

COMPONENTS AND PRACTICE OF MINDFULNESS

Abstract

Objectives: The study investigated 1) if meditators and non-meditators differ in their levels of mindfulness, attention, acceptance, loving-kindness, compassion, joy, equanimity, and empathy; and 2) whether and how mindfulness practice affected the above qualities.

Methods: The 241 participants (18-81 years, $M = 40.3$, $SD = 14.8$; 64% female) completed an online questionnaire consisting of scales measuring mindfulness components (mindful attention, acceptance, non-judging), and mindfulness related qualities, including loving-kindness, compassion, joy, equanimity, and empathy. The participants who reported being meditators ($N = 122$; 50.4%) were also asked questions about their meditation practice.

Results: Meditators differed significantly from non-meditators in relation to their levels of mindful attention ($t_{(239)} = 4.80$, $p < .001$, $d = .63$) and empathy ($t_{(239)} = 2.80$, $p < .01$, $d = .37$) but not for the other mindfulness components or related qualities. Multiple regression analyses indicated that practice variables (years of practice, frequency of practice, and length of session) explained a significant proportion of variance in mindful attention ($R^2 = .27$, $p < .001$) and empathy ($R^2 = .15$, $p < .05$).

Conclusions: The present findings are consistent with conceptualizations of mindfulness that focus on the centrality of mindful attention over acceptance and non-judging components, which is consistent with several Buddhist mindfulness traditions. Present findings also demonstrate the importance of practice for the cultivation of mindful attention. Future studies are required to increase our understanding of effects relating to the type of mindfulness undertaken and the influence of practice factors.

Keywords Mindfulness, Meditation, Attention, Buddhism

COMPONENTS AND PRACTICE OF MINDFULNESS

Differences between Meditators and Non-Meditators in Mindfulness, its Components and Related Qualities

The term "Mindfulness" has increasingly become part of the common vernacular, with the words "mindfulness" or "meditation" being mentioned over 30,000 times in the popular media, and 1200 articles being published in 2015 alone (Van Dam, van Vugt, Vago, Schmalzl, Saron, Olendzki et al. 2018). As mindfulness has no single external referent, it must be inferred from a variety of related behaviours, attitudes or experiences, which has resulted in multiple descriptions and definitions of mindfulness (Grossman 2011). For example, some suggest that mindfulness is a combination of skills, such as observing, describing, acting with awareness, and accepting non-judgmentally (Baer, Smith and Allen 2004). Others suggest, however, that mindfulness is simply being aware of, and paying attention to, whatever is happening in the present moment, both inside and outside of oneself (Brown and Ryan 2004). Furthermore, although contemporary conceptions of mindfulness are frequently acknowledged to have originated in Buddhism (e.g., Brown and Ryan 2003), there is a disparity between the understanding of mindfulness common to several Buddhist traditions and practice of mindfulness and some of the more contemporary conceptualisations of mindfulness. Specifically, while various Buddhist traditions and the Mindfulness-Based Interventions (MBIs) emphasise the cultivation of mindfulness through sustained practice, mindfulness is also depicted as a trait that everyone possesses even without deliberately cultivating it (e.g., Brown and Ryan 2003).

In a broad sense, the Buddha taught people how to end the suffering that pervades their lives; however, the teachings of the Buddha spread across many countries and assumed different manifestations. Therefore, scholars such as Dunne (2011) have commented that it is incorrect to use the singular term 'Buddhism' to describe its varied philosophy and meditation

COMPONENTS AND PRACTICE OF MINDFULNESS

practices. This diversity extends to the understanding of mindfulness in various Buddhist traditions. This paper is primarily drawn on Bodhi's (2011) description of mindfulness or *sati* as a set of Buddhist meditation practices and principles. In this Buddhist tradition, mindfulness is described as training the mind to cultivate wholesome qualities of kindness, compassion, and empathy while eliminating unwholesome qualities such as greed, hate, and delusion (Bodhi 2011). *Satipatthāna Sutta*, a discourse that the Buddha is reported to have given to his disciples, describes the purpose and the method of mindfulness practice and the mental qualities required to succeed in its practice (Bodhi 2011).

