios were counterbalanced in pre-post training sessions.

I also used pre-post training EMA-based measures of *in vivo* prosocial action to address “real world” social benefits of MT. Specifically, prosocial actions were assessed using an end-of-day checklist of prosocial action toward strangers and acquaintances (Rameson, Morelli, & Lieberman, 2012). To extend this research I also queried about the sociodemographic

characteristics of the individuals that were helped (i.e., race, gender, and perceived income), and to conceal study aims these prosocial actions were embedded among other common positive and antagonistic behaviors that a person may engage in with strangers and acquaintances. This study focused on White female graduate students (and some female community adults); graduate students were a targeted convenience sample that has shown high retention rates (> 90%) in a similar study of brief mindfulness training (Quaglia, 2016). Female graduate students were chosen to control for possible self-presentation differences between males and females in empathy contexts (Jones & Pittman, 1982).

Primary Aims

Figure 1 displays the two proposed primary study aims to be tested.

Primary aim 1. The first primary aim addressed whether MT, relative to ST, provided to self-identifying White or Caucasian female adults increases empathic simulation with and empathic concern for Black individuals expressing sadness. I tested the following specific questions:

- *Question 1.1.* Does MT, relative to ST, produce greater pre-post increases to empathic simulation toward Black individuals in need as measured by right frontal alpha asymmetry scores in response to sadness video stimuli?
- *Question 1.2.* Does MT, relative to ST, produce greater pre-post increases in empathic concern (but not personal distress or empathic sadness) toward Black individuals in need as measured by reported empathic concern in response to sadness video stimuli?

Primary aim 2. The second primary aim asked whether MT, relative to ST, increases interracial prosocial action. I tested the following specific questions:

- *Question 2.1.* Does MT, relative to ST, produce greater pre-post increases in laboratory scenario-based helping frequency toward Black individuals?
- *Question 2.2.* Does MT, relative to ST, produce greater pre-post increases in end-of-day EMA-based helping behavior frequency toward Black individuals (and other racial outgroup members)?

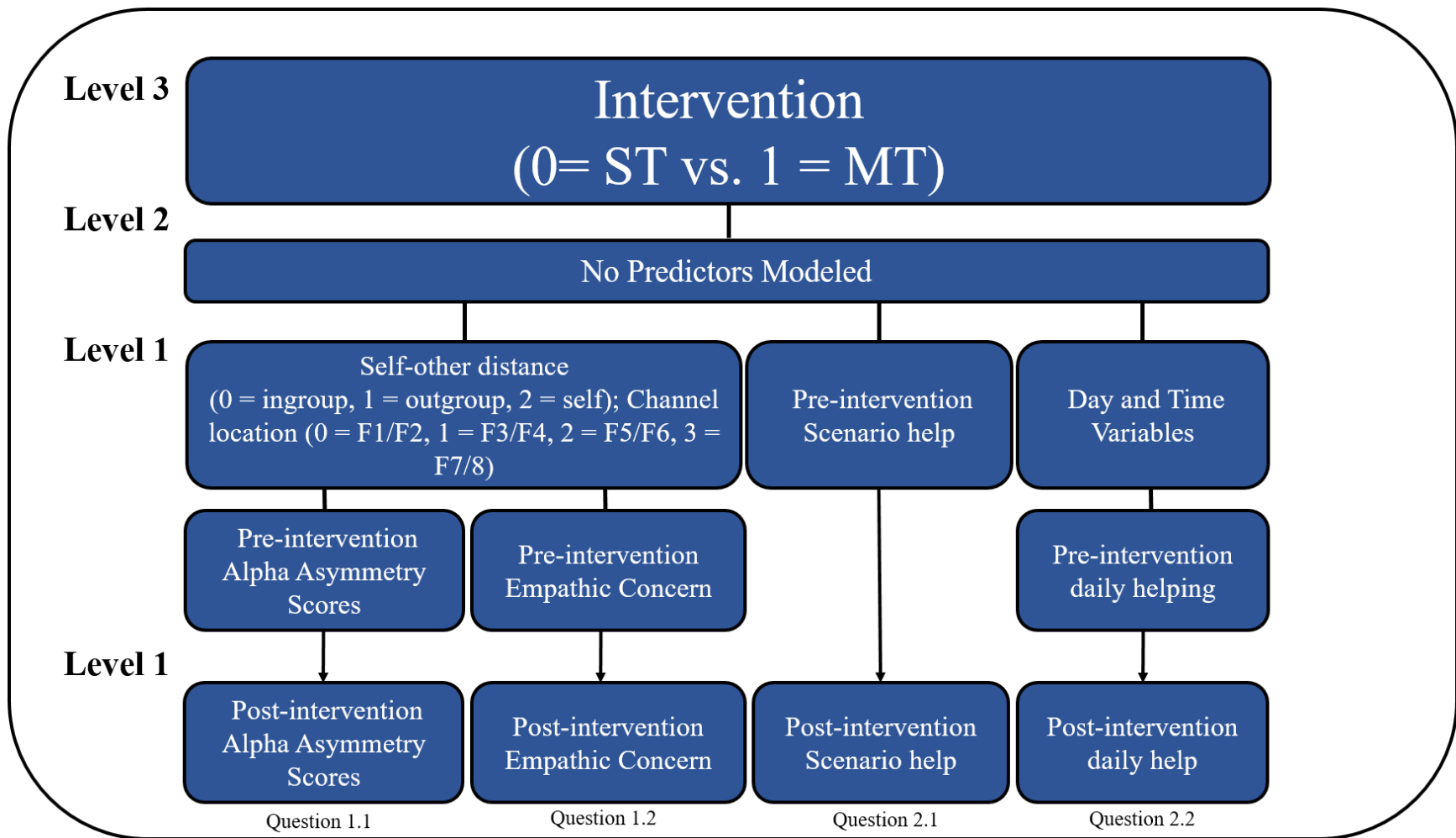


Figure 1. Study primary aims 1 and 2.

Notes. Level 3 = between training condition; Level 2 = between persons; Level 1 = repeated measures (within persons)

Secondary Aims

Secondarily, the present study attempted to better understand the role of dispositional mindfulness, the tendency to deploy mindful attention in daily life (Brown & Ryan, 2003), in predicting empathy and prosocial action in interracial interactions. One commonly used individual difference measure of dispositional mindfulness (Brown & Ryan, 2003) was used to examine the predictive role of trait mindfulness on the *pre-intervention* study outcomes detailed in the primary aims. To examine the incremental predictive validity of trait mindfulness, racial prejudice against Black individuals (Henry & Sears, 2002), social dominance orientation (Pratto, Sidanius, Stallworth, & Malle, 1994), trait empathy (Davis, 1983) and trait agreeableness (Costa & McCrae, 1992) were controlled. The secondary aims are detailed as follows (see Figure 2).

Secondary aim 1. The first secondary aim of the present study asked whether dispositional mindfulness predicts greater self-reported empathic concern and right frontal alpha activity to outgroup sadness stimuli measured at baseline. I examined the following specific questions:

- *Secondary Question 1.1.* Does self-reported dispositional mindfulness predict greater empathic simulation (as assessed by right frontal alpha activity) to outgroup sadness video stimuli assessed at pretest?
- *Secondary Question 1.2.* Are these Question 1.1 relations maintained when controlling for self-reported trait empathy, agreeableness, and racial prejudice toward Black individuals?
- *Secondary Question 1.3.* Does dispositional mindfulness predict greater self-reported empathic concern (but not empathic sadness and empathic distress) to outgroup sadness video stimuli assessed at pretest?

- *Secondary Question 1.4.* Are these Question 1.3 relations maintained when controlling for self-reported trait empathy, agreeableness, and racial prejudice toward Black individuals?

Secondary question 2. The second secondary question aimed to extend the findings of Berry, Cairo, et al. (2017; Study 1), to address whether dispositional mindfulness at pre-test predicted increased frequency of interracial helping behavior. I examined the following questions:

- *Secondary Question 2.1.* Does dispositional mindfulness predict greater frequency of helping Black individuals in scenario-based helping behavior?
- *Secondary Question 2.2.* Are these Question 2.1 relations maintained after controlling for trait empathy, agreeableness, and racial prejudice toward Black individuals?
- *Secondary Question 2.3.* Does dispositional mindfulness predict greater frequency of helping Black individuals (and other racial outgroup members) in end-of-day helping behavior?
- *Secondary Question 2.4.* Are these Question 2.3 relations maintained after controlling for trait empathy, agreeableness, and racial prejudice toward Black individuals?

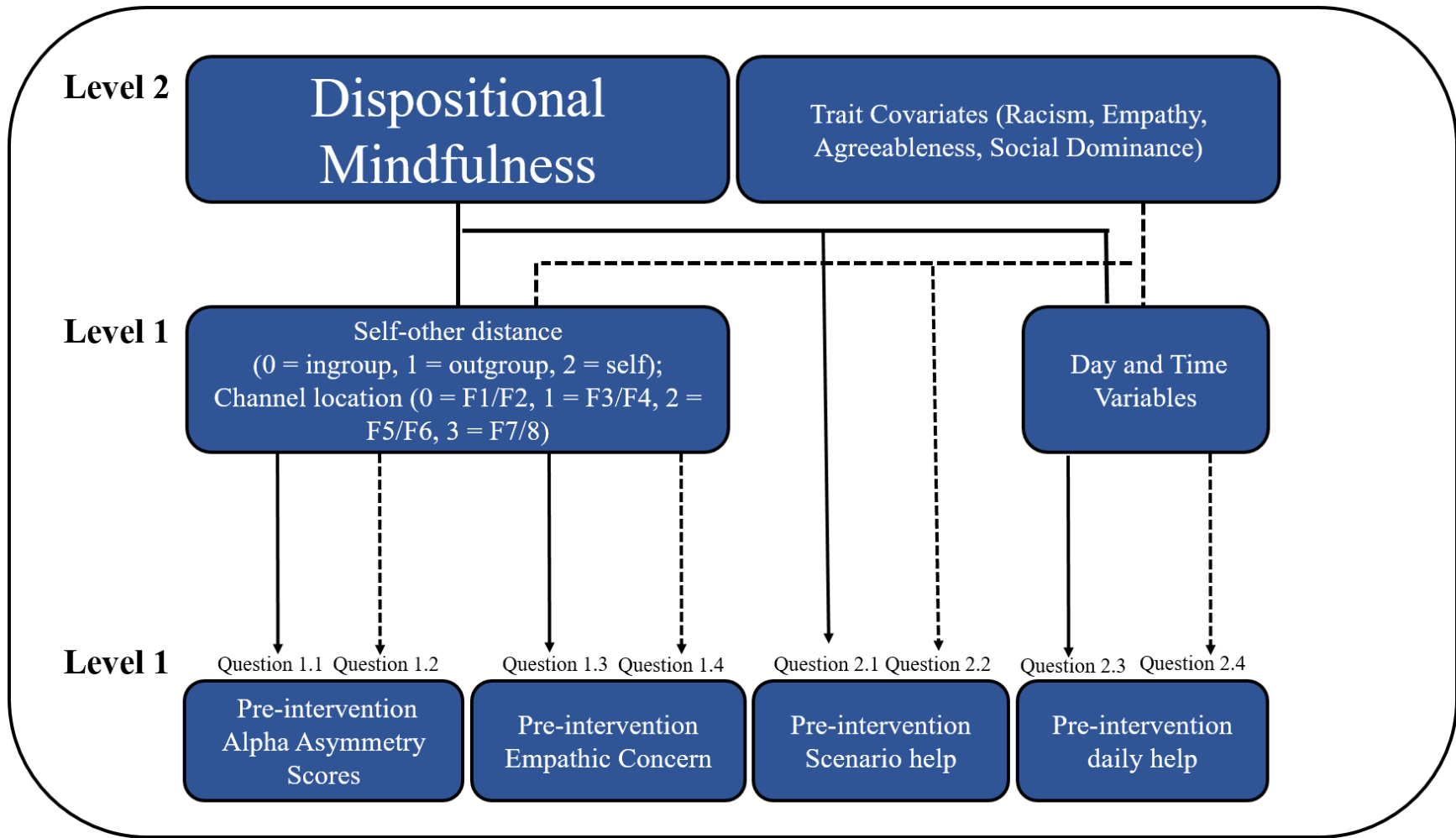


Figure 2. Study secondary aims 1 and 2.

Notes. Level 2 = between persons; Level 1 = repeated measures (within persons).

Method

Sample size determination

Previous studies of the effects of brief MT on empathy and helping behavior in intergroup contexts show medium effect sizes ($d = 0.53 - 0.62$; Berry, Cairo, et al., 2017). Power analysis for multilevel model statistical approaches was conducted using Optimal Design Software (Spybrook, Raudenbush, Liu, Congdon, & Martínez, 2006). Assuming a medium effect size of $d = 0.50$, $\alpha = 0.05$, and $1 - \beta = 0.80$, a sample of $N = 80$ (training $n_s = 40$) was shown to be required for sufficient power to reject null hypotheses if training condition differences do exist. In a recent study by Quaglia (2016), high retention rates were shown using a similar 4-day MT (97%) and a structurally-equivalent control (96%) and in the same target population. Assuming a conservative 90% retention rate, I attempted to over-recruit an additional 4 participants per condition ($N = 88$).

Participants

Seventy-nine self-identifying White, Caucasian, or European American women from the Richmond community, and graduate students and from Virginia Commonwealth University (VCU) completed all study measures. Graduate students ($n = 75$) were recruited via emails sent through VCU-hosted graduate student and staff listservs (see Appendix A). Community members were recruited through word-of-mouth ($n = 4$). Study advertisements described an opportunity to participate in a study on mindfulness meditation in exchange for a free course in mindfulness meditation and \$110 compensation. Participants were excluded via email-based screening (see Appendix B) prior to provision of informed consent on the following bases: history of (a) neurological or (b) psychiatric illness, (c) lack of access to a personal computer at home, (d) previous experience with mindfulness meditation, (e) under the age of 18 or over the

age of 60, and/or (f) self-identifying as any race other than White, Caucasian, or European American (g) self-identifying as any gender other than woman. These last two exclusion criterion were not advertised in recruitment emails so as to conceal the aims of the study that are associated with race. Older adults (i.e., older than 60 years of age) were excluded from the present study on the basis that stranger and acquaintance interactions steadily decline throughout adulthood (Carstensen, 1992), and decline steeply after the age of 60 (Lansford, Sherman, & Antonucci, 1998) when many adults begin to retire from work.

Procedure

After checking exclusion criteria via email screening, each participant reported individually to a laboratory in the VCU Department of Psychology. An experimenter greeted participants upon arrival and led them into a waiting room where two confederates were seated in two of three chairs. The experimenter asked the participant to be seated while he or she prepared the experiment rooms. After the experimenter left the waiting room to ostensibly prepare for the study, each participant was randomized to receive one of the two following scenarios: (1) a Black experimenter returns and ostensibly accidentally dropped a large stack of informed consent documents on the floor (modified from Latané & Dabbs, 1975), or (2) another ostensible Black participant walked into the waiting room on crutches and leaned uncomfortably against the wall (cf., Condon et al., 2013). In these scenarios, prosocial action was assessed as helping the experimenter pick up the dropped papers and offering one's seat to the individual on crutches, respectively. Importantly, the two confederates in chairs served as bystanders who did not react to the predicament of the individuals in need of help. This number of bystanders, and their aloof reaction are two factors shown to reduce prosocial action toward anyone (Darley & Latane, 1968) and racial outgroup members in particular (Saucier et al., 2005). Two scenarios

were chosen as a means to conceal study hypotheses so that participants were not confronted with the same scenario at pre- and posttest sessions; they were counterbalanced within-participants pre-post training. Appendix C shows pilot study results (Berry, Brown, et al., 2017) on the prediction of helping frequency in these two scenarios by dispositional mindfulness.

After scenario-based interracial prosocial action assessment, participants were escorted into the EEG testing room. Participants were informed that the study was examining the effects of meditation on everyday social interactions, given informed consent (see Appendix D), and completed an initial questionnaire (see *Expected Benefits of Intervention Questions*; Devilly & Borkovec, 2000). Then participants were fitted for a 64-channel EEG cap (Geodesics, GES 400). During EEG recording participants observed eight video stimuli of individuals expressing sadness (four White and four Black individuals; see Appendix E for stimulus validation procedures). The videos were each 20 seconds in duration and depicted one young Black or White female adult expressing sadness while sitting in a chair behind a regular height table and in front of a blank white background. After watching each video participants completed state measures of empathic concern, empathic distress (Batson et al., 1987), and empathic sadness (Batson & Shaw, 1991) (see *State Empathy Measures*). The videos were presented in random order without replacement (within-subjects; see Figure 3). Following sadness video observation, participants were instructed to express sadness themselves. Participants were instructed to think of a sad event in their life that they could remember vividly, and were then instructed to emote (but not visibly so as to control for muscle artifacts) on two successive occasions for 40 seconds while recollecting the event; there was a one-minute break in between emoting occasions (cf., Gutsell & Inzlicht, 2012). The two sadness video conditions (same-race and other-race) and the self-generated sadness condition comprised one, within-subjects factor (self-other distance; 0 =

ingroup, 1 = outgroup, 2 = self) across which alpha asymmetry scores were compared. At the end of each self-generated sadness condition participants completed a self-report measure of their emotional state while emoting (see *State Emotion Measures*).

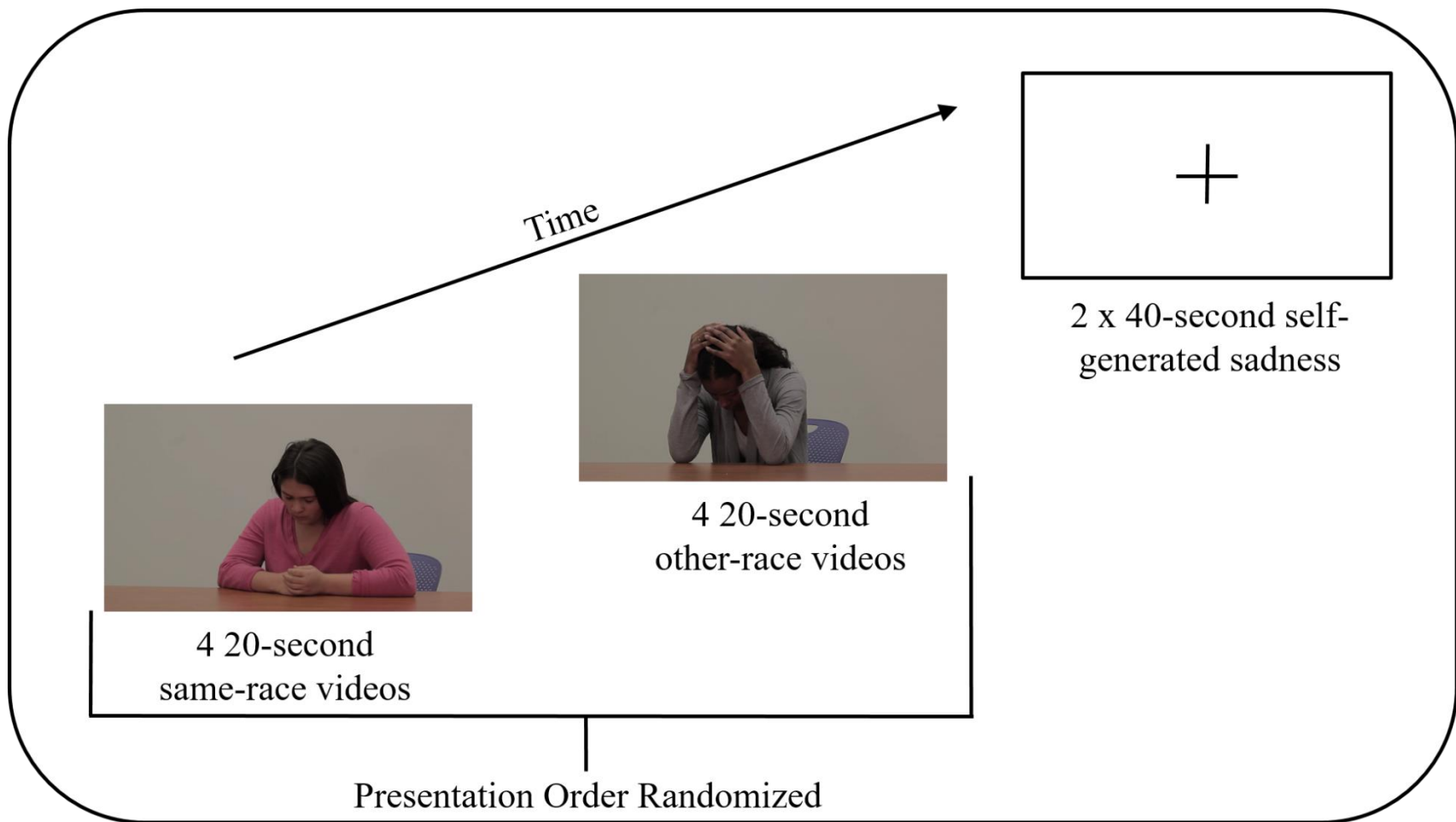


Figure 3. Stimulus presentation order during EEG-recording.

After removing the EEG cap, participants were trained on how to complete end-of-day EMA-based measures (see *End-of-day Measures*), and given opportunity to ask questions about the study. Participants were instructed to record spontaneous social interactions that occurred with strangers and acquaintances, and were told to refrain from recording social interactions at work that were required to perform their job. Following EMA training, participants were randomly assigned to either MT or ST. The experimenters were blind to condition assignments. Participants were then thanked and dismissed.

Figure 4 shows the study procedure timeline. Following an initial 14-day, end-of-day EMA-based recording of helping behavior, participants reported to either MT or ST training sessions on three consecutive days (see *Interventions*). At the end of each training session participants filled out a brief questionnaire querying the belief that they were meditating. After three days of MT or ST were completed the participants reported back to the lab where scenario-based prosocial action was assessed. Then the fourth MT or ST session was completed in the lab prior to EEG assessment and end-of-day EMA-based refresher training. After a second, 14-day EMA-based helping assessment identical to the first one, participants reported back to the lab for compensation disbursement and debriefing. Participants were then thanked and dismissed.

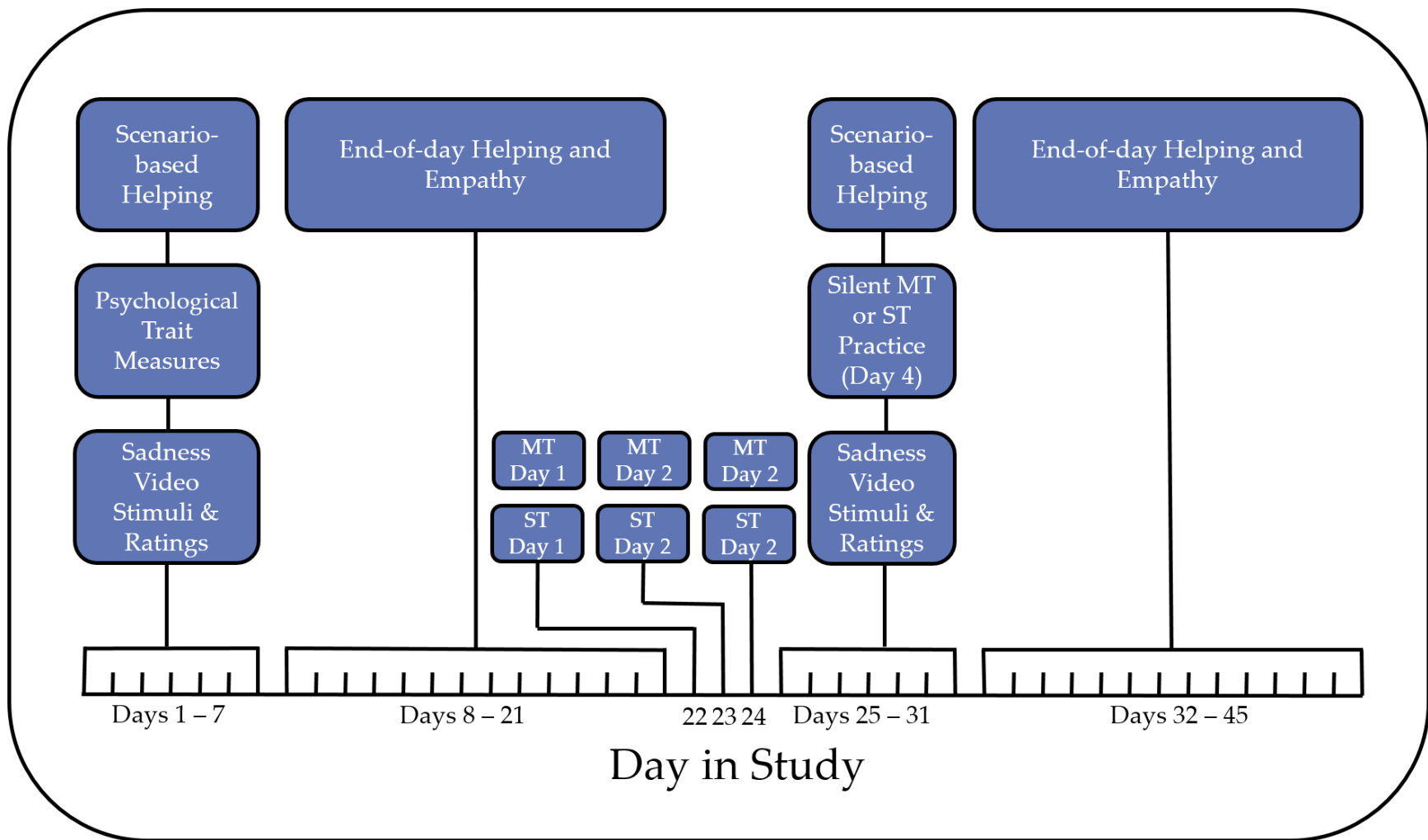


Figure 4. Procedure of study activities by day in the study.

