Altruistic Effects in Mindfulness and Compassion Meditation: A RCT Investigating Social Psychological Mechanisms

Abstract

Objectives: Increases in altruism within and between meditation practice styles are poorly understood and few studies have assessed these effects across self-report and behavioral measures. This study aimed to investigate the impacts of mindfulness and compassion styles of meditation practice on altruistic outcomes and explore the extent to which reductions in correspondence bias in the case of mindfulness meditation and increases in latent altruistic construct accessibility for compassion meditation can account for these outcomes.

Methods: 127 participants completed a randomly assigned 8-week online course in either mindfulness, compassion, or sham control meditation. Meditations consisted of video lectures, guided audio meditation, and logged meditation sessions. Self-report measures were taken before and after the study, and tasks designed to assess correspondence bias, lexical accessibility, and altruistic behavior, and empathic response were given after course completion.

Results: All three groups reported significant increases in trait mindfulness, compassion, empathy, and perspective taking after the completion of the course. However, when presented with a "real" suffering other, the compassion group showed a significantly stronger empathic response and took more actions. Correspondence bias and accessibility of compassionate cognitions did not show hypothesized effects.

Conclusions: Our project confirmed the altruistic effects of compassionate forms of meditation. Empathic feelings for a suffering other were they key difference between the compassion

meditation and other groups. Further, the comparable performance of our control group to the two meditation groups on many measures highlights the likely role of common factors and expectancies in widely reported results of meditation, especially in self-report measures.

Introduction

Altruistic effects from meditation practices are increasingly reported in the literature. There is emerging evidence that both mindfulness (Berry et al., 2020; Donald et al., 2019; Iwamoto et al., 2020; Lim et al., 2015; Weng et al., 2013) and compassion meditation (Jazaieri et al., 2012; Kirby, 2017; Lieberg, Klimecki, & Singer, 2011) increase altruistic behavior and motivation. This is encouraging, because the development of prosocial thoughts and behavior are an integral part of the philosophical traditions that underline such meditation practices.

Altruistic behavior has long been studied by social psychologists, where it is seen as a common human behavior that has an important role in a functioning society. The psychological study of altruism and other prosocial behaviors was initially prompted by concerns that altruistic behavior was becoming less common and this would have deleterious effects on society (Darley & Latané, 1968). Social psychologists have made a great deal of progress in understanding the mechanisms that foster or hinder altruism (for a review see Batson & Powell, 2003), but meditation practices as a cause of altruism have only begun to be investigated.

An important precursor of altruistic behavior is empathic concern for the welfare of another person (Schroeder et al., 2015). In Batson's empathy-altruism theory, empathic concern arises when a person perceives suffering in another, and other's welfare has intrinsic value for the perceiver. This motivational feeling produces a goal to benefit another person. However, while this feeling may move someone towards an act of helping, it does not guarantee an altruistic or helping behavior. A compassionate motivation must overcome a cost-benefit

analysis, taking into account social and situational risks which may be present. While this general picture is somewhat simplistic (see Schroeder et al. 2015, for more), it makes a clear distinction between feeling empathic concern or compassion and taking action based on these feelings. While much research has shown that meditation interventions increase altruistic feelings, fewer studies have demonstrated changes in helping behavior, given an encounter with suffering others.

This characterization is important because the methodology of altruistic meditation styles focuses on the development of altruistic motivations. Such practices aim to develop a caring, heartfelt feeling of love and/or compassion towards imagined others. Therefore, we would expect meditation styles aimed at increasing compassion to have effects on prosocial feelings. However, the precise mechanisms by which this occur remain unclear. It is even less clear why mindfulness meditation would have such an effect, given that the practice is not overtly concerned with compassion. Further, the extent to which either of these meditation styles lead to helping behaviors requires additional study.

Altruism in Meditation Practices

Both mindfulness and compassion meditation styles are derived from Buddhist techniques, and such meditation training both historically and in modern religious discourse emphasizes the development of altruistic feelings. In fact, in many cases this component of one's spiritual development is thought to be necessary for successful practice and significant results (Tenzin & Ānando, 2019). While traditional modes of meditation training do emphasize familiar mindfulness exercises such as mindfulness of breathing, body scans, and open presence (Dahl et al., 2015), they are almost always accompanied by an array of other practices of which altruistic meditation styles play a vital role (Analayo, 2015, pp. 5–74; Lama & Chodron, 2014, pp. 207–

237). The exact practice varies from tradition to tradition, but practices such as loving-kindness, tong-len, or even ritualized prayer aimed at the development of altruistic qualities are often given great emphasis. Such practices are explicitly and directly aimed at developing a compassionate state that would be expected to increase altruistic behavior.

Mindfulness practice is not directly aimed at compassion, and it is not immediately clear why it would lead to altruistic behavior. However, there are some clues in the Buddhist literature. Early sutras describe mindfulness-style practices leading to freedom from ill-will or equanimity. Such states are described more as a lack of aggression or increased impartiality respectively rather than an active prosocial feeling, but such states may relate to prosocial feelings. Later Mahayana texts connect meditative insight into interdependence with altruistic feelings (Tenzin & Ānando, 2019). Such insight into interdependence, also known as "emptiness", involves understanding that the self, as experienced in one's own mind, is not separate from the causes and conditions surrounding it, its context. It involves attention to and understanding of the constructed and impermanent nature of the things we experience, including our thoughts, feelings, perceptions, and concepts, such as our "self". As one sees the lack of an essential, independent nature to things, we may feel closer to others as an extension of our wider view. Such a radical transformation likely involves the suspension of habitual patterns and automatic reactivity to external events.

In the psychology literature, cognitive changes in the context of mindfulness interventions are most often discussed either through the lens of decentering or cognitive defusion. Decentering and cognitive defusion concern the experience of witnessing one's thoughts rather than participating in them (Sauer & Baer, 2010). This phenomenon takes place when one begins to observe thoughts and feelings, considering them as mere perceptions, habits,

or even errata, rather than reflections of fact or parts of oneself. Mental events are experienced in a way that they are no longer subjectively real and immersive. Thoughts and feelings that are a product of these automatic processes lose immediate impact and become less meaningful (Bernstein et al., 2019) in the presence of a knowing, mindful mind. The state is similar to that postulated by the five-facet model of mindfulness (Baer et al., 2006), in which the practitioner has the ability to stay present to an emerging moment, noticing thoughts and emotions without responding impulsively or getting caught up in emotional reactions.

