Mindfulness Increases Prosocial Responses Toward Ostracized Strangers Through Empathic Concern

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Four studies tested the proposition that mindfulness and its training fostered prosociality toward ostracized strangers. In discovery Study 1, dispositional mindfulness predicted greater empathic concern for, and more helping behavior toward, an ostracized stranger. Using an experimental design, Study 2 revealed that very briefly instructed mindfulness, relative to active control instructions, also promoted prosocial responsiveness to an ostracized stranger. Study 3 ruled out alternative explanations for this effect of mindfulness, showing that it did not promote empathic anger or perpetrator punishment, nor that the control training reduced prosocial responsiveness toward an ostracized stranger rather than mindfulness increasing it. Study 4 further ruled out the alternative explanation of relaxation in the experimental effects of mindfulness. In all studies, empathic concern mediated the relation between mindfulness and one or both of the helping behavior outcomes. Meta-analyses of the four studies revealed stable, medium sized effects of mindfulness instruction on prosocial emotions and prosocial behavior. Together these findings inform about circumstances in which mindfulness may increase prosocial responsiveness, and deepen our understanding of the motivational bases of prosociality.

Keywords: empathic concern, helping, mindfulness, ostracism, prosocial behavior

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The capacity for prosocial behavior—actions instantiated to promote others' well-being (Tomasello, 2009)—is arguably one of humanity's most virtuous qualities. When another person is in pain, distress, or apparent need, people often feel concern for them, and act on this concern by helping them (Batson, Lishner, & Stocks, 2015; Davis, 2015; de Waal, 2008). What is more, prosocial responses are often expressed unintentionally or automatically (e.g., Keltner, Marsh, & Smith, 2010; Preston & de Waal, 2002; Zaki & Mitchell, 2013). Yet as a human *capacity*, prosocial action is not a given, and as many news reports and decades of research attest, both personal (Penner, Fritzsche, Craiger, & Freifeld, 1995) and situational factors (e.g., Latané & Darley, 1970) can diminish or even prevent the enactment of helping. Further, it is well documented that prosocial responses are commonly reserved for "known" others rather than for strangers (e.g., Cialdini, Brown, Lewis, Luce, & Neuberg, 1997; Stinson & Ickes, 1992). In an increasingly interconnected and interdependent world, there is a pressing need to ask how prosociality can be fostered across these familiarity lines. This series of studies sought to address this issue by examining whether a trainable state of mind called *mindfulness* can promote prosociality toward strangers, as centuries of Buddhist and other psychological theories (Davidson & Harrington, 2002; Ricard, 2015) and an incipient body of empirical research suggest. This study series was also designed to examine *how* mindfulness instruction may foster such prosocial action.

The Case for Mindfulness in Promoting Prosocial Action

The term *mindfulness* has multiple historically and culturally embedded meanings (Dreyfus, 2011) but has been classically described as concerning a sustained, receptive attention to current internal and external stimuli (e.g., Anālayo, 2003; Brown & Ryan, 2003; Quaglia, Brown, Lindsay, Creswell, & Goodman, 2015). Research on the benefits of mindfulness and its training has grown exponentially over the past two decades (Brown, Creswell, & Ryan, 2015). Although much scientific research on the construct has focused primarily on the intrapersonal outgrowths of mindfulness, for example, for mental and physical health (Davidson, 2010), there has been a recent uptick in exploration of the interpersonal benefits of mindfulness training (e.g., Brown, Berry, & Quaglia, 2016; Karremans & Papies, 2017; Sedlmeier et al., 2012).

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Buddhist contemplative traditions have long regarded mindfulness and related forms of mental training as promoters of virtuous behavior, including those intended to alleviate other's suffering (i.e., kindness, generosity, compassionate acts; Davidson & Harrington, 2002; Gyatso, 1995; Walsh & Shapiro, 2006). Consistent with this, incipient research using secularized (and much-simplified) derivations of these trainings has shown them to predict prosocial behaviors (see Condon, 2017 for review).

For example, in two recent experiments, mindfulness trainees had an opportunity to offer their seat to a confederate on crutches, and in the presence of two bystanders, the latter a situational factor reliably shown to reduce helping behavior (Darley & Latané, 1968). The trainees showed higher levels of this helping behavior compared with both waitlisted controls (Condon, Desbordes, Miller, & Desteno, 2013) and active controls (Lim, Condon, & DeSteno, 2015). Yet as important as this research is in demonstrating the potential of mindfulness training to enhance prosociality, two limitations are important to note. First, the mindfulness training provided in these and other studies has been multimodal in form, including nonspecific elements alongside mindfulness practice such as didactic instruction and group social support; the role of mindfulness itself in prosocial responses has been virtually unstudied. This represents an important avenue toward better understanding the specific role of mindful states in prosocial responsiveness, and such research may have implications for building or tailoring mindfulness-integrated interventions to enhance prosociality.

A second limitation of existing research in the area is our lack of understanding how mindfulness has effects on helping and other prosocial outcomes. Condon, DeSteno and colleagues (Condon et al., 2013; Lim et al., 2015) attributed helping to prosocial motivation—an intention to alleviate the injured person's discomfort. Yet absent evidence of such motivation, it is also possible that participants helped so as to alleviate their own discomfort in the situation, to avoid social or self-punishment (e.g., embarrassment, guilt) for not helping, or to gain reward as a consequence of helping (see Batson, 2011; Batson & Shaw, 1991 for reviews). While Lim et al. (2015) tested whether empathic accuracy mediated a relation between mindfulness and helping, they found no support for this hypothesized mediation. Thus, a mechanistic explanation of the mindfulness–helping relation remains an open question that deserves attention.

Empathic Concern as a Plausible Mechanism for Effects of Mindfulness on Helping

When another person is in distress or apparent need, people may experience or enact one or more kinds of empathic responses that have been grouped into three broad categories (Ashar, Andrews-Hanna, Dimidjian, & Wager, 2017; Zaki & Ochsner, 2012). First, people may engage in perspective taking (also called mentalizing and theory of mind, among other terms) by imagining how the target person feels (imagine-other), or by imagining themselves in that person's place (imagine-self; Batson, 2016; de Waal, 2008; Preston & de Waal, 2002). Second, they may experience emotional contagion (also called experience sharing, among other terms; Batson, 2016; Zaki, 2014; Zaki & Ochsner, 2012), which involves resonating with or feeling as another person feels (or is perceived to feel; Darwin, 1872/2009; Doherty, 1997), and often leads to *empathic distress* (also called personal distress). Third, people may

feel empathic concern—also termed prosocial concern, sympathy (Zaki & Ochsner, 2012), and compassion (Batson et al., 2015; Condon, 2017)—and is distinctive from emotional contagion in its feeling for an affected person (Batson, 2016; Goetz, Keltner, & Simon-Thomas, 2010).

The distinction between feeling *with* versus feeling *for* a person in need or distress is key, and lies in a self-versus-other emotional focus. The empathic distress that often arises from emotional contagion (as well as the imagine-self form of perspective-taking; Batson, 2016) is a self-oriented emotional state reflecting upset in the face of another's predicament. Empathic concern is an other-oriented constellation of affective states congruent in valence with the perceived welfare of a person (or nonhuman animal) in need.

The distinction between empathic concern and empathic distress is further underscored by neural evidence. For example, a recent study manipulating empathic concern versus empathic distress found the former to be associated with ventromedial prefrontal-striatal systems believed to underlie valuation, affiliation, and self-relevance, whereas the latter was preferentially associated with premotor and somatosensory cortical activity thought to support the representation of one's own and others' bodily states (Ashar et al., 2017). Importantly for this discussion, empathic distress tends to lead to withdrawal from the situation at hand, or leads to helping merely to reduce one's own negative affect (Batson, 2016; Batson, O'Quinn, Fultz, Vanderplas, & Isen, 1983; Bloom, 2017; Toi & Batson, 1982), whereas empathic concern has been shown a reliable motivator of prosocial action (Batson, 2009, 2016; Batson, Fultz, & Schoenrade, 1987).

On both theoretical and empirical grounds, we propose that mindfulness may catalyze prosocial behavior specifically by facilitating empathic concern for a target individual. Contemplative scholars and scientists have emphasized the potential for mindfulness and other forms of meditation training to enhance social welfare by increasing interest in and concern for others (along with subduing self-focus; Berry & Brown, 2017; Brown et al., 2016; Feldman, Greeson, & Senville, 2010; Leary & Terry, 2012; Trautwein, Naranjo, & Schmidt, 2014). In line with this claim, measures of dispositional mindfulness have predicted self-reported empathic concern (Beitel, Ferrer, & Cecero, 2005; Cameron & Fredrickson, 2015; Dekeyser, Raes, Leijssen, Leysen, & Dewulf, 2008). Training in mindfulness has predicted empathic concern via self-report measures (Birnie, Speca, & Carlson, 2010; Shapiro, Schwartz, & Bonner, 1998), objective (facial) indicators (Rosenberg et al., 2015), and the content of hand-written notes to victims of social exclusion (Tan, Lo, & Macrae, 2014). Together, this research led us to propose that mindfulness will confer prosocial behavior through enhanced empathic concern. This represents an important avenue toward better understanding the emotional and motivational pathways through which mindfulness may have its prosocial effects, and because mindfulness can be trained, such research may have implications for efforts to increase rates of prosocial behavior.

The Present Research

In this study series, we examined whether brief instruction in mindfulness would promote empathic concern and subsequent helping behavior among those witnessing ostracism.

Ostracism—intentionally ignoring or excluding another person—carries significant psychological and interpersonal costs for

the victim (Eisenberger, 2012). Consistent with decades of research on helping behavior, witnessing ostracism ("vicarious ostracism"; Wesselmann, Williams, & Hales, 2013) can provoke empathic concern and helping behavior (Masten, Morelli, & Eisenberger, 2011). To date, studies seeking to disclose what fosters empathic concern, and in turn helping behavior toward ostracism victims has focused on circumstantial factors such as familiarity with the victim (Meyer et al., 2013) and relatively immutable personality traits (e.g., dispositional empathy; Masten et al., 2011).

Based on theory and research reviewed here, we proposed three hypotheses that were systematically tested in four studies. We first predicted that very brief mindfulness training would promote helping of an ostracism victim, based on theory (e.g., Berry & Brown, 2017; Brown et al., 2016; Brown, Ryan, Creswell, & Niemiec, 2008; Davidson & Harrington, 2002; Trautwein et al., 2014) and prior research on multimodal mindfulness training effects on prosocial behavior (e.g., Condon et al., 2013). Our second prediction was that mindfulness training would promote empathic concern for an ostracism victim, given theory and suggestive evidence that training in mindfulness fosters this other-oriented emotional state (Birnie et al., 2010; Shapiro et al., 1998). In line with this, and as already noted, empathic concern is an established proximal predictor of prosocial action (e.g., Batson et al., 1983; Batson et al., 2015), and thus our third prediction was that empathic concern would mediate the effect of very brief mindfulness training on helping behavior.