Psychological Trait Measures

Mindfulness. The 15-item Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003; Appendix F) tapped the frequency of mindful states in daily life on a 6-point Likert scale ('almost always' to 'almost never'). Higher scores indicate higher mindful attention deployment.

Empathy. The Interpersonal Reactivity Index (IRI; Davis, 1983; Appendix G) assessed trait empathy on a 5-point Likert scale ('does not describe me well' to 'describes me very well'). The 7-item *fantasy* subscale assessed the tendency to adopt the point of view of fictional characters. The 7-item *empathic concern* subscale assessed felt sympathy or compassion for suffering others. The 7-item *personal distress* subscale assessed emotional discomfort in the presence of others' distress or suffering. The seven-item *perspective taking* subscale assessed the tendency to adopt others' points of view.

Agreeableness. The 12-item *agreeableness* personality dimension subscale of the NEO-FFI (Costa & McCrae, 1992; Appendix H) assessed agreeableness on a 5-point Likert scale ('strongly disagree' to 'strongly agree'). Higher scores on the scale indicate greater agreeableness.

Racial prejudice against Black individuals. The 8-item Modern Racism Scale (Henry & Sears, 2002; Appendix I) assessed racial prejudice on a 4-point Likert scale (one item is on a 3-point Likert scale). Because most individuals endorse egalitarian attitudes, and will not explicitly endorse racially prejudiced attitudes, the measure combines prejudiced statements with those that convey perceived social and political justice. Higher scores on this measure indicate higher racial prejudice against Black individuals.

Social dominance orientation. The 16-item Social Dominance Orientation Scale (SDO; Pratto et al., 1994; Appendix J) assessed the extent to which one feels positively or negatively

about statements that endorse inequality among social groups on a 7-point scale (‘very negative’ to ‘very positive’; example item: “*Some groups of people are simply inferior to other groups.*”) Higher scores indicate greater preference for inequality among social groups.

State Empathy Measures

Using a 7-point Likert scale (‘not at all’ to ‘extremely’), six adjectives tapped empathic concern: *sympathetic, moved, compassionate, tender, warm, and softhearted*. Seven adjectives tapped personal distress: *alarmed, upset, worried, disturbed, perturbed, distressed, and troubled* (Batson et al., 1987). Seven adjectives assessed empathic sadness: *sad, dejected, sorrowful, low-spirited, downhearted, heavyhearted, and feeling low* (Fultz, Schaller, & Cialdini, 1988). These measures are shown in Appendix K.

State Emotion Measures

Twenty-four adjectives from five subscales, *sadness, fatigue, serenity, fear, and guilt*, of the Positive Affect and Negative Affect Schedule – Expanded form (PANAS-X; Watson & Clark, 1994; see Appendix L) were administered immediately after recollection of a sad autobiographical event (self-emoting) during EEG recording. Responses were made on a 5-point Likert scale about the extent to which the person in the video expressed the following emotion or psychological state (‘very slightly or not at all’ to ‘extremely’). When responding to these items participants were asked to express how they felt *during* self-emoting.

Expected Benefits of Intervention Questions

Appendix M shows the 6-item Credibility/Expectancy Questionnaire (CEQ; Devilly & Borkovec, 2000) that was administered immediately following training condition assignment to control for differences in the expected benefits of the interventions. Items include “*At this point, how logical does the course offered to you seem?*” (9-point Likert scale; ‘not at all logical’ to

‘very logical’), and “*At the end of this course, how much improvement in your personal well-being do you think will occur?*” (11-point Likert scale; ‘0%’, ‘10%’, ‘20%’... ‘100%’).

Electrocortical Recording and Pre-processing

Continuous EEG was recorded using 64 sintered Ag/AgCL electrodes mounted in an electrode net (Geodesics, GES 400). Electrodes were based on the international 10-10 system with a CPz ground, and referenced to Cz. Signals were amplified, filtered with a 60 Hz notch filter, and digitized at 1000 Hz. Signals were manually scored for artifacts, with regression-based eye movement correction applied (Semlitsch, Anderer, Schuster, & Presslich, 1986); 2.048 second epochs were extracted through a Hamming window, and then a fast Fourier transform extracted power within the alpha band (8—13 Hz).

Alpha asymmetry indices were created for homologous electrode sites (natural log right minus natural log left scores). Because alpha power is inversely related to cortical activity, higher scores will indicate greater left than right alpha activity (Davidson, 2000). Homologous sites included medial frontal (F1/2, F3/4) and lateral frontal (F5/6, F7/8) electrode sites.

End-of-day EMA-based Measures

Stranger and acquaintance interaction checklist. For 14 consecutive days, pre- and post-training, participants were emailed at 5pm with a link to a survey (REDCap; Harris et al., 2009), where they were instructed to complete the survey immediately prior to going to bed in the evening. Daily helping was measured with a 12-item yes/no checklist that included the following helping behaviors (Morelli, Rameson, & Lieberman, 2014): *gave directions; helped someone with technology; delayed elevator; held open a door; made change; picked up a fallen object for someone; lent or gave money; let someone go ahead of you in line; helped a disabled*

or elderly person; lent an item of value (tool, clothes, car, etc.); helped someone with schoolwork; and asked someone if they needed help.

Fifteen undergraduate research assistants pilot tested this checklist, and to conceal the specific aims of this study, which focused on helping behavior, research assistants were asked to report on pleasant (non-helping) interactions and antagonistic interactions with strangers and acquaintances in day-to-day life for fourteen days. These responses were open-ended, allowing participants to comment on all stranger and acquaintance interactions they had on a particular day. Common positive (non-helping) interactions included: *introduced yourself; verbally greeted someone; non-verbally greeted someone (e.g., waved, smiled, made eye-contact); and made conversation.* Common antagonistic behaviors included: *ignored or avoided someone; made an aggressive gesture at someone; and disagreed with someone; felt good about someone's misfortune; cut a conversation short.* These additional 9 items were randomized with the 12 original helping checklist items (see Appendix N) in the present research.

Situational and subjective end-of-day measures. For each interaction behavior that the person checked, the following situational questions were asked: (1) *“please indicate the number of times you engaged in this specific activity today”* (with the option to report up to 7 times), (2) *“where were you when the interaction took place?”* (forced choice; Work, School, Home, Traveling, Shopping, Church, Gym, On the Street / Sidewalk; Restaurant, Park, Other), (3) *“what time of day did the interaction take place”* (forced choice; Morning, Afternoon, Evening), (4) *“please indicate who you interacted with.”* (forced choice; Stranger, Acquaintance), (5) *“what was the race of the primary person with whom you interacted”* (forced choice; White, Black, East Asian, etc.). Participants also indicated (6) *“what was the sex of the primary person with whom you interacted”* (forced choice; male, female), and if multiple interactions involving

the same behavior were indicated, these questions (excluding question 1) were answered about each corresponding behavior that occurred that day.

Interventions

Two conditions underwent 3 consecutive days of training for 20 minutes each day. A fourth day training, also 20 minutes in duration, was held at the beginning of the final lab session (cf., Zeidan et al., 2010, 2011). Groups included 5 – 10 participants, each of which met in the same room at the same time of day.

Mindfulness training (MT). MT was modeled on basic Vipassana (focused breathing) meditation training (Zeidan et al., 2011; Zeidan, Johnson, Diamond, et al., 2010; Zeidan, Johnson, Gordon, et al., 2010). Training was conducted by a person experienced in mindfulness meditation training and naïve to the study hypotheses. Participants were told that the meditation practices used in this intervention were secular in nature, associated with no religious teachings. Unlike other secular MT interventions, such as the popular 8-week Mindfulness-based Stress Reduction program (MBSR; Kabat-Zinn, 1982), participants were instructed to refrain from practicing mindfulness meditation outside of the regular 4-day meeting time to control for individual variations in the frequency of mindfulness practice during treatment.

In session 1, participants were instructed to close their eyes and relax and then to focus on the flow of their breath (Wallace, 2006). If a random thought was aroused they were instructed to notice and acknowledge the thought and to “simply let it go” by bringing attention back to the breath. In session 2, participants were instructed to focus on the full breath sensations in the nostrils, chest, and abdomen. The last 7 minutes of sessions 1 and 2 were held in silence as the participants practiced what was taught that day. Sessions 3 and 4 were extensions of Session 2, with the last 13 minutes devoted to silent practice in Session 3, and

nearly the full 20 minutes devoted to silent practice in Session 4 (facilitated by the first author). As a manipulation check participants responded to the yes/no question “*did it feel like you were meditating?*” at the conclusion of each session. Participant questions about meditation were fielded by the instructor before the conclusion of each session.

Sham mindfulness training (ST). The purpose of the ST was to provide a very closely matched control condition to examine whether non-mindfulness-based breathing exercises and a placebo effect (the belief that one is meditating) affect outcome variables (cf., Zeidan et al., 2010). A different facilitator, matched for sex, education level, and years of group leadership experience, conducted the training. Specifically, both facilitators were male, have earned master’s degrees (in social work and in teaching for MT and ST facilitators respectively), and had more than five years of group leadership (7 years teaching meditation and 6 years leading positive youth development groups for MT and ST facilitators respectively). Participants were introduced to ST in the same manner as to MT. As conducted by Zeidan et al. (2010), each session of ST was based on breathing exercises. Participants were told every 2—3 minutes to “take deep breaths as we sit in meditation.” Time spent giving instructions was matched to MT for each of the four sessions. This intervention differed notably from MT, as MT includes instruction in both focused attention and meta-awareness (letting go of random thoughts that occur during practice). As in MT, the fourth ST session was facilitated by the first author, who is male, had earned a master’s degree in experimental psychology, and had 7 years of teaching experience at the university level; this fourth session was identical to the fourth MT laboratory session. Given that nearly the full 20 minute fourth session was devoted to silent practice, the instructions were identical as participants were already familiar with the exercises in the interventions. In addition, delivering the same instructions allowed the first author to be blind to

the participant's intervention assignment. At the conclusion of each session participants responded to the same manipulation check question as in the MT sessions. The instructor fielded questions before the end of each session.

Data Analysis Plan

Prior to data analysis, univariate and multivariate normality was checked. Skewness and kurtosis was examined for all self-report and EEG-based measures. Skewness and kurtosis values that exceed +/- 1.50 were considered in violation of normality, and outlier scores were examined in frequency tables. Outliers higher than the 97th percentile and lower than the 3rd percentile were winsorized (Dixon & Tukey, 1968) – that is, replaced by the next highest or lowest value, respectively, to remedy skewed and/or leptokurtic or platykurtic distributions.

To account for the nested structure of the data, 3-level and 2-level multilevel linear mixed (MLM) models with restricted maximum likelihood estimation (REML; Bryk & Raudenbush, 1992) were constructed using SAS PROC MIXED (Singer, 1998) for models using continuous outcomes (i.e., alpha asymmetry scores and self-reported state empathy measures). Three-level models were used in tests of primary study aims that examined continuous outcomes comparisons between interventions (level 3), between subjects (level 2), and within subjects (repeated-measures; level 1). All 2-level models examined the effects of psychological traits between subjects (level 2) and within subjects (repeated-measures; level 1; e.g., self-other distance) on pre-intervention continuous outcomes. SAS PROC GLIMMIX was used to construct multilevel mixed models predicting dichotomous helping behavior in scenario-based helping. Because daily helping frequency is a count variable, which may contain a preponderance of zero counts, procedures used for fitting multilevel zero-inflated Poisson mixed models were performed first using SAS PROC GENMOD and then SAS PROC NLMIXED

(Veronica, Egede, & Gebregziabher, 2014). Veronica et al. (2014) argue that it is not possible to fit zero-inflated Poisson models in PROC GLIMMIX or PROC MIXED, and testing zero-inflated Poisson models in SAS PROC NLMIXED often fails to converge. One reliable solution to this problem is fitting so-called “baseline parameter estimates” for all main effects and interactions using SAS PROC GENMOD using a zero inflated Poisson distribution. Thereafter, these baseline parameter estimates are entered as starting values in SAS PROC NLMIXED to assist with model convergence, and allow modeling of random effects, which is not possible using PROC GENMOD (Veronica et al., 2014). The optimal variance-covariance structure of each model was identified by comparing the -2 log likelihood ($-2LL$; a goodness of fit index) across unconditional means models; unstructured, variance components, Toeplitz, and first-order autoregressive variance-covariance structures were compared. As shown in Figures 1 and 2, separate MLM models were tested to address research questions concerning the main effects of intervention, dispositional mindfulness, and self-other distance (i.e., actress race; same race vs. other race) in sadness video stimuli on the primary study outcomes (i.e., scenario-based helping frequency; end-of-day assessed helping frequency and empathy; and self-reported empathic concern and alpha asymmetry scores in response to sadness video stimuli). Intervention (0 = ST, 1 = MT), self-other distance (0 = ingroup, 1 = outgroup, 2 = self.), and EEG channel pair (0 = F1/F2, 1 = F3/F4, 2 = F5/F6, 3 = F7/F8) were identified as categorical variables in all MLM models.

Results

Preliminary Analyses and Manipulation Checks

Two participants’ post-intervention scores were removed from analyses, as post-experimental inquiry revealed suspicion about study procedures. The remaining 79 pre-

intervention and 77 post-intervention outcome scores were included for further analyses. MT included ($n = 41$) at pre-intervention assessment and ($n = 40$) at post-intervention. ST included ($n = 38$) at pre-intervention assessment and ($n = 37$) at posttest. All continuous variables were checked for univariate and multivariate normality. Also, all participants indicated that they thought they were meditating regardless of intervention type (all ‘yes’ responses to the “*did it feel like you were meditating?*” question administered at the end of each training session). Table 1 shows descriptive statistics for all psychological traits measured at baseline. Several of these trait measures were intercorrelated, but most importantly intervention (0 = ST, 1 = MT) was weakly positively correlated with racism and weakly negatively correlated with empathic concern. It is expected that randomization equalizes participant variables across groups. But the use of a randomized controlled trial design in this study focuses on change, and thus, initial scores are less important. Age was not related to study outcomes ($ps > 0.41$) so was not further considered. Also noteworthy, there were no training condition differences in expected benefits of the intervention ($ps > 0.51$).

Table 1. Descriptive statistics and bivariate relations among baseline trait predictors and training intervention.

Variable	1	2	3	4	5	6	7	8
1. MAAS	–							
2. NEO-A	0.48**	–						
3. MRS	0.10	–0.10	–					
4. SDO	0.14	–0.13	0.36**	–				
5. IRI-FS	–0.15	0.12	–0.24*	–0.25*	–			
6. IRI-PT	0.28*	0.33**	–0.12	–0.07	0.29**	–		
7. IRI-EC	0.16	0.29**	–0.26*	–0.33**	0.51**	0.53**	–	
8. IRI-PD	–0.21	0.03	–0.13	–0.20	0.19	–0.08	0.14	–
9. INTVN	0.02	–0.01	0.25*	–0.01	–0.12	–0.19	–0.24*	0.01
α	0.82	0.61	0.74	0.91	0.80	0.68	0.83	0.80
M	3.54	3.97	1.95	1.73	24.30	25.99	26.52	18.44
SD	0.66	0.52	0.30	0.71	5.60	3.89	3.77	4.99

Notes. INTVN = (intervention; 0 = ST, 1 = MT); MAAS = Mindful Attention Awareness Scale; NEO-A = NEO Agreeableness subscale; MRS = Modern Racism Scale; SDO = Social Dominance Orientation Scale; IRI = Interpersonal Reactivity Index; FS = Fantasy subscale; PT = Perspective Taking subscale; EC = Empathic Concern subscale; PD = personal distress; Significant training relations highlighted in bold.

* $p \leq 0.05$, ** $p < .01$

Video Observation Task Results

Does recollection of autobiographical events produce sadness? Self-induced sadness was included as a baseline to compare frontal alpha asymmetry scores for ingroup and outgroup video observation. To ascertain whether recollection of a sad autobiographical event elicited sadness, emotion intensity (sadness, guilt, fear, serenity, and fatigue) during the self-induced sadness task was compared using repeated measures ANOVA in SPSS (v24). There was a significant difference in reported intensity of these five emotions at pre-intervention, [$F(1, 77) =$

42.12, $p < 0.01$]. Post hoc analyses using Bonferonni correction showed that sadness ($M = 3.416$, $SD = 0.78$) was the most intense emotion when compared to guilt ($M = 2.10$, $SD = 0.97$, $p < 0.01$), fear ($M = 2.13$, $SD = 1.06$, $p < 0.01$), serenity ($M = 1.92$, $SD = 0.88$, $p < 0.01$), and fatigue ($M = 1.88$, $SD = 0.88$, $p < 0.01$), which were not statistically different from each other ($ps > 0.92$). At post-intervention assessment, there was also a significant difference in reported emotional intensity across the five emotions after the self-induced sadness task, [$F(1, 74) = 30.62$, $p < 0.01$]. Again sadness ($M = 3.06$, $SD = 1.00$) showed the highest intensity, followed by serenity ($M = 2.54$, $SD = 0.92$, $p = 0.03$). Guilt ($M = 1.81$, $SD = 0.89$), fear ($M = 1.48$, $SD = 0.87$), and fatigue ($M = 1.94$, $SD = 0.91$) were not statistically different from each other ($ps > 0.23$), but were significantly lower in reported intensity than sadness ($ps < 0.01$) and serenity ($ps < 0.04$). It is possible that because participants (sham-) meditated during the post-training assessment, that increased the level of serenity. There were no training condition differences in pre- and post-intervention emotion intensity ($ps > 0.68$), nor did training condition interact with the reported intensity of the five emotions (i.e., sadness, guilt, fear, serenity, and fatigue; $ps > 0.18$).

Does self-other distance predict empathic simulation? To examine the impact of self-other distance (defined by actress race) on empathic simulation, assessed via pre-intervention frontal alpha asymmetry scores (cf., Gutsell and Inzlicht, 2012), a 3 (self-other distance; 0 = ingroup, 1 = outgroup, 2 = self) x 4 (EEG channel location; 0 = F1/F2, 1 = F3/F4, 2 = F5/F6, 3 = F7/F8) repeated measures mixed model was constructed using SAS (v9.4) PROC MIXED; channel location was included to test for specific spatial localization of self-other distance effects. Self-other distance predicted frontal alpha asymmetry scores [$F(2, 144) = 18.42$, $p < 0.01$]. Planned contrasts were performed to decompose the effect of self-other distance on alpha

asymmetry scores across the four channel pairs. Other (Black) race videos elicited significantly higher right frontal alpha ($M = -0.029$, $SD = 0.235$) than self-induced sadness ($M = -0.066$, $SD = 0.189$), [$t(144) = -5.57$, $p < 0.01$]. Same race videos also elicited significantly higher right frontal alpha ($M = -0.038$, $SD = 0.176$) than self-induced sadness, [$t(144) = -4.92$, $p < .01$]. Because alpha frequency oscillations are thought to be inversely related to empathic simulation (e.g., Gutsell & Inzlicht, 2012), lower scores indicate more empathic simulation. One final contrast compared White race vs. Black race videos on alpha asymmetry scores. Other race videos did not produce higher alpha asymmetry scores than same race videos across channel pairs, [$t(144) = 0.72$, $p = 0.47$]. Figure 5 summarizes these results showing self – other differences of alpha asymmetry scores at each channel pair. Channel location, [$F(3, 228) = 2.26$, $p = 0.08$] and channel location x self-other distance interaction [$F(6, 432) = 1.38$, $p = 0.22$] did not predict alpha asymmetry scores.

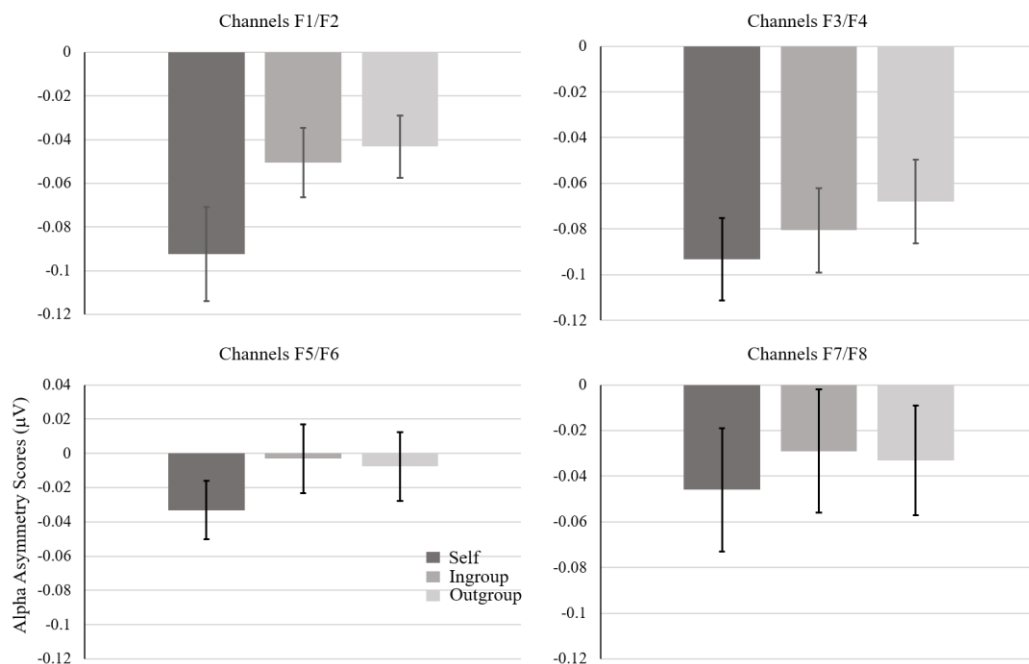


Figure 5. Mean alpha asymmetry scores (log right alpha–log left alpha) during self-induced and observed sadness according to racial group membership. More negative scores indicate greater withdrawal and negative emotionality. Bars indicate standard errors.

Do frontal alpha asymmetry scores predict state empathy? Three random coefficients MLM models were constructed using SAS (v9.4) PROC MIXED to examine the relation between pre-intervention frontal alpha asymmetry scores and self-reported, video-based empathic concern, empathic sadness, and empathic distress across channel pair locations. As indicated in Table 2, frontal alpha asymmetry scores at medial frontal channel locations F1/F2 and F3/4 were negatively related to empathic sadness; as previously mentioned negative coefficients in these analyses indicate that higher negative emotionality (reflected in lower frontal alpha asymmetry scores) is associated with empathic sadness underlain by increased neural activity of the right prefrontal cortex. Lateral frontal channel locations were not associated with self-reported empathic concern, empathic sadness, and empathic distress. Also, frontal alpha asymmetry scores at F3/F4 negatively predicted empathic distress; no other channel pairs were associated with empathic distress, nor did alpha asymmetry at any channel pair predict empathic concern.

Table 2. MLM models showing baseline prediction of empathic concern, empathic sadness, and empathic distress by frontal alpha asymmetry scores.

Channel	Empathic Concern				Empathic Sadness				Empathic Distress			
	<i>b</i>	SE(<i>b</i>)	<i>t</i> (216)	<i>p</i>	<i>b</i>	SE(<i>b</i>)	<i>t</i> (216)	<i>p</i>	<i>b</i>	SE(<i>b</i>)	<i>t</i> (216)	<i>p</i>
F1/F2	-0.65	0.63	-1.04	0.30	-2.05	0.65	-3.18	<0.01	0.23	0.62	0.37	0.72
F3/F4	-0.90	0.67	-1.35	0.18	-0.99	0.33	-3.02	<0.01	-1.12	0.57	-1.95	0.05
F5/F6	-0.13	0.63	-0.20	0.84	0.12	0.61	0.19	0.85	-0.95	0.57	-1.67	0.10
F7/F8	-0.40	0.36	-1.11	0.27	-0.68	0.58	-1.17	0.24	-0.07	0.33	-0.22	0.82

Notes. Channel pair location was disaggregated into individual channel pair variables, so as to keep all predictors and the self-reported empathy outcome at level 1 in MLM models. Crossing channel pair location with alpha asymmetry scores would inadvertently change the self-reported empathy outcome from level 1 to level 2, while both channel pair location and alpha asymmetry scores would remain at level 1.

Primary question 1.1: Does mindfulness training predict training related changes in empathic simulation? To test whether MT predicts change in empathic simulation, as measured by pre-post-intervention change in frontal alpha asymmetry, I constructed a 3 (self-other distance; 0 = ingroup, 1 = outgroup, 2 = self) x 4 (channel location; 0 = F1/F2, 1 = F3/F4, 2 = F5/F6, 3 = F7/F8) x 2 (training; 0 = ST, 1 = MT) repeated measures mixed model that included pre-training alpha asymmetry scores as predictors. This initial model failed to converge because of infinite likelihood in the estimation. Therefore, to simplify the analysis, additional models tested the effect of training condition and self-other distance at each channel pair separately. Here I only detail analyses at the F1/F2 channel pair, as training condition did not produce change in alpha asymmetry at any of the other channel pairs ($ps > 0.38$). Table 3 shows that there was no main effect of intervention on alpha asymmetry scores. Table 3 also shows that pre-intervention alpha asymmetry scores were positively related to post-intervention alpha asymmetry scores. Self-other distance modulated post-intervention alpha asymmetry scores consistent with pre-training results; specifically, self-induced sadness produced lower post-intervention frontal alpha asymmetry scores than ingroup (White actress), [$t(132) = -6.44, p < 0.01$] and outgroup (Black actress) sadness observation, [$t(132) = -6.65, p < 0.01$]; ingroup and outgroup sadness observation did not differ in post-intervention alpha asymmetry scores, [$t(132) = -0.00, p = 0.99$]. Pre-intervention alpha asymmetry scores also interacted with self-other distance to predict alpha asymmetry scores. More importantly this interaction was qualified by an intervention x pre-training alpha x self-other distance interaction (see Table 3).