At first glance, these central components of mindfulness practice do not seem to lend themselves to the development of compassion. However, Berry et al. (2020) suggest that increases in compassion resulting from mindfulness practice are related in part to de-automatization (Kang et al., 2013) and disidentification (Britton et al., 2021). De-automatization refers to the deactivation of automatic cognitive and behavioral patterns while disidentification specifically weakens self-relevant cognitive processes (Berry & Brown, 2017). Mindfulness practices aim to disrupt automaticity and these identification processes. These authors point out that automaticity as well as automatically activated stereotypes (Devine, 1989) have been shown to be an obstacle to altruistic responding (Darley & Batson, 1973; Darley & Latané, 1968). Therefore, de-automatization and de-identification should bring out a more thoughtful interaction with others, which supports one's altruistic potential.

The Correspondence Bias as a Mediator

In the present study, we explore the possibility that one automatic process that is affected by meditation involves social attribution. People often fall prey to the *correspondence bias*. This is the tendency to infer that another person has an enduring disposition based on observed behavior even when other causes for the behavior (typically situational in nature) are present

(Gilbert & Malone, 1995). Social attributions are made via a multi-stage information-processing process such that people first observe a behavior and make an initial automatic interpretation of the behavior. They then make an inference regarding the person's traits based on that interpretation. That inference is (sometimes) adjusted to take into account other information relevant to the attributional inference, such as possible situational causes, recognition that the behavioral interpretation might be inaccurate, and so on. Such adjustment typically requires a motivation to adjust and awareness of the need to make the adjustment. The correspondence bias occurs when people "underadjust" for the presence of a situational cause that could reduce the diagnosticity of the behavior for inferring the trait (Gilbert et al., 1988; Trope, 1986).

We contend that negative dispositional attributions of others may be a significant obstacle to compassionate appraisals. Negative attributions are known to be a barrier to helping, in part because they lead people to assume that a person in need of help doesn't deserve it (Weiner, 1990). In addition, such attributions lead to negative moral emotions such as disgust or contempt (Hutcherson & Gross, 2011).

A central theme of the insights discussed as resulting from Buddhist meditation is a process whereby conceptions of causality and identity based on inherent and essentialized qualities are replaced with interdependent, de-essentialized ways of seeing the world (Thakchoe, 2022). People become aware that mental events occur and then fade away on their own and that one's thoughts and feelings about events, oneself, other people, and so on are not inherently attached to (or true of) those targets. Beliefs and feelings about others are more akin to subjective labels than to actual fact. This leads to a related realization that multiple "labels" could just as readily apply to the person.

In social psychology, when multiple interpretations can be applied to a stimulus, that stimulus is said to be *ambiguous* (E. T. Higgins & Brendl, 1995). In the parlance of the correspondence bias specifically, this means that one's thoughts and feelings become subjectively *less diagnostic* as indicators of the innate qualities of other people, events, and so on, which means people will be less likely to use them when forming impressions of others (Trope, 1986; Trope & Liberman, 1993). The likely consequence of this is that meditators will be less likely to assume that their automatic dispositional attributions of others are innately true, which should make the correspondence bias less likely to occur. In addition, meditators may be more likely to adjust their initial impressions of others to take into account other possible reasons for the person's behavior given that their initial impressions of the target person's behavior are recognized to be relatively nondiagnostic. There is some emerging evidence that mindfulness meditation may indeed affect the correspondence bias this way (Hopthrow et al., 2017).

Accessibility of Compassionate Cognitions as a Mediator

Altruistic forms of meditation have a seemingly much more direct association in developing compassionate feelings. These styles of meditation employ methods such as repetitive phrases that a practitioner repeats inwardly or imagined visualizations of others and their suffering. The point of these practices is to conjure up compassionate thoughts and feelings, to make them authentic as much as possible, and to repeat this process as often as possible.

Social-cognitive research indicates that thoughts vary in the likelihood that they will come to mind, or their *accessibility* (Sedikides & Skowronski, 1991). Thinking about something frequently leads those thoughts to become more accessible (Button, 1983; Higgins, 1996). Such chronic accessibility can predict numerous behaviors (e.g., Bargh et al., 1986). We propose that

altruistic meditations are likely to operate in part by increasing the accessibility of prosocial concepts.

A few studies suggest that meditation does indeed impact performance on accessibility tasks. Kemeny et al. (2012) found that meditators showed more accessibility compared to a wait list control group for compassion-related concepts after exposure to a stimulus designed to elicit compassion. However, those researchers used a meditation procedure that mixed mindfulness styles of practice with altruistic meditations, along with training in emotion-related skills. While this does suggest that accessibility can be impacted by a meditation-related practice, it is ambiguous as to which element of the training may have been responsible. Lusnig et al. (2022) examined accessibility after mindfulness and loving-kindness meditation sessions but examined accessibility of generally positive words rather than compassion-specific words. They found no effects of meditation condition on accessibility of positive words, although both active meditation conditions showed evidence of increased accessibility for positive words after the meditation sessions. However, accessibility effects are typically specific to a primed concept rather than a global evaluation (e.g., Higgins et al., 1977) so it is not surprising that they found no effects for meditation type. Lusnig et al. (2020) also looked at the accessibility of generally positive concepts, but they used experienced Zen practitioners and a single session of Zen meditation and found no effects. Zen meditation is classically free from conceptual content. Therefore, while there is some evidence that meditation practice can accessibility, there is no data on whether altruistic forms of meditation impact altruistic constructs specifically.

Common Factors Across Practices

Thus far we have laid out two different mechanisms by which mindfulness and altruistic meditation may increase the altruistic thoughts and feelings of practitioners. We suggest that

mindfulness meditation should reduce automatic biases related to the correspondence bias. Further, we have suggested that compassion meditation may operate much more directly, through increased chronic accessibility of compassionate thoughts and feelings.