The word *Satipatthāna* is a combination of *sati* - meaning "mindfulness", and *upatthāna* - meaning "attending closely" (Anālayo 2006). *Satipatthāna Sutta* includes a list of four domains for contemplating mindfully, the body, feelings, mind and *dhamma* (Pali; *dharma*, Sanskrit) or experiential phenomena (Anālayo 2006). Contemplation is a translation of the Pali word *anupassana* which is a combination of the verb *passana*, meaning "seeing", and the term *anu* which means "closely" or "repeatedly". Therefore, *sati* or mindfulness is a process characterised by close and repeated or continuous observation of whatever is occurring in each successive moment of experience (Anālayo 2006; Bodhi 2011).

Satipatthāna Sutta also contains detailed instructions on mindfulness practice related to each domain. For example, when contemplating the body, one is instructed to focus on the breathing and notice whether an inhalation is long or short and mentally categorize them as long and short breaths, respectively (Anālayo 2006). It is suggested that for an individual to establish mindfulness successfully, they should practice energetically (*atapi*, Pali), carefully observe whatever is being experienced both internally and externally in each successive moment, interpret the experiential phenomena (*satima*, Pali), and understand them clearly (*sampajano*, Pali) (Bodhi 1998). Practitioners are exhorted to become free of the attitudes of

COMPONENTS AND PRACTICE OF MINDFULNESS

clinging and dependence (Anālayo 2006). Therefore, an individual must cultivate mindfulness (*bhāvetabba*) through effortful practice (Bodhi 2011). Furthermore, in many Buddhist teachings, mindfulness is not considered a naturally occurring concomitant of any experience, but rather something that one must establish, unlike, for example, consciousness (Anālayo 2016).

Kabat-Zinn first introduced mindfulness to modern psychology through the Mindfulness-Based Stress Reduction program (MBSR; Kabat-Zinn, Lipworth and Burney 1985). Kabat-Zinn (2011) defined mindfulness as "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (p. 292). This definition has significantly influenced both researchers and clinicians (Quaglia, Brown, Lindsay, Creswell and Goodman 2015). Kabat-Zinn's MBSR program was followed by other MBIs, such as Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams and Teasdale 2018) and Dialectical Behavior Therapy (DBT; Linehan 1987). In keeping with the emphasis of various Buddhist traditions on practice, MBSR and the other MBIs highlight the importance of regular practice to cultivate mindfulness (Grossman, Niemann, Schmidt and Walach 2004).

There is a growing body of research demonstrating that mindfulness meditation increases self-reported levels of mindfulness and its components (e.g., Baer, Smith, Lykins, Button, Krietemeyer, Sauer et al. 2008; Basso, McHale, Ende, Oberlin and Suzuki 2019; Carmody and Baer 2008; Cavanagh 2014; Chan 2004; Elliot, Wallace and Giesbrecht 2014; Hölzel, Lazar, Gard, Schuman-Olivier, Vago and Ott 2011; Kozasa, Sato, Lacerda, Barreiros, Radvany, Russel et al. 2012; Mikulas 2011; Moore, Gruber, Derosé and Malinowski 2012; Pang and Ruch 2019; Semple, 2010; Thompson, Arnkoff and Glass 2011; Tortella-Feliu, Soler, Burns, Cebolla, Elices, Pascual et al. 2018; Tsai and Chou 2016); however, some studies dispute this. For example, a systematic review by Lao, Kissane and Meadows (2016) did not find that MBSR/MBCT practices increased attentional capacities.