Table 3. Multilevel model showing F1/F2 alpha asymmetry score change by intervention condition.

Effect	<i>df</i>	<i>F</i>	<i>P</i>
Self-Other Distance	(2, 132)	13.06	<0.01
Pre-Intervention Alpha	(1, 555)	39.86	<0.01
Intervention	(1, 71)	0.69	0.41
Intervention x Self-Other Distance	(2, 132)	0.57	0.57
Intervention x Pre-Intervention Alpha	(1, 555)	0.55	0.46
Self-other Distance x Pre-Intervention Alpha	(2, 555)	10.37	<0.01
Intervention x Self-Other Distance x Pre-Intervention Alpha	(2, 555)	7.86	<0.01

Notes. Self-Other Distance coded as 0 = ingroup, 1 = outgroup, 2 = self; intervention coded as 0 = ST, 1 = MT.

To decompose the significant intervention x self-other distance x pre-intervention alpha interaction, six contrasts were performed by examining pre- to post-change in alpha asymmetry scores within each training condition and self-other distance condition (see Figure 6). These analyses revealed that those receiving MT showed significant pre- to post-intervention increases in alpha asymmetry scores during ingroup, [$t(147) = 3.41, p < 0.01$], and outgroup, [$t(146) = 3.28, p < 0.01$], video observation tasks but not in the self-induced sadness task, [$t(33) = 0.75, p = 0.46$]. This indicates that while there was no pre- to post-intervention change in sadness felt during recollection of a sad autobiographical event, MT participants showed significantly lower empathic simulation toward White and Black targets at post-intervention assessment. Those receiving ST showed no pre- to post-intervention increases in alpha asymmetry scores during ingroup, [$t(137) = 0.67, p = 0.51$] and outgroup, [$t(139) = 0.54, p = 0.59$], video observation tasks, and thus evidenced no change in empathic simulation. Also, there was no pre- to post-intervention change in frontal alpha asymmetry among ST participants in the self-induced sadness task, [$t(30) = 0.18, p = 0.86$].

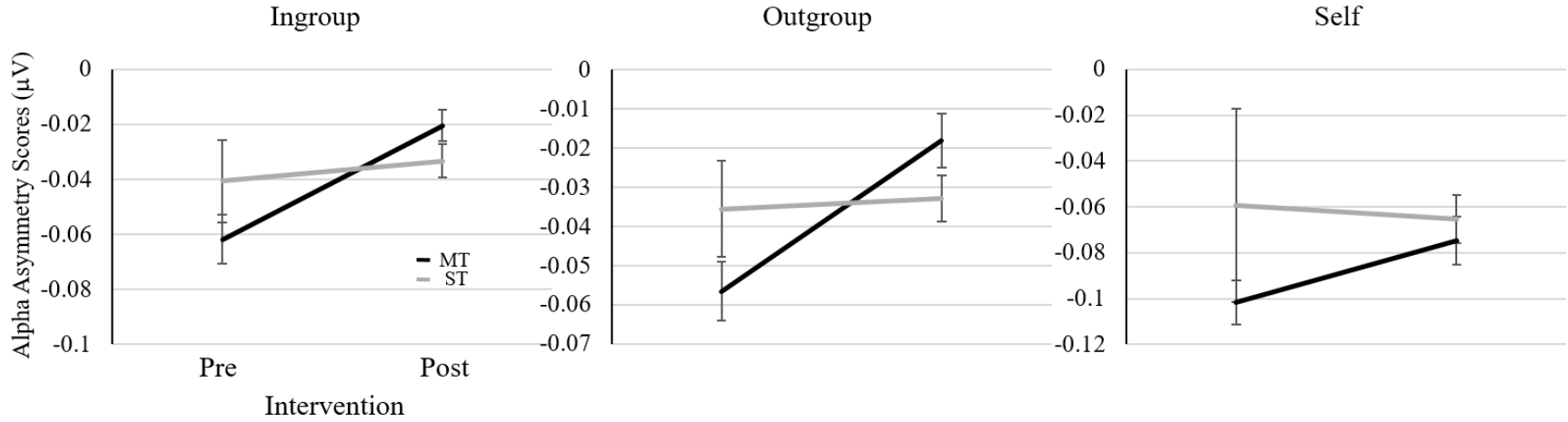


Figure 6. Pre- to post-intervention changes in alpha asymmetry scores (log right alpha–log left alpha) during self-induced and observed sadness according to intervention condition. More negative scores indicate greater empathic simulation of sadness during the video observation task.

Primary question 1.2: Does mindfulness training predict training-related changes in empathic concern in response to sadness videos? Three 2 (training; ST = 0, MT = 1) x 2 (self-other distance; ingroup = 0, outgroup = 1) repeated measures mixed models were constructed to examine the effect of intervention on pre- to post-intervention changes in empathic concern, empathic sadness, and empathic distress. Table 4 shows a main effect of self-other distance, such that lower empathic concern and empathic sadness was felt for outgroup (Black) individuals than for ingroup (White) targets expressing sadness. Pre-intervention empathic concern was also positively related to post-intervention empathic concern. Also, analyses revealed significant pre-intervention empathy x self-other distance interactions for empathic concern and empathic sadness. Last, as significant training x pre-intervention empathy x self-other distance interaction was found for empathic concern. Figure 7 shows this decomposition of the significant interaction. This significant 3-way interaction was decomposed by examining pre- to post-intervention change within each training condition and each self-other distance condition. MT participants did not show statistically significant pre- to post-intervention changes in empathic concern for racial ingroup members, [$t(156) = 0.07, p = 0.95$]. But MT participants did show a significant increase in empathic concern for racial outgroup members, [$t(158) = 2.57, p < 0.01$]. ST participants showed a significant decrease in empathic concern for racial ingroup members, [$t(141) = -3.23, p < 0.01$], but no change for racial outgroup members [$t(150) = 0.47, p = 0.64$].

Table 4. Multilevel models showing prediction of post-intervention empathic concern, empathic sadness, and empathic distress by training.

Effect	<i>df</i>	Empathic Concern		Empathic Sadness		Empathic Distress	
		<i>F</i>	<i>p</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>p</i>
Self-Other Distance	(1, 526)	7.48	<0.01	5.00	0.03	0.88	0.35
Pre-Intervention Empathy	(1, 526)	5.80	0.02	3.31	0.07	3.24	0.07
Intervention	(1, 75)	0.13	0.72	2.81	0.09	0.12	0.73
Self-Other Distance x Intervention	(1, 526)	0.01	0.91	0.84	0.36	0.00	0.98
Pre-Intervention Empathy x Intervention	(1, 526)	0.43	0.51	2.82	0.09	0.10	0.75
Pre-Intervention Empathy x Self-Other Distance	(1, 526)	10.38	<0.01	8.84	<0.01	1.68	0.20
Intervention x Pre-Intervention Empathy x Self-Other Distance	(1, 526)	5.28	<0.01	0.46	0.50	0.06	0.80

Notes. Self-Other Distance coded as 0 = ingroup, 1 = outgroup, 2 = self; intervention coded as 0 = ST, 1 = MT.

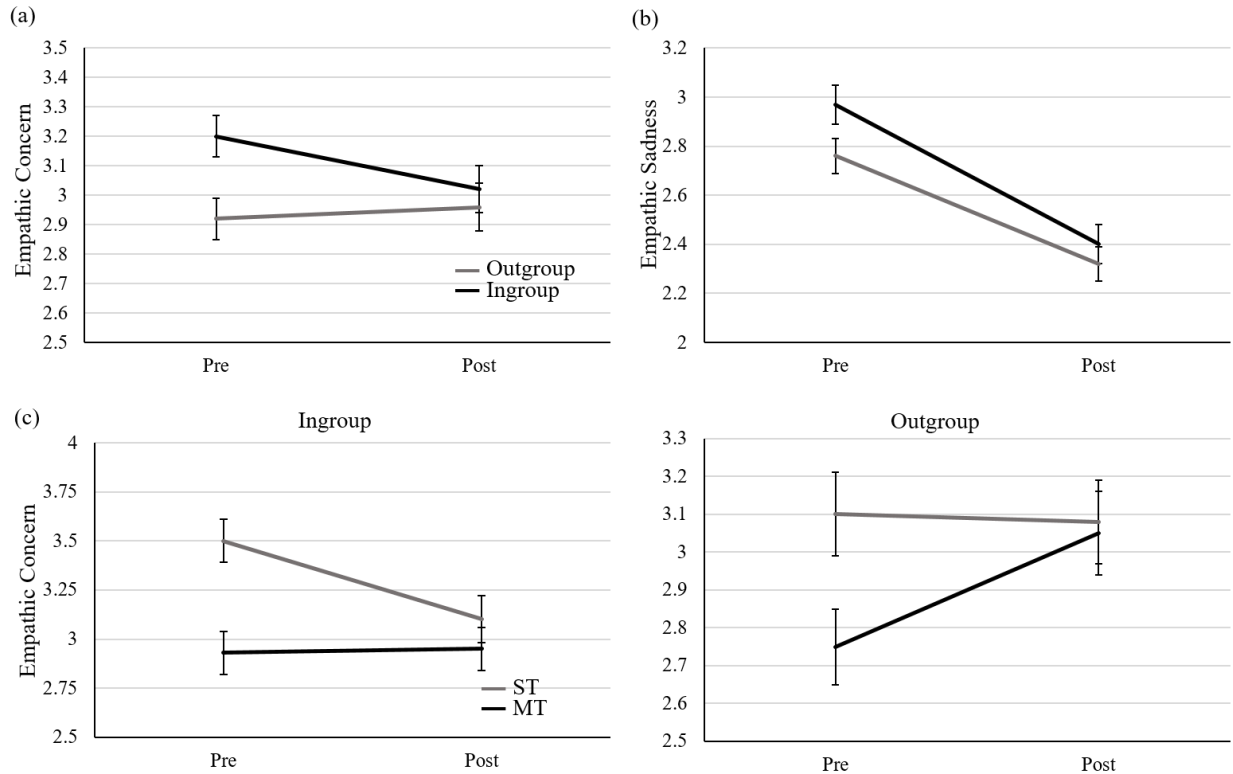


Figure 7. (a) Pre- to post-intervention change in empathic concern and (b) empathic sadness for ingroup and outgroup members. (c) Pre- to post-intervention change in empathic concern for ingroup and outgroup members by training condition.

Secondary questions 1.1 – 1.4: Does dispositional mindfulness predict empathic simulation and empathic concern in response to sadness videos? Prediction of pre-intervention frontal alpha asymmetry scores by trait mindfulness was tested using a 3 (self-other distance; 0 = ingroup, 1 = outgroup, 2 = self) x 4 (channel location; 0 = F1/F2, 1 = F3/F4, 2 = F5/F6, 3 = F7/F8) repeated measures MLM model. As done previously, self-other distance, channel pair location, and self-other distance x channel pair location were included in the model. Also included as predictors in the model were trait mindfulness, as measured by the MAAS, MAAS x self-other distance, and MAAS x self-other distance x channel pair location. None of these mindfulness terms predicted pre-intervention alpha asymmetry scores ($ps > 0.33$). A planned follow-up model tested the stability of the MAAS relations after controlling for trait

agreeableness, racism, social dominance orientation, and empathy, as per Secondary Question 1.2. Again, trait mindfulness not related to pre-intervention alpha asymmetry scores. As previously shown, this model indicated that pre-intervention alpha asymmetry scores were predicted by self-other distance, and test statistics of omnibus and planned comparisons were relatively stable compared to what is described in section entitled “Does self-other distance predict empathic simulation?”. Only one psychological trait, social dominance orientation, predicted higher frontal alpha asymmetry scores. This indicated that those higher in social dominance orientation show less empathic simulation before training.

Table 5. Multilevel model showing prediction of pre-training frontal alpha asymmetry scores by psychological traits, self-other distance, and EEG channel pair location.

Effect	<i>df</i>	<i>F</i>	<i>p</i>
Self-Other Distance	(2, 144)	18.52	<0.01
Channel location	(3, 228)	2.23	0.08
Self-Other Distance x Channel location	(6, 432)	1.41	0.21
MAAS	(1, 75)	0.00	0.95
NEO-A	(1, 75)	0.08	0.77
MRS	(1, 75)	0.13	0.72
SDO	(1, 75)	3.70	0.05
IRI-FS	(1, 75)	1.19	0.28
IRI-PT	(1, 75)	0.46	0.50
IRI-EC	(1, 75)	0.23	0.63
IRI-PD	(1, 75)	0.00	0.99
MAAS x Self-Other Distance	(2, 144)	1.13	0.32
MAAS x Self-Other Distance x Channel location	(9, 795)	0.89	0.54

Notes. Self-other Distance was coded 0 = ingroup, 1 = outgroup, 2 = self; Channel location was coded 0 = F1/F2, 1 = F3/F4, 2 = F5/F6, 3 = F7/F8; MAAS = Mindful Attention Awareness Scale; NEO-A = NEO Agreeableness subscale; MRS = Modern Racism Scale; SDO = Social Dominance Orientation Scale; IRI = Interpersonal Reactivity Index; FS = Fantasy subscale; PT = Perspective Taking subscale; EC = Empathic Concern subscale; PD = personal distress.

Prediction of pre-intervention empathic concern, empathic sadness, and empathic distress by psychological traits and self-other distance were tested in three separate repeated measures mixed models – one for each outcome. Initial models testing the relation of the MAAS to subjective empathy were not significant, so models reporting all psychological traits included in the study are shown in Table 6. Self-other distance predicted pre-intervention empathic concern, empathic sadness, and empathic distress, such that participants felt less subjective empathy for outgroup members across all three measures. Dispositional mindfulness was not associated with self-reported pre-intervention empathy. Trait personal distress predicted higher pre-intervention

empathic sadness and empathic distress, and perspective taking predicted higher pre-intervention empathic sadness. No other traits were related to state empathy outcomes.

Table 6. Multilevel models showing prediction of pre-training empathic concern, empathic sadness, and empathic distress by psychological traits and self-other distance (video stimuli only).

Effect	<i>df</i>	Empathic Concern		Empathic Sadness		Empathic Distress	
		<i>F</i>	<i>p</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>p</i>
Self-Other Distance	(1, 77)	11.21	<0.01	4.49	0.04	9.44	<0.01
MAAS	(1, 70)	0.00	0.97	2.51	0.12	0.06	0.81
NEO-A	(1, 70)	0.34	0.56	0.67	0.42	0.07	0.80
MRS	(1, 70)	0.00	0.99	1.47	0.23	3.52	0.06
SDO	(1, 70)	0.13	0.72	1.08	0.30	0.46	0.50
IRI-FS	(1, 70)	0.57	0.45	0.71	0.40	0.22	0.64
IRI-PT	(1, 70)	0.80	0.37	4.60	0.03	2.26	0.14
IRI-EC	(1, 70)	0.99	0.32	0.85	0.36	0.60	0.44
IRI-PD	(1, 70)	3.00	0.09	13.61	<0.01	14.22	<0.01
MAAS x Self-Other Distance	(1, 77)	1.08	0.30	2.32	0.12	1.47	0.22

Notes. Self-other Distance coded as 0 = ingroup, 1 = outgroup. MAAS = Mindful Attention Awareness Scale; NEO-A = NEO Agreeableness subscale; MRS = Modern Racism Scale; SDO = Social Dominance Orientation Scale; IRI = Interpersonal Reactivity Index; FS = Fantasy subscale; PT = Perspective Taking subscale; EC = Empathic Concern subscale; PD = Personal Distress subscale.

Video observation task results summary. Primary question 1.1, which asked if MT, relative to ST, would increase empathic simulation of outgroup members' sadness, was not supported. In fact, MT showed the opposite effect – namely, it reduced empathic simulation as evidenced by increased post-intervention frontal alpha asymmetry scores. Primary question 1.2 was partially supported. I found that, while starting values of empathic concern toward outgroup members were lower among MT participants at pre-intervention video observation than among

ST participants, MT increased empathic concern (but not empathic sadness or empathic distress) for outgroup sadness. However, it is difficult to attribute this pre- to post-intervention change in empathic concern to mindfulness training, per se, as MT and ST conditions did not statistically differ on post-intervention empathic concern. Taken together, these results do not strongly support putative mechanisms for the instantiation of empathy by mindfulness. For example, Berry, Cairo, et al. (2017) suggest that mindfulness may promote empathy through enhanced emotion matching or empathic simulation, but these results suggest a re-thinking of that hypothesis.

Secondary questions 1.1 and 1.2 were not supported; trait mindfulness was not associated with pre-intervention frontal alpha asymmetry scores. However, the pre-training frontal alpha asymmetry scores were related to empathic sadness measured immediately after video observation, and were sensitive to the self-other distance manipulation. Secondary questions 1.3 and 1.4 were not supported. Trait mindfulness was not associated with pre-intervention state empathic concern, empathic sadness, or empathic distress. All of these empathy measures were mutable to self-other distance, which for these self-report measures included ingroup and outgroup observation responses (but not self-sadness). A dispositional tendency to experience empathic personal distress was related to pre-intervention empathic sadness and empathic distress, as expected, and perspective taking was associated with higher empathic sadness.

Scenario-based and Daily Helping Behavior Results

Primary Question 2.1: Does mindfulness training increases scenario-based helping frequency? Primary question 2.1 was tested using a 2 (training; 0 = ST, 1 = MT) x 2 (helping scenario order (0 = crutches first, 1 = papers first) x 2 (pre-training help; 0 = no help, 1 = help) binary outcome MLM model; the post-intervention helping outcome was coded as 0 = no help

and 1 = help¹. As seen in Table 7, MT showed significantly higher post-intervention helping frequency ($M = 78.95\%$) than ST ($M = 56.76\%$), but most importantly, the significant intervention condition x pre-intervention help (yes, no) interaction, indicates that MT showed a significant change from pre- to post-intervention. Figure 8 displays this interaction effect.

Table 7. Multilevel binary logistic outcome models showing prediction of post-intervention scenario-based helping by intervention condition.

Effect	<i>B</i>	SE(<i>b</i>)	<i>t</i> (69)	<i>p</i>
Intervention	2.86	1.22	2.36	0.02
Scenario order	-0.92	1.31	0.70	0.49
Pre-Intervention Help	-1.90	1.23	1.54	0.13
Intervention x Pre-Intervention Help	-3.17	1.63	-1.94	0.05
Intervention x Scenario order	-2.04	1.58	-1.28	0.20
Scenario order x Pre-Intervention Help	-2.59	1.81	-1.43	0.16
Intervention x Pre-Intervention Help x Order	3.71	2.30	1.61	0.11

Notes. Intervention coded as 0 = ST, 1 = MT; scenario order coded as 0 = crutches first, 1 = paper drop first; Pre-Intervention Help coded as 0 = no help, 1 = help.

¹ Help recipient (confederate) height did not predict pre- or post-intervention helping frequency nor did it interact with intervention ($ps > 0.14$), and so was not considered further.

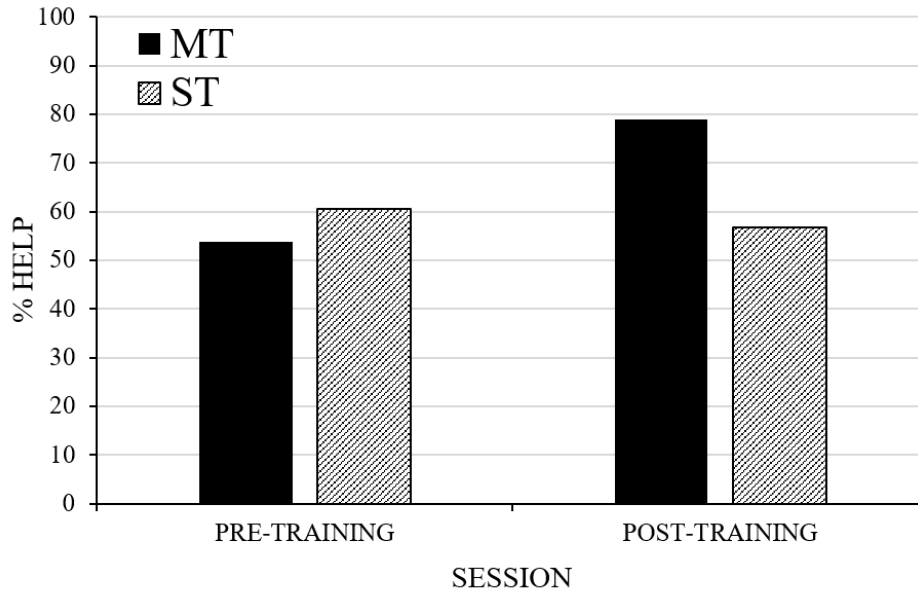


Figure 8. Pre- and post-intervention helping frequency as predicted by training condition.

Secondary questions 2.1 and 2.2: Does trait mindfulness predicts more frequent pre-intervention scenario-based helping? As a test of secondary question 2.1., bivariate relations among psychological traits and pre-intervention scenario-based helping behavior were examined using simple binary logistic regression, constructed in SPSS (v24) (see Table 8). As predicted, dispositional mindfulness predicted more frequent pre-intervention helping behavior; examination of the 95% confidence interval of the odds ratio indicates that for each 1-point increase on the MAAS, one is between 1.24 and 5.81 times more likely to provide help. This is consistent with Berry, Brown, et al., (2017), who showed a significant relation between MAAS and scenario-based helping, but an imprecise effect size. Also, positively related to helping behavior were agreeableness, and the fantasy, perspective taking, and empathic concern subscales of the IRI measure of trait empathy (Davis, 1980; 1983). Phone use or other technology use during the scenario predicted less frequent help.

Table 8. Descriptive statistics and bivariate relations (odds ratios and 95% CIs) among trait predictors and pre-intervention scenario helping behavior.

Predictor	Pre-Intervention Scenario Helping	
	OR	95% CI
Intervention	0.76	[0.31, 1.88]
Scenario order	1.10	[0.44, 2.71]
Phone use	0.29*	[0.10, 0.85]
MAAS	2.68*	[1.24, 5.81]
NEO-A	3.55*	[1.31, 9.64]
MRS	0.40	[0.09, 1.81]
SDO	0.66	[0.35, 1.26]
IRI-FS	1.19**	[1.07, 1.31]
IRI-PT	1.18*	[1.04, 1.35]
IRI-EC	1.16*	[1.01, 1.32]
IRI-PD	1.01	[0.92, 1.10]
<i>M</i> helping	57.14%	

Notes. Intervention coded as 0 = ST, 1 = MT; scenario order coded as 0 = crutches first, 1 = paper drop first; phone use coded as 0 = no technology use, 1 = using technology. MAAS = Mindful Attention Awareness Scale; NEO-A = NEO Agreeableness subscale; MRS = Modern Racism Scale; SDO = Social Dominance Orientation Scale; IRI = Interpersonal Reactivity Index; FS = Fantasy subscale; PT = Perspective Taking subscale; EC = Empathic Concern subscale; PD = Personal Distress subscale.

* $p \leq 0.05$, ** $p < .01$

To test the strength of the dispositional mindfulness – helping relation, a three-block hierarchical logistic regression was constructed in SPSS (v24) to examine the role of phone use, agreeableness, racism, social dominance orientation, and trait empathy on pre-intervention helping behavior in block one. Mindfulness was loaded into block two, and to replicate findings

from Berry, Brown, et al. (2017) (shown in Appendix D), a mindfulness x racism interaction term and a mindfulness x social dominance orientation interaction term was loaded into block three. Table 9 shows that in block one phone use predicted less frequent helping, and the fantasy subscale of the IRI predicted more frequent helping. The mindfulness – helping relation in block two remained positive and statistically significant, but the 95% confidence interval around the odds ratio estimate was imprecise, namely for each 1-point increase on the MAAS, a person is between 1.74 and 25.24 times more likely to provide help. Such imprecision in the effect size estimate leaves uncertainty regarding the impact of trait mindfulness on scenario-based helping. Finally, the mindfulness x racism and mindfulness x social dominance orientation interactions were not related to pre-intervention scenario-based helping.

Table 9. Three-block hierarchical logistic regression results showing prediction of scenario-based helping by phone use, psychological traits including mindfulness, and mindfulness by prejudicial attitudes interactions.

Block	Predictor	Pre-Training Help			
		OR	95% CI	Df	$\Delta\chi^2$
Step 1	Phone	0.27*	[0.07, 1.00]	8	26.10**
	NEO-A	3.05	[0.90, 10.29]		
	MRS	1.31	[0.19, 8.80]		
	SDO	0.75	[0.31, 1.83]		
	IRI-FS	1.20**	[1.06, 1.36]		
	IRI-PT	1.12	[0.93, 1.34]		
	IRI-EC	0.91	[0.74, 1.13]		
	IRI-PD	0.95	[0.86, 1.07]		
Step 2	MAAS	6.63**	[1.74, 25.24]	9	9.92**
Step 3	MAAS*MRS	1.17	[0.03, 42.96]	11	1.53
	MAAS*SDO	3.23	[0.29, 36.16]		

Notes. Phone use coded as 0 = no technology use, 1 = using technology. MAAS = Mindful Attention Awareness Scale; NEO-A = NEO Agreeableness subscale; MRS = Modern Racism Scale; SDO = Social Dominance Orientation Scale; IRI = Interpersonal Reactivity Index; FS = Fantasy subscale; PT = Perspective Taking subscale; EC = Empathic Concern subscale; PD = Personal Distress subscale.

