

Short-term Training in Mindfulness Predicts Helping Behavior toward Racial Ingroup and Outgroup Members

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Abstract

A randomized controlled trial tested whether mindfulness training would increase lab-based and *in vivo* spontaneous helping behaviors toward racial outgroup members. First, across conditions, those scoring higher in baseline trait mindfulness showed higher levels of pre-intervention lab- and ecological momentary assessment (EMA)-based helping behavior. Next, short-term (4 day) training in mindfulness, relative to a well-matched sham meditation training, increased interracial helping behavior in a lab-based simulation. Finally, among people scoring lower in a basic form of trait mindfulness at baseline – that is, with greater room for improvement – mindfulness training predicted higher post-intervention *in vivo* helping behavior reported via EMA. However, neither training condition alone attenuated preferential helping toward racial ingroup members. These findings indicate, for the first time, that mindfulness and its training fosters helping behavior toward strangers and acquaintances regardless of their racial ingroup or outgroup status, but preferential helping of racial ingroup members remains.

Short-term Training in Mindfulness Predicts Helping Behavior toward Racial Ingroup and Outgroup Members

Every day people are confronted with opportunities to help others (Depow et al., 2021). Though social psychological research indicates that people will often help in these circumstances (e.g., Goetz et al., 2010), helping is not always guaranteed (Bloom, 2017). In many countries, social ingroup/outgroup status is based on race, and in some circumstances racial outgroup members are shown less help than ingroup members when in need (e.g., Saucier 2015). How to increase rates of interracial prosocial behavior is an abiding concern to society and is of considerable interest to social scientists.

In interracial interactions, people are motivated to help for many reasons (Stürmer & Siem, 2017) unrelated to alleviating the other's suffering (e.g., to appear unprejudiced; Richeson & Shelton, 2003). The arousal: cost-reward model (Dovidio et al., 1991) and aversive racism theory (Dovidio & Gartner, 2000) describe circumstances in which (White) people help (predominantly Black) racial outgroup members at lower rates (Kunstman & Plant, 2008). Even benign interracial interactions are perceived as threatening by White individuals and evoke higher physiological arousal (Mendes et al., 2002). This arousal is aversive and predicts lower interracial helping when non-racist contextual factors are present for would-be helpers to justify not helping (e.g., task complexity, emergency situation, bystanders present) (Dovidio & Gartner, 2000). For example, in an experiment by Gaertner et al. (1982), White bystanders were less likely to help a Black confederate, relative to White help targets, when bystanders were present than when alone. This effect was exacerbated among more prejudiced participants.

Contemplative practice theory has emphasized the value of mindfulness—a receptive attention to present-moment experiences (Anālayo, 2003)—and attendant meditative practices for increasing prosocial behavior (e.g., Davidson & Harrington, 2002). Recent science has demonstrated practical benefits of mindfulness training for interpersonal outcomes (see Karremans & Papies, 2017 for review), and meta-analyses examining effects of mindfulness training on prosocial behavior have found reliable small-to-medium-sized effects of mindfulness relative to controls (Berry et al., 2020; Donald et al., 2019).

Two phenomenological features of mindfulness may be particularly relevant to interracial helping. First, there is a purported emotion regulatory advantage of mindfulness (see Hölzel et al., 2011 for review). Lower affective arousal in the presence of suffering others may be important for the enactment of prosocial behavior (Condon & Barrett, 2014). Another's suffering is unpleasant to observe, and people are motivated to avoid the accompanying cognitive, affective, and social costs to oneself (Cameron et al., 2019; Zaki, 2014). Conceptual definitions of empathic concern highlight its lower affective arousal than personal distress (Decety & Jackson, 2004), and there is indirect evidence that mindfulness trainees experience lower affective arousal in helping contexts. A series of experiments found that mindfulness trainees, compared to attention-based trainees, felt more empathic concern (but not personal distress) for ostracized strangers (Berry et al., 2018).

Second, mindful "presence" is entered through a suspension of automatized ways of processing experience in favor of a receptive attentiveness. Lueke and Gibson (2015) found that brief training in mindfulness, relative to a narrative control, predicted lower implicit race bias toward Black individuals, presumably because of attenuated automatic activation of conditioned Black/bad associations. Harboring higher implicit bias or prejudice against racial outgroup members is associated with feeling less empathy for them (e.g., Azevedo et al., 2012) and helping them less (Gaertner et al. 1982). Furthermore, mindfulness meditation trainees are more likely to overcome the bystander effect in helping contexts (e.g., Condon et al., 2013), a common race-neutral, contextual justification for not helping racial outgroup members. These results suggest that mindfulness training may attenuate arousal and increase awareness of and/or allow one to override situational and personal factors that inhibit interracial helping behavior.

Extending these findings, one experiment found that brief instruction in a focused attention form of mindfulness practice, relative to active and inactive controls, predicted lower discrimination in the Trust Game (Lueke & Gibson, 2016). In another experiment, Frost (2017) found that a focused attention mindfulness meditation, relative to a waitlist control, reduced parochial giving in a public goods game. As important as this work has been, no research has examined whether mindfulness-based forms of meditation practice can promote helping toward racial outgroup members in less constrained contexts.