COMPONENTS AND PRACTICE OF MINDFULNESS

Mindfulness has also been defined as a trait that everyone possesses to some degree (e.g., Baer et al. 2004; Brown and Ryan 2003). The assumption that mindfulness represents a trait has led to the development of several self-report measures of trait mindfulness that are based on different theoretical orientations and clinical conceptualisations, of trait mindfulness (Quaglia et al. 2015; Quaglia, Braun, Freeman, McDaniel and Brown 2016). Brown and Ryan (2003), for example, developed the Mindful Attention and Awareness Scale (MAAS), with attention to the present moment as its sole mindfulness component. Other trait mindfulness scales such as the Carolina Empirically Derived Mindfulness Inventory (CEDMI; Coffey, Hartman and Fredrickson 2010), Freiburg Mindfulness Inventory (FMI; Buchheld, Grossman and Wallach 2001), the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer and Toney 2006), and Philadelphia Mindfulness Scale (PHLMS; Cardaciatto, Herbert, Forman, Moitra and Farrow 2008), assess attributes such as acceptance, openness to experience, non-judging, and the ability to label/describe what one is experiencing as constituting mindfulness.

The intentions behind and attitudes towards mindfulness practice are also important (Kuyken 2010; Van Dam, Earleywine and Borders 2010). In various Buddhist traditions, the attentional quality that is exercised as part of mindfulness practice is imbued with compassion and kindness, the latter of which are termed *heart* qualities (Anālayo 2015; Kraus and Seers 2009; Logie and Frewen 2015; Shapiro, Carlson, Astin and Freedman 2006; Voci, Veneziani and Fuochi 2019), as well as empathy (Birnie, Speca and Carlson 2009; Winning and Boag 2015). Some researchers further suggest that mindfulness meditation increases the qualities of loving-kindness, compassion, joy and equanimity, which are collectively termed *brahmavihārā* in the Buddhist literature, as well as empathy (e.g., Boellinghaus, Jones and Hutton 2014; Desbordes, Gard, Hoge, Hölzel, Kerr, Lazar et al. 2015; Greason and Cashwell 2009; Hadash, Segev, Tanay, Goldstein and Bernstein 2016; Hoffmann, Grossman and

COMPONENTS AND PRACTICE OF MINDFULNESS

Hinton 2011; Kristellar and Johnson 2005; Pagis 2014; Raab 2014; Rodríguez-Carvajal, García-Rubio, Paniagua, García-Diex and de Rivas 2016; Winning and Boag 2015; Zeng, Oei, Ye and Liu 2013). Empathy is the ability to put oneself in other's shoes and is divided into cognitive and affective empathy (Shamay-Tsoory 2011). Of note, however, the description of *sati* in the Buddhist texts such as *Satipatthāna Sutta*, as discussed earlier, does not include these qualities.

To bring conceptual clarity to the field, Bishop et al. (2004) developed an operational definition of mindfulness, positing that mindfulness has two components: *attention* to the present moment and *acceptance* of whatever emerges from the present moment in a non-judgemental and non-resisting manner. Many mindfulness researchers have adopted this operational definition and found evidence to support the two-component model of mindfulness (e.g., Baer et al. 2006; Coffey et al. 2010; Cardaciotto et al. 2014). This definition is not, however, universally accepted and supported, especially in regard to the acceptance component (e.g., Hadash et al. 2016; Lilja, Lundh, Josefsson and Falkenström 2013; Soler, Cebolla, Feliu-Soler, Demarzo, Pascual, Baños et al. 2014).

Similarly, some researchers (e.g. Baer et al. 2006; Coffey et al. 2010) have operationalized acceptance by combining "non-reactivity to" and "non-judging of" internal experience, while others have referred to acceptance as "non-judgemental acceptance" (Baer et al. 2004; Bergomi, Tschacher and Kupper 2015; Feldman, Hayes, Kumar, Greeson and Laurenceau 2007), as well as some as overlapping qualities (Quaglia et al. 2015). In contrast, Brown and Ryan's (2003) findings led them to argue that mindfulness is just being aware of and paying attention to, whatever is happening internally and externally in the present moment, such that attributes like acceptance, trust, empathy, or gratitude are attitudes that one might bring to mindfulness but are not central to it. They also argue that acceptance and patience may be outcomes of wellbeing that mindfulness may enhance.