* $p \leq 0.05$, ** $p < .01$

Frequency of daily helpful, positive, and antagonistic behaviors. Prior to examining primary question 2.2, summary statistics of daily helping, positive, and antagonistic behavior frequency were examined. As shown in Figure 9 calculated daily helping behavior frequencies were lower than expected. Rameson et al., (2012) and Morelli et al., (2014) showed helping frequencies as high as 2.19 per day. However, I found helping frequencies averaging 0.20 per day (or 1 helping behavior per person every five days, on average), ten times less than in the aforementioned studies. One reason for this much lower helping frequency could be the

inclusion of pleasant and antagonistic behaviors that did not include helping; with only one type of stranger or acquaintance interaction recorded (i.e., helping behaviors), participants in previous studies may have been seeking situations to engage in such behaviors. In this study, there was no clear behavioral target with the inclusion of pleasant and antagonistic behaviors alongside helping behavior. Figure 9 shows that pleasant interactions were consistently more frequent than helping behavior, and antagonistic behaviors were rare; there also appeared to be a cyclical pattern in the behavior frequency, with helping behavior peaking during weekdays and occurring less frequently on the weekends. Pleasant behaviors appeared to reach peak frequency on Fridays and Saturdays when racial ingroup members were the target, but when racial outgroup members were the target, pleasant behaviors were less frequent during the weekend and more frequent on Mondays.

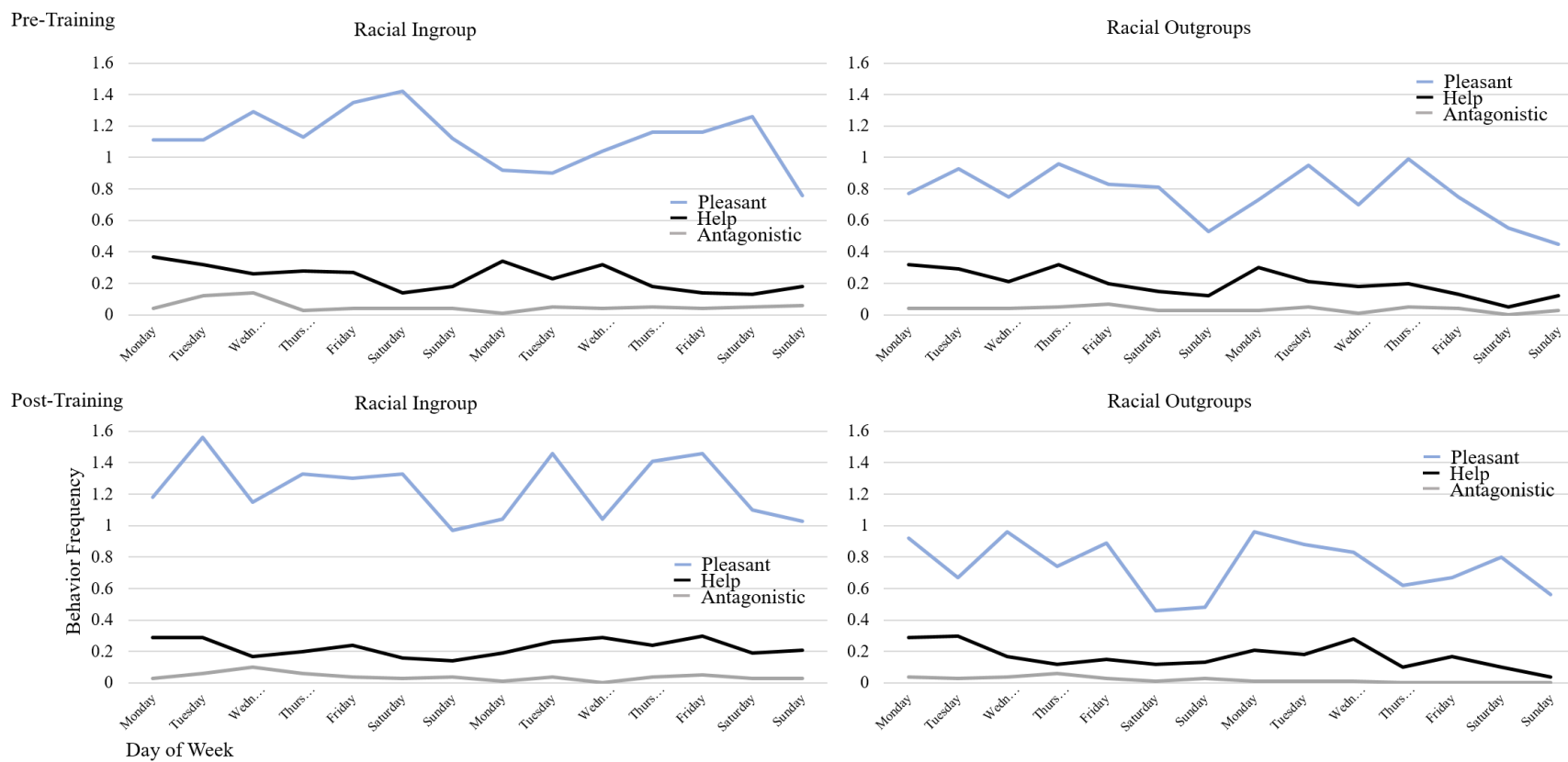


Figure 9. Pre- and post-intervention day-to-day helping, pleasant, and antagonistic behavioral frequencies by ingroup/outgroup target membership and day of week.

Primary question 2.2: Does mindfulness training increase daily helping frequency toward outgroup members? Visual inspection of frequency plots revealed a preponderance of zero counts for daily helping, pleasant, or antagonistic behavior. Because of this, a zero-inflated Poisson mixed model was used to test predictions by day of assessment, weekly cyclicality (sine vs. cosine), target group membership (0 = ingroup, 1 = outgroup), and intervention condition (0 = ST, 1 = MT) on daily helping behavior toward strangers and acquaintances using SAS (v9.4) PROC NLMIXED. Table 10 shows a significant sine-curve pattern of post-intervention helping frequency; specifically, helping behavior reached peak frequency during weekdays, and was lowest on weekends. Pre-training helping frequency was positively associated with post-training helping frequency. Also, helping behavior was less frequent for outgroup members, relative to ingroup members. MT and ST did not differ in post-intervention helping frequency change from pre-intervention helping baselines.

Table 10. Multilevel zero-inflated Poisson model showing prediction of post-training daily helping by intervention condition.

Effect	<i>b</i>	SE(<i>b</i>)	<i>t</i> (1810)	<i>p</i>
Day of assessment	-0.01	0.01	-0.44	0.66
Wkcycle Sine	0.21	0.08	2.61	<0.01
Wkcycle Cosine	0.07	0.08	0.91	0.36
Pre-Intervention Help	0.42	0.15	2.73	<0.01
Group Membership	-0.35	0.18	-1.97	0.05
Intervention	0.26	0.30	0.87	0.38
Intervention x Group Membership	0.10	0.25	0.39	0.70
Group Membership x Pre-Intervention Help	-0.26	0.22	-1.22	0.22
Intervention x Group Membership x Pre-Intervention Help	-0.12	0.21	-0.62	0.68

Notes. Day of assessment = 0 – 13; wkcycle sine = $\sin(2 \times \pi \times \text{Day} / 7)$; wkcycle cosine = $\cos(2 \times \pi \times \text{Day} / 7)$; target group membership coded as 0 = ingroup, 1 = outgroup; intervention coded as 0 = ST, 1 = MT.

Secondary questions 2.3. and 2.4: Does trait mindfulness predicts more frequent

daily helping? Three zero inflated Poisson mixed models examined the role of day of assessment, weekly cyclicity (sine vs. cosine), target group membership (0 = ingroup, 1 = outgroup), trait mindfulness, and trait mindfulness x target group membership on pre-intervention daily helping, pleasant, and antagonistic behavior toward strangers and acquaintances. Table 11 shows that helping behaviors and pleasant behaviors were less frequent throughout the 14-day assessment period, and there was a sine-shaped weekly cyclicity pattern in helping behavior that reached peak frequency during weekdays and was lowest during weekends, but a cosine-shaped weekly cyclicity pattern in pleasant interactions that was highest on Fridays and Saturdays and dropped sharply on Sunday and Monday. Although helping, pleasant, and antagonistic behaviors were lower for racial outgroup members compared to racial ingroup members, this difference was only statistically significant for pleasant behaviors. Trait

mindfulness predicted more frequent helping behavior, but did not interact with target group membership. This indicates that trait mindfulness was associated with increased pre-intervention helping toward strangers and acquaintances regardless of their ingroup-outgroup status.

Table 11. Multilevel zero-inflated Poisson models showing prediction of pre-intervention daily helping by trait mindfulness.

Effect	Helping		Pleasant		Antagonistic	
	<i>t</i> (2025)	<i>p</i>	<i>t</i> (2025)	<i>p</i>	<i>t</i> (2025)	<i>p</i>
Day	-3.34	<0.01	-3.22	<0.01	-1.28	0.20
Wkcycle Sine	3.22	<0.01	0.15	0.88	1.40	0.16
Wkcycle Cosine	1.57	0.12	-4.36	<0.01	-0.75	0.46
Group Membership	-1.70	0.09	-8.29	<0.01	-1.83	0.07
MAAS	1.96	0.05	0.30	0.77	-0.72	0.47
MAAS* Group Membership	0.55	0.58	1.36	0.17	-0.36	0.71

Notes. Day of assessment = 0 – 13; wkcycle sine = $\sin(2 \times \pi \times \text{Day} / 7)$; wkcycle cosine = $\cos(2 \times \pi \times \text{Day} / 7)$; target group membership coded as 0 = ingroup, 1 = outgroup; MAAS = Mindful Attention Awareness Scale.

To test the strength of the trait mindfulness to daily helping relation the same model was tested with the inclusion of psychological trait predictors of pre-intervention daily helping behavior toward strangers and acquaintances. Table 12 shows that participants helped outgroup members less frequently than ingroup members, and this relation was attenuated by trait empathic fantasy. Those higher in trait empathic fantasy showed more frequent ingroup (vs. outgroup) helping, while those lower in the trait were not significantly different in ingroup and outgroup helping. Again, trait mindfulness was associated with more frequent helping regardless of behavioral target group membership.

Table 12. Multilevel zero-inflated Poisson model showing prediction of pre-intervention daily helping by mindfulness, agreeableness, racism, social dominance orientation, and empathy trait scores.

Effect	<i>b</i>	SE(<i>b</i>)	<i>t</i> (2022)	<i>P</i>
Day of Assessment	-0.05	0.01	-3.76**	<0.01
Wkcycle Sine	0.23	0.07	3.22**	<0.01
Group Membership	-0.20	0.10	-2.05*	0.04
MAAS	0.55	0.21	2.59**	<0.01
NEO-A	0.12	0.23	0.52	0.60
MRS	-0.27	0.46	-0.63	0.53
SDO	-0.30	0.19	-1.58	0.11
IRI-FS	0.06	0.02	2.35*	0.02
IRI-PT	-0.05	0.03	-1.61	0.11
IRI-EC	-0.04	0.04	-1.10	0.27
MAAS x Group Membership	0.03	0.16	0.16	0.88
IRI-FS x Group Membership	-0.04	0.01	-2.24**	0.02

Notes. Day of assessment = 0 – 13; wkcycle sine = $\sin(2 \times \pi \times \text{Day} / 7)$; target group membership coded as 0 = ingroup, 1 = outgroup; MAAS = Mindful Attention Awareness Scale. NEO-A = NEO Agreeableness subscale; MRS = Modern Racism Scale; SDO = Social Dominance Orientation Scale; IRI = Interpersonal Reactivity Index; FS = Fantasy subscale; PT = Perspective Taking subscale; EC = Empathic Concern subscale; PD = Personal Distress subscale.

Scenario-based and daily helping behavior results summary. Primary question 2.1 asked whether mindfulness training, relative to sham meditation training, could increase scenario-based post-intervention helping frequency for outgroup members. There was support for this hypothesis, namely, a significant pre-post increase to helping frequency for MT participants relative to ST participants. Primary question 2.2 tested whether the effects on helping shown in primary question 2.1 were also present in daily living. There was no support for this hypothesis, as relative to ST, MT did not change daily helping frequency toward

outgroup members. Of note were markedly low daily helping frequencies - on average one helping instance every five days per person, which was more than ten times as infrequent as in previous studies (Morelli et al., 2014; Rameson et al., 2012).

Trait mindfulness predicted more frequent pre-intervention scenario-based helping behavior for racial outgroup members and remained stable after controlling for trait empathy, racism, social dominance orientation, and agreeableness. These results strongly support secondary questions 2.1 and 2.2. As noted previously, however, a large range of the 95% CI around the effect size estimate of the mindfulness – helping relation made it difficult to pinpoint a reliable effect size. Secondary questions 2.3 and 2.4 asked whether trait mindfulness predicted more frequent pre-intervention daily helping behavior toward outgroup members. Results indicated that trait mindfulness, indeed predicted more frequent helping behavior and did so after controlling for trait empathy, racism, social dominance orientation, and agreeableness. Scores on the fantasy subscale of the IRI were also positively associated with scenario-based and daily helping frequency, and specifically for racial outgroup members. This empathic fantasy – helping behavior relation was not expected, as other empathy-related traits have been more frequently associated with helping behavior (i.e., perspective taking and empathic concern; Penner et al, 1995).

General Discussion

Humans have a desire to establish and maintain social relationships with others (Baumeister & Leary, 1995; Deci & Ryan, 2000), so much so that we often automatically empathize with others and help them when they are in need (de Waal, 2008). But people are generally more likely to show kindness to non-biological kin when they are like oneself – defined by social ingroup and outgroup categories (Cikara et al., 2011; Decety & Chaminade,

2003) – perhaps because similar individuals are more likely to reciprocate help and cooperation (Trivers, 1971). Our world, however, is increasingly interdependent and interconnected, and geographic distance is no longer a major barrier between self and others. Thus, it is important to ask how kindness can be fostered across socio-cultural lines.

This study asked whether mindfulness training would increase empathic simulation of and empathic concern for racial outgroup members (primary questions 1.1 and 1.2, respectively) during a video observation task depicting expressions of sadness in adult females from both White and Black racial groups. This study also asked whether mindfulness training would increase prosocial action toward racial outgroup members in staged scenarios performed in the lab (primary question 2.1) and in daily life (primary question 2.2). As shown in Table 13, support was obtained for two of these four questions. Convergent tests of the role of mindfulness on empathy and helping were conducted by examining associations between trait mindfulness and measures of empathy and prosocial action. Specifically, I asked whether trait mindfulness predicted greater empathic simulation and empathic concern (secondary questions 1.1 and 1.3, respectively) during the video observation task. Tests of the strength of these trait mindfulness – empathy relations statistically controlled for trait agreeableness, racism, social dominance orientation, and trait empathy (secondary questions 1.2 and 1.4, respectively). No support was found for these four trait mindfulness questions (see Table 13). This study also examined whether trait mindfulness predicted more frequent helping behavior toward racial outgroup members in staged scenarios performed in the lab (secondary question 2.1) and in daily life (secondary question 2.3); the strength of these relations in secondary questions 2.1 and 2.3 were tested by controlling for trait agreeableness, racism, social dominance orientation, and trait

empathy (secondary questions 2.2 and 2.4, respectively). Support was found for all four of these trait mindfulness hypotheses.

Table 13. Primary and secondary study questions results summary.

Primary Question	Result	Supported?
1.1. MT ↑ empathic simulation of outgroup sadness	MT ↓ empathic simulation	No – opposite of predicted direction
1.2. MT ↑ empathic concern for outgroup sadness	MT ↑ empathic concern	Partial
2.1. MT ↑ scenario-based helping	MT ↑ helping	Yes
2.2. MT ↑ daily helping behavior	MT does not change helping	No
Secondary Question	Result	Supported?
1.1. Trait MAAS ↑ empathic simulation of outgroup sadness	MT not related to empathic simulation	No
1.2. Trait MAAS ↑ empathic simulation of outgroup sadness, controlling for covariates.	MT not related to empathic simulation	No
1.3. Trait MAAS ↑ empathic concern for outgroup sadness	MT not related to empathic concern	No
1.4. Trait MAAS ↑ empathic concern for outgroup sadness, controlling for covariates	MT not related to empathic concern	No
2.1. Trait MAAS ↑ scenario-based helping	MAAS ↑ helping	Yes
2.2. Trait MAAS ↑ scenario-based helping, controlling for covariates	MAAS ↑ helping	Yes
2.3. Trait MAAS ↑ daily helping	MAAS ↑ helping	Yes
2.4. Trait MAAS ↑ daily helping, controlling for covariates	MAAS ↑ helping	Yes

Notes. ↑ = increase; ↓ = decrease

Specifically, mindfulness meditation training, relative to sham meditation training, increased post-intervention alpha asymmetry scores, which was the opposite of what I predicted in primary question 1.1. This finding may indicate less empathic simulation among those receiving mindfulness training. Despite this unexpected finding, mindfulness training, compared to sham training, significantly increased post-intervention empathic concern (but not empathic sadness or empathic distress), and did so specifically toward racial outgroup members rather than racial ingroup members. Thus, support was obtained for primary question 1.2. Mindfulness training increased post-intervention scenario-based helping frequency toward a racial outgroup members (primary question 2.1); however, post-intervention daily helping behavior was not changed by intervention (primary question 2.2).

Turning to the secondary questions, which concerned trait mindfulness, this self-reported disposition was not associated with pre-intervention alpha asymmetry scores or pre-intervention empathic concern (secondary questions 1.1 – 1.4). However, trait mindfulness predicted more frequent scenario-based (secondary question 2.1) and daily (secondary question 2.3) helping behavior, and these relations held after controlling for the traits of agreeableness, racism, social dominance orientation, and empathy (secondary questions 2.2 & 2.4).

The majority of these findings are consistent with theory on the place of mindfulness in social relations (Berry & Brown, in press; Davidson & Harrington, 2002; Trautwein et al., 2014) and with recent empirical work showing that (a) mindfulness promotes prosocial responsiveness (Berry, Brown, et al., 2017; Berry, Cairo, et al., 2017; Cameron & Fredrickson, 2015; Condon et al., 2013; Lim et al, 2015) and (b) may do so by increasing empathy (Birnie et al, 2010). The strength of the present study design allowed me to rule out alternative explanations for the results that to date have been neglected in mindfulness research on social relations. Pre-post changes in

empathy and helping were not attributable to differences in the expected benefits of the interventions. A randomized controlled trial design was used with pre-post intervention assessments rather than post-test only assessment, the design most commonly used in mindfulness research concerning prosociality to date (Condon, in press). Furthermore, the use of a sham meditation control allowed me to rule out placebo effects of relaxed breathing and belief that one is meditating as the source of differences in pre-post-intervention change in study outcomes by mindfulness training (Zeidan et al., 2010, 2011). Previous intervention studies of the effect of meditation training on prosocial responsiveness have compared mindfulness training to a waitlist control condition (Condon et al., 2013) or to an active control that did not involve meditation-like activities (Lim et al., 2015; Quaglia, 2016); in these studies, participants may have been aware that they were in a control condition. Awareness that one is in a particular condition may create biased responses; for example, participants may attempt to corroborate (or discredit) what they perceive are the study hypotheses, or may lose motivation to participate (fully). These biased responses can occur in waitlist control or active control conditions, particularly if participants are not adequately deceived about their condition assignment.

Mindfulness training increases post-intervention alpha asymmetry scores. Relative to sham meditation training, mindfulness training increased post-intervention alpha asymmetry scores, believed to reflect lower empathic simulation. Berry, Brown, et al. (2017) suggested that mindfulness training may increase “emotion matching,” as mindfulness training directs one’s attention to somatic and mental processes (i.e., interoceptive awareness; Bornemann et al., 2014; Hölzel et al., 2011). This interoceptive awareness to one’s own experiences during unpleasant events serves as the basis for simulating the experiences of distressed, sad, or otherwise in need others (Singer et al., 2009). As previously mentioned, emotion matching is often lower in

intergroup contexts (Aventati et al., 2010; Batson & Ahmad, 2009; Gutsell & Inzlicht 2010, 2012), perhaps because perceiving similarity between self and other may be necessary to understand the experiences of the other in the first place (Decety and Sommerville 2003; Hein and Singer 2008; Singer et al., 2004; Singer et al., 2009). Thus, I predicted that mindfulness training would increase emotion matching, as evidenced by more negative post-intervention frontal alpha asymmetry scores.

The increase in frontal alpha asymmetry scores was unexpected, and is inconsistent with the results of Gutsell (2014) and Gutsell and Inzlicht (2010, 2012). There is currently a relative paucity of research concerning alpha asymmetry as a valid indicator of empathic simulation which may impact interpretation of the present findings concerning alpha. I offer three alternative explanations to this alpha asymmetry finding that were not tested in this study. First, the present finding may be related to the emotion regulatory advantage attributed to mindfulness training (see Arch & Landy, 2015 for review). For the instantiation of empathic concern and helping behavior, it is important to regulate one's own affective responses that occur when witnessing another person in need (Batson et al., 2015; Decety & Jackson, 2004; Haidt, 2003; Zaki, 2014). Recent theory and research (Woodruff, Martin, et al., 2011; Woodruff, Daut, Brower, & Bragg, 2011; Woodruff & Klein, 2013) indicates that EEG-based indicators of mirror neuron activity may have an inverted "U" relation with positive empathic traits like empathic concern, where low empathic simulation and high empathic simulation do not conduce to prosocial responsiveness. On the one hand, a lack of empathic simulation may indicate indifference to, or poor understanding of the affected person's distress. On the other hand, an overabundance of empathic simulation may reflect an unregulated vicarious emotional response to the affected person's distress, which has been termed empathic or personal distress – a self-

oriented emotional response that entails feeling negative affect when witnessing another person in need but which lacks concern for them (Batson, 1991; Haidt, 2003) Rather, moderate levels of empathic simulation may be necessary to foster empathic concern and helping behavior. One way to test this hypothesis with the current data would be to create quadratic frontal alpha asymmetry scores, and re-compute models examining the effects of intervention on these quadratic pre- to post-intervention changes in frontal alpha asymmetry scores. If the “adaptive level” hypothesis is correct as applied to mindfulness training, the resultant parameter estimates should indicate that mindfulness fosters adaptive levels of empathic simulation.

Another concern with the alpha asymmetry metric that is related to ambiguity about the present mindfulness training effects, is the fact that while approach-oriented and withdrawal-oriented emotions have been considered a two-dimensional construct (Carver & White, 1994), alpha asymmetry is scored along a single continuum (Davidson & Fox, 1982; Davidson et al, 1990; Sobotka, Davidson, & Senulis, 1992). Thus, it is difficult to disambiguate approach from withdrawal activation with current frontal alpha asymmetry measurement. A less-used quantification of frontal alpha asymmetry scores does not include subtracting right from left homologous pairs; instead, Wheeler et al. (1993) suggest that associations between individual channels of log-transformed frontal alpha scores and subjective emotions should be compared across left and right hemispheres. Alpha activity is inversely related to prefrontal cortical activity. Thus in this approach, negative associations between left hemisphere alpha scores and subjective emotion reports would indicate that the emotions may be guided by approach-oriented motivation. Similarly, negative associations between right hemisphere alpha and subjective emotion reports would suggest the emotions are supported by withdraw-oriented motivation. Empathic concern is a complex emotion, and may represent an amalgamation of approach and

withdraw tendencies (Condon, in press; Condon & Feldman Barrett, 2013; Goetz, Keltner, & Simon-Thomas, 2010). Specifically, empathic concern for someone who is sad, for example, may begin with empathic simulation of their negative emotion, but if appropriately regulated (Decety & Jackson, 2004) this response changes to a motivation to ameliorate the pain of the other, which I conjecture is an approach-related response. If so, the temporal shifts in alpha level scores during observation of a target in need could be observed.

Replication and extension of Gutsell and Inzlicht (2012). A third alternative explanation to the mindfulness training – empathic simulation could be related to the partial replication of the results from Gutsell and Inzlicht (2012) obtained in this study. First, alpha asymmetry scores were lower during contemplation of a sad autobiographical event than when observing video stimuli of racial outgroup members expressing sadness. However, I also found that alpha asymmetry scores were lower during self-generated sadness than when observing video stimuli of racial ingroup members expressing sadness, which was not found in the aforementioned study. It is noteworthy, that the sample size in the present study ($N = 77$) is more than 2.5 times that of the sample size used by Gutsell and Inzlicht (2012; $N = 30$). It is possible that Gutsell and Inzlicht's (2012) sample size lacked the sensitivity necessary to find the self vs. ingroup difference shown here.

Trait empathy – alpha asymmetry and racism to alpha asymmetry relations were found in Gutsell and Inzlicht (2012), but not in the present study. Rather, the only psychological trait related to alpha asymmetry scores was social dominance orientation, a psychological trait closely related to racism. Finally, the present study extends previous literature, and provides further evidence of alpha asymmetry scores' ability to tap empathic simulation, by examining relations between these neural measures and state self-report measures of empathic concern, empathic

sadness, and empathic distress. I found that alpha asymmetry was negatively related to empathic sadness, indicating that higher empathic simulation reflects in greater empathic sadness. These results suggest that frontal alpha asymmetry in this context may be related to negative emotion rather than empathy per se. Taken together with the aforementioned alternative explanations of the mindfulness – alpha asymmetry relation, the present results, and the questions concerning frontal alpha asymmetry as a marker of empathic simulation provide more questions than answers regarding neural signatures of the effects of mindfulness training on empathic concern and helping behavior.