However, there is also the possibility that whatever beneficial effects mindfulness meditation has on altruistic feelings are due to some factors that it has in common with compassion meditation and visa versa. This possibility should not be overlooked, as most compassion meditation programs include components often found in mindfulness meditation programs, such as mindfulness of breathing (Ash et al., 2021; Goldin & Jazaieri, 2017). In fact, some amount of mindfulness is required for effective compassion meditation in that such meditations require sustained focus on an object (e.g., wishes for another person's positive outcomes, etc.) and dealing with unwanted thoughts that arise. Therefore, we would expect several facets of mindfulness to be improved in an altruistic meditation practice.

There are other variables that might explain the similar effects of different meditation styles that are associated with the context or "trappings" of meditation rather than the meditation itself. Such factors include expectancies of positive outcomes, exposure to a prosocial role model in the form of a meditation leader, or social support/rapport gained in a group meditation setting. Goldberg (2022) argues that any beneficial effects seen from meditation interventions could be explained by these contextual factors.

Hypotheses

The current study was designed to assess the effects of mindfulness and compassion meditation on altruistic feelings and behaviors and whether those effects are mediated by different variables. We predicted that both types of meditation would increase altruistic feelings and behaviors relative to an active control group. However, because of its direct focus on

compassion, we expected that compassion meditation would have a stronger effect than mindfulness meditation. Second, we expected mindfulness meditation to be associated with less correspondence bias compared to compassion meditation and non-meditation controls through increases in decentering and/or trait mindfulness. Third, we predicted compassion meditation would increase accessibility for concepts related to compassion compared to mindfulness and controls, and for this accessibility to predict changes in altruistic attitudes. Finally, we expected the effects of the two types of meditation on altruism to be differentially mediated, such that increases in altruism in the compassion meditation condition would be related to its effects on increased accessibility of accessibility of compassionate thoughts, and through reductions in correspondence bias in the mindfulness meditation conditions.

The Present Study

To explore these hypotheses, we recruited novice meditators to participate in an RCT using meditation practices taken from common examples of mindfulness and compassion meditation programs (e.g. MBSR and CBCT). These meditation practices were fit into a structured eight-week online meditation training course that included teaching and guided meditations. An active control condition was included in which participants engaged in "sham" meditation (cf. Zeidan et al., 2010). These participants were told they were meditating but were not actually given meditation instructions. This was designed to rule out peripheral variables that are associated with meditation but that are not actually mediation itself, such as expectancy effects, time spent in class, simply sitting quietly, etc. Measures of relevant variables were completed at baseline and after the intervention period. All procedures were approved by the university Institutional Review Board.

Method

Participants

4,978 U.S. English-speaking adults with less than 10 hours of meditation experience who expressed comfort with experiencing their own thoughts and feelings were recruited via online postings across social media platforms (ex. Facebook, Reddit, etc.). However, it became apparent that a large proportion of these were bots or individuals likely to be attempting fraud. Therefore, we adopted extensive fraud detection screening practices (see the Discussion) which, after implementation, left us with 652 enrolled participants. They were randomized into meditation condition. 127 volunteers completed the study, resulting in n= 42 in the mindfulness group, n= 47 in the compassion group, and n = 38 in the sham control group. This final sample ranged in age between 19 and 77 years old (M = 33.85, SD = 12.31), was 61% female, 41% white, 38% black, 9% asian, 6% latinae, and 6% mixed or unspecified. G-Power (Faul et al., 2007) analyses for a mixed repeated by between-subjects design indicated adequate power (0.95) for analysis of our main dependent variables at this sample size (f = .18). Volunteers who completed the study were given a $60 Amazon gift card.

Procedure

Interested participants first completed an eligibility screening via an online questionnaire that assessed their U.S. residency, meditation experience, and comfort with contemplative practices. Participants provided consent to join a “meditation study” and completed pre-intervention baseline questionnaires and provided demographic information in Qualtrics (Qualtrics, Provo, UT). Participants were randomly assigned to one of three meditation groups and blinded to the other conditions: compassion meditation, mindfulness meditation, and an active “sham” control meditation (Zeidan et al., 2010). Each course consisted of eight weekly

modules with video lectures and instructions, short readings, and guided audio meditations. The mindfulness course included meditation on breathing, body scans, and open awareness modeled after those contained in Mindfulness-based Stress Reduction (MBSR; Santorelli et al., 2017). The readings and video content contained discussion of mindfulness as a concept and as a practice, how meditation is thought to work, including some of the benefits that have been established in scientific literature. The course also covers important concepts such as decentering, acceptance, and how to apply meditative techniques within practice sessions as well as in daily life. The compassion course included meditations on breathing, open awareness, loving-kindness for self and others, gratitude, equanimity, and compassion modeled after those taught in Cognitively Based Compassion Training (CBCT) (Ash et al., 2021). The readings and videos also discussed how meditation is thought to work and some of its benefits, but also covered concepts such as kindness, gratitude, equanimity, and compassion, as well tips for applying them in and out of meditation sessions. The control "sham" course was slightly different. There was no discussion of technique, but instead audio guidance focused on the idea that participants were "meditating" but were given no instruction on actual meditation. They were simply told to adopt a meditation posture and sit in silence. They were also given content concerning academic research showing the beneficial effect of meditation on various health outcomes, but no instruction on actual meditation techniques, nor any content about mindfulness or compassion. Regardless of condition, participants were told to meditate as much as they were able. They were also asked to track the amount of time they meditated daily and which meditation they did and submit these logs weekly to the study team through their online course.

Upon completion of the course, participants performed one last meditation from their respective courses (i.e. open mindfulness, compassion, or sham) and then completed the post-

intervention questionnaires in Qualtrics. They also completed the two assessments of the correspondence bias and the compassion accessibility LDT in PsyToolkit (Stoet, 2010, 2017). They then engaged in a behavioral altruism assessment which occurred the day after their online data collection.

Demographic Measures

Participant age, gender, race, and ethnicity were assessed at consent.

Dependent Measures

All dependent variables were assessed both pre- and post-intervention, apart from the behavioral altruism assessment which was only done post-intervention.