Study 1, a correlational discovery study, examined whether individual differences in mindfulness would predict empathy and helping. Individual difference measures of mindfulness, reflecting the tendency to deploy a basic form of mindfulness of internal and external experiences in everyday circumstances, were completed before witnessing a stranger ostracized in the Cyberball environment (Williams, Yeager, Cheung, & Choi, 2012), a well-validated laboratory task typically used to test effects of ostracism (being excluded from a ball-tossing game) on intrapersonal outcomes. In an adaptation of this task, Study 1 participants witnessed a "player" (actually computer-generated) excluded from the Cyberball game. Subsequently, experienced empathy and two forms of objective (private and public) helping behavior toward the exclusion victim were measured in participant-observers. State empathic distress, a self-oriented vicarious emotion less strongly or consistently associated with helping than empathic concern, was also measured to help test whether the mindfulness–prosocial behavior relation was specific to empathic concern.

Study 2 participants were randomized (a) to a brief mindfulness exercise designed to enhance receptive attention to one's own sensory, mental, and somatic stimuli or (b) to a structurally equivalent control exercise. Participants then witnessed ostracism, after which empathy and helping behavior were again measured. Extending Study 2, Study 3 was designed to further test alternative explanations for the effect of mindfulness on prosociality in an ostracism context—namely that mindfulness fostered empathic anger and perpetrator punishment, and/or that the active control exercise reduced prosocial responsiveness rather than the mindfulness exercise increasing it.

Finally, Study 4 introduced a more closely matched control condition (progressive muscle relaxation; Bernstein & Borkovec, 1973) to disambiguate the effects of mindfulness instruction from a putatively close relative (relaxation instruction) that also engages

one's sensory, mental, and somatic experiences (Roemer & Orsillo, 2003). Study 4 also asked whether mindfulness instruction promoted prosocial action through increases in task engagement during ostracism observation.

In addition to procedural controls and tests of alternative hypotheses, all four studies incorporated several features designed to "raise the bar" for empathic concern and helping to occur, as guided by the past research reviewed here: first, the apparent victim was a stranger to the participant; second, the victim was unseen (only a name was given) and presented as geographically distant; third, key individual differences in various forms of empathy and attention were controlled in analyses testing the role of mindfulness in promoting helping; fourth, meta-analyses of the role of trait and training effects of mindfulness on empathic concern and helping (hypotheses 1 and 2) were conducted by combining results from all four studies to obtain more precise estimates of effect sizes. Together these studies and analyses were designed to provide a strong test of the mindfulness hypotheses.

Study 1

To our knowledge, no research has examined whether trait mindfulness predicts situational empathic concern and helping. Study 1 examined the three hypotheses using two well-validated measures of dispositional mindfulness. To test the specificity of these hypotheses, trait empathic concern was statistically controlled, as it could be expected to predict both empathic concern and prosocial action (Carlo, Eisenberg, Troyer, Switzer, & Speer, 1991). To test the incremental validity of dispositional mindfulness in predicting these outcomes, a measure of attentional control, tapping a construct conceptually similar to mindfulness, was also controlled. Finally, state empathic distress was examined to test the specificity of the mindfulness–empathic concern relation.

Method

Participants. Beitel et al. (2005) showed a modest positive correlation between dispositional mindfulness and trait empathic concern ($r = .28$) based on a sample of approximately 100 participants. Thus, we used a similar sample size as the stopping criterion in this initial discovery study. Ninety-three Virginia Commonwealth University (VCU) undergraduates received course credit for participation. During poststudy probes, eight people indicated suspicion about the study cover story and were excluded from analyses; three additional participants were excluded for careless responses, making 3 or more errors on 7 directed questions (Maniaci & Rogge, 2014) embedded randomly within the trait measures survey (e.g., "This is a control question, please skip this question."). Although careless responses could be construed as (inversely) related to mindfulness,[1] we excluded these participants from analyses as carelessness also commonly reflects motivational influences (low levels of interest and engagement in a task), predetermined responding (choosing responses without careful

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[1] Notably, across Studies 1-4, careless responders ($n = 32$) did not statistically differ from cases included in analyses ($n = 440$) on Mindful Attention Awareness Scale scores or Acting with Awareness subscale scores, ps > 0.80. This suggests that careless responding is not related to basic trait mindfulness as measured here.

reading of questions), and other causes (Meade & Craig, 2012). Meade and Craig (2012) show that careless response styles can introduce substantial unsystematic error into reported parameter estimates. For comparison purposes, analyses of data from Studies 1–4 that included the careless responders are available in the online supplemental materials. The 82 remaining participants were 52.63% female, with an average age of 18.72 years ($SD = 1.12$). The sample was 58.53% Caucasian, 15.85% African American or Black, 9.76% Hispanic or Latino(a), 6.10% Asian, 2.43% Middle Eastern, 1.21% Native American, and 6.10% multiracial.

Procedure. Participants were tested individually in a single laboratory room. They first completed self-report trait measures of mindfulness and attentional control, which were embedded in a larger survey (see Measures below) that was managed using RED-Cap software (Harris et al., 2009). Participants were then informed that the study was examining the effects of mental visualization on Internet-based social interaction. Participants were told that their unique study identification number preassigned them to first ob-serve an online ball-tossing game (Cyberball v4.0; Williams et al., 2012), after which they would join an 'all play' game. The three nonparticipant players and their throws were software-generated. To increase the plausibility of the cover story that participants were observing (and playing in) a real game with other people, the experimenter made a sham phone call to another lab on campus where the other ostensible players were waiting to begin. To enhance engagement while observing the game, participants were instructed to imagine what the three players looked like and the context in which they were playing (e.g., outside or inside).

The three Cyberball players were identified on the computer screen by first name only, which participants were told were randomly generated to foster the perception that the players were strangers to the participant. The name of the victim was gender matched to the participant (Eric or Jess), and the perpetrators were one female (Cassie) and one male (Kevin). During the first, ob-served game, one player was excluded from the ball tossing after receiving two throws. The exclusion continued until the end of the game (20 more throws between the other players). Immediately after the game, participants were queried as to whether exclusion occurred; state empathic concern and empathic distress were then measured (see Measures). Thereafter, participants wrote an e-mail to each ostensible player using a real e-mail (Gmail) account, first being told that they could "write whatever [they] want[ed] to the other three players" (Masten et al., 2011). To provide a cover story for why participants would be e-mailing other players, participants were told that e-mail is one way that we interact over the Internet, and that "We are interested in how e-mailing supports social interaction." Responses to the victim, coded for communication warmth, served as a private measure of prosocial behavior. During the following 'all-play' Cyberball game with the three players observed earlier, inclusion of the ostracism victim, a public indi-cator of prosocial action, was measured as the proportion of the total throws that the participant made to the victim (Riem, Bakermans-Kranenburg, Huffmeijer & van IJzendoorn, 2013). Be-cause participants interacted in the ball tossing game with three other individuals, we considered inclusion to be a public, however anonymous, form of helping. Following this second game, trait empathy was measured so as not to create a demand characteristic.

After a probe about prior knowledge of and suspicion about the study, participants were debriefed, thanked, and dismissed.

Measures.

Trait mindfulness. The 15-item Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) taps the frequency of basic mindful states in daily life on a 6-point Likert scale (*almost always* to *almost never*). Items reflect a lack of mindfulness (e.g., "I rush through activities without being really attentive to them"), which has been considered a common default state of mind and the self-reports of which appear to be more valid than do items assessing mindful attention directly (Brown & Ryan, 2003). Also assessing everyday mindful states in a similar fashion, the 8-item Act with Awareness subscale of the Five Facet Mindfulness Ques-tionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) uses a 5-point scale (*never or very rarely true* to *very often or always true*). On both scales, higher scores indicate higher mindful attention.

Trait attentional control. The 20-item Attentional Control Scale (Derryberry & Reed, 2002) measures focusing and shifting of attention on a 4-point Likert scale (*almost never* to *always*). Higher scores on items (e.g., "I can quickly switch from one task to another") indicate greater attentional control.

Trait empathy. Three relevant subscales of the Interpersonal Reactivity Index (IRI; Davis, 1983) assessed empathy on a 5-point Likert scale ("does not describe me well" to "describes me very well"). The 7-item *empathic concern* subscale assesses felt sym-pathy or compassion for suffering others. The 7-item *empathic distress* subscale assesses emotional discomfort in the presence of others' distress or suffering. The 7-item *perspective taking* sub-scale assesses the tendency to adopt others' points of view.

State empathic concern and empathic distress. Using a 7-point Likert scale (*not at all* to *extremely*), six adjectives tapped state empathic concern (Batson et al., 1987)—*sympathetic*, *moved*, *compassionate*, *tender*, *warm*, *and softhearted*—and seven adjec-tives assessed empathic distress (Batson et al., 1987)—*alarmed*, *upset*, *worried*, *disturbed*, *perturbed*, *distressed*, *troubled*.

Awareness of ostracism. (Masten et al., 2011). Four true/false questions regarding the ostracism (e.g., "All players participated in the game the same amount") were embedded among four filler questions germane to the game (e.g., "One player took much longer to throw the ball than others"). To further conceal the goals of this measure, instructions indicated that, "Because each set of players acts differently we would like to know how the events of the game unfolded."

E-mail helping. E-mail responses were submitted to coders naïve to the study hypotheses and uninvolved in data collection (cf., Masten et al., 2011). For e-mails addressed to the ostracism victim, three raters coded the extent to which the writer helped the ostracism victim using a 7-point scale (*not at all* to *very much*) in response to three questions: "Does it seem like they are trying to comfort the person?"; "How supportive are they?"; and "How much do they seem like they are trying to help the person?" Item scores were averaged for each rater; these mean scores were then averaged across raters. Interrater consistency was high ($ICC = 0.89$).

E-mail word count. It is possible that verbosity of victim e-mails could explain the relation between mindfulness and help-ing (i.e., simply writing more to victims could be conflated with empathy for them); thus, word count was included in analyses to

rule out verbosity as an alternative explanation for the mindfulness–prosociality relations.

The Linguistic Inquiry Word Count (LIWC2015; Pennebaker, Booth, Boyd, & Francis, 2015) was used to calculate raw word count in e-mails to victims. Prior to data processing, spelling and grammatical errors were corrected.

Results and Discussion

All participants reported awareness of the ostracism by answering all 'awareness of ostracism' manipulation check questions correctly. Before analyses, all variables were checked for univariate and multivariate normality and z transformed to provide standardized coefficients and effect size confidence intervals (CIs). Race/ethnicity, gender, and age were not associated with study outcomes (all $ps > 0.10$) so not further considered. Table 1 shows bivariate relations among trait mindfulness, attentional control, and the trait empathy subscales, and each with the study outcomes. Both mindfulness measures correlated positively with state empathic concern (but not empathic distress), e-mail helping, and inclusion. Among the four trait covariates, only empathic concern and attentional control correlated with the e-mail helping outcome, and none were associated with the inclusion outcome. Interestingly, the two prosocial behavior outcomes were not significantly correlated.