The Present Research

A randomized controlled trial examined whether brief, 4-day training in a focused attention form of mindfulness would promote interracial helping relative to closely matched control training. White participants randomized to mindfulness training or a sham meditation training were placed in situations in which they witnessed a Black person in apparent need of help. Six study design characteristics provided a strong test of our primary aim. First, simulations of helping situations commonly encountered in public contexts in day-to-day life were deployed. Second, in each situation bystanders did nothing to help. This is also a common social occurrence—one that typically suppresses helping in general (Darley & Latane, 1968) and in interracial helping contexts (Gaertner et al., 1982). Third, to allow inferences about preferential helping, pre- and post-intervention, *in vivo* measures of intra-racial and interracial helping behavior were additionally captured via ecological momentary assessment (cf., Morelli et al., 2012). To our knowledge no research has examined whether mindfulness training can promote helping in daily life. Fourth, only one form of mindfulness, namely focused attention, was taught to specify the type of training received (Lutz et al., 2015; Zeidan et al., 2015), and it was tested against a structurally equivalent sham meditation training (adapted from Zeidan et al., 2015). Fifth, the intervention facilitators were blind to the study hypotheses. Finally, a basic form of trait mindfulness, defined herein as the tendency to deploy mindful attention in daily life (Brown & Ryan 2003), was measured prior to the intervention. Trait mindful attention has been found to amplify the salutary effects of short-term mindfulness training on social stress outcomes (Creswell et al., 2014). Thus, we investigated trait \times mindfulness training interaction effects on helping behavior outcomes.

A secondary aim of this research was to examine whether trait mindfulness predicted pre-intervention real-world helping behavior toward racial outgroup members. Trait mindfulness has been positively associated with higher prosocial emotions (e.g., Berry et al., 2018) and helping behaviors (e.g., Donald et al., 2019). This study is the first to examine this relation in an intergroup context. To examine the incremental validity of trait mindfulness, individual differences in racial prejudice against Black

individuals (Henry & Sears, 2002), social dominance orientation (Pratto et al., 1994), empathy (Davis, 1983) and agreeableness (Costa & McCrae, 1992) were controlled.

An experiment (Berry et al., 2021) informed this work in three ways. First, participants showed similar rates of helping in the two scenarios used in the main study, and suspicion rates were low (0.63%). Thus, in the main study participants were assigned to these scenarios at pre- and post-intervention in counterbalanced order. Second, and consistent with previous research (Saucier et al., 2005), White participants showed a similar rate of helping given to Black and White persons in need in that initial study. Although high emergency situations might have increased preferential helping, as this social context reduces interracial prosociality (e.g., Kunstman & Plant, 2008), low emergency situations were chosen to support our aim to study interracial helping in situations with high mundane realism. Moreover, manipulating the race of the help target in this study would be underpowered for this trial's budget. Given the historic and contemporary focus on Black disadvantage in American and other cultures, we focused on improving rates of White participant – Black help target helping behavior. Third, women showed lower rates of scenario-based helping in the initial study. Gender is also a salient social category with accompanying social roles in helping contexts (Eagly & Crowley, 1986), so to support our focus on interracial helping, the present study enrolled only women. Finally, we studied helping among a population with room to improve. Graduate students were recruited, as higher educational attainment is associated with lower helping behavior (Piff et al., 2010).