COMPONENTS AND PRACTICE OF MINDFULNESS

Given that researchers differ in their conceptualizations of mindfulness and its components, greater clarity in our understanding of the construct and its practice is clearly needed. More specifically, those qualities that specifically constitute or are related to mindfulness need to be more clearly elucidated. To this end, the present study was designed to investigate if the levels of the components of mindfulness and its related qualities would differ between meditators and non-meditators. In addition, the study also investigated the impact that different mindfulness practice factors, such as years of practice, usual frequency of practice, and the typical length of each practice session, have on various aspects of mindfulness.

The present study specifically hypothesized that:

1. Meditators would have higher levels of mindfulness components (mindful attention, acceptance, and non-judging) than non-meditators;
2. Meditators would have higher levels of mindfulness-related qualities (loving-kindness, compassion, joy, equanimity, and empathy) than non-meditators;
3. Within the meditator group, there would be positive associations between the mindfulness practice factors (years of practice, frequency of practice and length of session), with mindfulness components and mindfulness-related qualities;
4. Mindfulness practice factors would explain a significant proportion of variance in mindfulness components and related qualities, even after controlling for social desirability bias.

Method

Participants

Using G*Power (Faul, Erdfelder, Buchner & Lang 2009) with a medium effect size (.05), a power of 0.8, and $\alpha = .05$, it was estimated that a minimum of 128 participants would

COMPONENTS AND PRACTICE OF MINDFULNESS

be required to detect differences between meditators and non-meditators. Consequently, 241 participants (34% male, 64% female, 2% other) were recruited via email, online forums, from meditation centers, and through a university. They ranged in age from 18 to 81 years ($M = 40.3$, $SD = 14.8$), with the majority having completed an undergraduate or a post-graduate university degree (84%) and being currently employed (63%). In total, 122 (51%) reported that they were meditators. Of these, 58 participants reported the name of their practice, with eight practicing MBSR, five practicing Zen and one each from the remaining types. Meditators and non-meditators did not differ significantly on any of the demographic variables (see Table 1).

<<Insert Table 1 about here>>

Materials

Participants completed an anonymous online questionnaire hosted by Qualtrics®. The questionnaire contained a section for collecting demographic information (e.g., age, sex, education, employment) followed by the scales described below.

Carolina Empirically Derived Mindfulness Inventory (CEDMI; Coffey, Hartman and Fredrickson 2010) is a 22-item scale that measures the trait mindfulness in an individual. Respondents are asked to indicate on a 5-point scale how true each item is of them (from 1 = *never or very rarely true* to 5 = *very often or always true*). The scale yields a total mindfulness score along with scores for three subscales: attention (8 items), acceptance (6 items), and non-judging (8 items). All scores range from 1-5 with higher scores indicating higher levels mindfulness or the named components. Good internal consistency reliability has been reported for the full scale and the subscales (attention: $\alpha = .74$; acceptance: $\alpha = .90$; non-judging: $\alpha = .87$; trait mindfulness total score: $\alpha = .88$; Coffey et al. 2010), which were also found in the current study (attention: $\alpha = .87$; acceptance: $\alpha = .94$; non-judging: $\alpha = .93$; trait mindfulness total score: $\alpha = .84$).

COMPONENTS AND PRACTICE OF MINDFULNESS

Self-Other Four Immeasurables (SOFI; Kraus and Sears 2009) measures the *Four Immeasurables* (*brahmavihārā*, Pali) from Buddhist literature (Kraus and Sears 2009), being: loving-kindness, compassion, joy, and equanimity. The scale contains eight adjectives describing these qualities matched with eight opposite adjectives; for example, 'friendly' and 'hateful' respectively, reflecting loving-kindness. The current study only used the positive adjectives constituting the two sub-scales: Positive Qualities towards Self (PQTS) and Positive Qualities towards Others (PQTO). Participants responded to each adjective to indicate the extent to which they thought, felt or behaved towards themselves (or others) using a 5-point scale (from 1 = *very slightly or not at all* to 5 = *extremely*), such that the PQTS and PQTO scores range from 4-20. Higher scores indicate a higher level of positive qualities towards self or others, respectively. Both subscales have been reported to have good internal consistency reliability (PQTS: $\alpha = .86$; PQTO: and $\alpha = .80$; Kraus & Sears 2008), which was also found in the current study (PQTS: $\alpha = .89$; PQTO: $\alpha = .86$).