Mindfulness training increases post-intervention empathic concern for outgroup members. Consistent with Berry, Brown, et al., (2017) and Berry, Cairo, et al., (2017) mindfulness increased post-intervention empathic concern for racial outgroup members, but unexpectedly did not increase empathic concern for ingroup members. At its core, “social mindfulness” is about perceiving others’ suffering with reduced conceptual overlay on what is perceived (Brown, Berry, Quaglia, 2016; Gyatso, 1995; Teasdale & Chaskalson, 2011). Mindfulness theory suggests that training to enhance this quality of attention fosters kindness for (dissimilar) others, as familiarity with the pervasive nature of suffering may reveal commonality among individuals typically perceived to be different from oneself (Berry & Brown, in press). This study, however, cannot ascertain precise mechanisms of the mindfulness empathic concern relation, as attempts to test a neural empathic simulation mechanism were unsupported. Furthermore, it is unlikely (and not currently supported in the literature) that the realization of such commonality of suffering can be achieved in a mere four days of training. Here I conjecture other mechanisms of the mindfulness - empathic concern relation that future research may explore.

First, steps taken to disambiguate alpha asymmetry as a putative indicator of empathic simulation may uncover a key neural mechanism. Second, and as previously mentioned, mindfulness may conduce to empathic concern through emotion regulation processes, in which one's own vicarious emotional distress is tempered (Quaglia et al., 2014, 2015) – a necessary precondition to promoting empathic concern (Decety & Jackson, 2006; see Batson et al., 2015; Haidt, 2003 for review). Mindfulness training is considered part of a family of meditation practices that promote emotion regulation (Tang, Hölzel, & Posner, 2015), and many of the benefits of mindfulness practice are believed to be underlain by these emotion regulatory advantages (Arch & Landy, 2015; Hölzel et al., 2011). Third, mindfulness may increase the perceived similarity between self and other (DeSteno, 2016); as noted, perceiving likeness between the self and other is vital in the promotion of empathy (Cialdini et al., 1997; Decety & Chaminade, 2003; Trivers, 1971). Fourth, mindfulness may promote empathic concern via temporary suspension of automatic biases (Kang et al., 2013; Lueke & Gibson, 2014) that can attenuate kindness toward outgroup members (Stepanikova et al., 2011).

It is unclear why trait mindfulness was not associated with empathic concern. Berry, Cairo, et al., (2017) found that meta-analyzing relations between trait mindfulness and prosocial responsiveness (including measures of empathy) toward ostracized strangers revealed unstable effect sizes, that could have been due to chance. More research with larger sample sizes is needed to find a more precise range of parameter estimates of the trait mindfulness – empathy relation, as it may be dependent on as-yet unmeasured factors or may not exist at all.

Mindfulness training increases post-intervention scenario-based helping behavior but not daily helping behavior. Previous research has shown that weeks-long mindfulness training can increase objective helping behavior toward an individual in need (Condon et al.,

2013; Lim et al., 2015), and the present study extended these findings by showing that even brief mindfulness training increased post-intervention helping frequency in a staged scenario.

Convergent with this finding was evidence that trait mindfulness was associated with more frequent helping, even after controlling for traits associated with helping behavior. As previously discussed, mindfulness training concerns a comparatively less conceptually engaged attention to pleasant, unpleasant, and neutral states (Brown et al., 2007; Olendski, 2005). As such, one may be more acutely attentive to and aware of one's own emotional states (Davidson & Harrington, 2002; Dambrun & Ricard, 2011; Teasdale & Chaskalson, 2011;), and those of others (Bolz & Singer, 2015; Gyatso, 1995; Trautwein, Nanjo, & Schmidt, 2014). Additional analyses, not reported here, showed that all participants in the study acknowledged the person in need of help by looking at them or engaging them in conversation. Thus, a lack of helping was not due to failure to notice the person. Yet noticing did not always result in help, and in fact, there was one instance where the confederate on crutches accidentally tripped and fell coming into the room; the participant started a conversation with them, but did not offer them their seat.

The fact that mindfulness training did not increase post-intervention day-to-day helping was unexpected. This finding is inconsistent with previous research using lab-based helping scenarios (Berry, Brown, et al., 2017; Berry, Cairo, et al., 2017; Cameron & Fredrick, 2015; Condon, et al., 2013; Lim et al., 2015). But what this measure lacks that measures in previous lab research possess are clear signals of suffering in the potential helpee. For example, in this study, helping behaviors included holding doors, picking up fallen items, and giving money, few of which were unlikely to be accompanied by a person's distress. A person dropping their wallet on the ground may suffer later when they realize they cannot find it, but immediately there is no apparent distress. While these behaviors are indeed helpful brief mindfulness training, like that

studied here, may require distress signals for helping to occur. What is unclear, then, is why trait mindfulness was positively associated with pre-intervention daily helping in the present study. Trained and trait mindfulness may converge and diverge in some aspects of construct validity. Condon (2017) suggested that training in mindfulness includes implicit ethical instruction (also see Bodhi, 2011), “through language encouraging a ‘non-judgmental’ and ‘accepting’ approaches to negative emotion” (p. 6). Mindfulness, as measured by the Mindful Attention Awareness Scale (Brown & Ryan, 2003), taps present-centered attention and awareness, for which non-judgment and acceptance may be outgrowths (Brown et al., 2011). But there have been concerns about the construct validity of trait mindfulness measures, as they do not capture the ethical dimension that often accompanies mindfulness training and its resultant expression in daily life (Grossman, 2011). Thus, I conjecture that trait mindfulness, as measured in this study, may include a more general attentiveness to internal and external stimuli that helps to cue people to others’ predicaments. Similarly, brief mindfulness training may only increase attentiveness to the immediate distress of others. This is speculative, of course, but could be tested in the future using scenario-based helping outcomes wherein distress (vs. no distress) is a between subjects characteristic; in this way, the specificity of mindfulness training effects could be investigated.

The unexpected importance of empathic fantasy in helping behavior. It was expected that perspective taking and empathic concern would be associated with helping behavior, as these relations have been shown in previous research (Calro et al., 1991). It was unexpected, however, that empathic fantasy would be associated with helping behavior. Empathic fantasy taps individual proclivities to imaginatively place oneself in the feeling states and actions of fictional characters. One example item from the IRI subscale is exemplary of the construct; “After seeing a play or movie, I have felt as though I were one of the characters.” A

recent social neuroscience study found that individuals scoring higher on the fantasy subscale of the IRI evidenced greater beta frequency oscillations, a measure of distress reactivity, to outgroup members in pain. These results may be consistent with previous research suggesting that the empathy gap for outgroup members is due to dampened empathic simulation of their distress (Gutsell & Inzlicht, 2012). However, it should be noted that individuals higher in fantasy showed an exaggerated empathy gap; that is, higher fantasy scores were associated with more frequent ingroup helping relative to outgroup helping. When tailoring interventions to lessen the empathy gap, researchers ought to be cognizant of the dispositional tendencies that may change as a consequence of the intervention, and based on the findings here, training that involves taking the perspectives of fictional characters may compound the empathy gap.

Limitations

The target sample size (to achieve power of 0.80) was 80, but participant attrition dropped the sample size to $N = 77$ after session cancellations and participant suspicion regarding study hypotheses. Thus, this study may have been slightly underpowered to find effects or relations that would exist with larger samples.

Generalizability of the empathic simulation findings outside of video observation are unknown. However, inclusion of staged *in vivo* measures of helping behavior provided an ecologically valid metric for prosocial responsiveness. Furthermore, it could be argued that the pervasiveness of distress-related content in various media sources (e.g., appeals to help refugees or starving children) provides an ecological exemplar to which these effects can be generalized. Further examining relations between these measures could reveal more about the link between emotional responsiveness to suffering and helping. This study was not ideal for testing such questions as the distress contexts in video and *in vivo* stimuli were different (i.e., sadness vs.

discomfort and frustration). Another possible solution to this apparent mismatch between video and *in vivo* stimuli would include querying about helpee distress in end-of-day measures of daily helping.

Also, to my knowledge there are no studies that have explored whether event sampling of helping behavior (capturing salient behavioral events as they happen) can be used. Such a design would reduce retrospective memory bias concerns about the end-of-day recording. Perhaps the addition of pleasant and antagonistic behaviors, as was done in this study, would allow researchers to use event sampling without creating unintentional demand on participants to unnaturally seek out opportunities to help.

There are additional limitations to the end-of-day helping checklist used here. First, the items on the daily helping checklist were not randomized, and participants may have unintentionally believed that information ordered first was more important (Krosnick, Li, & Lehman, 1990). Second, the 21-item checklist may have contributed to floor effects on the outcome due to increased cognitive load (Schwarz, 1996). Future research could benefit from using a shorter checklist that excludes infrequent helping behaviors and that randomizes the presentation of help behavior items to avoid such measurement error issues. Third, the low frequency of helping, which was more than ten times less frequent than expected, could be due to a variety of factors. For example, females graduate students may have less opportunity to help outside of work contexts; and participants in this study reporting living in less sociodemographically diverse areas of the Richmond, Virginia community.

The study sample was quite homogenous, including only self-identifying White women, most of whom were graduate students. This approach to participant recruitment was taken for gender-related self-presentation concerns. Including male participants would have created a

second ingroup/outgroup factor based on gender, thereby weakening study power to detect training effects and trait relations. This sample was not ideal for other reasons as well. Women are more likely than men to shift attitudes toward the perceived attitudes of others (Sinclair, Lowery, Hardin, & Colangelo, 2005), and race-egalitarian attitudes among White individuals are more commonly endorsed in the presence of Black individuals (e.g., Lowery, Hardin, & Sinclair, 2001). Thus, there could have been floor effects among the Women in this study sample, where insufficient ingroup/outgroup bias existed at baseline. Stated differently, men may benefit more from mindfulness training in regard to intergroup empathy, as they commonly have higher levels of racism to attenuate that appear less mutable to the attitudes of social interaction partners (Sinclair, Lowery, Hardin, & Colangelo, 2005).

Including measures of self-reported racism and social dominance orientation was necessary for validation of outcome measures, but also presented a risk, as White individuals may experience stereotype threat when primed with the measures (Schmader, Johns, & Forbes, 2008). This stereotype threat could lead individuals to enact socially desirable behaviors so as not to appear racist – namely, reporting higher levels of empathy or helping racial outgroup members. Items from these measures were combined with additional measures consistent with the study’s cover story, and were measured on day eight of the first assessment of daily helping so as to reduce cueing participants in to study hypotheses concerning race. No participants indicated suspicion over these questions at post-experimental inquiry, but lack of awareness and misattribution of the downstream effects of a prime to volition are how primes are effective in altering behavior to begin with (Loersch & Payne, 2011). Thus, it is unclear in the present study whether inclusion of trait measures tapping racism and related constructs may have primed

subsequent helping behaviors, but this was not a demand characteristic specific to either training condition.

Another study limitation concerns the reliance upon Black female confederates in the helping scenarios. Most individuals belong to manifold social categories simultaneously (e.g., socioeconomic status, sex, skin tone), many of which were held constant or not measured in this study. Thus, helping responses in the scenarios could also be predicted by whatever social category was most immediately salient to the participant (Mitchell, Nosek, & Banaji, 2003). Also of importance are the sociodemographic characteristics of the bystanders in the helping scenarios. Although several decades of research on the effects of the presence of bystanders exists (Latané & Nida, 1981), to my knowledge no research has addressed the characteristics of the bystanders as predictors of helping. For example, it is possible that participants would have deemed Black bystanders as more responsible for helping a Black individual in distress than the White bystanders that were present in the scenarios in this study.

Concluding Remarks and Implications of Mindfulness for Outgroup Prosociality

This dissertation was designed to examine whether mindfulness training increases empathic simulation and helping behavior toward racial outgroup members. While mindfulness training did not increase empathic simulation, it did increase empathic concern and *in vivo* prosocial action toward racial outgroup members. These findings are an important step in understanding the benefits of mindful attention for interracial kindness. This research offers some support to the contention that mindfulness training may thin boundaries between self and other in intergroup contexts, but what remains to be answered is how mindfulness achieves this. This research also extends previous work by showing that mindfulness can promote positive interpersonal outcomes. Mindfulness may present an effective means to shrink the social gaps

that divide us and help to drive social discord. These potential benefits notwithstanding, it should be noted that in today's world, many social issues are underlain by inequality, and when individuals in advantaged groups empathize with members of disadvantage groups they do not engage in behaviors to repair this inequality because they feel like they have already "done something" by showing empathy (Bruneau & Saxe, 2012). More research is needed in this area to understand the basic mechanisms of mindfulness in intergroup prosociality so as to better tailor the application of mindfulness training to current social issues.

References

- Ackerman, J. M., Shapiro, J. R., Neuberg, S. L., Kenrick, D. T., Becker, D. V., Griskevicius, V., ... Schaller, M. (2006). They all look the same to me (unless they're angry): From outgroup homogeneity to outgroup heterogeneity. *Psychological Science, 17*(10), 836–840. <http://doi.org/10.1111/j.1467-9280.2006.01790.x>
- Adams, R. B., Jr., & Kleck, R. E. (2005). Effects of direct and diverted gaze on the perception of facially communicated emotion. *Emotion, 5*(1), 3–11. <http://doi.org/10.1037/1528-3542.5.1.3>
- Amodio, D. M., & Frith, C. D. (2006). Meeting of minds: The medial frontal cortex and social cognition. *Nature Reviews Neuroscience, 7*(4), 268–277. <http://doi.org/10.1038/nrn1884>
- Anālayo. (2003). *Satipaṭṭhāna: The Direct Path to Realization*. Birmingham, UK: Windhorse Publications.
- Arch, J. J. & Landy, L. N. (2015). Mindfulness and emotional benefits. In K. W. Brown, J. D. Creswell & R. M. Ryan, (Eds.), *Handbook of Mindfulness: Theory and Research* (pp. 208-224), New York, NY: Guilford Press.
- Avenanti, A., Sirigu, A., & Aglioti, S. M. (2010). Racial bias reduces empathic sensorimotor resonance with other-race pain. *Current Biology, 20*(11), 1018–1022. <http://doi.org/10.1016/j.cub.2010.03.071>
- Axelrod, R. M. (2006). *The evolution of cooperation*. New York: Basic Books.
- Baer, R. A. (2006). Mindfulness training as a clinical intervention: A Conceptual and Empirical Review. *Clinical Psychology: Science and Practice, 10*(2), 125–143. <http://doi.org/10.1093/clipsy.bpg015>

- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27–45.
<http://doi.org/10.1177/1073191105283504>
- Bargh, J. A., & Chartrand, T. L. (1999). The unbearable automaticity of being. *American Psychologist, 54*(7), 462–479. <http://doi.org/10.1037/0003-066X.54.7.462>
- Bargh, J. A., & Chartrand, TL (2000). Studying the mind in the middle: A practical guide to priming and automaticity research. H. T. Reis & C. M. Judd (eds.). *Handbook of research methods in social and personality psychology*, (p. 253-285). NY: Cambridge University Press.
- Baron-Cohen, S., & Wheelwright, S. (2004). The Empathy Quotient: An investigation of adults with Asperger Syndrome or high functioning Autism, and normal sex differences. *Journal of Autism and Developmental Disorders, 34*(2), 163–175.
<http://doi.org/10.1023/B:JADD.0000022607.19833.00>
- Barrett-Lennard, G. T. (1981). The empathy cycle: Refinement of a nuclear concept. *Journal of Counseling Psychology, 28*(2), 91–100. <http://doi.org/10.1037/0022-0167.28.2.91>
- Batson, C. D., & Ahmad, N. Y. (2009). Using empathy to improve intergroup attitudes and relations. *Social Issues and Policy Review, 3*(1), 141–177. <http://doi.org/10.1111/j.1751-2409.2009.01013.x>
- Batson, C. D., Early, S., & Salvarani, G. (1997). Perspective taking: imagining how another feels versus imagining how you would feel. *Personality and Social Psychology Bulletin, 23*(7), 751–758. <http://doi.org/10.1177/0146167297237008>

- Batson, C. D., Fultz, J., & Schoenrade, P. A. (1987). Distress and empathy: Two qualitatively distinct vicarious emotions with different motivational consequences. *Journal of Personality, 55*(1), 19–39. <http://doi.org/10.1111/j.1467-6494.1987.tb00426.x>
- Batson, C. D., Lishner, D. A., & Stocks, E. L. (2015). The empathy - altruism hypothesis. In D. A. Schroeder & W. G. Graziano (Eds.). *The Oxford handbook of prosocial behavior* (pp. 259–281). New York: Oxford University Press.
- Batson, C. D., & Shaw, L. L. (1991). Evidence for altruism: Toward a pluralism of prosocial motives. *Psychological Inquiry, 2*(2), 107–122.
http://doi.org/10.1207/s15327965pli0202_1
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529. <http://doi.org/10.1037/0033-2909.117.3.497>
- Beckes, L., Coan, J. A., & Hasselmo, K. (2013). Familiarity promotes the blurring of self and other in the neural representation of threat. *Social Cognitive and Affective Neuroscience, 8*(6), 670–677. <http://doi.org/10.1093/scan/nss046>
- Beitel, M., Ferrer, E., & Cecero, J. J. (2005). Psychological mindedness and awareness of self and others. *Journal of Clinical Psychology, 61*(6), 739–750.
<http://doi.org/10.1002/jclp.20095>
- Berry, D. R., & Brown, K. W. (in press). Reducing separateness with presence: How mindfulness catalyzes intergroup prosociality. In J. C. T. M. Karremans & E. Papias (eds.). *The Handbook of Mindfulness in Social Psychology*. New York: Routledge.

- Berry, D. R., Cairo, A. H., Goodman, R. J., Quaglia, J. T., Green, J. D., & Brown, K. W., (2017). Mindfulness increases empathic and prosocial responses toward ostracized strangers. *Unpublished Manuscript, Virginia Commonwealth University.*
- Berry, D. R., Brown, K. W., Cairo, A. H., Wall, C., & Plonski, P. E. & Tubbs, J. D. (2017). Mindfulness increases empathic and prosocial responses toward racial outgroup members. *Unpublished Manuscript, Virginia Commonwealth University.*
- Birnie, K., Speca, M., & Carlson, L. E. (2010). Exploring self-compassion and empathy in the context of mindfulness-based stress reduction (MBSR). *Stress and Health, 26*(5), 359–371. <http://doi.org/10.1002/smi.1305>
- Bodhi, B. (2011). What does mindfulness really mean? A canonical perspective. *Contemporary Buddhism, 12*(01), 19-39. <http://dx.doi.org/10.1080/14639947.2011.564813>
- Bolz, M., & Singer, T. (2013). *Compassion bridging practice in Science*. Munich: Max Planck Society.
- Bornemann, B., Herbert, B. M., Mehling, W. E., & Singer, T. (2015). Differential changes in self-reported aspects of interoceptive awareness through 3 months of contemplative training. *Frontiers in Psychology, 5*. <http://doi.org/10.3389/fpsyg.2014.01504>
- Brewer, M. (2001). Ingroup identification and intergroup conflict. In *Social identity, intergroup conflict, and conflict reduction*. New York: Oxford University Press.
- Brewer, M., & Caporael, L. (2006). An evolutionary perspective on social identity: Revisiting groups. In *Evolution and social psychology* (pp. 143–161). New York: Psychology Press.
- Brown, K.W., Berry, D. R., & Quaglia, J. T. (2017). The hypo-egoic expression of mindfulness in social life. In M. L. Leary & K. W. Brown (Eds.) *The Oxford handbook of hypo-egoic processes*. NY: Oxford University Press.

- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84(4), 822–848. <http://doi.org/10.1037/0022-3514.84.4.822>
- Brown, K. W., Ryan, R. M., Creswell, J. D., & Niemiec, C. P. (2008). Beyond me: Mindful responses to social threat. In H. A. Wayment & J. J. Bauer (Eds.) *Transcending self-interest: Psychological explorations of the quiet ego* (pp. 75 - 84). Washington, DC: American Psychological Association.
- Brown, K. W., Ryan, R. M., Loverich, T. M., Biegel, G. M., & West, A. M. (2011). Out of the armchair and into the streets: Measuring mindfulness advances knowledge and improves interventions: Reply to Grossman (2011).
- Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park, CA: Sage.
- Cameron, C. D., & Fredrickson, B. L. (2015). Mindfulness facets predict helping behavior and distinct helping-related emotions. *Mindfulness*, 6(5), 1211–1218. <http://doi.org/10.1007/s12671-014-0383-2>
- Carlo, G., Eisenberg, N., Troyer, D., Switzer, G., & Speer, A. L. (1991). The altruistic personality: In what contexts is it apparent?. *Journal of Personality and Social Psychology*, 61(3), 450–458. doi: 10.1037/0022-3514.61.3.450
- Carstensen, L. L. (1992). Social and emotional patterns in adulthood: Support for socioemotional selectivity theory. *Psychology and Aging*, 7(3), 331–338. <http://doi.org/10.1037/0882-7974.7.3.331>

- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS Scales. *Journal of Personality and Social Psychology*, *67*(2), 319. <http://dx.doi.org/10.1037/0022-3514.67.2.319>
- Chartrand, T. L., & Lakin, J. L. (2013). The antecedents and consequences of human behavioral mimicry. *Annual Review of Psychology*, *64*(1), 285–308. <http://doi.org/10.1146/annurev-psych-113011-143754>
- Chen, D., Lew, R., Hershman, W., & Orlander, J. (2007). A cross-sectional measurement of medical student empathy. *Journal of General Internal Medicine*, *22*(10), 1434–1438. <http://doi.org/10.1007/s11606-007-0298-x>
- Chiao, J. Y., & Mathur, V. A. (2010). Intergroup empathy: How does race affect empathic neural responses? *Current Biology*, *20*(11), R478–R480. <http://doi.org/10.1016/j.cub.2010.04.001>
- Chiao, J. Y., Mathur, V. A., Harada, T., & Lipke, T. (2009). Neural basis of preference for human social hierarchy versus egalitarianism. *Annals of the New York Academy of Sciences*, *1167*(1), 174–181. <http://doi.org/10.1111/j.1749-6632.2009.04508.x>
- Chödrön, P. (2000). *When things fall apart: heart advice for difficult times*. Boston: Shambhala: Distributed in the U.S. by Random House.
- Cialdini, R. B., Brown, S. L., Lewis, B. P., Luce, C., & Neuberg, S. L. (1997). Reinterpreting the empathy–altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology*, *73*(3), 481. <http://dx.doi.org/10.1037/0022-3514.73.3.481>

- Cikara, M. (2015). Intergroup schadenfreude: motivating participation in collective violence. *Current Opinion in Behavioral Sciences*, 3, 12–17.
<http://doi.org/10.1016/j.cobeha.2014.12.007>
- Cikara, M., Bruneau, E. G., & Saxe, R. R. (2011). Us and them: Intergroup failures of empathy. *Current Directions in Psychological Science*, 20(3), 149–153.
<http://doi.org/10.1177/0963721411408713>
- Cikara, M., & Van Bavel, J. J. (2014). The neuroscience of intergroup relations: An integrative review. *Perspectives on Psychological Science*, 9(3), 245–274.
<http://doi.org/10.1177/1745691614527464>
- Cochin, S., Barthelemy, C., Roux, S., & Martineau, J. (1999). Observation and execution of movement: similarities demonstrated by quantified electroencephalography. *European Journal of Neuroscience*, 11(5), 1839–1842. <http://doi.org/10.1046/j.1460-9568.1999.00598.x>
- Cohen, T. R., & Insko, C. A. (2008). War and peace: possible approaches to reducing intergroup conflict. *Perspectives on Psychological Science*, 3(2), 87–93.
<http://doi.org/10.1111/j.1745-6916.2008.00066.x>
- Condon, P., Desbordes, G., Miller, W. B., & DeSteno, D. (2013). Meditation increases compassionate responses to suffering. *Psychological Science*, 24(10), 2125–2127.
<http://doi.org/10.1177/0956797613485603>
- Condon, P., & Feldman Barrett, L. (2013). Conceptualizing and experiencing compassion. *Emotion*, 13(5), 817. <http://dx.doi.org/10.1037/a0033747>
- Cooley, E., & Payne, B. K. (2017). Using groups to measure intergroup prejudice. *Personality and Social Psychology Bulletin*, 43(1), 46–59. doi: 10.1177/0146167216675331

- 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), 1314–1329. <http://doi.org/10.1037/0022-3514.83.6.1314>
- McCrae, R. R., & Costa, P. T. (1992). The NEO Personality Inventory (NEO-PI-R and The NEO Five-Factor Inventory (NEO-FFI). Professional Manual. Odessa. *Psychological Assessment Resources*.
- Dambrun, M., & Ricard, M. (2011). Self-centeredness and selflessness: A theory of self-based psychological functioning and its consequences for happiness. *Review of General Psychology*, 15(2), 138. doi: 10.1037/a0023059
- Darley, J. M., & Latane, B. (1968). Bystander intervention in emergencies: Diffusion of responsibility. *Journal of Personality and Social Psychology*, 8(4, Pt.1), 377–383. <http://doi.org/10.1037/h0025589>
- Davidson, R., & Fox, N. (1982). Asymmetrical brain activity discriminates between positive and negative affective stimuli in human infants. *Science*, 218(4578), 1235–1237. <http://doi.org/10.1126/science.7146906>
- Davidson, R. J. (2000). Dysfunction in the neural circuitry of emotion regulation--A possible prelude to violence. *Science*, 289(5479), 591–594. <http://doi.org/10.1126/science.289.5479.591>
- Davidson, R. J. (2004). What does the prefrontal cortex “do” in affect: perspectives on frontal EEG asymmetry research? *Biological Psychology*, 67(1-2), 219–234. <http://doi.org/10.1016/j.biopsycho.2004.03.008>