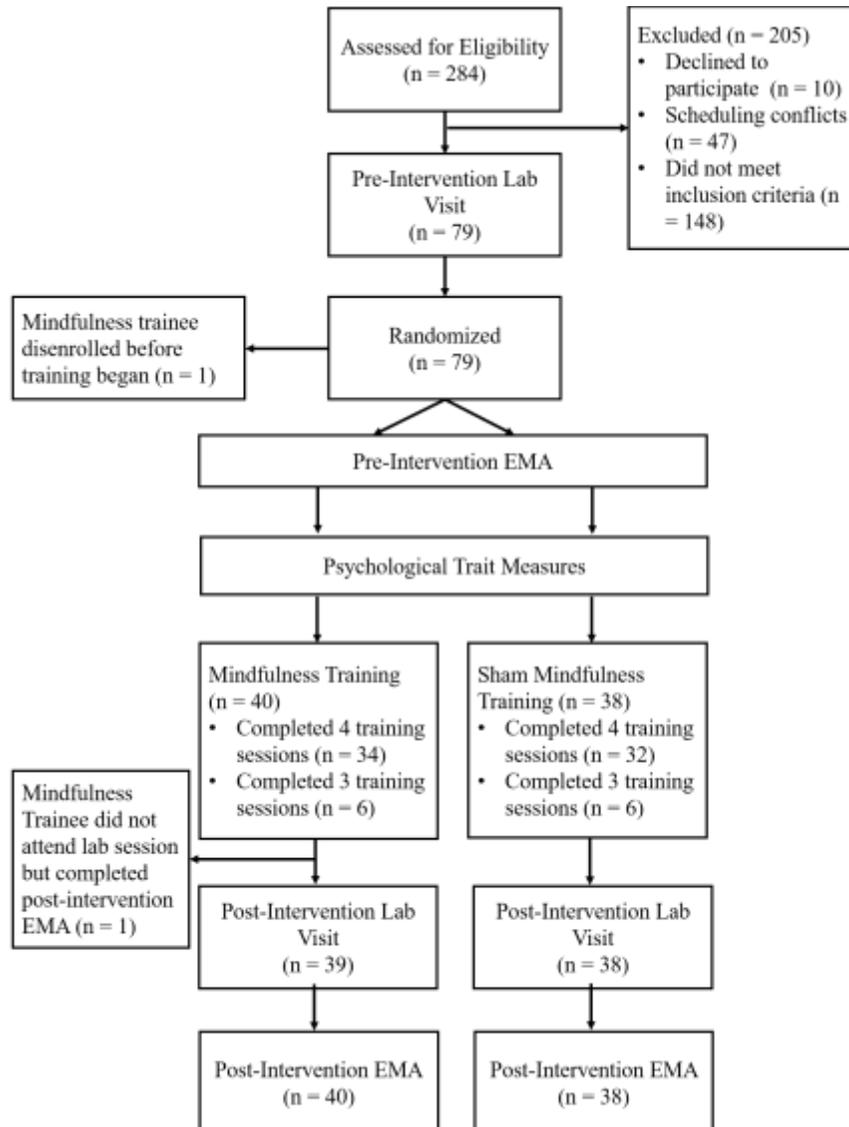
Method

Participants

An *a priori* stopping criterion of 80 participants was used. Previous research using 3- and 4-day mindfulness mediation interventions recruited sample sizes of $N = 60 - 80$ (Quaglia et al., 2019; Zeidan et al., 2015), with retention rates nearing 100%.

White female graduate students ($n = 75$) were recruited in fall 2016 via emails sent through a university-hosted graduate student listserv. Emails described an opportunity to participate in a study on mindfulness in exchange for a free course in mindfulness meditation and \$110 compensation.

Additionally, four community-dwelling, self-identifying White participants were recruited by word-of-mouth. Exclusion criteria included: (a) history of neurological or (b) psychiatric illness; (c) lack of access to a home personal computer; (d) previous experience with mindfulness meditation; (e) under the age of 18 or over the age of 60; or (f) identifying with any race other than White, Caucasian, or European American; and (g) identifying as any sex other than female. Exclusion criteria (a) and (b) were important contraindications for electroencephalographic (EEG) recording (not reported herein). Adults older than 60 years of age were excluded because stranger and acquaintance interactions decline after the age of 60 (Lansford et al., 1998). No participants were excluded for study suspicion during the funneled debriefing. Figure 1 shows 78 cases were available for intent-to-treat analyses (M age = 26.78 years; SD = 5.77).

Figure 1*Participant flow through the study***Procedure**

The corresponding author's Institutional Review Board approved the study procedure. This protocol was not preregistered. After online screening, participants reported individually to the laboratory wherein *scenario-based* helping behavior was recorded (*Helping Simulations*). Participants were then briefed on the study—namely, examining the effects of two different mindfulness meditation

interventions on personal and social well-being. After obtaining informed consent, participants self-reported the perceived credibility and expected benefits of the meditation intervention (Devilly & Borkovec, 2000), were fitted for a 64-channel EEG recording, and then completed a passive viewing task and self-reported task-based (state) empathy (EEG and self-report procedures reported in Berry, 2017).

Participants were next trained on completing end-of-day EMA-based measures. Participants were then randomly assigned to either mindfulness training or sham meditation training. Experimenters were blind to condition assignments. Participants were then dismissed. Over a fourteen-day interval, beginning on the first Monday after the pre-intervention session, participants completed online daily EMA (*End-of-day Measures*), and on the second Monday during this interval, participants completed psychological trait measures (*Psychological Trait Measures*) via a web-based survey (REDCap; Harris et al., 2009).

Interventions commenced on the third Monday following the pre-intervention session (*Interventions*). Four weeks after the pre-intervention session, participants returned to the lab and were exposed to the second helping scenario, completed EEG recording, and completed 2 weeks of EMA of stranger/acquaintance interactions. Compensation and funneled debriefing were given at a third lab visit.

Interventions

Table 1 shows the mindfulness intervention involved three consecutive days of training, each lasting 20 minutes (cf., Zeidan et al, 2015). The structurally equivalent sham meditation (see Supplemental File) was adapted from a sham mindfulness meditation (cf., Johnson et al. 2015) and progressive muscle relaxation (cf., Berry et al., 2018). The intervention sessions included 3 – 10 participants per group that met in the same room at the same time of day. Two hypothesis-naïve facilitators conducted the interventions (one per intervention); facilitators were matched on gender (male), education, and group leadership experience. The sham meditation facilitator was naïve to meditation practice but led to believe he was leading a genuine mindfulness intervention. At the end of each session, participants responded to a yes/no question, “*Did it feel like you were meditating?*” and the facilitator then fielded questions. A fourth 20-minute training was held immediately after assessment of post-

intervention helping simulations¹. This final meditation session was facilitated by the first author and consisted of self-guided practice in the technique learned over the previous three training sessions. Thus, this fourth session appeared identical for mindfulness and sham meditation trainings, blinding the first author to participant conditions.