The Toronto Empathy Questionnaire (TEQ; Spreng, McKinnon, Mar and Levine 2009) is a 16-item scale that measures empathy. Participants rate each item using a 5-point scale (from 0 = *never* to 4 = *always*) indicating how often they felt a certain way over the past week. Total scores range from 0-64 with higher scores indicating a higher level of empathy. Previously, the scale has been reported to have good internal consistency reliability ($\alpha = .85$; Spreng et al. 2009), with $\alpha = .85$ also found in the current study.

The Marlowe-Crowne Social Desirability Scale (MC-SDS; Crowne and Marlowe 1960) is a 33-item scale that measures the desire of respondents for social approval. The respondents select 'true' or 'false' for each item, with total scores ranging from 0 to 33, where higher scores indicate greater propensity to answer questions in a socially desirable manner. The internal consistency of the scale, calculated using the Kuder-Richardson formula, was

COMPONENTS AND PRACTICE OF MINDFULNESS

found to be $\alpha = .88$ (Crowne and Marlowe 1960), which is similar to the current study's ($\alpha = .72$).

Mindfulness practice questions were presented to participants who were meditators. These questions included: years of practice (e.g., *How long have you been practising meditation?*; 1 = *less than 1 year* to 6 = *5 years or more*); frequency of practice (e.g., *How many times on average do you practice meditation per week?*; 1 = *less than once a week* to 6 = *5 times or more per week*); and the average length of each meditation session (e.g., *When you meditate, how long on average do your practice sessions last?*; 1 = *less than 5 minutes* to 5 = *30 minutes or more*). Although the latter scoring system produced only ordinal data, this was chosen to reflect the most common length/s of meditation sessions.

Procedure

The study received approval from the Human Research Ethics Committee of the University of New England (approval number: HE 18-040). Recruitment messages were disseminated by email, online forum postings, flyers at meditation centers, and through the learning management system of the university. The recruitment messages included a link to the study's Qualtrics questionnaire. On accessing the online questionnaire, participants were provided with information about the study and informed consent was obtained from all individual participants included in the study. Participants were subsequently categorized into meditator and non-meditator groups based on their answer to a question asking whether they engaged in mindfulness meditation or any other form of meditation of which mindfulness was a component. Categorizing participants in this way ensured that only meditators were asked the meditation practice questions; all other aspects of the questionnaire were identical for both groups. On average, the questionnaire took between 30 and 35 minutes to complete. After completing the questionnaire, the participants could choose to enter a prize draw (one of 4 x \$50 gift cards). The students of the university participated for course credit.

COMPONENTS AND PRACTICE OF MINDFULNESS

Results

Comparison of Meditators and Non-meditators

Table 2 displays the means and standard deviations for the mindfulness components and related qualities by group, along with results from the independent samples t-tests. Meditators were found to have a significantly higher levels of mindful attention ($M = 3.51$, $SD = .73$) than non-meditators ($M = 3.03$, $SD = .80$), $t(239) = 4.80$, $p < .001$, with a medium to large effect indicated ($d = .63$). Similarly, meditators were found to have significantly higher levels of empathy ($M = 49.52$, $SD = 7.49$) than non-meditators ($M = 46.76$, $SD = 7.83$), $t(239) = 2.80$, $p < .01$, with a small to medium effect indicated ($d = .37$). No other significant differences were evident between the groups.