Altruism Assessment - Empathy

Altruistic feelings and behavior in response to a real person in distress was assessed using a paradigm created by Batson et al. (1997). Participants watched a video (Karabinas, 2020), based on Batson's original material, that was ostensibly part of a university student media broadcast containing a fictional story in which a senior at the university ("Katie Banks) described her struggles with grief and financial trouble after a tragic accident in which her parents were killed. The video was created with the help of student actors at the university. The video was framed as a separate part of the study to help assess participants' reaction to various types of media and labeled as "Video #7" although all participants saw the same presentation. Participants were asked a set of factual questions about the content of the video that served as a manipulation check, a short questionnaire rating the quality of the video used to legitimize the video framing, and an emotional reaction questionnaire ("to what extent did you feel the following emotions" rated on 1-5 scales). The extent to which participants experienced "empathy" for Katie was the key assessment of empathy towards a specific suffering individual.

Altruism Assessment – Behavior

After the post-intervention data collection, an email was sent to the volunteers thanking them for participating in the study and forwarding them an email made to appear like it was directly from the student in the video. This email suggested that the study was over, compensation was pending, and that the researchers had previously agreed to share a support campaign for the student in the video. The email contained a link to a Google Form made to look like it had been created by the student's friends. This form asked participants if they would be willing to help either by volunteering a portion of their compensation or time researching scholarships. Their responses or lack thereof were recorded, as was the amount of compensation they would be willing to donate. This served as the second dependent variable of altruistic behavior in response to a suffering other.

Compassionate Love Scale

Global changes in feelings of compassion were assessed with the Compassionate Love Scale (CLS; (Sprecher & Fehr, 2005). Compassionate love as assessed by the CLS is defined as a caring and supportive orientation towards close others, especially when others are in need. Participants rate 21 statements (e.g., "I spend a lot of time concerned about the well-being of those people close to me") on 1-7 Likert format response scale ("not true at all of me" to "very true of me").

Interpersonal Reactivity Index - Empathy and Perspective Taking

The Empathic Concern and Perspective-Taking subscales of the Interpersonal Reactivity Index (IRI; (Davis, 1980) were used as assessments of variables related to compassion. Of chief interest was Empathic Concern, which can be defined as experiencing feelings of sympathy and compassion towards others who have experienced misfortune. The Perspective-Taking subscale

is a somewhat less direct measure of compassion but assesses an important precursor of it. Perspective-taking concerns the spontaneous adoption of the subjective point of view of others. Each subscale consists of seven items to which participants respond on 1-5 Likert-format scale ("does not describe me well" to "describes me very well).

Five Facet Mindfulness Questionnaire

Changes in mindfulness were measured with the Five Facet Mindfulness Questionnaire (FFMQ; (Baer et al., 2008) administered pre- and post-intervention. The FFMQ was developed to optimize shared factors underlying previous mindfulness scales. Mindfulness is defined as the trait tendency to be fully aware of one's experiences in the present moment without judgment. Participants respond to the 39 items on a Likert-style 1 to 5 scale. The FFMQ has been demonstrated to be one of the most valid measures of modern mindfulness available (Baer et al., 2008).

Experiences Questionnaire - Decentering

The decentering subscale of the Experiences Questionnaire (EQ; (Fresco et al., 2007; Naragon-Gainey et al., 2022) was used to assess the tendency to observe one's thoughts and internal experiences in a detached, observational way. The EQ is a 20-item questionnaire, of which 11 items were used that comprise the decentering subscale. Participants respond to items on a 1-5 scale ("never" to "all the time").

Marlowe-Crowne Socially Desirability Scale

Many of which were self-report assessments of positive personal characteristics. To rule out social desirability motivation as a potential confound for positive responses to our key measures, the short-form Marlowe-Crowne Socially Desirability Scale (MCSDS; (Reynolds, 1982) was administered during the initial, pre-intervention phase of data collection. The original

MCSDS has long been used as an index of people's tendency to respond in socially desirable ways. The short Marlowe Crowne has been found to be a viable alternative for the original, longer MCSDS. Participants respond to 13 true-false items that ask people to indicate whether they engage in culturally approved yet low frequency behaviors.

Meditation Journal

To estimate the amount of meditation done by participants, participants kept a weekly meditation journal tracking daily minutes meditated and the specific meditation completed.

Mediating Variables

All mediating variables were assessed post-intervention only.

Lexical Decision Task

Accessibility of compassion-related thoughts was assessed using a lexical decision task (LDT; Meyer & Schvaneveldt, 1971), an often-used measure of accessibility. The LDT was administered through PsyToolkit (Stoet, 2010; 2017). This task was adapted from the compassion LDT used by Kemeny et al., (2012) with some modifications. In the LDT, strings of letters were displayed to volunteers, some of which formed coherent words and others of which were nonwords but in the form of words (e.g., "lomtep"). There were three groups of letter strings: 1) words related to compassion, 2) positively valenced control words unrelated to compassion, and 3) nonwords. There were ten letter strings per group. Stimuli were pretested in an MTurk sample (n = 96). 123 candidate words were selected and or constructed (35 compassionate words, 53 positive words, 35 constructed nonwords) based on best linguistic relevance to compassion, positive valence, character lengths. Participants rated themselves on the positive and compassionate words. Positive valence ratings for each word and nonwords were also collected. Ten compassionate words were selected based on the highest correlations between

self-ratings on the words and Interpersonal Reactivity Index Empathy and Perspective Taking and Compassionate Love Scale scores. The two other groups of ten strings were then constructed for a best balance for average rated positivity, number of characters, and frequency of use in English (if applicable).

The task began by having participants focus on an "X" presented in the middle of a computer screen for 1000ms followed by a mask image for 40ms. The mask image was pixelated visual noise. Subjects were then primed with a subliminal (30ms) presentation of face pictures. The faces were neutral (a woman with an emotionally neutral facial expression) or emotionally distressed (a woman crying). The latter face was designed to elicit compassion. The prime procedure and stimuli were adopted from Kemeny et al. (2012) and was designed to improve the task by priming relevant altruistic concepts prior to the presentation of the character string. Following the presentation of the facial expression, the mask was presented again for 40ms. This second mask is designed to remove any afterimage of the prime stimulus from sensory memory. Participants were then presented with a letter string and asked to identify whether each stimulus was a word or nonword as quickly as possible with the press of a key (A for a word, L for a nonword). All 30 letter strings were displayed three times with each prime, for a total of nine parings, resulting in 270 trials. The order of each block of trials was randomized. Mean reaction times (RTs) were computed for correct responses within word type (compassion, positive controls, nonword) by prime type (compassion, neutral, or none). Faster responses to compassion-related words compared to the positive controls and nonwords indicated greater accessibility for altruistic constructs. We also hypothesized, following Kemeney (2012), that compassion accessibility should be stronger when the associated construct has been primed by emotional faces.