Table 1

Mindfulness training and sham meditation training intervention instructions by session

Session	Mindfulness Training Instructions	Sham Meditation Training Instructions	Duration of Silent Practice
1	Introduced to meditation practice, and common misconceptions about meditation. Focus on the flow of breath (focused attention). Notice and acknowledge thought and to “simply let it go” by bringing attention back to the breath (meta-awareness).	Introduced to meditation practice in the same way as MT. Breathing exercises without focused attention or meta-awareness. Told to “take deep breaths as you sit in meditation” every 2 to 3 minutes	1 minute
2	Focus on full breath sensations in the nostrils, chest and abdomen. Breath counting.	Breath counting without focus on sensation of the breath.	7 minutes
3	Extension of MT session 2 instructions.	Extension of ST session 2 instructions.	13 minutes
4	Self-guided practice.	Self-guided practice.	20 minutes

Helping Simulations

At the beginning of pre- and post-intervention lab sessions, an experimenter led participants into a waiting room where two ostensible participants (confederates) were seated in two of three chairs. The experimenter asked the participant to be seated in the empty chair while they prepared the experiment

¹P. Condon (personal communication, May 3, 2016) recommended capture of scenario-based helping prior to lab-based tasks based on pilot studies with floor effects on helping behavior after lab-based tasks (Condon, 2015).

rooms. While waiting, each participant was randomized to receive one of the following scenarios: (1) the female experimenter returned and ostensibly accidentally dropped a large stack of informed consent documents (blank) onto the floor (modified from Latané & Dabbs, 1975); or (2) another ostensible female participant walked into the waiting room on crutches and leaned uncomfortably against the wall (cf., Condon et al., 2013). In these scenarios, helping behavior was defined as aiding the experimenter by picking up the dropped papers and offering one's seat to the individual on crutches, respectively. Two scenarios were chosen to conceal study hypotheses such that participants were confronted with different scenarios at pre- and post-intervention sessions (counterbalanced within participant). All help recipients (confederates) identified as Black or African American. Scenarios were terminated at one minute if no help was given.

End-of-day Measures

Stranger and Acquaintance Interaction Checklist

Daily helping was measured with a 12-item yes/no checklist that included the following helping behaviors (Morelli et al., 2012): *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*. Nine additional positive (non-helping) and antagonistic interaction items were derived from piloting (see Supplemental File) and randomized with the 12 helping checklist items. Positive interactions included: *introduced yourself; verbally greeted someone; non-verbally greeted someone (e.g., waved, smiled, made eye contact); and made conversation*. Antagonistic behaviors included: *introduced yourself; verbally greeted someone; non-verbally greeted someone (e.g., waved, smiled, made eye contact); and made conversation*.

Situational End-of-day Measures

For each interaction behavior that the person checked, the following forced choice 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?"*

(Work, School, Home, Traveling, Shopping, Church, Gym, On the Street / Sidewalk, Restaurant, Park, Other), (3) “*what time of day did the interaction take place*” (Morning, Afternoon, Evening), (4) “*please indicate with whom you interacted.*” (Stranger, Acquaintance), (5) “*what was the race of the primary person with whom you interacted*” (Black, East Asian, White, etc.). Participants also indicated (6) “*what was the sex of the primary person with whom you interacted*” (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. Participants recorded only spontaneous social interactions that occurred with strangers and acquaintances and refrained from recording social interactions at work that were required to perform their job.

Psychological Trait Measures

Mindfulness

The 15-item Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) tapped the frequency of mindful states in daily life on a 6-point Likert-type scale (‘almost always’ to ‘almost never’).

Empathy

The Interpersonal Reactivity Index (IRI; Davis, 1983) assessed trait empathy on a 5-point Likert-type scale (‘does not describe me well’ to ‘describes me very well’). The 7-item *fantasy* subscale assessed adopting fictional characters’ points of view. 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. The 7-item *perspective taking* subscale assessed adopting others’ points of view.

Agreeableness

The 12-item *agreeableness* subscale of the NEO-FFI personality scale (Costa & McCrae, 1992) assessed agreeableness on a 5-point Likert-type scale (‘strongly disagree’ to ‘strongly agree’).

Racial prejudice toward Black and African American Individuals

The 8-item Modern Racism Scale (Henry & Sears, 2002) assessed racial prejudice toward Black individuals on a 4-point Likert-type scale (one item is on a 3-point Likert-type scale).

Social Dominance Orientation

The 16-item Social Dominance Orientation Scale (SDO; Pratto et al., 1994) 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').

Results

Preliminary Analyses

Three participants in the sham meditation indicated that they did not think they were meditating. In all instances, participants reported that this was due to inability to concentrate during the session, and not the belief that the intervention was not meditation, establishing construct validity that control trainees believed they were meditating. Mindfulness and sham meditation mean scores of perceived intervention credibility ($M = 6.63$, $SD = .91$ and $M = 6.67$, $SD = 1.34$, respectively; $t(64.642) = -.16$, $p = .876$), and expected benefit ($M = 5.12$, $SD = 1.53$ and $M = 5.10$, $SD = 1.82$, respectively; $t(77) = .07$, $p = .947$) did not differ. Age was not related to the study outcomes ($ps \geq .94$). Thus these variables were not controlled in intent-to-treat analyses. Prior to the intervention, mindfulness trainees, compared to sham meditation trainees, scored significantly lower in trait empathic concern ($r(77) = -.24$, $p = .036$) and higher in prejudice ($r(77) = .25$, $p = .028$) against Black individuals (see Supplemental File). No other traits differed by condition. These two predispositions were statistically controlled in intent-to-treat analyses.