<<Insert Table 2 about here>>

Correlational Analyses

Pearson product-moment correlations were used to assess the strength and direction of associations between key variables for non-meditators and meditators. Zero-order correlations, controlling for age, sex, education, and social desirability, were calculated. The effect of controlling was negligible. For non-meditators, trait mindfulness correlated significantly with PQTS and empathy. Similarly, the three components of mindfulness, mindful attention, acceptance, and non-judging also correlated significantly with PQTS, with the associations for acceptance and non-judging being stronger than for mindful attention. No other significant associations were found (see Table 3).

<<Insert Table 3 about here>>

Trait mindfulness also correlated significantly with PQTS and empathy for meditators (see Table 4). Similarly, for meditators, mindful attention correlated significantly with PQTO and empathy, but not with PQTS. Further, neither acceptance nor non-judging components correlated significantly with empathy or PQTO.

COMPONENTS AND PRACTICE OF MINDFULNESS

<<Insert Table 4 about here>>

The associations between trait mindfulness and its components with the three practice factors were analyzed for the meditators indicating that mindful attention correlated significantly with all three practice factors. However, the acceptance and non-judging components of mindfulness did not have significant associations with any of the practice factors. The total mindfulness score was significantly correlated with the frequency of practice but not with the years of practice or the length of session. While empathy correlated significantly with all three practice factors, PQTS and PQTO were not significantly associated with any of them (see Table 5 for descriptive statistics for the mindfulness practice factors).

<<Insert Table 5 about here>>

Multiple Regression Analyses

Data from the meditators were further analyzed through two hierarchical multiple regression analyses to evaluate the combined and individual contributions of the three practice factors (years and frequency practice, and length of session) in explaining the variance in mindful attention and empathy, respectively. Due to the non-significant findings reported above, planned analyses focusing on acceptance, non-judging, PQTS, and PQTO were not conducted. Preliminary analyses ensured that there were no violations of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Age, sex, education, and social desirability were included in both regressions to control for any associated effects.

Mindful attention. The final model, which included age, sex, education and social desirability (entered at Step 1) and the three practice factors (entered at Step 2) explained 27% of the variance in mindful attention: $F(7, 114) = 6.03, p < .001, \eta_p^2 = .27$. The three practice factors explained an additional 16% of variance over Step 1: R^2 change = .16, F

COMPONENTS AND PRACTICE OF MINDFULNESS

change $(3, 114) = 8.35, p < .001$. In the final model (see Table 6), frequency of practice ($beta = .25, p < .05, 95\% \text{ CI } [.05, .37]$) and length of session ($beta = .26, p < .05, 95\% \text{ CI } [.09, .36]$) made a significant unique contributions to the variance in mindful attention, while the contribution of years of practice was marginally short of significance. While education also made a significant unique contribution, age, sex, and social desirability did not contribute significantly to the variance in attention.

<<Insert Table 6 about here>>

Empathy. In the final model which included age, sex, education, and social desirability (entered at Step 1) and the three practice factors (entered at Step 2) explained 15% of the variance in empathy, $F(7, 114) = 2.84, p < .05, \eta_p^2 = .15$. The three practice factors explained an additional 10% of variance over Step 1, R^2 change = .09, F change $(3, 114) = 4.32, p < .05$. In the final model (see Table 7), years of practice ($beta = .23, p < .05, 95\% \text{ CI } [.05, .31]$) made a significant unique contribution to the variance in empathy while the contributions of frequency of practice and length of session were non-significant. Sex also made a significant unique contribution, reflecting that females had higher mean levels of empathy ($M = 50.47, SD = 7.50$) than males ($M = 47.51, SD = 8.07$). Age, education, social desirability did not contribute significantly to the variance in empathy.

<<Insert Table 7 about here>>

Discussion

In the current study, meditators had significantly higher levels of mindful attention than non-meditators; however, the two groups did not differ significantly in relation to their levels of acceptance and non-judging. Thus, the first hypothesis was partially supported. Similarly, the second hypothesis, that mindfulness-related qualities (*brahmavihārā* and empathy) would be higher in meditators than non-meditators was only partially supported.