- Davidson, R. J., Ekman, P., Saron, C. D., Senulis, J. A., & Friesen, W. V. (1990). Approach-withdrawal and cerebral asymmetry: Emotional expression and brain physiology: I. *Journal of Personality and Social Psychology*, *58*(2), 330–341.
<http://doi.org/10.1037/0022-3514.58.2.330>
- Davidson, R. J., & Harrington, A. (Eds.). (2002). *Visions of compassion: Western scientists and Tibetan Buddhists examine human nature*. New York: Oxford University Press.
- Davis, M. H. (2015). Empathy and Prosocial Behavior. In D. A. Schroeder & W. G. Graziano (Eds.). *The Oxford Handbook of Prosocial Behavior* (pp. 282–306). New York: Oxford University Press.
- Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, *44*(1), 113–126. <http://doi.org/10.1037/0022-3514.44.1.113>
- Decety, J., & Chaminade, T. (2003). When the self represents the other: A new cognitive neuroscience view on psychological identification. *Consciousness and Cognition*, *12*(4), 577–596. [http://doi.org/10.1016/S1053-8100\(03\)00076-X](http://doi.org/10.1016/S1053-8100(03)00076-X)
- Decety, J., & Jackson, P. L. (2004). The functional architecture of human empathy. *Behavioral and Cognitive Neuroscience Reviews*, *3*(2), 71-100. doi: 10.1177/1534582304267187
- Decety, J., & Jackson, P. L. (2006). A social-neuroscience perspective on empathy. *Current Directions in Psychological Science*, *15*(2), 54-58.
- Decety, J., & Sommerville, J. A. (2003). Shared representations between self and other: a social cognitive neuroscience view. *Trends in Cognitive Sciences*, *7*(12), 527–533.
<http://doi.org/10.1016/j.tics.2003.10.004>

- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268.
http://doi.org/10.1207/S15327965PLI1104_01
- De Dreu, C. K. W., Balliet, D., & Halevy, N. (2014). Parochial cooperation in humans: Forms and functions of self-sacrifice in intergroup conflict. In A. J. Elliot (Ed.). *Advances in Motivation Science* (Vol. 1, pp. 1–47). Elsevier. Retrieved from
<http://linkinghub.elsevier.com/retrieve/pii/S2215091914000029>
- Desbordes, G., Gard, T., Hoge, E. A., Hölzel, B. K., Kerr, C., Lazar, S. W., ... Vago, D. R. (2015). Moving beyond mindfulness: Defining equanimity as an outcome measure in meditation and contemplative research. *Mindfulness*, *6*(2), 356–372.
<http://doi.org/10.1007/s12671-013-0269-8>
- Devilly, G. J., & Borkovec, T. D. (2000). Psychometric properties of the credibility/expectancy questionnaire. *Journal of Behavior Therapy and Experimental Psychiatry*, *31*(2), 73-86.
- Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, *56*(1), 5–18. <http://doi.org/10.1037/0022-3514.56.1.5>
- Devine, P. G., & Baker, S. M. (1991). Measurement of racial stereotype subtyping. *Personality and Social Psychology Bulletin*, *17*(1), 44-50. [http://dx.doi.org/10.1016/S0005-7916\(00\)00012-4](http://dx.doi.org/10.1016/S0005-7916(00)00012-4)
- Devine, P. G., Forscher, P. S., Austin, A. J., & Cox, W. T. (2012). Long-term reduction in implicit race bias: A prejudice habit-breaking intervention. *Journal of experimental social psychology*, *48*(6), 1267-1278. <http://dx.doi.org/10.1016/j.jesp.2012.06.003>

- de Waal, F. B. M. (2008). Putting the altruism back into altruism: The Evolution of Empathy. *Annual Review of Psychology*, *59*(1), 279–300.
<http://doi.org/10.1146/annurev.psych.59.103006.093625>
- di Pellegrino, G., Fadiga, L., Fogassi, L., Gallese, V., & Rizzolatti, G. (1992). Understanding motor events: a neurophysiological study. *Experimental Brain Research*, *91*(1), 176–180.
<http://doi.org/10.1007/BF00230027>
- Dixon, W. J., & Tukey, J. W. (1968). Approximate behavior of the distribution of Winsorized t (trimming/Winsorization 2). *Technometrics*, *10*(1), 83–98.
<http://doi.org/10.1080/00401706.1968.10490537>
- Dovidio, J. F., & Gaertner, S. L. (2000). Aversive racism and selection decisions: 1989 and 1999. *Psychological Science*, *11*(4), 315–319. <http://doi.org/10.1111/1467-9280.00262>
- Eckel, C. C., & Grossman, P. J. (1996). Altruism in anonymous dictator games. *Games and Economic Behavior*, *16*, 181.
- Eisenberg, N., McCreath, H., & Ahn, R. (1988). Vicarious emotional responsiveness and prosocial behavior: Their interrelations in young children. *Personality and Social Psychology Bulletin*, *14*(2), 298–311. <http://doi.org/10.1177/0146167288142008>
- Ekman, P., & Friesen, W. V. (1982). Felt, false, and miserable smiles. *Journal of Nonverbal Behavior*, *6*(4), 238–252. <http://doi.org/10.1007/BF00987191>
- Elfenbein, H. A., & Ambady, N. (2002). On the universality and cultural specificity of emotion recognition: A meta-analysis. *Psychological Bulletin*, *128*(2), 203–235.
<http://doi.org/10.1037/0033-2909.128.2.203>

- Fadiga, L., Fogassi, L., Pavesi, G., & Rizzolatti, G. (1995). Motor facilitation during action observation: A magnetic stimulation study. *Journal of Neurophysiology*, 73(6), 2608–2611.
- Feldman, G., Greeson, J., & Senville, J. (2010). Differential effects of mindful breathing, progressive muscle relaxation, and loving-kindness meditation on decentering and negative reactions to repetitive thoughts. *Behaviour Research and Therapy*, 48(10), 1002–1011. <http://doi.org/10.1016/j.brat.2010.06.006>
- Fultz, J., Schaller, M., & Cialdini, R. B. (1988). Empathy, sadness, and distress: Three related but distinct vicarious affective responses to another's suffering. *Personality and Social Psychology Bulletin*, 14(2), 312–325. <http://doi.org/10.1177/0146167288142009>
- Gable, P. A., & Harmon-Jones, E. (2008). Approach-motivated positive affect reduces breadth of attention. *Psychological Science*, 19(5), 476–482. <http://doi.org/10.1111/j.1467-9280.2008.02112.x>
- Gallese, V. (1998). Mirror neurons and the simulation theory of mind-reading. *Trends in Cognitive Sciences*, 2(12), 493–501. [http://doi.org/10.1016/S1364-6613\(98\)01262-5](http://doi.org/10.1016/S1364-6613(98)01262-5)
- Gastaut, H. J., & Bert, J. (1954). EEG changes during cinematographic presentation (Moving picture activation of the EEG). *Electroencephalography and Clinical Neurophysiology*, 6, 433–444. [http://doi.org/10.1016/0013-4694\(54\)90058-9](http://doi.org/10.1016/0013-4694(54)90058-9)
- Gilbert, P. (2005). *Compassion: Conceptualisations, research and use in psychotherapy*. NY: Routledge.
- Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychological Bulletin*, 136(3), 351. <http://dx.doi.org/10.1037/a0018807>

- Goleman, D. (2015). *Focus: The hidden driver of excellence*. NY: Harper Collins.
- Graziano, W. G., Bruce, J., Sheese, B. E., & Tobin, R. M. (2007). Attraction, personality, and prejudice: Liking none of the people most of the time. *Journal of Personality and Social Psychology*, *93*(4), 565–582. <http://doi.org/10.1037/0022-3514.93.4.565>
- Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review*, *102*(1), 4–27. <http://doi.org/10.1037/0033-295X.102.1.4>
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*, *74*(6), 1464–1480. <http://doi.org/10.1037/0022-3514.74.6.1464>
- Grossman, P. (2011). Defining mindfulness by how poorly I think I pay attention during everyday awareness and other intractable problems for psychology's (re) invention of mindfulness: comment on Brown et al.(2011). *Psychological Assessment*, *23*(4), 1034–1040. <http://dx.doi.org/10.1037/a0022713>
- Gutsell, J. N., & Inzlicht, M. (2010). Empathy constrained: Prejudice predicts reduced mental simulation of actions during observation of outgroups. *Journal of Experimental Social Psychology*, *46*(5), 841–845. <http://doi.org/10.1016/j.jesp.2010.03.011>
- Gutsell, J. N., & Inzlicht, M. (2012). Intergroup differences in the sharing of emotive states: neural evidence of an empathy gap. *Social Cognitive and Affective Neuroscience*, *7*(5), 596–603. <http://doi.org/10.1093/scan/nsr035>
- Gyatso, T. the Fourteenth Dalai Lama (1995). *The world of Tibetan Buddhism: An overview of its philosophy and practice*. Audible Studios.

- Haidt, J. (2003). The moral emotions. In R. J. Davidson, K. R. Sherer, & H. H. Goldsmith (Eds.). *Handbook of Affective Sciences*, (pp. 852-870). NY: Oxford.
- Halperin, E., Porat, R., Tamir, M., & Gross, J. J. (2013). Can emotion regulation change political attitudes in intractable conflicts? From the laboratory to the field. *Psychological Science*, *24*(1), 106-111. doi: 10.1177/0956797612452572
- Harmon-Jones, E., Gable, P. A., & Peterson, C. K. (2010). The role of asymmetric frontal cortical activity in emotion-related phenomena: A review and update. *Biological Psychology*, *84*(3), 451–462. <http://doi.org/10.1016/j.biopsycho.2009.08.010>
- Harmon-Jones, E., & Sigelman, J. (2001). State anger and prefrontal brain activity: Evidence that insult-related relative left-prefrontal activation is associated with experienced anger and aggression. *Journal of Personality and Social Psychology*, *80*(5), 797–803. <http://doi.org/10.1037/0022-3514.80.5.797>
- Harris, L. T., & Fiske, S. T. (2006). Dehumanizing the lowest of the low: Neuroimaging responses to extreme outgroups. *Psychological Science*, *17*(10), 847–853. <http://doi.org/10.1111/j.1467-9280.2006.01793.x>
- Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J. G. (2009). Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics*, *42*(2), 377–381. <http://doi.org/10.1016/j.jbi.2008.08.010>
- Haslam, N. (2006). Dehumanization: An integrative review. *Personality and Social Psychology Review*, *10*(3), 252–264. http://doi.org/10.1207/s15327957pspr1003_4

- Hein, G., Silani, G., Preuschoff, K., Batson, C. D., & Singer, T. (2010). Neural responses to ingroup and outgroup members' suffering predict individual differences in costly helping. *Neuron*, 68(1), 149–160. <http://doi.org/10.1016/j.neuron.2010.09.003>
- Hein, G., & Singer, T. (2008). I feel how you feel but not always: the empathic brain and its modulation. *Current Opinion in Neurobiology*, 18(2), 153–158. <http://doi.org/10.1016/j.conb.2008.07.012>
- Henry, P. J., & Sears, D. O. (2002). The Symbolic Racism 2000 Scale. *Political Psychology*, 23(2), 253–283. <http://doi.org/10.1111/0162-895X.00281>
- Hogeveen, J., Chartrand, T. L., & Obhi, S. S. (2015). Social mimicry enhances mu-suppression during action observation. *Cerebral Cortex*, 25(8), 2076–2082. <http://doi.org/10.1093/cercor/bhu016>
- Holz, E. M., Doppelmayr, M., Klimesch, W., & Sauseng, P. (2008). EEG correlates of action Observation in Humans. *Brain Topography*, 21(2), 93–99. <http://doi.org/10.1007/s10548-008-0066-1>
- Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science*, 6(6), 537–559. doi: 10.1177/1745691611419671
- Hooker, C. I., Verosky, S. C., Germine, L. T., Knight, R. T., & D'Esposito, M. (2010). Neural activity during social signal perception correlates with self-reported empathy. *Brain Research*, 1308, 100–113. <http://doi.org/10.1016/j.brainres.2009.10.006>
- Ioannidis, J. P. (2005). Why most published research findings are false. *PLoS Med*, 2(8), e124. <http://dx.doi.org/10.1371/journal.pmed.0020124>

- Insko, C. A., Kirchner, J. L., Pinter, B., Efav, J., & Wildschut, T. (2005). Interindividual-intergroup discontinuity as a function of trust and categorization: The paradox of expected cooperation. *Journal of Personality and Social Psychology*, 88(2), 365–385.
<http://doi.org/10.1037/0022-3514.88.2.365>
- Insko, C. A., Schopler, J., Gaertner, L., Wildschut, T., Kozar, R., Pinter, B., ... Montoya, M. R. (2001). Interindividual-intergroup discontinuity reduction through the anticipation of future interaction. *Journal of Personality and Social Psychology*, 80(1), 95–111.
<http://doi.org/10.1037//0022-3514.80.1.95>
- Insko, C. A., Schopler, J., Pemberton, M. B., Wieselquist, J., McIlraith, S. A., Currey, D. P., & Gaertner, L. (1998). Long-term outcome maximization and the reduction of interindividual–intergroup discontinuity. *Journal of Personality and Social Psychology*, 75(3), 695–710. <http://doi.org/10.1037/0022-3514.75.3.695>
- Jarvis, W. B. G. (2012). MediaLab v2012 ed. *New York: Empirisoft*.
- Jha, A., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. *Cognitive, Affective, & Behavioral Neuroscience*, 7(2), 109–119.
- 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.
[http://doi.org/10.1016/0163-8343\(82\)90026-3](http://doi.org/10.1016/0163-8343(82)90026-3)

- Kabat-Zinn, J., Wheeler, E., Light, T., Skillings, A., Scharf, M. J., Cropley, T. G., ... & Bernhard, J. D. (1998). Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing photo therapy (UVB) and photochemotherapy (PUVA). *Psychosomatic Medicine*, *60*(5), 625-632.
- 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), 1306–1313. <http://doi.org/10.1037/a0034150>
- Kang, Y., Gruber, J., & Gray, J. R. (2013). Mindfulness and de-Automatization. *Emotion Review*, *5*(2), 192–201. <http://doi.org/10.1177/1754073912451629>
- Kelman, H. C. (1997). Group processes in the resolution of international conflicts: Experiences from the Israeli–Palestinian case. *American Psychologist*, *52*(3), 212–220. <http://doi.org/10.1037/0003-066X.52.3.212>
- Keuken, M. C., Hardie, A., Dorn, B. T., Dev, S., Paulus, M. P., Jonas, K. J., ... Pineda, J. A. (2011). The role of the left inferior frontal gyrus in social perception: An rTMS study. *Brain Research*, *1383*, 196–205. <http://doi.org/10.1016/j.brainres.2011.01.073>
- Killingsworth, M. A., & Gilbert, D. T. (2010). A wandering mind is an unhappy mind. *Science*, *330*(6006), 932–932. <http://doi.org/10.1126/science.1192439>
- Krosnick J. A., Li F., & Lehman D. R. (1990). Conversational conventions, order of information acquisition, and the effect of base rates and individuating information on social judgments. *Journal of Personality Social Psychology*, *59*, 1140-1152.

- Kunstman, J. W., & Plant, E. A. (2008). Racing to help: Racial bias in high emergency helping situations. *Journal of Personality and Social Psychology*, 95(6), 1499–1510.
<http://doi.org/10.1037/a0012822>
- Lamm, C., Decety, J., & Singer, T. (2011). Meta-analytic evidence for common and distinct neural networks associated with directly experienced pain and empathy for pain. *NeuroImage*, 54(3), 2492–2502. <http://doi.org/10.1016/j.neuroimage.2010.10.014>
- Lansford, J. E., Sherman, A. M., & Antonucci, T. C. (1998). Satisfaction with social networks: An examination of socioemotional selectivity theory across cohorts. *Psychology and Aging*, 13(4), 544–552. <http://doi.org/10.1037/0882-7974.13.4.544>
- Latane, B., & Darley, J. M. (1975). Sex, group size and helping in three Cities. *Sociometry*, 38(2), 180. <http://doi.org/10.2307/2786599>
- Latané, B., & Darley, J. M. (1970). *The unresponsive bystander: Why doesn't he help?* Englewood Cliffs, NJ: Prentice-Hall.
- Latané, B., & Nida, S. (1981). Ten years of research on group size and helping. *Psychological Bulletin*, 89(2), 308-324.
- Leary, M. R. (2002). The interpersonal basis of self-esteem: Death, devaluation, or deference? In J. P. Forgas & K. D. Williams (Eds.), *The social self: Cognitive, interpersonal, and intergroup perspectives* (pp. 143– 159). New York: Psychology Press.
- Leary, M. R., & Terry, M. L. (2012). Hypo-egoic mindsets: Antecedents and implications of quieting the self. In M. R. Leary, & J. P. Tangney. *Handbook of self and identity* (pp. 268–288). NY: Guilford Press.

- Lepage, J.-F., & Théoret, H. (2006). EEG evidence for the presence of an action observation-execution matching system in children. *European Journal of Neuroscience*, *23*(9), 2505–2510. <http://doi.org/10.1111/j.1460-9568.2006.04769.x>
- Levesque, C., & Brown, K. W. (2007). Mindfulness as a moderator of the effect of implicit motivational self-concept on day-to-day behavioral motivation. *Motivation and Emotion*, *31*(4), 284–299. <http://doi.org/10.1007/s11031-007-9075-8>
- Lim, D., Condon, P., & DeSteno, D. (2015). Mindfulness and compassion: An examination of mechanism and scalability. *PLOS ONE*, *10*(2), e0118221. <http://doi.org/10.1371/journal.pone.0118221>
- Loersch, C., & Payne, B. K. (2011). The situated inference model: An integrative account of the effects of primes on perception, behavior, and motivation. *Perspectives on Psychological Science*, *6*(3), 234–252. <http://doi.org/10.1177/1745691611406921>
- Lowery, B. S., Hardin, C. D., & Sinclair, S. (2001). Social influence effects on automatic racial prejudice. *Journal of Personality and Social Psychology*, *81*(5), 842–855. doi: 10.1037/0022-3514.81.5.842
- 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. <http://doi.org/10.1177/1948550614559651>
- 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. <http://doi.org/10.1016/j.tics.2008.01.005>
- Malhotra, D. (2005). Long-term effects of peace workshops in protracted conflicts. *Journal of Conflict Resolution*, *49*(6), 908–924. <http://doi.org/10.1177/0022002705281153>

- Maner, J. K., & Gailliot, M. T. (2007). Altruism and egoism: Prosocial motivations for helping depend on relationship context. *European Journal of Social Psychology, 37*(2), 347-358.
- Masten, C. L., Morelli, S. A., & Eisenberger, N. I. (2011). An fMRI investigation of empathy for “social pain” and subsequent prosocial behavior. *NeuroImage, 55*(1), 381–388.
<http://doi.org/10.1016/j.neuroimage.2010.11.060>
- Mathur, V. A., Harada, T., Lipke, T., & Chiao, J. Y. (2010). Neural basis of extraordinary empathy and altruistic motivation. *NeuroImage, 51*(4), 1468–1475.
<http://doi.org/10.1016/j.neuroimage.2010.03.025>
- Metzinger, T. (2003). Phenomenal transparency and cognitive self-reference. *Phenomenology and the Cognitive Sciences, 2*(4), 353–393.
<http://doi.org/10.1023/B:PHEN.00000007366.42918.eb>
- Meyer, M. L., Masten, C. L., Ma, Y., Wang, C., Shi, Z., Eisenberger, N. I., & Han, S. (2013). Empathy for the social suffering of friends and strangers recruits distinct patterns of brain activation. *Social Cognitive and Affective Neuroscience, 8*(4), 446–454.
<http://doi.org/10.1093/scan/nss019>
- Mitchell, J. P., Nosek, B. A., & Banaji, M. R. (2003). Contextual variations in implicit evaluation. *Journal of Experimental Psychology: General, 132*(3), 455-469. doi:
10.1037/0096-3445.132.3.455
- Morelli, S. A., Rameson, L. T., & Lieberman, M. D. (2014). The neural components of empathy: Predicting daily prosocial behavior. *Social Cognitive and Affective Neuroscience, 9*(1), 39–47. <http://doi.org/10.1093/scan/nss088>

- Murphy, F. C., Nimmo-Smith, I., & Lawrence, A. D. (2003). Functional neuroanatomy of emotions: A meta-analysis. *Cognitive, Affective, & Behavioral Neuroscience*, 3(3), 207–233. <http://doi.org/10.3758/CABN.3.3.207>
- Muthukumaraswamy, S. D., Johnson, B. W., & McNair, N. A. (2004). Mu rhythm modulation during observation of an object-directed grasp. *Cognitive Brain Research*, 19(2), 195–201. <http://doi.org/10.1016/j.cogbrainres.2003.12.001>
- Obama, B. H. (2013, June 17). Remarks by President Obama and Mrs. Obama in town hall with youth of Northern Ireland. Retrieved from <https://www.whitehouse.gov/the-press-office/2013/06/17/remarks-president-obama-and-mrs-obama-town-hall-youth-northern-ireland>
- Oberman, L. M., Pineda, J. A., & Ramachandran, V. S. (2007). The human mirror neuron system: A link between action observation and social skills. *Social Cognitive and Affective Neuroscience*, 2(1), 62–66. <http://doi.org/10.1093/scan/nsl022>
- Ochsner, K., & Gross, J. (2005). The cognitive control of emotion. *Trends in Cognitive Sciences*, 9(5), 242–249. <http://doi.org/10.1016/j.tics.2005.03.010>
- Olendzki, A. (2005). The roots of mindfulness. In Germer, C. K., Siegel, R. D., & Fulton, P. R. (Eds.), *Mindfulness and psychotherapy* (pp. 241–261). NY: Guilford.
- Park, B., & Judd, C. M. (1990). Measures and models of perceived group variability. *Journal of Personality and Social Psychology*, 59(2), 173–191. <http://doi.org/10.1037/0022-3514.59.2.173>
- Perry, A., Bentin, S., Shalev, I., Israel, S., Uzefovsky, F., Bar-On, D., & Ebstein, R. P. (2010). Intranasal oxytocin modulates EEG mu/alpha and beta rhythms during perception of

- biological motion. *Psychoneuroendocrinology*, 35(10), 1446–1453.
<http://doi.org/10.1016/j.psyneuen.2010.04.011>
- Pettigrew, T. F. (1998). Intergroup contact theory. *Annual Review of Psychology*, 49(1), 65–85.
<http://doi.org/10.1146/annurev.psych.49.1.65>
- Pfurtscheller, G., & Aranibar, A. (1979). Evaluation of event-related desynchronization (ERD) preceding and following voluntary self-paced movement. *Electroencephalography and Clinical Neurophysiology*, 46(2), 138–146. [http://doi.org/10.1016/0013-4694\(79\)90063-4](http://doi.org/10.1016/0013-4694(79)90063-4)
- Pineda, J. A. (2005). The functional significance of mu rhythms: Translating “seeing” and “hearing” into “doing.” *Brain Research Reviews*, 50(1), 57–68.
<http://doi.org/10.1016/j.brainresrev.2005.04.005>
- Pineda, J. A., & Hecht, E. (2009). Mirroring and mu rhythm involvement in social cognition: Are there dissociable subcomponents of theory of mind? *Biological Psychology*, 80(3), 306–314. <http://doi.org/10.1016/j.biopsycho.2008.11.003>
- Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social dominance orientation: A personality variable predicting social and political attitudes. *Journal of Personality and Social Psychology*, 67(4), 741–763. <http://doi.org/10.1037/0022-3514.67.4.741>
- Preston, S. D., & de Waal, F. B. M. (2001). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences*, 25(01). <http://doi.org/10.1017/S0140525X02000018>
- Preston, S. D., & Hofelich, A. J. (2012). The many faces of empathy: Parsing empathic phenomena through a proximate, dynamic-systems view of representing the other in the self. *Emotion Review*, 4(1), 24–33. <http://doi.org/10.1177/1754073911421378>

- Pyszczynski, T., Greenberg, J., Solomon, S., Arndt, J., & Schimel, J. (2004). Why do people need self-esteem? A theoretical and empirical review. *Psychological Bulletin*, *130*(3), 435–468. <http://doi.org/10.1037/0033-2909.130.3.435>
- Quaglia, J. T. (2016). From Intra-to Inter-personal: Effects of Mindfulness Training on Emotion Regulation in Social Contexts. (Doctoral dissertation). Virginia Commonwealth University, Richmond, VA.
- Quaglia, J. T., Braun, S. E., Freeman, S. P., McDaniel, M. A., & Brown, K. W. (2016). Meta-analytic evidence for effects of mindfulness training on dimensions of self-reported dispositional mindfulness. *Psychological Assessment*. <http://dx.doi.org/10.1037/pas0000268>
- Quaglia, J. T., Goodman, R. J., & Brown, K. W. (2015). From mindful attention to social connection: The key role of emotion regulation. *Cognition and Emotion*, *29*(8), 1466–1474.
- Rameson, L. T., Morelli, S. A., & Lieberman, M. D. (2012). The neural correlates of empathy: Experience, automaticity, and prosocial behavior. *Journal of Cognitive Neuroscience*, *24*(1), 235–245. http://doi.org/10.1162/jocn_a_00130
- Ricard, M. (2015). *Altruism: The power of compassion to change yourself and the world*. London: Atlantic Books.
- Rizzolatti, G., Fadiga, L., Gallese, V., & Fogassi, L. (1996). Premotor cortex and the recognition of motor actions. *Cognitive Brain Research*, *3*(2), 131–141. [http://doi.org/10.1016/0926-6410\(95\)00038-0](http://doi.org/10.1016/0926-6410(95)00038-0)