Pre-Intervention Trait Mindfulness Effects

Pre-Intervention Scenario Helping

All primary analyses were performed in Mplus 8. Data and syntax are available at (<https://osf.io/gvtds/>). Statistically significant effects ($p \leq .05$) are reported in text. A logistic regression examined the prediction of scenario helping behavior by psychological traits, technology use (e.g., mobile device) during the scenario, and scenario type. Change in odds are standardized for continuous variables and unstandardized for categorical variables. Table 2 shows that people using technology during the scenario were 8.19 times less likely to help than people not using technology. For every standard deviation increase in trait mindfulness, the odds of helping were 3.52 times higher. The odds of helping

increased by 4.76 times for every standard deviation increase in empathic fantasy, and the odds of helping decreased by 2.71 times for every standard deviation increase in trait empathic concern.

Table 2

Pre-intervention scenario helping behavior as predicted by psychological traits

<i>b</i> (<i>SE</i> (<i>b</i>)) [Δ odds]	
Intercept	.62 (.31)
Scenario Type	.68 (.69)
Tech	-2.10* (.86) [8.19]
MAAS	1.93** (.70) [3.52]
NEO-A	-.27 (.70)
MRS	.00 (1.02)
SDO	-.76 (.53)
IRI-F	.28** (.09) [4.76]
IRI-P	.16 (.09)
IRI-E	-.27* (.12) [2.71]
IRI-D	-.03 (.06)
Model Fit	
Δ -2 * Log Likelihood	$\Delta\chi^2(10) = 35.52^{***}$

Note. Scenario Type = randomized pre-intervention scenario (Crutches = -.5, Paper Drop = .5); Tech = Technology use (-.5 = no technology use; .5 = technology use); MAAS = Mindful Attention Awareness Scale; NEO-A = Agreeableness subscale of the NEO-FFI; MRS = Modern Racism Scale; SDO = Social Dominance Orientation Scale; IRI- = Interpersonal Reactivity Index; F = Fantasy, P = Perspective Taking, E = Empathic Concern; D = Personal Distress. *b* = log odds ratios. % Δ odds = e^b ; this statistic represents the change in odds for every one-point increase in the predictor and is interpreted as a decrease in odds for negative *b* values. Standardized odds ratios were calculated by *z*-transforming predictors. * $p < .05$, ** $p < .01$, *** $p < .001$

Pre-Intervention Daily Stranger and Acquaintance Interactions

Two-level multilevel models were constructed to examine the effects of psychological traits and recipient race on helping behaviors, positive interactions, and antagonistic interactions in day-to-day life. No variables predicted antagonistic interactions. Table 3 shows that helping behaviors and positive

interactions were more likely to occur on weekends and were lowest on Mondays (indicated by a positive sine contrast). For every standard deviation increase in trait mindfulness the odds of helping increased 1.49 times and a standard deviation increase in trait perspective taking predicted a 1.33-times decrease in the odds of helping behavior regardless of the race of the help recipient. The odds of positive interactions with racial outgroup members was 1.62 times lower than ingroup members, and a standard deviation increase in trait perspective taking was associated with a 1.33-times decrease in the odds of positive interaction. Non-mindfulness trait x race interaction effects are reported in the Supplemental File.

Table 3

Pre-intervention daily interactions with strangers and acquaintances as predicted by psychological traits

Outcome		Helping Behavior	Positive Interactions	Antagonistic Interactions
Fixed Effects γ (SE(γ)) [Δodds]				
Level 1	Intercept	-1.98** (.12)	-.03 (.10)	-3.72*** (.23)
	Sine Cyclicity	.53*** (.09) [1.48]	.15* (.07) [1.11]	.27 (.18)
	Race	-.25 (.13)	-.48*** (.12) [1.62]	-.33 (.30)
	MAAS x Race	-.10 (.22)	-.10 (.23)	-.12 (.50)
Level 2	MAAS	.62** (.20) [1.49]	.24 (.16)	.12 (.36)
	NEO-A	.08 (.25)	.17 (.20)	-.68 (.36)
	MRS	.08 (.30)	-.56 (.30)	.39 (.61)
	SDO	-.24 (.17)	-.10 (.17)	-.16 (.26)
	IRI-F	.03 (.02)	-.02 (.02)	.06 (.04)
	IRI-P	-.07* (.04) [1.33]	-.08** (.03) [1.33]	-.07 (.05)
	IRI-E	-.06 (.05)	.04 (.03)	.02 (.06)
	IRI-D	.01 (.03)	.01 (.02)	-.01 (.04)
Random Effects residual SE(residual)				
μ_{0i} [Person Level ICC]		.55*** (.16) [.24]	.53*** (.14) [.20]	1.05*** (.23) [.11]
Model Fit				
$\Delta -2 * \text{Log Likelihood}$		$\Delta\chi^2(11) = 53.57^{***}$	$\Delta\chi^2(11) = 46.38^{***}$	$\Delta\chi^2(11) = 12.94$

Note. Sine Cyclicity = $\sin(2 \times \pi \times \text{Day} / 7)$; Race = race of the primary interaction partner (Same = -.5,

Other = .5); MAAS = Mindful Attention Awareness Scale; NEO-A = Agreeableness subscale of the

NEO-FFI; MRS = Modern Racism Scale; SDO = Social Dominance Orientation Scale; IRI- =

Interpersonal Reactivity Index; F = Fantasy, P = Perspective Taking, E = Empathic Concern; D =

Personal Distress. γ = log odds ratio. Δ odds = e^γ ; this statistic represents the change in odds for every

one-point increase in the predictor and is interpreted as a decrease in odds for negative γ values.