Direct relations of mindfulness to empathic and prosocial responses. To test the hypotheses that mindfulness predicts empathy (H1) and prosocial action (H2), hierarchical least squares regression analyses were performed in SPSS (v24). Trait empathic concern and trait attentional control comprised block one of each model. In block two, dispositional mindfulness was loaded. Although the Mindful Attention Awareness Scale and Acting with Awareness subscale were strongly correlated ($r = .82$), they were not combined for analyses, as they share five of the same items and are frequently treated separately in research. Thus, separate models were constructed for each mindfulness measure. Both measures of mindfulness predicted state empathic concern and inclusion in the Cyberball game, after controlling for trait empathic concern and trait attentional control (see Table 2), supporting hypotheses 1 and 2.[2] Only the Mindful Attention Awareness Scale predicted e-mail helping after controlling for trait empathic concern and trait attentional control. In a subsequent model, victim e-mail word count was loaded as a covariate with trait empathic concern and trait attentional control in block 1. Victim e-mail word count was positively related to e-mail helping, ($\beta = 0.27$, $p < .05$, 95% CI = [0.06, 047]), but not empathic concern or inclusion, $ps > 0.18$. Including victim e-mail word count in block 1 did not change the relations between dispositional mindfulness and study outcomes, thus more mindful individuals' higher e-mail helping was not attributable to verbosity.

Mediation of mindfulness - prosocial response relations. To test the third hypothesis, namely that empathic concern mediates the relation between mindfulness and the two prosocial outcomes, mediation analyses were performed using the PROCESS bootstrapping plugin (Model 4; Hayes, 2016) for SPSS; 5000 resamples with 95% bias corrected standardized bootstrap confidence intervals were simulated for each model. Four separate models were constructed, testing the role of each mindfulness measure and each helping outcome, controlling for trait attentional

control, trait empathic concern, and victim e-mail word count. Both the Mindful Attention Awareness Scale and Acting with Awareness subscale were directly related to e-mail helping and inclusion. As Figure 1 shows, the Mindful Attention Awareness Scale - e-mail helping mediation by state empathic concern was significant ($\beta = 0.10$, 95% CI = [0.02, 0.27]). Empathic concern also mediated the relation between Acting with Awareness and e-mail helping, ($\beta = 0.11$, 95% CI = [0.03, 0.28]). However, state empathic concern did not significantly mediate the relation between mindfulness and inclusion; specifically, the CI of the indirect effect of state empathic concern between the Mindful Attention Awareness Scale and inclusion contained zero, ($\beta = 0.07$, 95% CI = $[-0.02, 0.26]$), as did the same model with Acting with Awareness, ($\beta = 0.07$, 95% CI = $[-0.02, 0.24]$; see Figure S1 in supplemental material available online depicting Acting with Awareness models).

Study 1 provided initial correlational evidence that mindfulness predicts greater empathic concern (but not empathic distress) for an ostracized stranger, and more helping behavior toward them, measured with two objective outcomes. These hypothesized relations held (except the Acting with Awareness prediction of e-mail helping) after controlling for trait empathic concern, trait attentional control, and victim e-mail word count. It is possible that the relation between Acting with Awareness and e-mail helping was conflated with trait empathic concern and trait attentional control, as these constructs were related to Acting with Awareness.

Trait and state measures of empathic concern were not correlated in this study. One possible reason for this is that these measures are tapping different constructs, but it is more likely that inclusion of the trait measure after all outcomes were assessed could have interfered with the strength of the relation. The fact that empathic concern can be induced (e.g., Batson & Shaw, 1991, 2011; Batson, Early, & Salvarani, 1997; Batson et al., 2015; Batson et al., 1983; Davis, Conklin, Smith, & Luce, 1996; Toi & Batson, 1982) suggests that the state is not limited to those with higher levels of trait empathy. Our third hypothesis was partially supported, in that state empathic concern mediated the relation between trait mindfulness and e-mail helping, but not inclusion during the all-play game. The longer temporal gap between capturing state empathic concern and inclusion may have interfered with the strength of the association, but we sought to test the reliability of these relations in Study 2, and with a design that permitted stronger causal inferences.

Study 2

Tan et al. (2014) demonstrated that very brief mindfulness training, relative to active control training, promoted higher empathic concern in letters written to Cyberball ostracism victims. The present Study 2, an experimental replication and extension of Study 1, similarly randomized participants to a very brief mindfulness training exercise or a structurally equivalent attention-based control training exercise in a test of our three hypotheses.

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[2] In Study 1 and all subsequent studies we found that victims received more prosocial e-mails than did perpetrators ($ps < 0.01$). The relations between trait mindfulness and e-mail helping toward perpetrators were also examined; in Study 1 and the three studies that follow, trait mindfulness did not predict e-mail helping directed toward perpetrators ($ps > 0.51$).

Table 1
Study 1 Descriptive Statistics and Bivariate Relations With [95% Confidence Intervals] Among Trait Predictors and Study Outcomes

Measure	1	2	3	4	5	6	7	8	9	10	11
1. MAAS	—										
2. AAw	.82** [.69, .95]	—									
3. ACS	.30** [.08, .52]	.31** [.10, .53]	—								
4. TEC	.45** [.25, .64]	.32** [.11, .53]	.42** [.22, .62]	—							
5. TPD	.24* [.03, .46]	.17 [-.05, .39]	-.10 [-.33, .13]	.19 [-.02, .43]	—						
6. TPT	.28* [.07, .50]	.24* [.02, .45]	.49 [.29, .70]	.65 [.49, .82]	.09 [-.13, .32]	—					
7. SEC	.29** [.07, .50]	.33** [.12, .54]	.08 [-.15, .30]	.05 [-.18, .27]	.08 [-.14, .31]	.14 [-.09, .37]	—				
8. SED	.08 [-.15, .30]	.19 [-.03, .41]	.02 [-.20, .25]	-.23* [-.45, .00]	.17 [-.05, .39]	-.01 [-.24, .23]	.58** [.40, .76]	—			
9. EH	.34** [.13, .55]	.31** [.10, .53]	.31** [.10, .53]	.28* [.07, .50]	.06 [-.16, .29]	.16 [-.06, .38]	.42** [.22, .62]	.28* [.07, .50]	—		
10. VEWC	.04 [-.19, .26]	.07 [-.15, .29]	.16 [-.07, .37]	-.08 [-.30, .15]	.04 [-.19, .26]	.21 [-.01, .41]	.06 [-.16, .27]	.25* [.03, .46]	.18 [-.04, .40]	—	
11. INC	.28* [.06, .49]	.29** [.07, .50]	.22 [-.01, .44]	.11 [-.11, .33]	-.15 [-.37, .07]	-.06 [-.28, .16]	.26* [.04, .48]	.25* [.04, .47]	.18 [-.04, .47]	.08 [-.15, .30]	—
α	.88	.90	.72	.81	.72	.75	.89	.88			
M	3.74	2.98	2.38	26.54	20.82	24.34	2.71	2.37	3.35	33.34	44.16
SD	.79	.72	.27	7.18	3.84	4.31	1.30	1.31	1.73	25.71	17.27

Note.   MAAS = Mindful Attention Awareness Scale; AAw = Acting with Awareness subscale of the Five Facet Mindfulness Questionnaire; ACS = Attentional Control Scale; TEC = Trait Empathic Concern subscale of the Interpersonal Reactivity Index (IRI); TPD = Trait Empathic distress subscale of the IRI; TPT = Trait Perspective Taking subscale of the IRI; SEC = State Empathic Concern; SED = State Empathic distress; EH = E-mail Helping; VEWC = Victim E-mail Word Count; INC = Inclusion.
* $p \le .05$.   ** $p < .01$.

Study 1 found that H3 was only partially supported, in that mindfulness predicted communication warmth but not victim inclusion. Using a dispositional operationalization of mindfulness to predict specific behaviors may have weakened the potential strength of this association. We retested the hypotheses with an experimental design that made mindfulness more salient.

Method

Participants.   An a priori sample size of $N = 66$ ($n = 33$ per condition) was set as per Tan et al.'s (2014) experimental research testing the effects of brief mindfulness training on responses to ostracism victims in the Cyberball environment. Specifically, Tan et al. (2014) found a moderate effect size of mindfulness training on prosociality toward ostracism victims ($d = 0.62$), and we calculated sample size based on this effect size estimate in G*Power 3.0.10 ($\alpha = .05$, power $= 0.80$). We anticipated excluding data based on participants' prior knowledge or suspicion of the Cyberball manipulation, suspicion about the study cover story, or careless responses, and thus overrecruited to a target $N = 100$ to meet anticipated sample size requirements in the smallest condition ($n = 33$).[3] The initial sample of 102 VCU undergraduates was reduced using the same data quality measures reported in Study 1: Ten people indicated suspicion about the study cover story, and nine participants were excluded for careless responses in the trait measures survey.[4] The remaining 83 participants were 68% female, with an average age of 19.72 years ($SD = 2.50$). The sample was 44.26% Caucasian, 18.03% African American or Black, 9.83% Hispanic or Latino, 11.48% Middle Eastern, 6.56% Asian, 3.28% Pacific Islander, 1.64% Native American, and 4.92% multiracial. All received course credit for study participation.

Procedure.   Participants completed the same trait measures and procedures, and in the same order, as in Study 1, except that prior to observing the ostensible ostracism, participants were randomly assigned[5] to listen to either mindfulness-based ($n = 39$) or attention-based ($n = 44$) audio-recorded instructions through headphones while seated in a chair in front of a computer screen (inactive during this instruction period). The 8 min, 35 sec mindfulness training involved a series of instructions, delivered by a male voice, to establish a state of present-centered attention to moment-to-moment somatic, cognitive, and emotional experiences (adapted from Segal, Williams, & Teasdale, 2002). Thus attention was oriented toward and focused on dynamic inner experiences of a specific kind (Lutz, Jha, Dunne, & Saron, 2015). The structurally equivalent attention-based training, also conducted while partici-

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[3] We anticipated that the mindfulness and control instructions might produce their own suspicions irrespective of the Cyberball procedures. Thus, $N = 100$ was chosen as a conservative target. Although not an a priori intention, oversampling in this replication may also have protected against possible inflated effect size estimates (e.g., Simonsohn, 2015).

[4] Number of participant exclusions did not differ by training condition in Study 2: MT ($n = 8$), CT ($n = 11$), $\chi^2(1) = 0.18$, $p = .70$; in Study 3: MT ($n = 10$), reaction time (RT; $n = 4$), NT ($n = 6$), $\chi^2(2) = 4.14$, $p = .13$; nor in Study 4: MT ($n = 10$), CT ($n = 11$), NT ($n = 13$), $\chi^2(2) = 1.82$, $p = .40$.

[5] Simple randomization, a single sequence of random assignments, was done in Studies 2-4. Simple randomization can result in an unequal number of assignments per condition (Suresh, 2011). A more appropriate approach, which minimizes this risk, is to set randomization software to generate equal participant assignments per condition.