Neglect of External Demands Scale

Correspondence bias was assessed in two ways during the second phase of data collection. Participants completed a modified version of the Neglect of External Demands Scale (NED; Scopelliti et al., 2018), which measures a person's tendency to discount the ways in which people's behavior is constrained by external forces. Participants read ten brief scenarios describing a person's behavior. The scenarios contained a potential situational factor that might have affected the behavior. Participants made an attributional trait judgment of the target person on a 7-point scale. The measure was modified slightly to better disambiguate raters' attributional trait judgments and their confidence in this assessment. Participants indicated their confidence in their assessment on a separate 7-point scale ("not at all confident" to "very confident").

Attitude Attribution Task

A second measure of the correspondence bias used a modified version of an attitude attribution paradigm from Jones et al. (1971). Participants were shown an essay in which a person has argued against the legalization of psychedelics. The topic was chosen to be one that was currently controversial but similar to topic from Jones et al., which was the legalization of marijuana. The argument was designed to be seen as strong. Half of the participants in each group were randomly assigned to be told that the essay writer was assigned the essay topic. The other half were told that the essay topic was freely chosen. All subjects were then asked to rate the true attitude of the author towards legalization of psychedelics on a -5 to 5 scale, with -5 being strongly against and 5 being strongly in favor. Additionally, participants rated their confidence in their answer on 1 – 10 scale, with 1 being not at all confident, and 10 extremely confident. Participants' ratings of the essay writer's attitudes towards legalization of psychedelics were analyzed as a second assessment of the correspondence bias. Adjustment of attributions to

take into account the situational factor (that the essay position was assigned) is indicated by movement towards the zero point of the scale. Given that the essay was anti-legalization and the attitude measure ranged from -5 (strongly against) to 5 (strongly in favor), we'd expect attitude attributions when the essay writer volunteered to write the negative essay to be negative. When the essay writer was assigned the topic, a situational factor that should ambiguate the diagnosticity of the essay for determining the writer's attitude, we would expect attitude attributions closer to the midpoint (0). Therefore, adjustment is shown by a difference between attributions in the volunteered condition and the assigned condition (or alternatively, more positive ratings in the assigned essay condition by the mindfulness group compared to the other groups, as we have hypothesized).

Results

With the exception of the Lexical Decision Task (LDT), which required a different methodology (outlined below), outliers were removed per analysis using box and whisker plots. Specifically, outliers were dropped that were more than 1.5 interquartile range points below the first quartile or above the third quartile. Due to omission by participants and some errors in data collection, some variables had missing data. Missing data, as reported below, was imputed using available data use the mice R package (Buuren & Groothuis-Oudshoorn, 2011).

Altruism and Compassion

Altruism Assessment - Empathy

Empathy ratings towards the person in the video were analyzed as a function of meditation condition with a one-way ANCOVA with MCSDS score as a covariate as well as a planned ANCOVA contrast. Two data points were missing and imputed. The Meditation Group main effect was marginally significant, F (2,123) = 2.9, p=.058, η^2 = .0465. MCSDS was not a

significant in the model, so it was removed and the Group main effect improved slightly, $F(2,124) = 3.2$, p=.04, $\eta^2 = .05$. A single-degree-of-freedom planned contrast was used to test the hypothesis that the compassion group would show greater empathy than the mindfulness and sham control groups. The contrast was specified as follows: mindfulness = -0.5, compassion = 1.0, and sham control = -0.5. A significant difference was detected $t(124)= 2.54$, p=.012, $d= 0.47$. This result indicated that the compassion meditation group endorsed significantly more empathy towards the student in the video compared to the mindfulness and sham control group.

Altruism Assessment – Behavior

Participants had a choice of how to offer help in the post-study fundraising form. We counted a choice to donate money or time, or a response to the email with condolences or well wishes with a binary variable. A one was recorded if one of these altruistic responses were made, and zero if not. A Chi^2 analysis indicated that the compassion meditation group was significantly more likely to take an action in response to the help request than the other two groups, Chi^2 (2) = 6.42, p=.04.

Altruistic Behavior – Donations

One of the options for helping the person in the video was for participants to donate a portion of their study compensation to her. The number of dollars donated was used as an indicator of altruism. This was analyzed as a function of meditation condition with a one-way ANOVA. Results showed no significant differences between groups in average donations offered, including those who did not donate (M=\$3.5, SD = \$11.6).

Compassionate Love Scale

CLS scores were analyzed with a 3x2 (Meditation Group: Mindfulness, Compassion, Control) X 2 (Time: Preintervention vs Postintervention) repeated measures ANOVA, with

MCSDS score as a covariate to control for socially desirable responding. Nine outliers were removed prior to analysis. The ANOVA showed a Time main effect, such that participants had higher CLS scores at Time 2 (M= 111.6, SD= 20.6) than at Time 1 (M= 102.1, SD= 21.9), F (1,118) = 16.8, p= < .001, η^2 = .02. Neither the Group main effect nor the Group X Time interactions were significant (p=ns). Social desirability had a significant effect on scores, F (1,118) = 3.8, p= < .05, η^2 = .006. A planned contrast was conducted to test the hypothesis that the compassion group would show greater increases than the mindfulness and sham control group combined, with MCSDS score as a covariate to control for socially desirable responding. The contrast was specified as follows: mindfulness = -0.5, compassion = 1.0, and sham control = -0.5. No significant difference was detected.