- Rosenberg, E. L., Zanesco, A. P., King, B. G., Aichele, S. R., Jacobs, T. L., Bridwell, D. A., ... Saron, C. D. (2015). Intensive meditation training influences emotional responses to suffering. *Emotion, 15*(6), 775–790. <http://doi.org/10.1037/emo0000080>
- Rothbart, M. K., & Taylor, M. (1992). Category labels and social reality: Do we view social categories as natural kinds? In *Language, interaction and social cognition* (pp. 11–36). Thousand Oaks, CA: Sage Publications, Inc.
- Rudman, L. A., & Glick, P. (2001). Prescriptive gender stereotypes and backlash toward agentic women. *Journal of Social Issues, 57*(4), 743–762. <http://doi.org/10.1111/0022-4537.00239>
- Salzberg, S. (2011). Mindfulness and loving-kindness. *Contemporary Buddhism, 12*(1), 177–182. <http://doi.org/10.1080/14639947.2011.564837>
- Saucier, D. A., Miller, C. T., & Doucet, N. (2005). Differences in helping whites and blacks: A meta-analysis. *Personality and Social Psychology Review, 9*(1), 2–16. http://doi.org/10.1207/s15327957pspr0901_1
- Schmader, T., Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat effects on performance. *Psychological Review, 115*(2), 336. doi: 10.1037/0033-295X.115.2.336
- Schwarz N. (1996). *Cognition and Communication: Judgmental Biases, Research Methods, and the Logic of Conversation*. Mahwah, NJ: Erlbaum
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology, 45*(3), 513–523. <http://doi.org/10.1037/0022-3514.45.3.513>

- Sedlmeier, P., Eberth, J., Schwarz, M., Zimmermann, D., Haarig, F., Jaeger, S., & Kunze, S. (2012). The psychological effects of meditation: A meta-analysis. *Psychological Bulletin*, 138(6), 1139–1171. <http://doi.org/10.1037/a0028168>
- Semlitsch, H. V., Anderer, P., Schuster, P., & Presslich, O. (1986). A solution for reliable and valid reduction of ocular artifacts, applied to the P300 ERP. *Psychophysiology*, 23(6), 695–703. <http://doi.org/10.1111/j.1469-8986.1986.tb00696.x>
- Shaver, P., Schwartz, J., Kirson, D., & O'Connor, C. (1987). Emotion knowledge: Further exploration of a prototype approach. *Journal of Personality and Social Psychology*, 52(6), 1061–1086. <http://doi.org/10.1037/0022-3514.52.6.1061>
- Shechtman, Z., & Basheer, O. (2005). Normative beliefs supporting aggression of Arab children in an intergroup conflict. *Aggressive Behavior*, 31(4), 324–335. <http://doi.org/10.1002/ab.20069>
- Sherif, M. (1988). *The Robbers Cave experiment: Intergroup conflict and cooperation*. Scranton, Pa: Wesleyan University Press
- Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology*, 4(1), 1–32. <http://doi.org/10.1146/annurev.clinpsy.3.022806.091415>
- Sinclair, S., Lowery, B. S., Hardin, C. D., & Colangelo, A. (2005). Social tuning of automatic racial attitudes: the role of affiliative motivation. *Journal of Personality and Social Psychology*, 89(4), 583–592. doi: 10.1037/0022-3514.89.4.583
- Singer, J. D. (1998). Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models. *Journal of Educational and Behavioral Statistics*, 23(4), 323–355. <http://doi.org/10.3102/10769986023004323>

- Singer, T. (2004). Empathy for pain involves the affective but not sensory components of pain. *Science*, 303(5661), 1157–1162. <http://doi.org/10.1126/science.1093535>
- Singer, T. (2006). The neuronal basis and ontogeny of empathy and mind reading: Review of literature and implications for future research. *Neuroscience & Biobehavioral Reviews*, 30(6), 855–863. <http://doi.org/10.1016/j.neubiorev.2006.06.011>
- Singer, T., Critchley, H. D., & Preuschoff, K. (2009). A common role of insula in feelings, empathy and uncertainty. *Trends in Cognitive Sciences*, 13(8), 334–340. <http://doi.org/10.1016/j.tics.2009.05.001>
- Slagter, H. A., Lutz, A., Greischar, L. L., Francis, A. D., Nieuwenhuis, S., Davis, J. M., & Davidson, R. J. (2007). Mental training affects distribution of limited brain resources. *PLoS Biology*, 5(6), e138. <http://doi.org/10.1371/journal.pbio.0050138>
- Sobotka, S. S., Davidson, R. J., & Senulis, J. A. (1992). Anterior brain electrical asymmetries in response to reward and punishment. *Electroencephalography and Clinical Neurophysiology*, 83(4), 236–247.
- Spybrook, J., Raudenbush, S. W., Liu, X. F., Congdon, R., & Martínez, A. (2006). Optimal design for longitudinal and multilevel research: Documentation for the “Optimal Design” software. *Survey Research Center of the Institute of Social Research at University of Michigan*.
- 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. <http://doi.org/10.1007/s11031-015-9514-x>

- Stepanikova, I., Triplett, J., & Simpson, B. (2011). Implicit racial bias and prosocial behavior. *Social Science Research, 40*(4), 1186–1195.
<http://doi.org/10.1016/j.ssresearch.2011.02.004>
- Stephan, W. G., & Finlay, K. (1999). The role of empathy in improving intergroup relations. *Journal of Social Issues, 55*(4), 729–743. <http://doi.org/10.1111/0022-4537.00144>
- Tajfel, H. (1974). Social identity and intergroup behaviour. *Social Science Information, 13*(2), 65–93. <http://doi.org/10.1177/053901847401300204>
- Tajfel, H. (Ed.). (1978). *Differentiation between social groups: Studies in the social psychology of intergroup relations*. London; Published in cooperation with European Association of Experimental Social Psychology by Academic Press.
- Tajfel, H. (1981). *Human groups and social categories: Studies in social psychology*. New York: Cambridge University Press.
- Tajfel, H. (1982). Social psychology of intergroup relations. *Annual Review of Psychology, 33*, 1–39. doi: 10.1146/annurev.ps.33.020182.000245
- Tang, Y. Y., Hölzel, B. K., & Posner, M. I. (2015). The neuroscience of mindfulness meditation. *Nature Reviews Neuroscience, 16*(4), 213-22. doi:10.1038/nrn3916
- Tang, Y.-Y., Ma, Y., Wang, J., Fan, Y., Feng, S., Lu, Q., ... Posner, M. I. (2007). Short-term meditation training improves attention and self-regulation. *Proceedings of the National Academy of Sciences, 104*(43), 17152–17156. <http://doi.org/10.1073/pnas.0707678104>
- Tang, Y.-Y., & Posner, M. I. (2009). Attention training and attention state training. *Trends in Cognitive Sciences, 13*(5), 222–227. <http://doi.org/10.1016/j.tics.2009.01.009>

- Teasdale, J. D., & Chaskalson, M. (2011). How does mindfulness transform suffering? I: the nature and origins of dukkha. *Contemporary Buddhism*, 12(1), 89-102. doi: 10.1080/14639947.2011.564824
- Tomasello, M. (2009). *Why we cooperate*. Cambridge, Mass: MIT Press.
- Tooby, J., & Cosmides, L. (2010). Groups in the mind: The coalitional roots of war and morality (pp. 191–234). London: Palgrave Macmillan.
- Trautwein, F. M., Naranjo, J. R., & Schmidt, S. (2014). Meditation effects in the social domain: self-other connectedness as a general mechanism? In *Meditation–Neuroscientific Approaches and Philosophical Implications* (pp. 175–198). Springer International Publishing.
- Trivers, R. L. (1971). The evolution of reciprocal altruism. *The Quarterly Review of Biology*, 46(1), 35-57. doi: 10.1086/406755
- Turner, J. C., Brown, R. J., & Tajfel, H. (1979). Social comparison and group interest in ingroup favouritism. *European Journal of Social Psychology*, 9(2), 187–204.
<http://doi.org/10.1002/ejsp.2420090207>
- van Baaren, R., Janssen, L., Chartrand, T. L., & Dijksterhuis, A. (2009). Where is the love? The social aspects of mimicry. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1528), 2381–2389. <http://doi.org/10.1098/rstb.2009.0057>
- Van Bavel, J. J., Packer, D. J., & Cunningham, W. A. (2008). The neural substrates of ingroup bias: A functional magnetic resonance imaging investigation. *Psychological Science*, 19(11), 1131–1139. <http://doi.org/10.1111/j.1467-9280.2008.02214.x>

- van den Hurk, P. A. M., Giommi, F., Gielen, S. C., Speckens, A. E. M., & Barendregt, H. P. (2010). Greater efficiency in attentional processing related to mindfulness meditation. *The Quarterly Journal of Experimental Psychology*, *63*(6), 1168–1180. <http://doi.org/10.1080/17470210903249365>
- Voronca, D. C., Egede, L. E., & Gebregziabher, M. (2014). Analysis of zero inflated longitudinal data using PROC NLMIXED. *Unpublished manuscript, North Carolina State University, Raleigh, NC.*
- Wallace, A. B. (2006). The nature of mindfulness and its role in Buddhist meditation: A correspondence between B. Alan Wallace and the venerable Bhikkhu Bodhi. *Unpublished manuscript, Santa Barbara Institute for Consciousness Studies, Santa Barbara, CA.*
- Watson, D. C., & Clark, A. LA (1994). The PANAS-X: Manual for the Positive and Negative Affect Schedule—Expanded Form. *Unpublished manuscript, Department of Psychology, University of Iowa, Iowa City, IA.*
- Weisbuch, M., & Ambady, N. (2008). Affective divergence: Automatic responses to others' emotions depend on group membership. *Journal of Personality and Social Psychology*, *95*(5), 1063–1079. <http://doi.org/10.1037/a0011993>
- Williams, K. S., Yeager, D.S., Cheung, C.K.T., & Choi, W. (2012). Cyberball (version 4.0) [Software]. Available from <https://cyberball.wikispaces.com>.
- Wesselmann, E. D., Bagg, D., & Williams, K. D. (2009). “I feel your pain”: The effects of observing ostracism on the ostracism detection system. *Journal of Experimental Social Psychology*, *45*(6), 1308–1311. <http://doi.org/10.1016/j.jesp.2009.08.003>

- Wheeler, R. E., Davidson, R. J., & Tomarken, A. J. (2007). Frontal brain asymmetry and emotional reactivity: A biological substrate of affective style. *Psychophysiology*, *30*(1), 82–89. <http://doi.org/10.1111/j.1469-8986.1993.tb03207.x>
- Williams, K. D., & Jarvis, B. (2006). Cyberball: A program for use in research on interpersonal ostracism and acceptance. *Behavior Research Methods*, *38*(1), 174–180. <http://doi.org/10.3758/BF03192765>
- Wolf, S. T., Insko, C. A., Kirchner, J. L., & Wildschut, T. (2008). Interindividual-intergroup discontinuity in the domain of correspondent outcomes: The roles of relativistic concern, perceived categorization, and the doctrine of mutual assured destruction. *Journal of Personality and Social Psychology*, *94*(3), 479–494. <http://doi.org/10.1037/0022-3514.94.3.479>
- Woodruff, C. C., Daut, R., Brower, M., & Bragg, A. (2011). Electroencephalographic α -band and β -band correlates of perspective-taking and personal distress. *Neuroreport*, *22*(15), 744–748.
- Woodruff, C. C., & Klein, S. (2013). Attentional distraction, μ -suppression and empathic perspective-taking. *Experimental brain research*, *229*(4), 507–515.
- Woodruff, C. C., Martin, T., & Bilyk, N. (2011). Differences in self- and other-induced Mu suppression are correlated with empathic abilities. *Brain Research*, *1405*, 69–76. <http://doi.org/10.1016/j.brainres.2011.05.046>
- Xu, X., Zuo, X., Wang, X., & Han, S. (2009). Do you feel my pain? Racial group membership modulates empathic neural responses. *Journal of Neuroscience*, *29*(26), 8525–8529. <http://doi.org/10.1523/JNEUROSCI.2418-09.2009>

- Zaki, J., & Cikara, M. (2015). Addressing empathic failures. *Current Directions in Psychological Science*, 24(6), 471–476. <http://doi.org/10.1177/0963721415599978>
- 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. <http://doi.org/10.1016/j.concog.2010.03.014>
- Zeidan, F., Johnson, S. K., Gordon, N. S., & Goolkasian, P. (2010). Effects of brief and sham mindfulness meditation on mood and cardiovascular variables. *The Journal of Alternative and Complementary Medicine*, 16(8), 867–873. <http://doi.org/10.1089/acm.2009.0321>
- Zeidan, F., Martucci, K. T., Kraft, R. A., Gordon, N. S., McHaffie, J. G., & Coghill, R. C. (2011). Brain mechanisms supporting the modulation of pain by mindfulness meditation. *Journal of Neuroscience*, 31(14), 5540–5548. <http://doi.org/10.1523/JNEUROSCI.5791-10.2011>

Appendix A

Graduate and Staff Listserv Recruitment Email

Subject: Free Mindfulness Meditation Training + \$ Compensation: Participants Needed

The Virginia Commonwealth University (VCU) Stress Reduction and Well-Being Study is seeking individuals who meet the following criteria:

- Between 18 and 60 years of age
- Own a smartphone or personal computer
- Interested in learning mindfulness meditation (4 brief weekday sessions)
- Not meditated previously (yoga is ok)

Qualifying participants have a chance to receive up to **\$110 in compensation, in addition to free mindfulness meditation training.**

For more information, please contact: vcuwellbeing@gmail.com

Appendix B

Email Screening Questions

MEDICAL HISTORY INFORMATION FORM

Section 1

Please indicate if you currently or in the past have experienced any of the following:
(If you check yes, state when)

When

I. Neurological conditions:

<input type="checkbox"/> Epilepsy	_____
<input type="checkbox"/> Head injury	_____
<input type="checkbox"/> Hemorrhage	_____
<input type="checkbox"/> Meningitis	_____
<input type="checkbox"/> Migraine	_____
<input type="checkbox"/> Multiple Sclerosis	_____
<input type="checkbox"/> Parkinson's	_____
<input type="checkbox"/> Seizures	_____
<input type="checkbox"/> Stroke	_____
<input type="checkbox"/> Shingles	_____
<input type="checkbox"/> Posttherapeutic neuralgia	_____
<input type="checkbox"/> Other	_____

II. Have you ever undergone any form of brain surgery?

Yes No

III. Are you currently taking any medications for a problem associated with a neurological condition, attention-related condition, or mental health condition?

Yes No

IV. Do you currently have problems with alcohol or drugs (excluding tobacco or social use of alcohol)?

Yes No

V. Are you currently in treatment for alcohol or drug use?

Yes No

VI. Are you currently being treated for a psychological or psychiatric condition?

Yes No

VII. Have you ever experienced brain trauma (e.g., an accident that left you unconscious for more than 10 minutes)?

Yes No

VIII. Have you experienced a traumatic or major aversive life event over the last six months?

Yes No

Section 2

I. Demographics and Additional Exclusion Criteria:

1. What race / ethnicity to you self-identify with?
2. Do you own a smartphone?
3. If yes to 2: What type of operating platform does the phone use?
4. If no to 2: Do you own a PC?
5. What is your age in years?
6. Have you ever practiced meditation before?
7. If yes to 6: What type of meditation did you practice?

Appendix C

Pilot Study: Do Helper Dispositional Mindfulness and Helpee Race Predict Helping Frequency?

Research indicates that helping behavior is less frequent in interracial contexts (Cikara et al., 2011; Saucier et al., 2005; Zaki & Cikara, 2015). As suggested by aversive racism theory (Gaertner & Dovidio, 2000), self-identifying White individuals are motivated to appear egalitarian, and will often behave prosocially toward racial outgroup members to maintain this appearance. However, when reasons unassociated with racism provide an opportunity for Whites to rationalize not helping - for example by putting oneself in danger - interracial helping is less frequent than same-race helping (Saucier et al., 2005). The aims of this pilot study were two-fold. First, no studies to date had examined whether helping frequency is mutable to the race of the helpee in the two scenarios proposed in this dissertation project (Condon et al., 2013; Latané & Dabbs, 1975). More specifically, do Whites provide less frequent help to Black individuals in need, relative to White individuals in need? Because helping Black individuals is less frequent in contexts where White individuals can rationalize not helping, this pilot study (and the proposed project) included bystanders who appeared aloof to the person in need. The number of bystanders and the presence of aloofness among bystanders have been identified as factors that reduce helping behavior in general (Darley & Latané, 1968) and have been identified as rationalizations for not helping in interracial interactions (Saucier et al., 2005). The first aim of this study was to examine if differences could be found in helping same-race and other-race confederates in these scenarios. And if race helping differences were found, then only using other-race confederates in the RCT will be justifiable and will preserve statistical power so as not to include race of the confederate as a between-subjects factor. Second, I aimed to understand the role of dispositional mindfulness, constructed as both an inherent capacity and an outgrowth of

MT (Quaglia, Braun, Freeman, McDaniel, Brown 2016), and racial prejudice in predicting helping frequency. Previous studies show that MT increases laboratory-based helping frequency (Condon et al., 2013; Lim et al., 2015), but none have examined this relation in interracial contexts or in one of the proposed scenarios.

Berry, Brown, Cairo, Wall, et al. (2016) recruited 139 self-identifying White or Caucasian undergraduate participants in exchange for course credit. Participants were randomized to receive one of the two following scenarios: (1) an experimenter ostensibly accidentally dropped a large stack of informed consent documents on the floor (modified from Latané & Dabbs, 1975), or (2) another ostensible participant walked into the waiting room on crutches and leaned uncomfortably against the wall (cf., Condon et al., 2013). The race of the confederate needing help (White or Black) was also randomized. Thereafter participants completed a series of self-report measures, including a commonly used measure of basic dispositional mindfulness (Brown & Ryan, 2003), a measure of trait agreeableness (Costa & McCrae, 1992), a measure of trait empathy (Davis, 1983), and a measure of racial prejudice toward Black individuals (Henry & Sears, 2002).

Preliminary multiple logistic regression models showed that there were no differences in the frequency of helping same race (coded as 0) vs. other race (coded as 1) confederates in need [$b = 0.55$, $SE(b) = 0.37$, $OR = 1.73$, 95% CI = (0.83, 3.59)] nor were there differences in the frequency of helping in the crutches (coded as 0) vs. paper-dropping (coded as 1) scenarios [$b = 0.31$, $SE(b) = 0.37$, $OR = 1.36$, 95% CI = (0.66, 2.80)]. Table 1 shows results from a three-block hierarchical logistic regression that tested whether participant sex (male = 0, female = 1), trait mindfulness, agreeableness, and racism, and mindfulness x racism interaction predicted helping behavior (yes, no). Initial tests of this model included helping recipient race, and scenario type,

but were not included in the subsequent model that is presented in Table 14 for parsimonious presentation of study effects. Males showed more frequent helping behavior frequencies than females, and higher agreeableness scores were associated with more frequent helping of same and other race individuals in need. Most importantly, higher dispositional mindfulness scores predicted more frequent helping of same and other race individuals in need. In addition to this significant main effect, a significant mindfulness x racial prejudice interaction was found.

Table 14. Hierarchical logistic regression results showing prediction of helping behavior across confederate race conditions and scenarios (Pilot study).

Block	Predictor	<i>B</i>	<i>SE(b)</i>	<i>OR</i>	[95% CI]
1	Participant Sex	-1.309*	.510	.270	[.099, .734]
	Agreeableness	1.026**	.371	2.791	[1.348, 5.777]
	Racial Prejudice	.14	.345	1.151	[.585, 2.263]
2	Mindfulness	1.167***	.316	3.213	[1.730, 5.965]
3	Mindfulness x Racial Prejudice	1.497*	.639	4.467	[1.277, 15.630]

Notes. ** $p < .01$, *** $p < .001$.

To decompose the significant mindfulness x racial prejudice interaction, four two-block hierarchical logistic regression analyses were constructed. Participant sex and agreeableness were loaded into block 1. Mindfulness was loaded into block 2. Median splits were performed on the racial prejudice and trait mindfulness variables. These two-level racial prejudice and mindfulness factors, and the race of the confederate were predictors of the binary helping outcome decomposition of the significant interaction effect. Thus, as depicted in Figure 10,

models were constructed for (1) low racism individuals toward Whites, (2) low racism individuals toward Blacks, (3) high racism individuals toward Whites, and (4) high racism individuals toward blacks. Results showed that racism qualified the relation between mindfulness and helping, such that individuals higher in racism helped more frequently if they were also high in mindfulness. Individuals lower in racism were also more helpful if they were higher in mindfulness, but this relation was not as strong as it was for individuals higher in racism.

Scenario-Based Helping Behavior Percentage

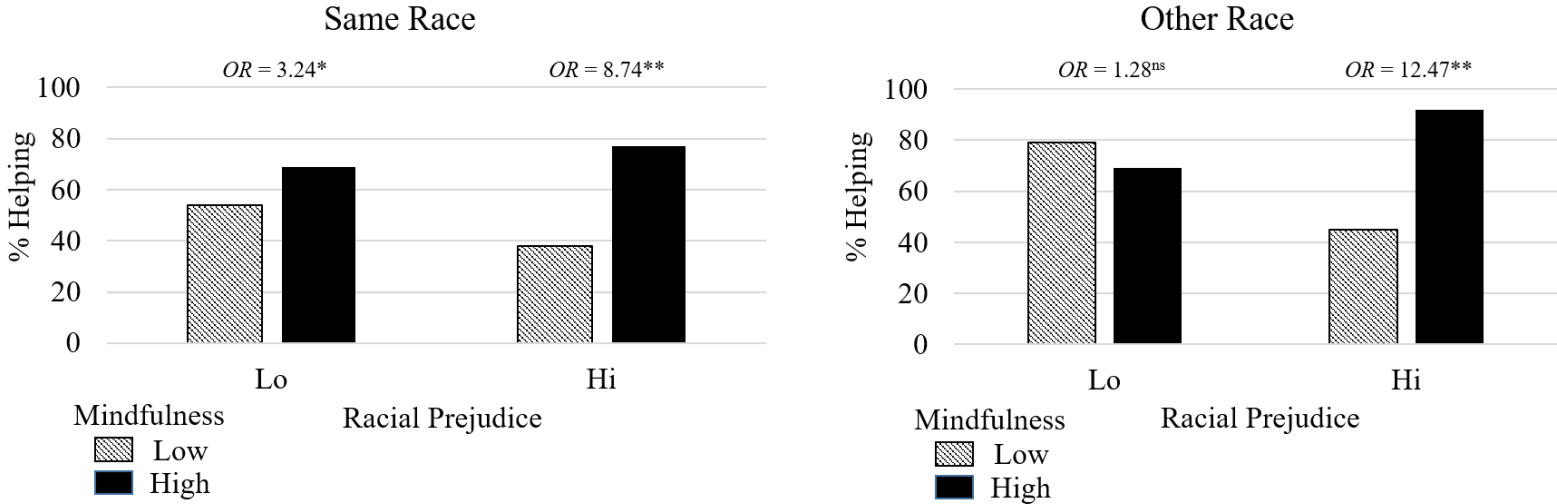


Figure 10. Trait mindfulness relations to helping behavior split by race of the person in need and median splits of racial prejudice and mindfulness scores.

Appendix D

Informed Consent

RESEARCH SUBJECT INFORMATION AND CONSENT FORM

TITLE: Meditation and Psychological / Neural Responses in Social Interaction

VCU IRB NO.:

This consent form may contain words that you do not understand. Please ask the study staff to explain any words that you do not clearly understand. You may take home an unsigned copy of this consent form to think about or discuss with family or friends before making your decision.

PURPOSE OF THE STUDY

This study seeks to understand how meditation is associated with psychological and neural responses during social interactions. You are being asked to participate in this study because you are an adult residing in the Richmond community between the ages of 18 and 60 years. The research study will be conducted in seven laboratory sessions lasting approximately 30 minutes to 2 hours in duration. There is compensation available for your participation, and you will receive a free 4-day course in mindfulness meditation. Participation is voluntary, and all responses will remain strictly confidential.

DESCRIPTION OF THE STUDY AND YOUR INVOLVEMENT

If you decide to be in this research study, you will first be asked to sign this consent form after you have had all your questions answered and understand what will happen to you. In the first laboratory session, you will be asked to complete a series of psychological questionnaires that ask about various experiences you may have. After this, you will receive training on diary questionnaires that you will answer each night for fourteen days (two weeks) on your own time using your personal smartphone or computer.

In the second laboratory session, you will be asked to complete a computer task while neurological recordings are made. We will be using an EEG recording in this study, which is a non-invasive procedure that is painless.

Thereafter, you will participate in four consecutive days of one of two sitting meditation classes. Classes will take place in the evening, and last approximately 30 minutes. The sitting meditation will be guided by an experienced practitioner, who will teach you gentle exercises that focus your attention on your breath and other experiences while you are seated. After the exercise is finished there will be time for questions and answers.

In the final laboratory session, you will complete a computer task while EEG recordings are made, and receive a second training session on the diary questionnaire protocol. You will complete another fourteen days of diary questionnaires each night on your own time using your personal smartphone or computer.

This study will take a 5-week time commitment, though you will only spend a few minutes on most days devoted to this study. Please note that laboratory sessions will require a greater time commitment of 30 minutes to 2 hours. You do not have to answer any questions or participate in any activities you do not wish to. You may withdraw from the study at any time without penalty. All of your data will be kept strictly confidential and will be viewed by the research study personnel only. We plan to enroll up to 120 adults from the Richmond community in our study.

RISKS AND DISCOMFORTS

The physical risks involved in this study are minimal and are related to the neurological recordings – specifically, wearing an EEG sensor cap. The sensor cap fits snugly on the head like a swim cap and is embedded with sensors that detect electrical brain activity on the surface of the scalp. The cap does not alter brain activity in any way; it simply detects electrical activity in the brain. This equipment has been used extensively and safely with healthy adults in previous research.