COMPONENTS AND PRACTICE OF MINDFULNESS

Specifically, the levels of empathy were significantly higher in meditators than non-meditators, but the two groups did not differ significantly on the PQT variables.

For meditators, all three practice factors (years of practice, frequency of practice and length of session) were found to be significantly correlated with mindful attention and empathy, but not with acceptance, non-judging, PQTS, or PQTO. As such, the third hypothesis was also partially supported. Based on those correlations, multiple regression analyses were only conducted concerning mindful attention and empathy. These analyses indicated that the frequency of practice and length of session explained significant proportions of the variance in mindful attention. Still, only years of practice explained a significant proportion of the variance in empathy. In the case of mindful attention, this might suggest an expectancy or placebo effect; that is, those who expect to experience results within a short time frame, get exactly what they expect. Empathy, alternately, may not be so malleable and thus may require a much longer time-frame for significant differences to become apparent.

Among the demographic variables, lower education achievement was a significant predictor of higher levels of mindful attention, while sex (female) was a significant predictor of higher levels of empathy. The latter was expected but the link with education is surprising with implications beyond the scope of the current study. On the face value, however, it suggests that paying attention to external factors (such as school or university work) may reduce levels of internal mindful attention. Further research is clearly needed to explore this more fully.

The finding that meditators have significantly higher levels of mindful attention than non-meditators is consistent with many previous findings (e.g., Brown and Ryan 2004; Basso et al. 2019; Carmody and Baer 2008; Lilja et al. 2013). Similarly, the lack of difference found between meditators and non-meditators concerning levels of acceptance and non-judging is

COMPONENTS AND PRACTICE OF MINDFULNESS

consistent with some previous findings (e.g., Hadash et al. 2016), although it is contradictory to others (e.g., Baer et al. 2006; Coffey et al. 2010; Grossman 2011).

These results can be better understood by noting the differences between 'mindful attention' and 'attention' as it is commonly understood. First, the former is paying attention consciously. There is a deliberateness and intentionality associated with mindful attention (e.g., Kuyken et al. 2010; Lilja et al. 2013; Van Dam et al. 2010). In contrast, the latter is the attention that may or may not be intentional. For example, an object or an internal experience such as thoughts, may 'grab' one's attention momentarily even though one may have no intention of doing so. The items in the CEDMI that measure mindful attention also highlight the aspect of intentionality. For example, the first item in the CEDMI is '*When I'm walking, I deliberately notice the sensations of my body Moving*'. Bhiku Bodhi (2011), describes mindful attention as advertence, which is defined by the Oxford English dictionary as intentionally paying attention as opposed to inadvertence which might describe attention as it is normally understood.

Second, the sole objective of paying 'mindful attention' is attending to the present-moment experience itself without any other goal. On the other hand, everyday 'attention' may or may not have a goal. Lastly, mindful attention is self-regulated and sustained (Bishop et al. 2004), unlike typical attention.

While it might be possible to argue that the differences between meditators and non-meditators in the current study are related to unmeasured differences such as pre-existing differences in personality or attitudes, this is considered unlikely; the two groups of participants, drawn from all over the world, did not differ significantly in any the demographic characteristics assessed. Nevertheless, it would be beneficial for future research to explore this possibility by examining a broader range of individual difference variables

COMPONENTS AND PRACTICE OF MINDFULNESS

concerning associations between trait mindfulness, mindfulness practice, and related qualities.

The findings from the present study are, however, consistent with Brown and Ryan's (2003) conclusion that the main component of mindfulness is the awareness of, and enhanced attention to, whatever one is experiencing inside and outside oneself in the present moment. They refer to this as "present-centred attention-awareness" (p. 824). Consistent with this, Baer et al. (2008) conceptualised mindfulness as a multi-dimensional construct, with mindful attention being more central than other facets. Hence, in Baer et al. 's (2008) conceptualisation, acceptance and non-judging may be considered peripheral facets of mindfulness. Brown and Ryan (2003) disagree on this point, positing that the acceptance component is redundant to overall mindfulness. Hence, the present findings, where neither acceptance nor non-judging was found to be higher in meditators than non-meditators, are more consistent with the conclusions of Brown and Ryan (2003) than Baer et al. (2006).