Table 2
Study 1 Final Hierarchical Ordinary Least Squares Regression Model Statistics on Prediction of Outcomes (Careless Responders Included)

Outcome measures	Block	Predictor	β	95% CI	F_{change}	ΔR^2
State empathic concern	Step 1	TEC	−.16	[−.43, .11]		
		ACS	−.03	[−.21, .27]	.18	.01
	Step 2	MAAS	.36*	[.11, .60]	5.54**	.10**
	Step 2	AAw	.37**	[.15, .61]	11.82**	.13**
E-mail helping	Step 1	TEC	.07	[−.20, .33]		
		ACS	.20	[−.03, .44]	5.11**	.12**
	Step 2	MAAS	.25*	[.01, .48]	4.20*	.05
	Step 2	AAw	.22	[−.01, .44]	3.70	.04
Inclusion	Step 1	TEC	−.09	[−.36, .19]		
		ACS	−.18	[−.07, .43]	1.79	.05
	Step 2	MAAS	.26*	[.04, .54]	4.33*	.05*
	Step 2	AAw	.25*	[.01, .49]	4.45*	.05*

Note. TEC = Trait Empathic Concern subscale of the Interpersonal Reactivity Index; ACS = Attentional Control Scale; VEWC = Victim E-mail Word Count; MAAS = Mindful Attention Awareness Scale; AAw = Acting with Awareness subscale of the Five Facet Mindfulness Questionnaire.
* $p \le .05$.   ** $p < .01$.

pants were seated in a chair in front of a presently inactive computer screen, involved instructions from a self-help book (Covey et al., 1995) highlighting the importance of focusing attention on important and urgent goals. Scripts for mindfulness-based and attention-based training were used in Brown, Goodman, Ryan, and Anālayo (2016). To provide a cover story to link these audio instructions with the social interaction tasks, participants were told that the "study [is] about the role of active engagement in social interaction over the internet."

Choosing a control condition emphasizing control of attention offered the benefit of allowing for more precise inferences to be made about the impact of a mindful quality of attention, and not simply that instruction in mindfulness confers helping and em-

pathic concern through gains in attentional control. This is important because mindfulness and attention control appear to be correlated constructs (e.g., Brown, Goodman, & Inzlicht, 2013) and because focused attention has predicted empathy and helping (Dickert & Slovic, 2009).

Instructions before and during the trainings used in this and the following studies made no mention of empathy-related or helping-related ideas, nor did they mention the contents of the tasks to follow. Careful, attentive listening was encouraged in both conditions (see *Pre-Game Instructions* in supplemental materials available online). After observing the first game, participants completed state empathic concern, empathic distress, and manipulation check measures (see *Measures* below). Participants then wrote an e-mail
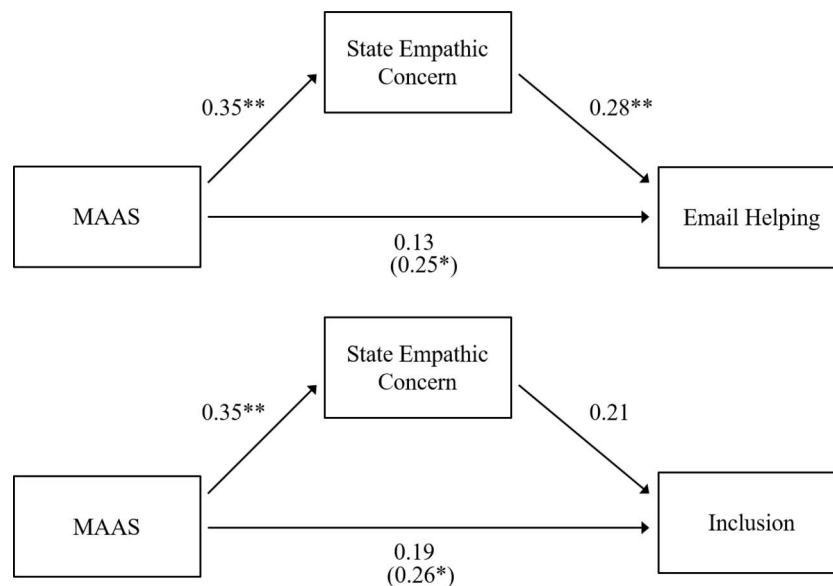

Figure 1. Study 1 mediation of Mindful Attention Awareness Scale–helping relations by empathic concern. Standardized path coefficients are shown; the direct effect of mindfulness on helping is parenthesized. MAAS = Mindful Attention Awareness Scale. * $p \le .05$, ** $p < .01$.

to each of the three players observed in the Cyberball game. Four e-mail coders followed the procedures detailed in Study 1; inter-rater consistency was high ($ICC = 0.93$). Just prior to joining the 'all-play' game, participants listened to brief, 2-min booster instruction consistent with their experimental condition. Following this game, participants were probed for suspicion and prior knowledge about the study, then debriefed, thanked, and dismissed.

Measures.

Trait measures. Four measures used in Study 1 were completed here: dispositional mindfulness (Mindful Attention Awareness Scale; Brown & Ryan, 2003; Five Facet Mindfulness Questionnaire—Act with Awareness subscale; Baer et al., 2006); attention control (Attentional Control Scale; Derryberry & Reed, 2002); and three subscales of the Interpersonal Reactivity Inventory (empathic concern, empathic distress, and perspective taking; Davis, 1983).

Manipulation checks. In addition to the questions used in Study 1 concerning awareness of ostracism during the observed Cyberball game, 6 questions were administered after the observed Cyberball game and after the all-play Cyberball game in an effort to rule out the possibility that specific aspects of the experimenter-delivered instructions and/or audio recordings explained experimental condition differences in study outcomes. Two questions tapped the participants' ability to concentrate on the experimenter-delivered instructions: "How easy was it for you to follow the instructions provided by the experimenter?" (7-point Likert scale; *very difficult* to *very easy*), and "To what extent were you able to focus on the instructions provided by the experimenter? (5-point Likert scale; *not at all* to *extremely*). Four questions queried participant concentration, comfort, and perceived quality of the audio recording, as follows: "How easy was it for you to follow the recorded audio instructions?" (7-point Likert scale; *very difficult* to *very easy*); "To what extent were you able to focus on the recorded audio instructions?" and "I felt uncomfortable about the activities the audio recording asked me to do." (both 5-point Likert scales; *not at all* to *extremely*); and "I felt that the quality of the audio recording was _____." (5-point Likert scale; *very poor* to *very good*).

Victim e-mail word count. As in Study 1, LIWC software was used to provide raw word count scores of e-mails to victims (Pennebaker et al., 2015).

Results and Discussion

Preliminary analyses. All participants reported awareness of the ostracism by correctly answering all awareness of ostracism manipulation check items. All variables were checked for univariate and multivariate normality and z transformed. Sex, race/ethnicity, and age were not related to any of the study outcomes (all $ps > 0.22$) so not further considered. Simple OLS regression analyses comparing experimental conditions on the experimenter instruction and audio-recorded instruction manipulation checks found no statistical differences ($ps > 0.45$); thus, condition differences on these nonspecific experimenter- and audio-delivered instruction factors were not plausible explanations for between-condition outcome differences. E-mail helping and inclusion were positively correlated, ($r(81) = 0.24$, $p = .03$, 95% CI = [0.02, 0.45]) but not so highly as to be combined for analysis. The inclusion of very brief training in this study appeared to largely

eliminate the trait—prosocial responsiveness relations ($ps > 0.05$). Victim e-mail word count was positively associated with e-mail helping, $r(81) = 0.23$, $p = .04$, 95% CI = [0.01, 0.49].

Effects of mindfulness training on empathic and prosocial responses. Table 3 shows simple OLS regression analyses, performed in SPSS v24, in which state empathic concern, empathic distress, e-mail helping, and inclusion were regressed on instructional condition in separate models. Mindfulness training participants showed higher state empathic concern but equivalent state empathic distress, relative to the attention training control group. Mindfulness training participants also offered more e-mail helping and included the victim more than did those receiving attention-based training.[6]

Mediation of mindfulness—prosocial response relations. The hypothesis (H3) that state empathic concern would mediate the mindfulness - prosocial outcome relations was tested with the PROCESS bootstrapping plugin (Model 4, Hayes, 2016) for SPSS; 5000 resamples with 95% bias corrected standardized bootstrap confidence intervals were simulated for each model. Figure 2 shows that state empathic concern mediated the relation between instructional condition and e-mail helping, ($\beta = 0.09$, 95% CI = [0.02, 0.20]), as well as the relation between condition and inclusion, ($\beta = 0.05$, 95% CI = [0.004, 0.15]). It is noteworthy that despite this significant mediation, the state empathic concern and inclusion relation was not statistically significant.

In sum, our three hypotheses were supported in Study 2. Very brief instruction in mindfulness, relative to brief control instruction, led to greater empathic concern for an ostracized stranger and in turn more prosocial actions toward them. These hypothesized relations held after controlling for the traits empathic concern, attentional control, and mindfulness. State empathic concern mediated the relations between instructed mindful attention and both helping outcomes. These experimental results are largely convergent with those of the correlational Study 1, and provide firmer causal evidence for the effects of mindfulness on empathy for, and helping of an ostracized stranger.

However, a weakness of this study was the fact that, without a nonactive control condition, it cannot be definitively concluded that mindfulness increased empathic concern and helping; it is also possible that the active control instruction decreased the likelihood of these responses. Thus, a third study was conducted in an effort to rule out this possibility. We also sought to further examine the specificity of empathic concern as a mediator of the mindfulness–helping relations, particularly given its inconsistent role as a mediator between these first two studies in predictions of inclusion, and in an effort to examine the viability of plausible alternative mediators of the observed relations. Also of note, the attention-based control training in this study encourages attending to important and urgent goals, which may have inadvertently trained self-focus during the ostracism task. However, if this were the case, the attention training control would have increased empathic distress, a self-oriented vicarious emotion.

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[6] Mindfulness training prediction of prosocial outcomes (empathic concern, e-mail helping, and inclusion) remained consistent after statistically controlling for trait mindfulness, attentional control, empathic concern, and victim e-mail word count. Mindfulness training did not interact with these traits or the manipulation check questions to predict prosocial outcomes in this study nor in Studies 3 or 4 ($ps > 0.08$).

Table 3

Training Condition Means, Standard Deviations, and Simple Ordinary Least Squares Regression Model Statistics on Prediction of Study 2 Outcomes

	Training condition M (SD)					
Outcome	MT	CT	β	95% CI	R^2	Sample α
SEC	3.04 (1.21)	2.45 (1.09)	.25*	[.04, .47]	.06*	.82
SED	2.30 (1.25)	2.21 (1.07)	.04	[−.18, .26]	.00	.89
EH	3.72 (2.03)	2.53 (1.64)	.31**	[.10, .52]	.10**	—
VEWC	32.19 (20.94)	27.15 (19.99)	.12	[−.13, .37]	.01	—
INC	46.55 (7.53)	37.30 (12.77)	.40**	[.20, .60]	.16**	—

Note. MT = mindfulness training; CT = attention training control; SEC = State Empathic Concern; SED = State Empathic distress; EH = E-mail Helping; VEWC = Victim E-mail Word Count; INC = Inclusion; Training condition (MT = 1, CT = 0).
* $p \leq .05$. ** $p < .01$.