IRI – Empathy

Scores on the Empathy subscale of the IRI were analyzed with a 3 (Meditation Group: Mindfulness, Compassion, Control) X 2 (Time: Preintervention vs Postintervention) repeated measures ANOVA, with MCSDS score as a covariate. Ten outliers were removed prior to analysis. The Time main effect was significant, such that participants had higher empathy scores at Time 2 (M=29.6, SD=2.5) than at Time 1 (M=27.6, SD=4.8), F (1,118) = 10.90, p=.001, η^2 = .02. Social desirability had a significant effect on scores, F (1,117) = 18.47, p=.001, η^2 = .10. No other effects were significant. A planned contrast tested the hypothesis that the compassion group would show greater increases than the mindfulness and sham control group combined, with MCSDS score as a covariate to control for socially desirable responding. The contrast was specified as follows: mindfulness = -0.5, compassion = 1.0, and sham control = -0.5. No significant difference was detected.

IRI – Perspective Taking

Scores on the Perspective Taking subscale of the IRI were analyzed with a 3 (Meditation Group: Mindfulness, Compassion, Control) X 2 (Time: Preintervention vs Postintervention) repeated measures ANOVA, with MCSDS score as a covariate as well as a planned ANOVA contrast. Five outliers were removed prior to analysis. The Time main effect was significant. Participants had higher empathy scores at Time 2 (M= 26, SD= 3.4) than at Time 1 (M=25.1, SD= 3.4), F (1,118) = 5.5, p=.02, η^2 = .01. No other effects were significant. A planned contrast tested the hypothesis that the compassion group would show greater increases than the mindfulness and sham control group combined, with MCSDS score as a covariate to control for socially desirable responding. The contrast was specified as follows: mindfulness = -0.5, compassion = 1.0, and sham control = -0.5. No significant difference was detected (p=*ns*).

Other Dependent Measures

Mindfulness

FFMQ total scores were analyzed with a 3 (Meditation Group: Mindfulness, Compassion, Control) X 2 (Time: Preintervention vs Postintervention) repeated measures ANOVA, with MCSDS score as a covariate to control for socially desirable responding. Ten outliers were removed, leaving 117 participants. There was a Time main effect, such that participants had higher FFMQ scores at Time 2 (M= 137.4, SD=16) than at Time 1 (M= 127, SD=19.3), F (1,117) = 53.5, p= < .001, η^2 = .09. Neither the Group main effect nor the Group X Time interaction were significant. Social desirability had a significant effect on scores, F (1,117) = 23.6, p= < .001, η^2 = .04.

Decentering

Scores on the Experiences Questionnaire were used as the assessment of decentering. A 3 (Meditation Group: Mindfulness, Compassion, Control) X 2 (Time: Preintervention vs

Postintervention) repeated measures ANOVA with MCSDS score as a covariate revealed a main effect for time, such that participants had higher decentering scores at Time 2 (M= 43.7, SD= 7.4) than at Time 1 (M= 38.7, SD= 8.5) F (1,123) = 38.12, p= <.001, η^2 = .07. The ANOVA also showed a main effect for social desirability, F (1,123) = 11.6, p= <.001, η^2 = .02.

Meditation Journals

Participants kept track of the number of sessions and total minutes they meditated over the course of the eight-week courses. 3x2 ANOVAs revealed no significant differences between groups on either number of sessions (M= 32*,* SD= 22.3) amounting to an average of ~4 sessions a week, or number of minutes meditated (M= 523.9*,* SD= 398.3) which translates to an average of ~9 hours total over the course of the 8 weeks.

Social Desirability

3x2 ANOVA on MCSDS scores, which were obtained preintervention only, did not differ across meditation groups (M = 6.4, SD= 3.2).

Mediating Variables

Lexical Accessibility

Reaction times to the different word types in the Lexical Decision Task were used as the indicator of the accessibility of compassion-related concepts. Reaction times below 200ms and above 2 SD from the mean were deleted (Berger & Kiefer, 2021). RTs were analyzed with a Meditation Group X Prime Type (distress, positive neutral, mask only) X Word Type (Compassion, Non-compassion Positive, Nonwords) ANOVA and an ANCOVA on individual Prime Type x Word Type averages using MCSDS as a covariate following Kemeney et al (2011). The 2x3x3 ANOVA showed a Meditation Group main effect (F [2, 29,768] = 59.17, p= <.001, η^2 = .004). Post hoc tests with Bonferroni correction revealed that the Mindfulness Group

(*M*=784.9, *SD*=286) had significantly slower (*t*=7.11, *p*= <.001) reaction times than the Compassion Group (*M*= 758.2, *SD*= 271.2), which in turn was significantly slower (*t*=4.17, *p*=.001) than the Control Group (*M*= 741.6, *SD*= 279.2). In addition, there was a significant Word Type effect (*F* [2, 29,768] = 545.15, *p*= <.001, η^2 < .035). Reaction times to nonwords (*M*= 837.3, *SD*=285.4) were slower compared to both compassion words (*M*=732, *SD*= 273.6; *t*= 27.1, *p*= <.001) and non-compassion positive words (*M*= 720.3, *SD*= 263.3; *t*= 30.17, *p*= <.001). RTs to compassion words were slower than were RTs to non-compassion words as well (*t*= 3.1, *p*=.005). There was also a significant Prime Type effect (*F* [2, 29,768] = 3.04, *p*=.048, η^2 < .001). Finally, there was a Meditation Group X Word Type effect (*F* [2, 29,768] = 3.04, *p*=.048, η^2 < .001). Post hoc comparisons reveal many significant effects in part due to the large number of conditions and trials, but Figure 1 shows that the chief driver of this interaction is that the Meditation Group main effect described above holds except for nonwords, where the Compassion and Control groups' RTs do not differ. Regardless, Figure 1 makes clear that these results are contrary to hypotheses. The above analyses were also conducted using log-transformed RTs but this did not significantly affect the results.

However, although meditation condition did not show the expected effects, another premise of this study was that the altruistic impacts of meditation may function through improved accessibility of compassionate constructs. In other words, as accessibility of compassionate constructs improves, altruistic attitudes improve. This relationship was examined with a series of linear models using average RT for compassionate words across the LDT design, as well as average RT for the compassionate prime x compassionate word condition alone as a predictor of altruistic self-report (CLS, IRI-Emp, IRI-PT), and a logistic regression use these two for variables predicting altruistic behavior (Email Reaction). Contrary to our hypotheses, none of

these models showed accessibility of compassionate constructs predicting altruistic attitudes or behavior.