Standardized odds ratios are reported for continuous variables and unstandardized odds ratios.

Standardized odds ratios were calculated by z -transforming predictors. * $p < .05$, ** $p < .01$, *** $p < .001$

Post-Intervention Mindfulness Training Effects

Post-Intervention Scenario Helping

A preliminary multilevel binary outcome model tested clustering of data by intervention cohort.

The six intervention cohorts (n s range 7 – 19) intercepts did not vary significantly (see Supplemental

File). Data were analyzed with binary logistic regressions to predict the occurrence of post-intervention helping behavior (0 = no help, 1 = help). Predictors included training, scenario order, and pre-intervention helping behavior. Controlling for pre-intervention helping behavior permitted inferences about condition change from baseline. Predictors were mean-centered, and a training x trait mindfulness interaction term was included.

Although neither block 1 ($p = .053$) nor block 2 ($p = .168$) was a better fit of the data than the intercept, mindfulness trainees as compared to sham meditation trainees showed a 3.25-times higher odds of helping toward a racial outgroup member at post-intervention, controlling for pre-intervention helping ($ps \leq .025$ in both blocks) (see Table 4)².

Table 4

Effects of training on post-intervention scenario helping behavior toward racial outgroup members

<i>b</i> (<i>SE</i> (<i>b</i>)) [Δ odds]	Block 1	Block 2
Intercept	.87** (.26)	.90** (.27)
Training	1.18* (.53) [3.25]	1.24* (.54) [3.45]
Pre-intervention Help	.03 (.52)	.10 (.57)
Scenario Order	-.65 (.52)	-.72 (.54)
MAAS		-.45 (.42)
Training x MAAS		-.56 (.86)
Model Fit		
-2 * Log Likelihood	$\Delta\chi^2(3) = 7.66$	$\Delta\chi^2(2) = .125$

Note. Training = training condition (Mindfulness = .5, Sham Meditation = -.5); Scenario Order = pre-post-intervention scenario order (Crutches First = -.5, Paper Drop First = .5); Pre-Help = pre-intervention helping behavior (No help = -.5, Help = .5). MAAS = Mindful Attention Awareness Scale. *b* = log odds ratios. $\% \Delta$ odds = e^b ; this statistic represents the increase in odds for every one-point increase in the predictor; it is interpreted as a decrease in odds for negative *b* values. * $p < .05$, ** $p < .01$, *** $p < .001$

²Controlling for trait empathic concern and trait racism in a third block did not improve model fit or meaningfully change effect size estimates (see Supplemental File).

Post-Intervention Daily Stranger and Acquaintance Interactions

On average, participants completed 12.39 of 14 end-of-day post-intervention surveys. There were 1958 total observations. All analyses used a two-level multilevel modeling approach³, as there was significant clustering within person. Level 1 variables included a contrast that modeled cyclical patterns in stranger/acquaintance interactions throughout the week. Level 1 also included the race of the interaction partner, and pre-intervention scores on the behavior. Training, trait mindfulness, and their interactions were placed at Level 2. All variables were mean-centered before creating two- and three-way interaction terms between training, race, and trait mindfulness.

We anticipated interactions with strangers and acquaintances would be rare, and all count variables were positively skewed. Because our data did not meet distributional assumptions of Poisson or zero-inflated Poisson models, we chose multilevel binary logistic regression models to predict the occurrence of stranger interactions each recording day. Level 1 outcomes represent the probability of stranger interactions on a given day; level 2 intercepts are the person-level probability of stranger interactions during the two-week recording interval.

Table 5 shows the final models.⁴ Across all three categories of stranger and acquaintance behaviors, participants interacted most on Fridays and Saturdays and least on Mondays (indicated by a positive sine contrast). Interactions were also more frequent with same race than other race strangers and acquaintances. There was a significant training x trait mindfulness interaction on helping behavior. Among those scoring greater than or equal to the median on trait mindfulness, there was no difference in helping behavior between mindfulness training and sham meditation training ($b = -.25$, $SE(b) = .36$, $p = .487$, $OR = .78$). Among those scoring lower than the median on trait mindfulness, mindfulness trainees reported 2.60 times as many daily helping behaviors as did sham meditation trainees ($b = .95$, $SE(b) = .41$, $p = .021$, $OR = 2.60$). These slopes were meaningfully different, $z = 2.20$, $p = .028$ (see Figure 2a). The

³There was no clustering by cohort ($ICCs \leq .05$).

⁴Controlling for trait empathic concern and racism did not change effect sizes of mindfulness training. Trait racism was associated with fewer positive interactions with strangers and acquaintances, $b = -.75$, $SE(b) = .33$, $p = .024$, $OR = 2.11$.

Supplemental File reports nonsignificant simple slopes of trait mindfulness on helping by training condition⁵.