Study 3

This experiment was designed to provide firmer conclusions about the hypothesized effects of mindful attention on empathic concern and helping. First, to rule out the possibility that the attention-based training from Study 2 reduced prosocial responsiveness rather than mindfulness training increasing it, we added a second, randomized no-instruction control condition alongside the attention-based and mindfulness-based training conditions. Second, it is possible that the inclusion outcome examined here could reflect anger at, and intention to punish the perpetrators by withholding throws from them. Empathic anger, like empathic concern, reflects care about the welfare of another person, specifically at seeing that person treated unfairly (Batson et al., 2007). Thus, to test the specificity of empathic concern as a mediator of mindfulness–helping relations, a measure of state empathic anger (along with empathic distress) was included as an alternative mediator. Additionally, after the all-play game we queried partic-

ipants' intentions to include and exclude the other Cyberball players.

Method

Participants. The same participant recruitment stopping criterion used in Study 2 was implemented, namely a minimum of ($n = 33$) participants in the smallest condition. However, also as in Study 2, we overrecruited in anticipation that some cases would be excluded based on participant carelessness or suspicion about study procedures. One hundred eighty-two VCU undergraduates received course credit for participation. Nineteen participants indicated suspicion about the study cover story; 12 participants were excluded for careless responses. An additional five participants were excluded from data analysis for failing at least one of the *awareness of ostracism* manipulation check questions. The remaining 146 participants were 66.54% female, with an average age of 19.40 years ($SD = 2.72$). The sample was 40.34% Caucasian,
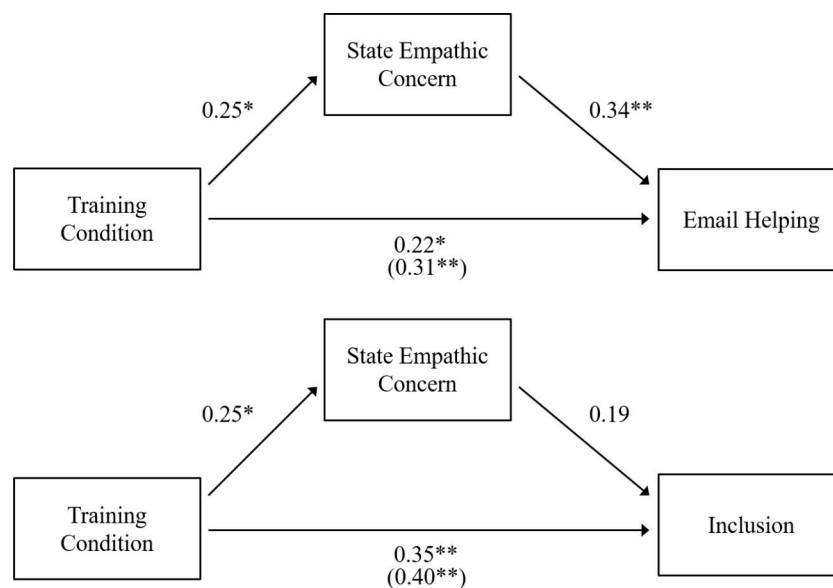

Figure 2. Study 2 mediation of training condition–helping behavior relations by empathic concern. Standardized path coefficients are shown, and the direct effect of mindfulness on helping is parenthesized. Training condition, where mindfulness training = 1, attentional control training = 0. * $p \leq .05$, ** $p < .01$.

31.82% African American or Black, 9.09% Hispanic or Latino(a), 5.68% Asian, 7.39% Middle Eastern, and 3.41% multiracial; 1.70% of participants provided no response.

Procedure. Experimental procedures largely replicated those presented in Study 2 except that participants were randomized using online randomization software (Research Randomizer) into no training ($n = 40$) as well as the mindfulness-based training ($n = 59$) and attention-based training ($n = 47$) conditions. No-instruction participants were simply instructed to "take a few moments to become actively engaged on your own" prior to observing and then playing the Cyberball game. In addition, two new measures were added. First, seven adjectives—*angry, irritated, offended, outraged, mad, frustrated, annoyed*—measured *state empathic anger,* a vicarious emotion that occurs when witnessing a person being treated unfairly and is directed toward the perpetrator(s) (Vitaglione & Barnett, 2003). Two additional adjectives are typically included in this measure of empathic anger—*upset* and *perturbed* (Batson et al., 2007)—but were used to tap empathic distress in this study, as these adjectives are also included in the canonical measure of state empathic distress (Batson et al., 1997; Batson et al., 1983; Toi & Batson, 1982). These adjectives were combined with the empathic concern and empathic distress adjectives and presented in random order across participants. Second, an item was added after the all-play game assessing participants' intention to include or exclude each of the other three players (7-point Likert scale; *exclude very much* to *include very much*). The responses pertaining to the two perpetrators were combined before analyses.

Results and Discussion

Preliminary analyses. Univariate and multivariate normality assumptions were met and all variables were z transformed prior to statistical analyses. Sex, race/ethnicity, and age were unrelated to the study outcomes ($ps > 0.15$) so were not further considered. Simple OLS regression analyses showed no differences between mindfulness and attention control training conditions ($ps > 0.37$) in the experimenter and audio-recording manipulation check questions (see Study 2 *Measures*) so were not further considered. Two

contrast variables were created with the following codes (contrast 1: mindfulness training condition = 2, attention control training condition = −1, no-instruction condition = −1; contrast 2: mindfulness training condition = 0, attention control training condition = 1, no-instruction condition = −1). z transformations corrected for unequal sample size influence on the intercept, and so all intercept terms reflect the mean of the training conditions. As in the previous study, e-mail helping was modestly correlated with inclusion, $r(144) = 0.32$, $p < .01$, 95% CI = [0.16, 0.47]. Empathic concern was modestly correlated with empathic distress, $r(146) = 0.28$, $p < .01$, 95% CI = [0.12, 0.44], and empathic anger, $r(146) = 0.18$, $p = .03$, 95% CI = [0.02, 0.35]. Empathic distress and empathic anger were positively correlated, $r(146) = 0.64$, $p < .01$, 95% CI = [0.51, 0.77].

Effects of mindfulness on empathic and prosocial responses. Table 4 presents simple OLS regression model results on condition differences (using contrast codes 1 and 2) in state empathic concern, empathic distress, empathic anger, e-mail helping, inclusion, intention to include/exclude the victim, and intention to include/exclude the perpetrators. Consistent with our first two hypotheses, and with Studies 1 and 2, mindfulness instruction increased state empathic concern, e-mail helping, and inclusion, relative to attention control instruction and no instruction. There was also a nonsignificant trend in which mindfulness training participants scored lower on empathic anger than attention control training and no-instruction participants. Mindfulness training was equivalent to attention control training and no instruction on empathic distress, victim e-mail word count, and on the items tapping intentions to include/exclude other players. The attention training and no instruction conditions did not differ on any outcomes.

Mediation of mindfulness—prosocial response relations. To test the specificity of our third hypothesis predicting that state empathic concern, but not empathic distress or empathic anger, would mediate the two helping outcomes, 5000 resamples with a 95% bias corrected bootstrap confidence interval were simulated using the PROCESS (Model 4; Hayes, 2016) macro for SPSS. Empathic distress and empathic anger were added as simultaneous mediators of the mindfulness and prosocial response relations.

Table 4
Training Condition means, Standard deviations, and Simple Ordinary Least Squares Regression Model Statistics on Prediction of Study 3 outcomes

| Outcome | Training condition M (SD) | | | C1 β | C1 95% CI | C2 β | C2 95% CI | Sample α |
	MT	CT	NT					
SEC	3.43 (1.37)	2.82 (.96)	2.85 (1.05)	.25**	[.09, .41]	−.01	[−.17, .15]	.87
SED	2.78 (1.12)	2.96 (1.21)	2.67 (.81)	−.02	[−.18, .15]	.12	[−.06, .27]	.86
SEA	1.76 (1.09)	2.29 (1.37)	1.93 (1.06)	−.15	[−.31, .01]	.12	[−.05, .28]	.95
EH	3.51 (1.91)	2.91 (1.37)	2.38 (1.49)	.23**	[.07, .39]	.12	[−.05, .28]	—
VEWC	32.36 (21.94)	29.53 (21.57)	32.83 (27.14)	.02	[−.14, .19]	.05	[−.11, .22]	—
INC	46.15 (11.41)	40.38 (9.56)	40.97 (6.68)	.27**	[.11, .43]	−.02	[−.18, .14]	—
IVC	1.20 (1.76)	1.31 (1.56)	1.50 (1.32)	−.06	[−.23, .11]	−.05	[−.22, .13]	—
IPR	1.29 (1.61)	1.58 (1.22)	1.33 (1.44)	−.06	[−.23, .11]	.07	[−.11, .24]	—

Note. MT = mindfulness training; CT = attention control training; NT = no-instruction control; SEC = State Empathic Concern; SED = State Empathic distress; State Empathic distress; SEA = State Empathic Anger; EH = E-mail Helping; VEWC = Victim E-mail Word Count; INC = Inclusion; IVC = Intention to Include/Exclude Victim; IRP = Intention to Include/Exclude Perpetrator; C1 = Contrast 1 (MT = 2, CT = −1, NT = −1); C2 = Contrast 2 (MT = 0, CT = 1, NT = −1).
* $p ≤ .05$. ** $p < .01$.

Contrast 2 (mindfulness training = 0, attention control training = 1, no instruction = −1) was loaded into the model as a covariate. The total indirect effect of the mindfulness—e-mail helping relation was not significant, (β = 0.04, 95% CI = [−0.03, 0.13]), but this does not preclude examining individual indirect effects (Preacher & Hayes, 2008), as the specific mediation of empathic concern was hypothesized. Figure 3 shows that state empathic concern significantly mediated the mindfulness—e-mail helping relation, (β = 0.05, 95% CI = [0.004, 0.13]). Empathic distress (β = −0.0006, 95% CI = [−0.03, 0.01]) and empathic anger (β = −0.004, 95% CI = [−0.06, 0.03]) did not mediate this relation. The total indirect effect of the mindfulness—inclusion relation was not significant, (β = 0.04, 95% CI = [−0.05, 0.17]) but again state empathic concern mediated the mindfulness–inclusion relation, (β = 0.06, 95% CI = [−0.006, 0.18]); empathic anger was also a significant mediator (β = −0.04, 95% CI = [−0.12, −0.001]), but empathic distress (β = 0.008, 95% CI = [−0.05, 0.08]) was not.