Correspondence Bias – NED

Scores on the Neglect of External Demands (NED) scale were used as a measure of correspondence bias. Software issues with data collection resulted in an unusual number of missing data points (n= 18) which were imputed. NED scores were analyzed with a one-way ANCOVA as well as a planned ANCOVA contrast. The one-way ANCOVA showed a significant effect for MCSDS, F (1,122) = 15.41, p= <.001, η^2 = .11 but no other effects (M= 53.2, SD= 9.1). The contrast was specified as follows: mindfulness = -1, compassion = .05, and sham control = 0.5. This contrast was designed to test the hypothesis that the mindfulness group would have lower NED scores than the average of the other two groups. There were no significant effects detected.

Although there was no unique effect for group on decentering scores, another hypothesis of the study was that decentering would impact the display of the correspondence bias. Higher decentering scores were predicted to be associated with lower bias. This relationship was tested with a linear model using the EQ's decentering scores to predict NED scores and Attitude Attribution scores. Post-intervention decentering was significantly related to NED trait attribution scores, b = 0.63, SE = 0.09, t(125) = 6.6, p = <.001. Additionally, FFMQ scores also predicted NED trait attributes with a similar linear model, b = 0.12, SE = 0.23, t(125) = 2.7, p = .007. However, these results were in the opposite direction than was hypothesized.

Confidence in Attributions – NED

Participants rated their confidence in the attributions they made for on the NED. 18 data points were imputed, and five outliers were removed. Confidence ratings were summed. We

would expect lower confidence in attributions for people who are aware of and adjusting for situational information since the situational factor obscures the target's true attitude. One-way ANCOVA showed a significant effect for MCSDS**,** F (1,118) = 15.301, p= <.001, η^2 = .11 but no other effects on confidence means (M= 57.4, SD= 11.5). The same contrast as was performed on NED trait ratings but for confidence levels. This contrast analysis did not detect any significant effects. However, NED trait attribution confidence was positively predicted by EQ decentering scores. Post-intervention decentering (b = 0.79, SE = 0.13, t[125] = 5.8, p = <.001) and FFMQ scores (b = 0.15, SE = 0.05, t[121] = 2.7, p = .008) were both significantly related to NED trait confidence ratings.

Attributions – Attitude Attribution

18 data points were missing and imputed. Scores were analyzed with a 3 (meditation condition) x 2 (essay information condition) ANCOVA using MCSDS as a covariate, as well as with a planned ANCOVA contrasts designed to test the hypotheses that a) in the assigned essay condition, the mindfulness group would show attitude attributions closer to the midpoint (effectively higher) than the other meditation conditions (coded 1, -0.5, -0.5, 0, 0, 0) and b) that the mindfulness group/assigned essay condition would show attitude attributions closer to the midpoint than the all other meditation/essay condition subgroups (coded 1, -0.2, -0.2, -0.2, -0.2, -0.2). The 3x2 ANCOVA as well as both planned contrasts showed no significant effects (M= -1.3, SD = 3.4). Post-intervention decentering was marginally related to lower attitude attribution scores, b = -0.079, SE = 0.04, t(126) = -1.9, p = .06. Post-intervention FFMQ score significantly predicted attitude attributions, b = -0.049, SE = 0.01, t(126) = -3.0, p = .003.

Confidence in Attributions – Attitude Attribution Task

Participants' confidence in their ratings of the essay writer's attitudes towards legalization of psychedelics were analyzed. As with the NED, we would expect lower confidence in the attitude attributions of participants who are aware of and adjusting for a situational factor. 18 data points were imputed, and 4 outliers were removed. Scores were analyzed with a 3 (meditation condition) x 2 (essay information condition) ANCOVA using MCSDS as a covariate, as well as with a planned ANCOVA contrasts designed to test the hypothesis that a) in the assigned essay condition the mindfulness group would show lower confidence in their attitude attributions than the other meditation conditions, and b) that the subset of the mindfulness group which was told essay topic was assigned would show lower confidence in their attitude attributions than all other meditation/essay condition subgroups. These contrasts had the same coding as the attitude attribution task above. The 3x2 ANCOVA showed only a significant effect for MCSDS, F (1,116) = 6.8, p= .01, η^2 = .05 Neither planned contrasts showed significant effects on attribution confidence (M= 6.9, SD = 2.9). Attitude attribution confidence was also well predicted by post-intervention decentering scores b = 0.14, SE = 0.03, t(122) = 4.4, p = .001, and marginally well by post-intervention FFMQ scores b = 0.02, SE = 0.01, t(122) = 1.7, p = 0.08.

Mediational Analyses

We had several mediational hypotheses. However, because the results for the measures of accessibility (the LDT), attribution, and decentering did not conform to predictions in that they did not have the expected meditation group effects, we did not perform mediational analyses using those measures as it is a precondition of mediation that the independent variable be related to the mediator.

Discussion

The present study was designed to investigate the widely reported increases in altruistic feelings within empirical meditation literature. Our results confirmed that meditation practices increase altruistic feelings. However, our data implies two striking additional conclusions. First, our course in compassion meditation had stronger effects on altruistic feelings and behavior towards a specific suffering other than the mindfulness meditation course. Our intervention groups did not differ in self-reported, global feelings of compassionate love, empathy, or perspective taking, but in general these introspective self-assessments improved over the course of the study. Our data suggests that meditation interventions designed around Buddhist loving-kindness and compassion meditation may provide an additional factor beyond these more global self-reported feelings that increases the likelihood someone will act on their feelings.

Even though our findings did not show evidence for changes in the cognitive accessibility of altruistic lexical *concepts* in our compassion meditation group, empathic *feelings* were more likely to be activated when the meditator is confronted by a specific individual in distress. There is evidence that affective information and conceptual information are processed through partly distinct channels, leading to differences in how readily each is accessed (Chen & Bargh, 1999; Fazio et al., 1986; Robinson & Clore, 2002). Since our lexical task was designed to measure the cognitive dimension of compassionate thoughts, it may not have captured changes in the accessibility of compassionate feelings that our data point to. Traditionally, at least some compassion meditation techniques are aimed at increasing compassionate feelings, so in retrospect this may not be a surprise.