⁵Figure 2b shows mindfulness training did not meaningfully attenuate preferential helping of racial ingroup members ($p = .070$; see Supplemental File).

Table 5

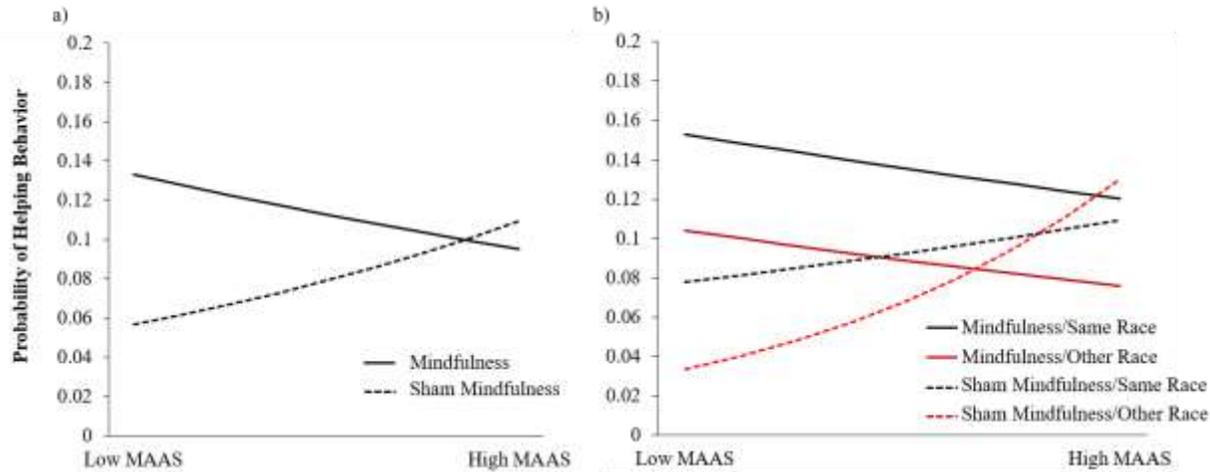
Binary outcome multilevel models predicting daily interactions with strangers and acquaintances

Outcome		Helping Behavior	Positive Interactions	Antagonistic Interactions
Fixed Effects γ (SE(γ)) [Δodds]				
Level 1	Intercept	-2.27*** (.15)	-.01 (.11)	-4.30*** (.28)
	Sine Cyclicity	.32* (.12) [1.37]	.18* (.08) [1.20]	.43* (.18) [1.54]
	Pre-Intervention Behavior	.49** (.14) [1.63]	.40** (.12) [1.49]	.71 (.45)
	Race	-.41* (.17) [1.51]	-.73*** (.13) [2.07]	-1.05*** (.311) [2.86]
	Training x Race	-.13 (.33)	.13 (.25)	-.48 (.63)
	MAAS x Race	.39 (.25)	.22 (.21)	-.53 (.47)
	Training x Race x MAAS	-.89 (.49)	-.27 (.41)	-1.50 (.93)
	Level 2	Training	.34 (.28)	-.16 (.23)
	MAAS	.22 (.20)	-.04 (.17)	-.08 (.28)
	Training x MAAS	-.86* (.41) [2.36]	-.26 (.33)	-.87 (.55)
Random Effects residual SE(residual)				
	μ_{0j} [Person Level ICC]	.95** (.28) [1.16]	.76*** (.15) [1.03]	.90* (.44) [1.00]
Model Fit				
	-2 * Log Likelihood	$\Delta\chi^2(9) = 62.21^{***}$	$\Delta\chi^2(9) = 167.26^{***}$	$\Delta\chi^2(9) = 67.03^{***}$

Note. Sine Cyclicity = $\sin(2 \times \pi \times \text{Day} / 7)$; Pre-Intervention Behavior = pre-intervention behavior that corresponds with the outcome; Race = race of the primary interaction partner (Same = -.5, Other = .5). Training = training condition (Mindfulness = .5, Sham Meditation = -.5); MAAS = Mindful Attention Awareness Scale. γ = log odds ratio; Δ odds = e^γ ; this statistic represents the change in odds for every one-point increase in the predictor and is interpreted as a decrease in odds for negative γ values. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 2

Mindfulness training by trait mindfulness interaction on daily helping behavior



Note. MAAS = Mindful Attention Awareness Scale. Low and High MAAS represent effects at +/- 1 standard deviation away from the mean of MAAS. Figure 2a decomposes the Training x MAAS interaction. Figure 2b decomposes the Training x race x MAAS interaction. Figures created with J. Dawson’s Microsoft Excel Macros (retrieved from <http://www.jeremydawson.co.uk/slopes.htm>; cf., Dawson, 2014).

Discussion

In many contexts racial outgroup members are helped less frequently than racial ingroup members (e.g., Saucier 2015). This randomized controlled trial is the first study to test if mindfulness training increases lab-based and *in vivo* helping behavior toward other-race strangers and acquaintances. Those completing four days of mindfulness training showed comparatively higher helping behavior than sham meditation trainees in a lab-based simulation. This finding is consistent with mindfulness theory (Berry & Brown, 2017) suggesting that mindfulness can promote virtuous action across social divides. It also extends nascent research showing that mindfulness instruction increases help given to strangers (Berry et al., 2018; Condon et al., 2013).