The risks to participating are not greater than the risks associated with daily living. However, if participating in this study causes you to feel upset or you become concerned about your psychological state or your current life situation, the study staff will provide you with contact information for resources available on campus that can help you address these issues, including:

- University Counseling Services, which offers free counseling for VCU students; phone 828-6200 (Monroe Park Campus) or 828-3964 (Medical Campus).
- University Student Health Services (also free for VCU students); phone 828-8828 (Monroe Park Campus) or 828-9220 (Medical Campus).
- Center for Psychological Services and Development, which offers counseling services on a sliding fee scale; phone 828-8069.

Should you need services other than those provided by VCU University Counseling Services or University Student Health Services, fees for such treatment will be billed to you or to appropriate third party insurance.

BENEFITS TO YOU AND OTHERS

We do not anticipate that you will receive any direct benefit from this study. However, others may benefit from your participation in that the information we learn from people in this study may help us better understand the processes under study.

COSTS

There are no costs for participating in this study other than the time you will spend on the tasks and filling out questionnaires.

ALTERNATIVES

The alternative to participating in this study is to not participate.

CONFIDENTIALITY

The data collected in this study will not be personally identifiable, as no name or other potentially identifiable information will be associated with the data. We will not put your name

on any documents or forms that we collect. Data is being collected only for research purposes, identified only by an anonymous study ID number, and stored separately from the consent form in a locked research area. All information will be kept in password protected electronic files. Hard copy questionnaires will be kept in a locked file cabinet for 3 years after the study ends and will be destroyed at that time. Electronic files of the study data will be kept indefinitely. Access to all data will be limited to study personnel. A data and safety monitoring plan is established.

We will not tell anyone the answers you give us; however, information from the study and the consent form signed by you may be looked at or copied for research or legal purposes by the sponsor of the research, or by Virginia Commonwealth University. Personal information about you might be shared with or copied by authorized officials of the Federal Food and Drug Administration, or the Department of Health and Human Services (if applicable). What we find from this study may be presented at meetings or published in papers, but your name will not ever be used in these presentations or papers.

VOLUNTARY PARTICIPATION AND WITHDRAWAL

You do not have to participate in this study. If you choose to participate, you may stop at any time without any penalty. You may also choose not to answer particular questions that are asked in the study. Withdrawal from the study will not affect your present or future University relationship.

Your participation in this study may be stopped at any time by the study staff without your consent. The reasons might include:

- the study staff thinks it necessary for your health or safety;
- you have not followed study instructions;
- administrative reasons require your withdrawal.

QUESTIONS

In the future, you may have questions about your participation in this study. If you have any questions, complaints, or concerns about the research, contact:

Kirk Warren Brown, PhD
Virginia Commonwealth University
Department of Psychology
806 W. Franklin Street
P.O. Box 982018
Richmond, VA 23284
Telephone: 804-828-6754

The researcher named above is the best person to call for questions about your participation in this study.

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

Office of Research
Virginia Commonwealth University
800 East Leigh Street, Suite 3000
P.O. Box 980568
Richmond, VA 23298
Telephone: (804) 827-2157

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

Appendix E

Sadness Video Stimuli Creation and Validation

Stimuli creation. Eighteen female undergraduate students were recruited from a 200-level psychology course at Virginia Commonwealth University (VCU) to participate in video stimulus creation in exchange for course credit. Each amateur “actress” reported individually to a recording studio on the Monroe Park Campus of VCU, and prior to video recording participants signed a video release form. Professional lighting was used and the videos were directed by a professional videographer, an alumna from the VCU School of the Arts. Actresses were instructed to think about a sad time in their life that they could remember vividly, and were instructed to practice facial (i.e., oblique eyebrows; Eisenberg, McCreath, & Ahn, 1988; Ekman & Friesen, 1982), postural, and behavioral (e.g., slumped posture, head in hands, looking down; Adams & Kleck, 2005; Shaver, Schwartz, Kirson, & O’Connor, 1987) expressions of sadness. The actresses practiced emoting while video was recorded; this author and the videographer provided feedback to each actress, and actresses were shown the video so as to modify their behaviors and facial expressions for more genuine expression of sadness if necessary. Then, three to five 45-second to 60-second videos were recorded of each actress while she emoted.

Three-tiered analytic strategy for video validation. Four actresses were excluded from analyses for self-identifying with a race other than White or Black, leaving 51 videos depicting 14 actresses. A three-round analytic approach was adopted to validate the video stimuli. First, 22 of the 51 videos were removed from subsequent video analyses for lack of 20 continuous seconds of genuine sadness expression (visually inspected by this author and the videographer), leaving 29 videos depicting 14 unique actresses. During the second round of video validation, 15 undergraduate research assistants reported to a lab room on the Monroe Park Campus in groups of 2 to 6 individuals and performed self-report ratings of the video stimuli. The 29 video stimuli

were presented with MediaLab (Jarvis, 2012), and during video observation raters made continuous scale ratings anchored by 5 text labels ('not at all' to 'extremely') for the following emotions: *sadness*, *guilt*, *fatigue*, *anger*, and *fear*. Continuous ratings were performed with a slider scale that allowed raters to move the slider with the left and right arrow keys on the keyboard; there were three incremental stopping points between each of the five text anchors on the scale. MediaLab samples the slider position at a rate of one sample for every 1/10th of a second. These data are then averaged for each second of ratings, and a second-by-second output file is created for analysis. Because of the large number of videos, the raters were instructed to rate no more than two emotions during one session, and thus required a minimum of three sessions to complete the full emotion set. After continuous rating of each video research assistants also responded to the following six items using a 5-point Likert scale (cf., Gutsell & Inzlicht, 2012): (1) "*the person in the video felt _____.*" ('very slightly or not at all positive' to 'extremely positive'), (2) "*the person in the video felt _____.*" ('very slightly or not at all negative' to 'extremely negative'), (3) "*the person in the video experienced a _____ emotion.*" ('very weak' to 'very strong'), (4) "*the person in the video was _____.*" ('very unlikable' to 'very likable'), (5) "*the person in the video was _____.*" ('very attractive' to 'very unattractive'), and (6) "*the technical quality of the video was _____.*" ('very poor' to 'very good').

From these 29 videos, 13 were excluded on the basis of significantly lower means, relative to the other 16 videos, on questions 2 and 3 ($n = 10$) above, question 5 ($n = 2$) and in the emotion adjective ratings, appearing guilty, not sad ($n = 1$). Twenty-second clips were then used from the 16 selected videos using video-editing software (Nero Video). These videos were cut

such that the 20 second increments indicated the greatest average sadness scores in each video, as measured by continuous ratings of the emotion item *sadness* during video observation.

The 16 videos selected from round two, which depicted 14 unique individuals, were piloted in the third round of stimulus validation. Three-hundred sixty-six undergraduate participants were recruited in exchange for course credit. Upon arriving to a large classroom on the Monroe Park Campus at VCU, participants gave written informed consent, and were then shown 9 videos in random order from one of three video orders (see Table 15). Videos were shown on a large projector screen at the front of the auditorium; sadness scores were compared within video orders using a repeated-measures ANOVA, and videos that were shown across multiple groups were compared using one-way ANOVA.

Table 15. Videos included in each video viewing session.

Video	<i>N</i>	Race	Order 1	Order 2	Order 3
Video 1	214	White	X		X
Video 2	223	White	X		X
Video 3	161	Black	X		
Video 4	292	White	X	X	
Video 5	261	Black	X	X	
Video 6	219	Black	X		X
Video 7	159	Black	X		
Video 8	223	White	X		X
Video 9	203	Black	X		X
Video 10	240	White		X	X
Video 11	239	Black		X	X
Video 12	199	Black		X	X
Video 13	199	White		X	X
Video 14	185	Black		X	X
Video 15	139	Black		X	
Video 16	132	White		X	

Notes. Videos selected for use as stimuli in future research are bold. X indicates that video was shown in the video viewing session.

Prior to watching the videos, the lights were dimmed and participants were instructed to devote their full attention to the projector screen. After each video ended the lights were turned back on and participants rated 24 adjectives from five subscales, *sadness*, *fatigue*, *serenity*, *fear*, and *guilt*, of the Positive Affect and Negative Affect Schedule – Expanded form (PANAS-X; Watson & Clark, 1994). Responses were made on a 5-point Likert scale concerning the extent to which the person in the video expressed the following emotions or psychological states (‘very slightly or not at all’ to ‘extremely’). The six items used in the second tier of analysis (described

above) were also completed after each video. Exploratory factor analysis (EFA) was performed on the 24 PANAS-X items for each video separately. During factor extraction, an oblique rotation was used and factor loadings were examined in pattern matrices and structure matrices. Videos were not used in the present study if, first, non-sadness items cross-loaded onto the sadness factor (factor loading cutoff ≤ 0.30). Sadness was found to be a unique factor with no cross-loadings across all 16 videos. An example factor structure matrix for one of the 16 videos is depicted in Table 16. Second, videos with statistically lower or higher sadness mean scores, assessed with post-hoc analyses using Bonferonni correction, were also removed. Table 17 depicts statistical analytic results for removal of 4 video stimuli, leaving a total of 12 videos for use in the dissertation study.

Table 16. Factor structure matrix of video 1 emotions.

Emotion	Guilt	Fear	Sadness	Fatigue	Serenity
Drowsy	-0.01	0.04	-0.00	0.78	0.07
Sleepy	-0.01	0.14	0.12	0.71	-0.21
Sluggish	-0.01	0.03	0.11	0.68	0.09
Tired	-0.00	0.22	0.28	0.61	0.19
Afraid	0.13	0.34	0.07	0.16	0.12
Frightened	0.23	0.80	0.14	0.11	-0.00
Jittery	0.13	0.81	0.13	0.06	-0.02
Nervous	0.08	0.66	0.17	0.05	-0.02
Scared	0.28	0.58	0.05	0.15	0.09
Shaky	0.11	0.48	0.03	0.14	-0.11
Angry at Self	0.59	0.23	0.15	-0.05	-0.02
Ashamed	0.72	0.11	0.30	-0.07	0.04
Blameworthy	0.71	0.12	0.08	0.02	0.03
Disgusted with Self	0.78	0.16	0.22	0.01	-0.00
Dissatisfied with Self	0.60	0.07	0.15	-0.13	0.02
Guilty	0.75	0.13	0.08	0.10	-0.03
Alone	0.09	0.25	0.68	0.16	0.04
Blue	0.16	-0.00	0.64	0.04	0.10
Downhearted	0.12	0.01	0.56	-0.05	-0.08
Lonely	0.14	0.12	0.58	0.24	0.03
Sad	0.25	0.11	0.57	0.10	0.02
At Ease	-0.02	0.10	0.04	0.11	0.40
Calm	0.01	0.03	0.03	0.19	0.68
Relaxed	0.02	-0.13	0.00	-0.03	0.41
Eigenvalue	5.90	2.92	2.14	1.68	1.24
% Variance	24.59	12.15	8.93	6.99	5.16

Notes. Factor loadings > 0.30 are bold.

Table 17. One-way and repeated-measures ANOVAS used to remove videos from the present study's stimulus set.

Order	V1 M	V2 M	V3 M	V4 M	V5 M	V6 M	V7 M	V8 M	V9 M	V10 M	V11 M	V12 M	V13 M	V14 M	V15 M	V16 M	F all	F drop
Order 1	3.69	3.39	2.15	3.39	3.27	3.12	2.54	3.70	3.25								4.29*	2.32 ^{ns}
Order 2				3.57	3.39					3.29	3.29	3.11	3.23	3.17	2.57	2.45	7.36*	1.67 ^{ns}
Order 3	3.82	3.51				3.37		3.53	3.07	3.40	3.34	3.25	3.40	3.53			2.32 ^{ns}	
<i>F</i>	0.25 ^{ns}	0.00 ^{ns}		0.70 ^{ns}	0.07 ^{ns}	0.08 ^{ns}		1.58 ^{ns}	0.66 ^{ns}	0.38 ^{ns}	0.44 ^{ns}	0.56 ^{ns}	1.11 ^{ns}	5.48*				

Notes. Videos removed from the present study's stimulus set are bold; *F* all = test statistic including all videos in a viewing order; *F* drop = test statistic after removing videos with statistically different mean sadness scores from analysis.

* $p < .05$, ^{ns} $p > 0.05$

Appendix F

Mindful Attention Awareness Scale

Day-to-Day Experiences

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what *really reflects* your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6
Almost	Very	Somewhat	Somewhat	Very	Almost
Always	Frequently	Frequently	Infrequently	Infrequently	Never

I could be experiencing some emotion and not be conscious of it until some time later.	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
I find it difficult to stay focused on what’s happening in the present.	1	2	3	4	5	6
I tend to walk quickly to get where I’m going without paying attention to what I experience along the way.	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
I forget a person’s name almost as soon as I’ve been told it for the first time.	1	2	3	4	5	6
It seems I am “running on automatic,” without much awareness of what I’m doing.	1	2	3	4	5	6
I rush through activities without being really attentive to them.	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I’m doing right now to get there.	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I’m doing.	1	2	3	4	5	6
I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

I drive places on 'automatic pilot' and then wonder why I went there.	1	2	3	4	5	6
I find myself preoccupied with the future or the past.	1	2	3	4	5	6
I find myself doing things without paying attention.	1	2	3	4	5	6
I snack without being aware that I'm eating.	1	2	3	4	5	6

Appendix G

Interpersonal Reactivity Index

IRI

Instructions: The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: 1, 2, 3, 4, or 5. When you have decided on your answer, fill in the letter on the answer sheet next to the item number. **READ EACH ITEM CAREFULLY BEFORE RESPONDING.** Answer as honestly as you can. Thank you.

ANSWER SCALE

Does Not
Describe Me
Well

1

2

3

4

Describes Me
Very Well

5

- ___ 1. I daydream and fantasize, with some regularity, about things that might happen to me.
- ___ 2. I often have tender, concerned feelings for people less fortunate than me.
- ___ 3. I sometimes find it difficult to see things from the "other guy's" point of view.
- ___ 4. Sometimes I don't feel very sorry for other people when they are having problems.
- ___ 5. I really get involved with the feelings of the characters in a novel.
- ___ 6. In emergency situations, I feel apprehensive and ill-at-ease.
- ___ 7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.
- ___ 8. I try to look at everybody's side of a disagreement before I make a decision.
- ___ 9. When I see someone being taken advantage of, I feel kind of protective towards them.
- ___ 10. I sometimes feel helpless when I am in the middle of a very emotional situation.
- ___ 11. I sometimes try to understand my friends better by imagining how things look from their perspective.
- ___ 12. Becoming extremely involved in a good book or movie is somewhat rare for me.

ANSWER SCALE

Does Not
Describe Me
Well

Describes Me
Very Well

1

2

3

4

5

- ___ 13. When I see someone get hurt, I tend to remain calm.
- ___ 14. Other people's misfortunes do not usually disturb me a great deal.
- ___ 15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.
- ___ 16. After seeing a play or movie, I have felt as though I were one of the characters.
- ___ 17. Being in a tense emotional situation scares me.
- ___ 18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.
- ___ 19. I am usually pretty effective in dealing with emergencies.
- ___ 20. I am often quite touched by things that I see happen.
- ___ 21. I believe that there are two sides to every question and try to look at them both.
- ___ 22. I would describe myself as a pretty soft-hearted person.
- ___ 23. When I watch a good movie, I can very easily put myself in the place of a leading character.
- ___ 24. I tend to lose control during emergencies.
- ___ 25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.
- ___ 26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.
- ___ 27. When I see someone who badly needs help in an emergency, I go to pieces.
- ___ 28. Before criticizing somebody, I try to imagine how I would feel if I were in their place.

Appendix H

NEO-Five Factor Inventory: Agreeableness Subscale

Instructions: Please read each of the following statements carefully. Using the 0 to 4 scale below, indicate the extent to which you agree with each statement.

Strongly Disagree 0	Disagree 1	Neither Disagree nor Agree 2	Agree 3	Strongly Agree 4
---------------------------	---------------	------------------------------------	------------	------------------------

- ___ 1. I try to be courteous to everyone I meet.
- ___ 2. I often get into arguments with my family and co-workers.
- ___ 3. Some people think I'm selfish and egotistical.
- ___ 4. I would rather cooperate with others than compete with them.
- ___ 5. I tend to be cynical and skeptical of other's intentions.
- ___ 6. I believe that most people will take advantage of you if you let them.
- ___ 7. Most people I know like me.
- ___ 8. Some people think of me as cold and calculating.
- ___ 9. I am hardheaded and tough-minded in my attitudes.
- ___ 10. I generally try to be thoughtful and considerate.
- ___ 11. If I don't like people, I let them know it.
- ___ 12. If necessary, I am willing to manipulate people to get what I want.

Appendix I

Modern Racism Scale

Perceptions of Social Groups

Instructions: The following statements ask about feelings toward social groups and social issues. Please indicate your feelings by endorsing the scale below each question. There are no right or wrong answers to these questions; please select the answer that best reflects your opinion.

1. It's really a matter of some people not trying hard enough; if blacks would only try harder they would be just as well off as whites.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

2. Irish, Italians, Jewish and many other minorities overcame prejudice and worked their way up. Blacks should do the same.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

3. Some say that black leaders have been trying to push too fast. Others feel that they haven't pushed fast enough. What do you think?

Trying to push too fast	Going too slowly	Moving at the right speed
1	2	3

4. How much of the racial tension that exists in the United States today do you think blacks are responsible for creating?

All of it	Most	Some	Not much at all
1	2	3	4

5. How much discrimination against blacks do you feel there is in the United States today, limiting their chances to get ahead.

A lot	Some	A little	None at all
1	2	3	4

6. Generations of slavery and discrimination have created conditions that make it difficult for blacks to work their way out of the lower class.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

7. Over the past few years, blacks have gotten less than they deserve.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

8. Over the past few years, blacks have gotten more economically than they deserve.

Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1	2	3	4

Appendix J

Social Dominance Orientation Scale

Instructions: Please read each of the following statements carefully. Using the 1 to 7 scale below, indicate the extent to which you positive or negative about the statement.

Very Negative	Negative	A Little Negative	Neither Positive nor Negative	A Little Positive	Positive	Very Positive
1	2	3	4	5	6	7

- ___ 1. Some groups of people are simply inferior to other groups.
- ___ 2. In getting what you want, it is sometimes necessary to use force against other groups.
- ___ 3. It's OK if some groups have more of a chance in life than others.
- ___ 4. To get ahead in life, it is sometimes necessary to step on other groups.
- ___ 5. If certain groups stayed in their place, we would have fewer problems.
- ___ 6. It's probably a good thing that certain groups are at the top and other groups are at the bottom.
- ___ 7. Inferior groups should stay in their place.
- ___ 8. Sometimes other groups must be kept in their place.
- ___ 9. It would be good if groups could be equal.
- ___ 10. Group equality should be our ideal.
- ___ 11. All groups should be given an equal chance in life.
- ___ 12. We should do what we can to equalize conditions for different groups.
- ___ 13. Increased social equality.
- ___ 14. We would have fewer problems if we treated people more equally.
- ___ 15. We should strive to make incomes as equal as possible.
- ___ 16. No one group should dominate in society

Appendix K

Empathic Concern, Personal Distress, and Empathic Sadness Scales

This scale consists of a number of words and phrases that describe different feelings and emotions. For each item, indicate **TO WHAT EXTENT YOU WERE FEELING THIS WAY WHILE WATCHING THE VIDEO**. Please circle a number for each emotion using the 1 to 5 scale shown below.

	1	2	3	4	5	6	7		
	Not at All	A Little		Moderately		Quite a Bit	Extremely		
<i>sympathetic, moved, compassionate, tender, warm, and softhearted. Seven adjectives will tap</i>									
1. Sympathetic			1	2	3	4	5	6	7
2. Moved			1	2	3	4	5	6	7
3. Compassionate			1	2	3	4	5	6	7
4. Tender			1	2	3	4	5	6	7
5. Warm			1	2	3	4	5	6	7
6. Softhearted			1	2	3	4	5	6	7
7. Alarmed			1	2	3	4	5	6	7
8. Upset			1	2	3	4	5	6	7
9. Worried			1	2	3	4	5	6	7
10. Disturbed			1	2	3	4	5	6	7
11. Perturbed			1	2	3	4	5	6	7
12. Distressed			1	2	3	4	5	6	7
13. Troubled			1	2	3	4	5	6	7
14. Sad			1	2	3	4	5	6	7
15. Dejected			1	2	3	4	5	6	7
16. Sorrowful			1	2	3	4	5	6	7
17. Low-spirited			1	2	3	4	5	6	7

	1	2	3	4	5	6	7		
	Not at All	A Little		Moderately		Quite a Bit	Extremely		
18. Downhearted			1	2	3	4	5	6	7
19. Heavy-hearted			1	2	3	4	5	6	7
20. Feeling Low			1	2	3	4	5	6	7

Appendix L

Video Validation Ratings for Tier 3

Video 1 Emotions

This scale consists of a number of words and phrases that describe different feelings and emotions. For each item, indicate **TO WHAT EXTENT YOU BELIEVE THE PERSON IN THE VIDEO YOU JUST WATCHED IS FEELING THIS WAY**. Please circle a number for each emotion using the 1 to 5 scale shown below.

1	2	3	4	5
Very Slightly or Not At All	A Little	Moderately	Quite a Bit	Extremely

1. Sleepy	1	2	3	4	5
2. Guilty	1	2	3	4	5
3. Tired	1	2	3	4	5
4. Sad	1	2	3	4	5
5. Sluggish	1	2	3	4	5
6. Afraid	1	2	3	4	5
7. Calm	1	2	3	4	5
8. Scared	1	2	3	4	5
9. Ashamed	1	2	3	4	5
10. Relaxed	1	2	3	4	5
11. Blue	1	2	3	4	5
12. Downhearted	1	2	3	4	5
13. At ease	1	2	3	4	5
14. Blameworthy	1	2	3	4	5
15. Frightened	1	2	3	4	5
16. Nervous	1	2	3	4	5

-2	-1	0	1	2
Very Unlikable	Unlikable	Neither Unlikable nor Likable	Likable	Very Likable

5. I thought the person in the video was _____.

-2	-1	0	1	2
Very Unattractive	Unattractive	Neither Unattractive nor Attractive	Attractive	Very Attractive

6. I thought the video quality was _____.

-2	-1	0	1	2
Very Poor	Poor	Neither Poor nor Good	Good	Very Good

Please wait for further instructions from the experimenter. He or she will begin the next video momentarily.

Appendix M

Expected Benefits of Intervention Questionnaire

COURSE EVALUATION FORM

Instructions: We would like you to indicate below how much you believe, *right now*, that the course you will receive will help to reduce your stress. Belief usually has two aspects to it: (1) what one *thinks* will happen and (2) what one *feels* will happen. Sometimes these are similar; sometimes they are different. Please answer the questions below.

In the first set, answer in terms of what you *think*. In the second set answer in terms of what you really and truly *feel*. Your course leaders will not ever see these ratings, so please be honest in your responses.

Set I

1. At this point, how logical does the course offered to you seem?

1	2	3	4	5	6	7	8	9
Not At All Logical				Somewhat Logical				Very Logical

2. At this point, how successfully do you think this course will be in reducing your stress?

1	2	3	4	5	6	7	8	9
Not At All Useful				Somewhat Useful				Very Useful

3. How confident would you be in recommending this course to a friend who experiences similar stresses?

1	2	3	4	5	6	7	8	9
Not At All Confident				Somewhat Confident				Very Confident

4. By the end of this course, how much improvement in your stress do you think will occur?

0	1	2	3	4	5	6	7	8	9	10
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Set II

1. At this point, how much do you really *feel* this course will help you to reduce your stress?

1	2	3	4	5	6	7	8	9
Not At All				Somewhat				Very Much

2. By the end of the course, how much improvement in your stress do you really *feel* will occur?

0	1	2	3	4	5	6	7	8	9	10
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Appendix N

EMA End-of-day Helping and Empathy Measures

Behavior Checklist

Please check all of the behaviors that you performed today.

- Introduced yourself
- Verbally greeted someone
- Gave directions
- Helped someone with technology
- Delayed an elevator
- Ignored or avoided someone
- Held open a door
- Nonverbally greeted someone (smiled, waved, made eye contact)
- Made change
- Made an aggressive gesture toward someone
- Picked up a fallen object for someone
- Lent or gave money
- Disagreed with someone
- Made conversation
- Helped a disabled or elderly person
- Let someone go ahead of you in line
- Felt good about another person's misfortune
- Lent an item of value (tools, clothes, car)
- Helped someone with school work

- Cut a conversation short
- Asked someone if they needed help

For each checked item participants will answer

1. How many times did you perform this behavior today? 1 2 3 4 5 6 7

2. Where were you when the interaction took place?

- Work Church
- Home Gym
- School On The Street / Sidewalk
- Traveling Restaurant
- Shopping Park
- Other

3. What time of day did the interaction take place? Morning Afternoon Evening

4. Please indicate who you interacted with. Stranger Acquaintance

5. What do you think was the race of the primary person with whom you interacted?

- | | |
|---|---|
| <input type="checkbox"/> White or Caucasian | <input type="checkbox"/> Filipino |
| <input type="checkbox"/> Black or Black | <input type="checkbox"/> Japanese |
| <input type="checkbox"/> Hispanic or Latino(a) | <input type="checkbox"/> Korean |
| <input type="checkbox"/> Native American | <input type="checkbox"/> Vietnamese |
| <input type="checkbox"/> Asian Indian | <input type="checkbox"/> Hawaiian or other Pacific Islander |
| <input type="checkbox"/> Chinese | <input type="checkbox"/> Middle Eastern |
| <input type="checkbox"/> Multi-Racial (please specify): _____ | |
| <input type="checkbox"/> Other (please specify): _____ | |

6. What was the sex of the primary person with whom you interacted? Male Female

Vita

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