Our three hypotheses were again supported in Study 3. Very brief training in mindfulness, relative to attention control instruction and a no instruction control, increased empathic concern and prosocial action for an ostracized stranger. With an inactive control condition, which did not differ from our active control condition on any study outcomes, we can more definitively conclude that mindfulness training increased prosocial responses from a putative baseline rather than conclude that the active control instruction decreased prosocial responsiveness. Our third hypothesis was further supported by showing that mindfulness increased prosocial action because of increases in empathic concern (and not increases

in empathic anger or empathic distress). In fact, mindfulness training helped to increase victim inclusion via lower empathic anger. Finally, measures tapping intentions to include or exclude other players were not predicted by mindfulness training. This finding, however counterintuitive, may strengthen our causal inferences about the effects of mindfulness training. Specifically, one concern about induced mindfulness, a potentially socially desirable state, is that it may differentially increase attention to measures of empathy and helping so as to create a demand characteristic specific to our experimental group. If this were the case, we suggest, those in the mindfulness training condition would have made explicit their intention to help the victim. An alternative explanation for this finding is that this item of inclusion intentions did not differentiate the conditions because including others is a socially desirable behavior.

A weakness of Studies 2 and 3 is that mindfulness training is potentially confounded with relaxation, a construct, like mindfulness, that can be trained by promoting interoception. Interoception concerns awareness of one's own emotional and attendant mental and somatic responses to aversive (and other) events, and appears to be involved in generating empathic concern for others in need (Singer, Critchley, & Preuschoff, 2009). Moreover, mindfulness theory suggests that interoception may be key in producing empathic and prosocial responses toward others (Bornemann, Herbert, Mehling, & Singer, 2015; Hölzel et al., 2011). The mindfulness training in Studies 2 and 3 relies heavily on cultivating interoception, and thus, it cannot be concluded whether mindfulness is promoting empathic concern or whether this effect was achieved through relaxation. Also, given the potential for
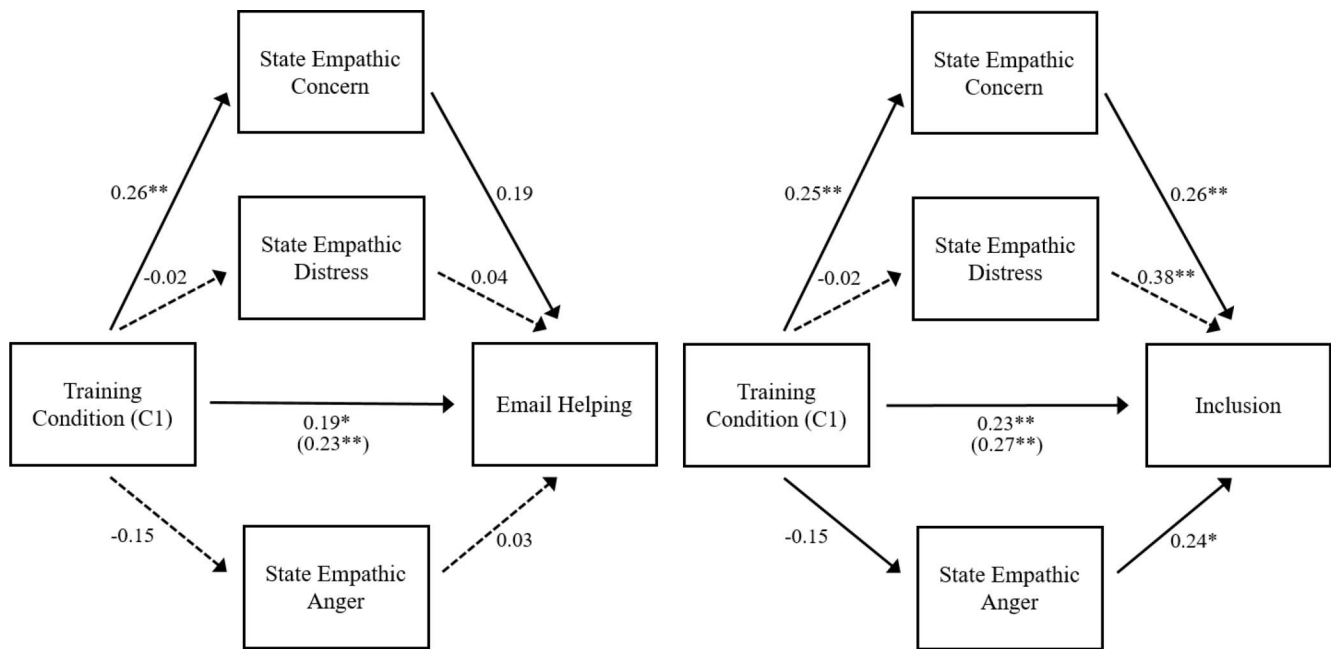

Figure 3. Study 3 mediation of training condition–helping behavior relations by empathic concern. Standardized path coefficients are presented, and direct effects of mindfulness on helping are parenthesized. Solid line pathways indicate significant mediation; dashed line pathways indicate nonsignificant mediation of the training condition–helping behavior relations. C1 = training condition contrast 1, where mindfulness training = 2, attention control training = −1, no instruction control = −1. * $p \leq .05$, ** $p < .01$.

mindfulness-induced increases in sustained attention (van Vugt, 2015), and the fact that sustained attention is fundamental to the generation of empathic concern (Dickert & Slovic, 2009), it is possible that participants receiving mindfulness training were more concerned for the victim simply because they were better able to pay closer attention to the game. Thus in a final study we tested the effects of mindfulness instruction against those of relaxation instruction, and included a measure of concentrated attention to the game.

Study 4

This experiment was designed to rule out additional alternative hypotheses about the mindfulness–prosocial action relation. First, to rule out the possibility that the mindfulness training from Studies 2 and 3 was producing prosocial responsiveness by relaxing participants, we replaced the attention control training from these studies with a progressive muscle relaxation training, a commonly used form of relaxation. Second, the specificity of empathic concern as a mediator of the mindfulness–helping relations was once again examined by including a measure of focused attention to the task, operationalized as concentration. Specifically, we tested the alternative hypothesis that mindfulness training fosters prosocial action through concentration of attention to the Cyberball game, and if so, whether it—more so than or instead of empathic concern—mediates the relation between mindfulness and prosocial action.

Method

Participants.   As in Studies 2 and 3, the same participant recruitment stopping criterion was used, ($n/condition$ = 33). One-hundred fifty-one Mid-Atlantic U.S. university undergraduates received course credit for participation. Twenty participants were excluded from analyses: 12 for suspicion about study procedures and eight for careless responses in trait surveys. The remaining 131 participants were 68.7% female, with an average age of (M = 19.78). The sample was 43.8% Caucasian or White, 22.3% African American or Black, 14.6% East Asian, 6.9% Hispanic or Latino(a), 2.3% Southeast Asian, 1.5% Multiracial, and 0.8% Middle Eastern; 7.7% of participants did not disclose their race.

Procedure.   Experimental procedures largely replicated those presented in Studies 2 and 3 except that participants were randomized using online randomization software (Research Randomizer) into relaxation training (n = 51) as well as the mindfulness training (n = 38) and the no-instruction (n = 42) conditions. Relaxation training instructions were modified from progressive muscle relaxation instructions (Bernstein & Borkovec, 1973) previously used as an active control condition for mindfulness training (Feldman et al., 2010). We recorded audio instructions of the adapted script to match the tone, pauses, and duration of the brief mindfulness training used in Studies 2 and 3. The Mindful Attention Awareness Scale (Brown & Ryan, 2003) and the Acting with Awareness subscale of the Five Facet Mindfulness Questionnaire (Baer et al., 2006) were completed prior to randomization. As in Studies 1–3, the Interpersonal Reactivity Index (Davis, 1983) was measured after all prosociality outcomes so as not to create a demand characteristic. Trait attentional control was not measured in this study. Empathic anger and empathic distress were also not

included, having been ruled out as alternative mechanisms of the mindfulness–prosocial action relation in Study 3. To examine the possibility that gains in concentration produced by mindfulness training were responsible for enhanced prosocial responsiveness, a measure of concentration was included immediately after ostracism observation, prior to measuring state empathic concern. Specifically, one subscale from the Dundee Stress State Questionnaire (DSSQ; Matthews et al., 2002)—the 7-item concentration subscale—tapped concentration during Cyberball observation (example items: "I found it hard to maintain my concentration for more than a short time," "My mind wandered a great deal"). Previous research indicates that concentration, as measured by the DSSQ, is mutable to training in meditation (Zanesco, King, MacLean, & Saron, 2013). The measures designed to tap participants' intention to include or exclude each of the other three players were used as in Study 3.

Results and Discussion

Preliminary analyses.   Univariate and multivariate normality assumptions were met and all variables were z transformed prior to statistical analyses. Sex, race, and age were unrelated to study outcomes (ps > 0.08) so were not further considered. Simple OLS regression analyses were performed in SPSS (v24). As in Study 3, two contrasts were created to examine differences between mindfulness training and the two control conditions (contrast 3: mindfulness training group = 2, relaxation training group = −1, no-instruction group = −1) and differences between the two control conditions were examined (contrast 4: MT = 0, relaxation training group = 1, NT = −1). Simple OLS regression analyses show no condition differences (ps > .12) in the experimenter and audio recording manipulation check questions (see Study 2 *Measures*) so these were not further considered.

Effects of mindfulness on concentration, empathic concern, and prosocial responses.   Table 5 presents simple OLS regression results on contrast-coded condition differences (contrasts 3 and 4) in state empathic concern, state concentration, e-mail helping, victim e-mail word count, inclusion, intention to include/exclude the victim, and intention to include/exclude the perpetrators. Mindfulness training was equivalent to no instruction and relaxation training on concentration, and on the items tapping intention to include/exclude the other players. Consistent with our first two hypotheses, and with Studies 1–3, very brief mindfulness training increased state empathic concern, e-mail helping, and inclusion relative to relaxation training and no-instruction control conditions. The relaxation and no instruction conditions did not differ statistically on these outcome measures.

Mediation of mindfulness—prosocial response relations. To test the specificity of our third hypothesis predicting that state empathic concern would mediate the mindfulness—helping outcome relations, 5000 resamples with a 95% bias corrected bootstrap confidence interval were simulated using the PROCESS (Model 4; Hayes, 2016) macro for SPSS; contrast 4 (mindfulness training = 0, relaxation training = 1, no instruction = −1) was loaded into the model as a covariate. As in studies 1–3, Figure 4 shows that state empathic concern significantly mediated the mindfulness–e-mail helping relation (β = 0.05, 95% CI = [0.004, 0.15]); empathic concern also significantly meditated the

Table 5

Training Condition Means, Standard Deviations, and Simple Ordinary Least Squares Regression Model Statistics on Prediction of Study 4 Outcomes

Outcome	Training condition M (SD)			C3 β	C1 95% CI	C4 β	C2 95% CI	Sample α
	MT	RT	NT					
SEC	3.00 (1.46)	2.29 (1.08)	2.24 (.97)	.28**	[.11, .45]	.02	[−.15, .19]	.84
CNTRT	17.68 (6.02)	19.00 (5.51)	20.21 (4.82)	−.15	[−.32, .02]	−.09	[−.26, .07]	.91
EH	3.35 (1.38)	2.48 (1.12)	2.71 (1.24)	.27**	[.10, .44]	−.08	[−.25, .09]	.84[a]
VEWC	41.00 (23.92)	34.70 (29.44)	28.85 (24.75)	.15	[−.03, .32]	.09	[−.09, .27]	—
INC	45.13 (12.67)	39.64 (9.65)	40.54 (10.33)	.21*	[.04, .39]	−.04	[−.21, .14]	—
IVC	1.45 (1.50)	1.69 (1.36)	1.48 (1.76)	−.04	[−.22, .13]	.06	[−.12, .23]	—
IPR	1.21 (1.76)	1.71 (1.30)	1.31 (1.92)	−.09	[−.26, .86]	.10	[−.07, .27]	—

Note. MT = mindfulness training; RT = relaxation control training; NT = no-instruction control; SEC = State Empathic Concern; CNTRT = Concentration; EH = E-mail Helping; VEWC = Victim E-mail Word Count; INC = Inclusion; IVC = Intention to Include/Exclude Victim; IPR = Intention to Include/Exclude Perpetrator; C3 = Contrast 3 (MT = 2, RT = −1, NT = −1); C4 = Contrast 4 (MT = 0, RT = 1, NT = −1).
[a] ICC.
* $p \leq .05$.   ** $p < .01$.

mindfulness–inclusion relation (β = 0.08, 95% CI = [0.007, 0.24]).