Participants scoring lower in a basic form of trait mindfulness who received mindfulness training showed comparatively higher odds of EMA-based helping behavior toward same race and other race strangers. This finding is consistent with previous research indicating that short-term mindfulness training is more effective in enhancing wellbeing among those less predisposed to deploy mindful attention in daily life (e.g., Creswell et al. 2014). A recent meta-analysis found that the effects of mindfulness training on prosociality depends on the type of social interaction (Berry et al., 2020); specifically, mindfulness training, relative to various controls, predicted reliably higher compassion-related helping. Along these lines, only helping behaviors (and not positive and antagonistic interactions) were mutable to mindfulness training in the present study.

Neither intervention meaningfully reduced preferential helping toward same race strangers and acquaintances in the EMA-based measure. This finding is inconsistent with previous literature that has found brief mindfulness training reduces preferential prosociality toward ingroup members (Lueke & Gibson, 2016), and may have an important implication for the application of mindfulness training in prejudice reduction and intergroup contexts. Specifically, prejudice reduction occurs when one is aware of their biases and concerned about the consequences of these biases (Plant & Devine, 2009). The focused attention mindfulness intervention used herein may have promoted awareness of bias (e.g., Lueke & Gibson, 2015), but did not explicitly train concern about the consequences of bias. Recent mindfulness

theory (Condon, 2019) and research have suggested that social goals (Poulin et al., 2021), such as egalitarianism, may amplify the effects of mindfulness training on prosocial outcomes. Thus mindfulness may complement existing efforts that increase concern about the consequences of bias (e.g., Devine et al., 2012).

Trait mindfulness predicted higher pre-intervention helping behavior (but not positive and antagonistic interactions) toward outgroup members on both lab-based and EMA-based indicators. Although consistent with previous research indicating that trait mindfulness predicts higher helping behavior (Berry et al., 2018; Donald et al., 2019), trait mindfulness did not interact with race to predict EMA-based helping behavior. Furthermore, race of the help target was not a significant predictor of pre-intervention helping. Thus, we are unable to draw inferences about the impact of trait mindfulness on parochial helping. We conclude that a predisposition to deploy mindful attention in daily life predicts help toward both same race and other race strangers and acquaintances.

Trait empathic concern predicted lower scenario-based helping and trait perspective taking predicted lower daily helping. Though unexpected, these results are consistent with research indicating empathy more reliably predicts helping behavior toward ingroup than outgroup members (Stürmer et al., 2006). Instead, personal contact promotes prosocial behavior toward outgroup members (Koschate et al., 2012). Thus, one explanation for these results is that the impersonal and brief interactions in scenario and daily helping situations did not require feeling empathy to motivate helping. Furthermore, people feel less empathy for competitive outgroups (Richins et al., 2019). Our sample of White participants—an empowered social group—may have perceived Black targets as a competitive threat. Interestingly, trait empathic fantasy predicted higher scenario helping. Perhaps people high in empathic fantasy are better able to imagine future contact with racial outgroup members (Vazzeli et al., 2017). Imagining events in a specific time or place—for instance, imagining a helping episode, has been shown to eliminate preferential helping behaviors given to ingroup members (Gaesser et al., 2020). If intergroup helping is the goal, researchers ought to be cognizant of the dimensions of empathy that reduce preferential helping in designing interventions.

We note five design limitations of this study. First, the sample included only White females. However, males may benefit from mindfulness training to promote interracial helping, as they commonly have higher levels of racism, and are less likely to endorse race-egalitarian attitudes in the presence of Black individuals (e.g., Sinclair et al., 2005). Second, self-report measures of racism and social dominance orientation may have primed reactance among White participants (Schmader et al., 2008). Specifically, individuals may enact socially desirable (helping) behaviors post-intervention so as not to appear racist. We anticipated this issue and asked race-related questions in an online survey outside of the laboratory context, and embedded questions with additional measures consistent with the study's cover story. It would be more appropriate, however, to measure these traits after assessments of post-intervention helping.

A third design limitation is that most individuals belong to multiple social categories simultaneously (e.g., socioeconomic status, sex, skin tone) that were held constant or not measured in this study. Thus, helping responses in the scenarios could have been at least partly due to whatever social category was most salient to each participant (Mitchell et al., 2003). As this line of research develops it will be important to rule out these and other alternative explanations of the prosocial effects of mindfulness training in intergroup contexts. Fourth, we are unable to make inferences about reductions in preferential helping from the lab-based helping outcome, as we did not experimentally manipulate the race of the help target. Fifth, the sample size was determined by budget, and most of the p -values related to mindfulness training effects on helping ranged between $p = .025 - .05$. True effects are expected to generate an abundance of low p -values ($ps < .01$; Simonsohn et al., 2014), and thus we encourage scientists to reproduce these findings in well powered, preregistered studies.

Investigating the mechanisms of mindfulness training effects will be important to understanding how this training can be best applied to promote interracial prosocial behavior. For example, mindfulness training may promote helping via gains in awareness of bias (Plant & Devine, 2009; Lueke & Gibson, 2015) and/or social emotion regulation (Quaglia et al., 2019). Additionally, the mindfulness training

examined here was very short-term. Future research will do well to study the effects of longer-term mindfulness training on sustaining prosocial actions over time.

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