The lack of effects for our measure of lexical accessibility of compassionate thoughts might be seen as inconsistent with the results of Kemeny et al. (2012), who found that meditation did have significant accessibility effects for altruism using a similar task. However, Kemeny et

al. (2012) used a different meditation condition that combined elements of mindfulness and compassion meditation together and had a wait list control group rather than an active control group. In addition, their lexical task compared compassion words versus disgust words, which raises the possibility that their manipulation led to well-known general positivity effects in these tasks (Kissler & Koessler, 2011; Scott et al., 2014) rather than accessibility specifically towards compassion. The current study intentionally pitted compassion words against non-compassion positive words to rule this out. The current study suggests that while lexical accessibility of compassion may not differ between meditation styles, one's feelings and motivations in relation to real suffering others may.

Weng et al. (2013) found that compassion meditation increased helping behavior in a laboratory game and that such a change was associated with increased activity in reward circuits of the brain when choosing to help. Such a change could explain how compassionate forms of meditation incentivize greater action in the face of suffering others. While mindfulness meditation may increase self-reported empathic concern in the abstract, compassion meditation helps to overcome the potential costs and barriers to taking a helping action by increasing the value of helping in real situations. Future research into the impact of altruistic forms of meditation could assess this possibility.

The second important conclusion from our data concerns the performance of our control group. Much of meditation research has been conducted with poor methodological controls. Lack of well matched, active control groups and standardized meditation curricula have rendered much prior research weak in terms of its ability to isolate mechanisms. Our project was designed with this issue in mind. Our sham control group was to our knowledge the first such active control condition used in a long-term 8-week format. All of our meditation conditions –

including the sham meditation condition – led to increases in compassionate love, generalized empathy, mindfulness, and decentering from pre- to post-test. Note that all the measures used to assess these variables were self-reports of relatively global, generalized concepts. The fact that our control group performed so statistically similar to our active meditation conditions on these measures while not receiving any of the meditation instructions of the other conditions, including psychoeducation components or practice advice, is a stark challenge to the common narrative surrounding the mechanics of meditation interventions. It suggests that, at worst, the individual idiosyncratic nuances of particular practice techniques may matter less than previously believed, and factors in common to all meditation interventions may be playing more of a role than predicted by current theories, especially when self-report measures are the main dependent variable. At best, we can see that something like this must be at work in our control group.

In the current study we used a measure of social desirability motivation as a covariate in the analyses, so our results are not merely due to increased eagerness by participants to see or portray themselves positively. However, a related possibility is that these are expectancy effects, such that participants believe that meditation – whether "real" or not – will enhance these sorts of characteristics and this leads them to believe the characteristics are there. In fact, our control condition was specifically constructed with an eye towards this possibility. This need not be simple delusion as it is possible that simply engaging in these practices makes people attend more to their feelings and behaviors, especially those that might be consistent with their expectations about the effects of the practice. These sorts of expectancy effects may be more likely to show up on general self-ratings scales like those on which we found increases than on the more behavioral altruism measure or the cognitive attribution and lexical decision tasks.

This lack of a differential effect across different meditation types is consistent with work showing that different meditations often show similar effect sizes compared to a (nonactive) control condition in predicting a number of variables (Sedlmeier et al., 2012). We believe that results like these point towards the importance (and possibly the preeminence) of the non-meditation aspects of meditation practice in explaining the effects found in meditation studies. Indeed, Goldberg (2022) lays out a convincing argument that many of the commonly used theoretical approaches to explaining the function of meditation may be too focused on specific mechanisms unique to meditation. In the literature on psychotherapy, "common factors" refers to the idea that different therapeutic interventions share many of the same core mechanics. Although there are a few models as to what these common factors are (see Wampold [2015] for a review), some common themes include the relationship between the therapist and the client, empathy, expectations about the treatment outcome, social support, etc. As Goldberg (2022) points out, many meditation interventions are designed from the ground up to maximize these common factors, yet such factors have not been a focus of research on their efficacy, nor have they informed models of their theoretical mechanics. Our results highlight the continued importance of this perspective and the vital important of active controls like our placebo "sham" meditation course.

Another unexpected finding was that across meditation conditions, greater trait mindfulness and decentering scores were associated with greater correspondence bias on both measures. Gilbert et al. (1988; see also Weary et al., 2006) found convincing evidence that the adjustment of initial dispositional inferences is vulnerable to cognitive load, such that those whose attentional resources were more engaged in the moment with other tasks were less likely to take into account situational factors when making a correspondent attribution. Since

mindfulness can be a challenging task for newer practitioners trying to keep up a new habit, it may be possible that the effort of this task interferes with one's ability to take situational factors into account in attributional judgements. Hopthrow et al., (2017)'s finding that mindfulness reduced the correspondence bias was based on a single brief exposure to mindfulness rather than a population of meditators trying to learn a new skill. Future research should probe this discrepancy so we might understand the connection between mindfulness and the correspondence bias.

Finally, this study was greatly complicated by a massive number of fraudulent participants that attempted to provide faked data. Problems with fraudulent participant activity have become a major headache for paid online studies, showing worrying increases in the last decade or so (Teitcher et al., 2015). We first began to suspect that our volunteers were not legitimate early in the recruitment process. We noticed hundreds of people signing up to participate in surges over several hours. Examining the IP addresses, emails, and names of these volunteers led us to conclude that many if not most were illegitimate. Many had the same IP addresses, or IP addresses located overseas. Further, data provided at screening and consent (i.e. names and email addresses) were not consistent. Our team consulted and implemented best practices for bot detection (Rodriguez & Oppenheimer, 2023) but we eventually concluded that much of the fraud we encountered was of human design, coming from Reddit and Facebook recruitment sources, particularly spaces designed for the advertisement of paid research studies. Although our initial screening practices eventually led us to randomize only a fraction of those who signed up, we also began to notice that many of our screened participants were submitting duplicate work. Examination of meditation logs and course participation revealed patterns of unreasonable coincidence. We used all available information to build solid fraud cases and

discussed it as a team before discontinuing any volunteers, but even with extremely conservative assessments we ended up having to discard large portions of our randomized participants, in addition to normal levels of participation attrition. We are confident that the data we present here is based on legitimate volunteers, but we wish to caution other research teams who are considering similar online studies.

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