The Study 4 results largely converge with and extend the results of Studies 2 and 3 by demonstrating that the effect of very brief mindfulness training on prosocial responsiveness was not attributable to feeling relaxed in face of ostracism, nor due to concentration on the task. It is also noteworthy that the effects of mindfulness on empathic concern may not be specific to interoception. Specifically, brief mindfulness training, relative to progressive muscle relaxation and no-instruction control conditions, increased empathic concern for, and increased prosocial action toward an ostracized stranger. Once again, state empathic concern mediated the instructed mindfulness–prosocial action relation. Levels of task

focus (concentration) did not differ between experimental conditions.

Summary effects of mindfulness on empathic concern and prosocial action. Similarities across study procedures, including outcome measures, dispositional measures, and the use of no instruction control conditions in Studies 3 and 4 allowed for meta-analysis of effect sizes pertaining to the observed relations of mindfulness (dispositional and briefly trained) to prosocial responsiveness. Meta-analytically derived summary mean effects across studies have greater precision than do single study results; thus, we first asked whether effect sizes for the relations of mindfulness to empathic concern and to both helping behavior outcomes remained stable (and secondarily, statistically significant) across studies
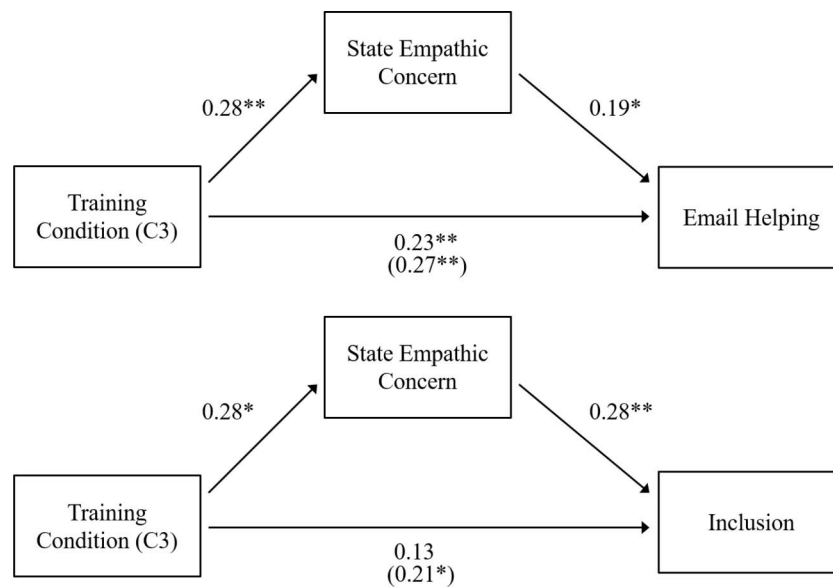

Figure 4. Study 4 mindfulness training–helping behavior relations mediated by empathic concern. Standardized path coefficients are shown, and the direct effect of mindfulness on helping is parenthesized. C3 = training condition contrast 3, where mindfulness training = 2, relaxation control training = −1, no instruction control = −1. * $p \leq .05$, ** $p < .01$.

using various active and inactive control conditions. Second, we sought more precise estimates of the effect sizes of experimentally manipulated brief mindfulness training on empathic concern and on both helping behavior outcomes across all three experiments (Studies 2–4).

Model choice and specific hypotheses. We assumed a distribution of true effect sizes, and sought to estimate the mean of this distribution (Brockwell & Gordon, 2001; Hedges & Vevea, 1998; Borenstein, Hedges, Higgins, & Rothstein, 2010); thus, we constructed separate random-effects models weighting studies by the inverse of the sampling error variance to independently examine effects size estimates of the Mindful Attention Awareness Scale, Acting with Awareness subscale, and training condition on empathic concern and both helping behavior outcomes using Comprehensive Meta-Analysis software (CMA; version 3.3.07). We applied Fisher z transformation to effect size estimates (Pearson Product-Moment Correlations, r) of dispositional mindfulness–study outcome relations to protect against the skewness evident in sampling distributions of correlation coefficients (Glass & Hopkins, 1996). For experimental effect sizes, we used Hedge's g (Hedges, 1981) to correct for influence of sample size on mean effect size estimates.

Results and Discussion

Table 6 presents meta-analytic results for each dispositional measure of mindfulness and experimentally manipulated brief mindfulness training. Mean effect size estimates include 95% confidence intervals and I^2 statistics, which indicate variance explained among studies not attributable to random sampling error. Leave-one-out sensitivity analyses are included in text to assess the influence of each study on the effect size estimate by serially removing one study from the analysis (Patsopoulos, Evangelou, & Ioannidis, 2008); lowest lower bound and highest upper bound estimates across all studies are reported.

Summary relations of dispositional mindfulness to prosocial responsiveness. As shown in Table 6, both the Mindful Attention Awareness Scale and Acting with Awareness subscale prediction of state empathic concern showed small to medium effect sizes (ES 95% CIs = [0.18, 0.46] and [0.07, 0.36], respectively); the effect of dispositional mindfulness on empathic concern was not attributable to random sampling error. Leave-one-out analyses of the dispositional mindfulness–empathic concern relation revealed that the relation between the Acting with Awareness sub-

scale and empathic concern was influenced by the sample, showing a decrease in effect sizes from Study 1 to Studies 3 and 4 ($ES_{min/max} = [-0.11, 0.43]$). This is likely because Acting with Awareness scores did not predict empathic concern in Study 3 ($z = 0.10$, 95% CI = $[-0.22, 0.40]$) and Study 4 ($z = 0.12$, 95% CI = $[-0.19, 0.41]$). The Mindful Attention Awareness Scale–empathic concern relation, however, remained statistically significant across studies when removing unique samples ($ES_{min/max} = [0.15; 0.54]$), and was significant in Study 3 ($z = 0.37$, 95% CI = $[0.07, 0.61]$) and Study 4 ($z = 0.35$, 95% CI = $[0.06, 0.59]$).

Including Studies 3 and 4 no-instruction conditions revealed that most of the significant relations between dispositional mindfulness and helping behavior were only realized in Study 1. Specifically, the relation of the Mindful Attention Awareness Scale to inclusion ($ES_{min/max} = [-0.09, 0.42]$) and e-mail helping ($ES_{min/max} = [-0.23, 0.49]$) was influenced by sample, showing a decrease in effect sizes from Study 1 to Studies 3 and 4. Unlike in Study 1, the Mindful Attention Awareness Scale did not predict e-mail helping in Study 3 ($z = -0.06$, 95% CI = $[-0.37, 0.26]$) and Study 4 ($z = 0.07$, 95% CI = $[-0.24, 0.37]$), nor did it predict inclusion in Study 3 ($z = 0.02$, 95% CI = $[-0.29, 0.32]$) and Study 4 ($z = 0.24$, 95% CI = $[-0.07, 0.50]$. Furthermore, the Acting with Awareness subscale did not predict e-mail helping in Study 3 ($z = -0.08$, 95% CI = $[-0.38, 0.24]$) and Study 4 ($z = 0.09$, 95% CI = $[-0.22, 0.38]$) nor did it predict inclusion in Study 3 ($z = -0.04$, 95% CI = $[-0.35, 0.28]$) and Study 4 ($z = 0.18$, 95% CI = $[-0.13, 0.46]$. It is unclear why effect sizes of dispositional mindfulness on helping behavior were lower in the studies with no-instruction conditions, but perhaps differences in task instructions produced these differences. Participants in Study 1 were instructed to mentally visualize the events taking place in the Cyberball game, whereas participants in the Studies 3 and 4 no-instruction condition were instructed to actively engage (i.e., attend closely) to the events of the game.

Summary effects of brief mindfulness training on prosocial responsiveness. Table 6 illustrates the effects of very brief mindfulness training on empathic concern, e-mail helping, and inclusion across studies. Mindfulness training, relative to active and inactive control conditions, increased empathic concern, e-mail helping, and inclusion, all with medium effect sizes. Leave-one-out analyses indicated that the effects of trained mindfulness on empathic concern ($ES_{min/max} = [0.23, 0.87]$), e-mail helping ($ES_{min/max} = [0.21, 1.24]$), and inclusion ($ES_{min/max} = [0.26,$

Table 6

Meta-Analysis and Sensitivity Analysis for Trait and Instructed Mindfulness Relations With Empathic Concern and Prosocial Action (Studies 1–4)

Predictor	N	Empathic concern			E-mail helping			Inclusion		
		ES	95% CI	I^2	ES	95% CI	I^2	ES	95% CI	I^2
MAAS	164	.32	[.18, .46]	.00	.14	[−.11, .37]	.00	.21	[.05, .35]	.00
AAw	164	.22	[.07, .36]	.00	.16	[−.10, .35]	.00	.18	[−.02, .35]	.00
Training condition	360	.54	[.32, .76]	.00	.67	[.38, .96]	4.90	.62	[.39, .84]	.00

Note. MAAS = Mindful Attention Awareness Scale; AAw = Acting with Awareness subscale of the Five Factor Mindfulness Questionnaire; Training Condition coded as mindfulness training = 2, attention control or relaxation training = −1, no instruction = −1 in Studies 3 and 4; ES = Fisher's z for dispositional predictors and Hedges' g for training condition.

1.02]) were not sensitive to any single study. Together these studies show consistent evidence that briefly and proximally instructed trained mindfulness appears to be more influential in situational prosocial responsiveness than dispositional mindfulness. This is perhaps unsurprising because the latter reflects a general tendency in day-to-day life rather than a predictor of specific behaviors at any one time; in contrast, the former was designed to invoke a mindful state at a single point in time.

General Discussion

In an increasingly interdependent world, it is of principal social, political, and scientific interest to uncover determinants of kindness and prosociality toward others, particularly toward others with whom we do not share kinship, social ingroup status, or familiarity. Despite the long-hypothesized potential for mindfulness to catalyze prosocial responsiveness toward strangers (Berry & Brown, 2017; Brown et al., 2016; Feldman et al., 2010; Leary & Terry, 2012; Trautwein et al., 2014), little empirical research has examined the role of mindfulness in supporting these processes. What is more, no studies have identified mechanisms of the mindfulness–helping behavior relation. Here, four studies examined the role of mindfulness in helping behavior toward strangers, and sought to explain why such a relation may occur. We hypothesized that more mindful individuals (Study 1) and those receiving very brief mindfulness training (Studies 2–4) would offer more help to an ostracism victim (H1) and report greater empathic concern for them (H2). We further hypothesized that empathic concern would mediate the observed mindfulness–helping relations (H3). Support for these three hypotheses was obtained in tests of both trait and instructed mindfulness, providing multimethod, convergent evidence on the facilitative role of mindfulness in prosocial responsiveness toward strangers.

Specifically, Study 1 demonstrated that more mindful individuals reported greater empathic concern for, and offered more help to, an ostracized stranger on two behavioral outcomes after controlling for trait empathic concern and attentional control. In Study 2, briefly instructed mindfulness, relative to a closely matched instructional control condition, predicted higher empathic concern and more victim helping, indexed by both the e-mail helping and inclusion behavior outcomes. Empathic concern mediated the mindfulness–prosocial behavior outcomes, although in Study 1 this was observed on only one helping outcome. Replicating Study 2, Study 3 further showed that the mindfulness effects observed were due to empathic concern, not empathic anger, a proximal promotor of perpetrator punishment (Vitaglione & Barnett, 2003), nor a reported intention to punish the exclusion perpetrators. Study 4 replicated Studies 2 and 3 and extended them by showing that mindfulness effects observed were not attributable to a closely matched mind state (relaxation) in the face of a vicarious stressor. Meta-analyses of the experimental effects of brief mindfulness training on prosocial outcomes showed medium effect sizes not driven by chance. However, meta-analyses of the dispositional mindfulness effects on prosocial outcomes, which included no instruction subsamples from Studies 3 and 4, showed only small, stable effect sizes for empathic concern; effect sizes for helping behavior outcomes may have been driven by chance.

Implications of Mindfulness for Prosocial Action

These findings are consistent with mindfulness theory (e.g., Brown et al., 2008; Davidson & Harrington, 2002; Dambrun & Ricard, 2011; Teasdale & Chaskalson, 2011; Trautwein, Naranjo, & Schmidt, 2014) and recent empirical research (e.g., Barnes, Brown, Krusemark, Campbell, & Rogge, 2007; Cameron & Fredrickson, 2015; Condon et al., 2013; Lim et al., 2015) indicating that mindfulness promotes prosocial responsiveness to others' perceived suffering. Together these studies show that mindfulness promotes prosocial responsiveness toward strangers, commonly regarded as more psychologically distant, and typically shown fewer kindnesses than familiar others (Cialdini et al., 1997; Rameson, Morelli, & Lieberman, 2012; Stinson & Ickes, 1992; Trivers, 1971).

Several procedural controls lent insight into important boundary conditions of the mindfulness effects on prosocial responsiveness. First, the mindfulness results are not attributable to gains in attention to the situation at hand. All participants (except 5 participants in Study 3) were aware of the Cyberball-based ostracism, so the effects of mindfulness were not simply due to greater notice of the exclusion. Mindfulness did not differentially increase concentration during ostracism observation relative to the other experimental conditions. Furthermore, the attention-based training, relative to the no-instruction control, did not produce statistically different scores on any measure of prosociality. Rather, the results accord with the theorized propensity of mindfulness to promote interest in and concern for others' well-being (Berry & Brown, 2017; Brown et al., 2016; Feldman et al., 2010; Leary & Terry, 2012; Trautwein et al., 2014) and incipient research supporting this theory (e.g., Condon et al., 2013; Lim et al., 2015).

To date, no studies have found evidence that one or another form of empathy underlies the mindfulness–helping relation. A second boundary condition brought to light by these four studies is mindfulness specifically fostered empathic concern, rather than empathic distress or empathic anger. Empathic concern appears to be an other-oriented emotion that more reliably encourages helping than does the self-oriented empathic distress (e.g., Batson et al., 1987). This result is consistent with the hypotheses that mindfulness confers prosocial responsiveness by fostering an other-oriented focus, as already noted (see Trautwein et al., 2014 for review).

Together, these findings on empathic concern provide two additional boundary conditions for the effect of mindfulness on helping behavior. It has been proposed that training in mindfulness promotes empathic concern at least in part through a tempering of self-related cognitions (Brown et al., 2016; Leary & Terry, 2012). Self-related cognitions are typically very accessible and in fact may be part of our default mental functioning (Fennis, 2011; Killingsworth & Gilbert, 2010); these cognitions help to support conceptual boundaries between self and other that can hinder empathic concern and helping behavior (Fennis, 2011). Yet the fact that mindfulness training was not related to empathic distress accords with a view that training in mindfulness conduces to other-oriented focus and not tempered self-focus. Additionally, this other-oriented focus appeared to be specific to the victim, not the perpetrators; evidence of this comes from the Study 3 results showing that training in mindfulness reduced rather than heightened empathic anger, which shares with empathic concern a care

for a person's welfare (Batson et al., 2007; Vitaglione & Barnett, 2003). More broadly, this finding is consistent with incipient research that shows mindfulness training attenuates aggression (Heppner et al., 2008), but further research is needed before determining that mindfulness training leads to lower anger (and perhaps retaliation) in contexts marked by unjust or unfair treatment of others.

A final boundary condition of the mindfulness effects observed in these studies concerns the role of interoception as a promoter of empathic concern. Study 4 pitted instruction in mindfulness against instruction in relaxation, both of which were designed to increase their intended states by fostering interoceptive awareness. Interoception appears to be a generator of empathic concern (Singer et al., 2004; Singer et al., 2009), but the Study 4 results suggest that mindfulness directed inward confers a prosocial advantage not accrued through the interoceptive awareness fostered by relaxation. Again, further research is needed to test this proposition. However, the Study 4 results are consistent with research showing that mindfulness and relaxation instruction differ in their effects on emotional and cognitive outcomes (Ditto, Eclache, & Goldman, 2006; Jain et al., 2007).

Limitations and Future Directions

Our investigation was limited to vicarious ostracism, and the generalizability of these findings to other helping contexts, including those outside of the Cyberball environment, is unknown. These studies were also limited to investigations in which participants had to infer the ostensible ostracism victim's subjective experience without emotional cues, both verbal and nonverbal (e.g., facial expressions). Thus, the results may generalize to other anonymous, increasingly common social interaction contexts (particularly Internet-based), but not necessarily to in vivo social situations (but see Condon et al., 2013; Lim et al., 2015). Future studies could examine the ecological validity of the present findings. Research could also ask whether more intensive mindfulness training might promote sustained prosocial responsiveness in complex, real-world environments over time.

Another limitation of this study series pertains to the specific claims regarding the underpinnings of the effect of mindfulness on helping. Typically, in studies of prosocial motivation, alternative explanations for selfish motivations are systematically ruled out by studying individuals in contexts where one may escape aversive arousal by declining to help someone, or may receive a reward or avoid punishment by helping someone (see Batson & Shaw, 1991 for review). Thus, with no clear alternatives for escape, reward, or punishment in these studies, we cannot conclude that mindfulness conduces to prosocially motivated helping only. However, three aspects of our study design lend some support to this idea. First, because mindfulness instruction did not promote empathic distress, escape from aversive arousal would be an unlikely outcome of such instruction. Second, all helping behavior was measured in a digitally mediated platform in which all participants were strangers and were reassured they would never meet. Thus participants could have declined to help without social cost, and many of them did. Third, participants were not instructed to help (or to refrain from helping), so there were no explicit rewards for helping or punishments for not doing so.

There are three design limitations of note in these studies. First, it would have been more appropriate to measure psychological traits outside of the session in which the study outcomes were measured so as to reduce the potential influence of demand characteristics on those outcomes. Second, asking participants whether they noticed whether exclusion occurred may have introduced an experimenter demand that influenced their reports. Yet in anticipation of this potential demand, we embedded these manipulation check questions among filler questions to reduce their salience. It is possible that some participants did not truthfully report noticing exclusion but we find no reason to believe that such mis-reporting would differ across experimental conditions. Related to this design limitation, participants may have underreported study suspicion in the postexperimental inquiry to avoid perceived penalty for guessing the study aims. Indeed, postexperimental inquiry can be problematic if participants think they may be disqualified for reporting truthfully on the measure (e.g., Orne, 1959, 2009). In the present studies participants knew that compensation would be administered prior to the postexperimental inquiry. Third, this study series used a measurement-of-mediation design (Spencer, Zanna, & Fong, 2005) rather than a design involving manipulation of a prospective mediating variable. Our approach limits our ability to make strong inferences about the mediating effect of empathic concern in the empathy–helping relations (see MacKinnon, 2008 for review). There are ways to manipulate empathic concern (e.g., Oveis, Horberg, & Keltner, 2010; Piff, Kraus, Côté, Cheng, & Keltner, 2010, Study 4), which may prove useful as research on the prosocial outcomes of mindfulness matures.

Other possibilities for future research in this very young area of work are abundant. There are various forms that mindfulness training can take—for example, to foster focused attention or broadened attention (open monitoring; Lippelt, Hommel, & Colzato, 2014). Understanding which type(s) confer prosociality is an important question. On the surface, lovingkindness or compassion training may be more effective in promoting prosociality than are forms of mindfulness training. But when measuring behavioral and self-report indicators of prosociality, as done in the present studies, lovingkindness training may cue participants to the aims of the study. Moreover, lovingkindness training often begins with instruction in mindfulness, which makes it difficult to isolate the active ingredients in meditative training that affect prosociality (Condon, 2017).

Another challenge in isolating active ingredients of mindfulness training is variability within training types. For example, Studies 2–4 used a form of mindfulness instruction that directed attention primarily to psychological and somatic experiences; as previously discussed, it is possible that trained mindfulness of external stimuli would not conduce to prosocial responsiveness, as empathy and prosociality appear to be at least partially dependent on interoception (e.g., Singer et al., 2009). This too remains a question for further research.

Finally, as receptive attention to current experience, mindfulness is theorized to reduce conceptual barriers between self and others that can reduce prosocial responsiveness (Decety & Sommerville, 2003; Leary & Terry, 2012). The present results are limited by their focus on prosocial responsiveness toward single individuals; this prompts us to ask whether mindfulness helps to bridge the perceived psychological distance between self and

members of sociocultural out-groups, an increasingly important social issue in the U.S.A. and other countries.

Conclusion

The present findings represent an important step in understanding the facilitative role of mindfulness for helping behavior, and more broadly for understanding the role of mindfulness in instantiating prosocial responsiveness. This research suggests that mindfulness not only offers intrapersonal benefits for mental and physical health (e.g., Brown et al., 2015; Sedlmeier et al., 2012), and benefits for those in close relationships (e.g., Carson, Carson, Gil, & Baucom, 2004), but also fosters social sensitivity toward individuals often regarded with much less concern. Our findings support the budding interest in, and promising research on the interpersonal and societal benefits of mindfulness.

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