This perspective also fits with Quaglia et al. 's (2015) suggestion that Kabat-Zinn proposed his highly influential definition of mindfulness as 'non-judgmental attention' more to serve the purposes of practical instruction than as a precise definition. On this basis, Quaglia et al. (2015) argue that, while acceptance and non-judging may enhance mindfulness, they are not actually components of it. The view that mindfulness is just contemplating whatever is unfolding in the present and is not concerned with either accepting or rejecting whatever emerges from it has also been put forward by Mikulas (2011) and could be considered consistent with Bodhi's (2011) interpretation of traditional Buddhist teachings.. Consequently, the present finding that meditators and non-meditators do not differ in their levels of acceptance and non-judging could be considered further evidence supporting the conceptualisation of mindfulness as consisting solely of mindful attention.

COMPONENTS AND PRACTICE OF MINDFULNESS

If mindfulness is conceptualized as *not* incorporating acceptance and non-judging components, then the lack of difference between meditators and non-meditators concerning the mindfulness-related qualities (or *brahmavihārā*) investigated in the present study (except for empathy), may not be surprising. Despite other researchers finding that meditators have significantly higher levels of positive qualities towards self and others than non-meditators and that mindfulness practice, including Loving-Kindness Meditation (LKM) and Compassion Meditation (CM), increase kindness, compassion, and equanimity, if as suggested by Cavanagh et al. (2014), and Thompson et al. (2011), mindfulness and acceptance/non-judging are related but distinct constructs, the previously reported associations may only be evident for meditators who participate in acceptance-based interventions or related types of meditation such as LKM or CM (Hadash et al. 2016; Zeng et al. 2014). As with many other mindfulness meditation practices such as MBSR, the current study supports the notion that acceptance is not an automatic consequence of mindfulness practice; instead, it needs to be specifically cultivated through specific types of mindfulness practices. This possibility was not investigated in the present study; however, results do shed further light on the effects of mindfulness meditation due to the observed differences between meditators and non-meditators.

For non-meditators, the mindfulness component variables (attention, acceptance, and non-judging) correlated positively and significantly with Positive Qualities towards Self (PQTS) although they did not correlate with Positive Qualities towards Others (PQTO). A similar pattern of associations was evident for meditators; however, mindful attention was significantly associated with PQTO but not PQTS for this group. Similarly, attention was significantly and positively associated with empathy for meditators but not for non-meditators. Hence, it appears that, for non-meditators, the mindfulness components are

COMPONENTS AND PRACTICE OF MINDFULNESS

mostly unrelated to feelings towards, or empathy for, others; yet, for meditators, mindful attention is related to both of these variables.

An individual's capacity for experiencing empathy for another person may be enhanced by their level of mindful attention, which would be consistent with other studies that have found that the practice of mindfulness increased levels of empathy (e.g., Birnie et al. 2009; Greason and Cashwell 2009; Tan, Lo and Macrae 2014; Winning and Boag 2015). Given that meditators had significantly higher levels of mindful attention than non-meditators, this may be the mechanism through which meditators also have higher levels of empathy than non-meditators. Among the practice factors, only the years of practice made a significant contribution to the variance in empathy in the present study. Yet, as noted above, the type of mindfulness practice undertaken may be an important factor underpinning the associations found between trait mindfulness, mindfulness practice, and empathy. Further research is needed to investigate this.

In considering what is known regarding the effects of mindfulness practice, there is much evidence indicating that meditation increases attentional capacity (e.g., Basso et al. 2019; Brown and Ryan 2003; Carmody and Baer 2008; Elliot et al. 2014; Hölzel et al. 2011; Kozasa et al. 2012; Moore et al. 2012; Semple 2010; Tsai and Chou 2016). However, there are several findings that mindfulness practice, particularly MBSR or MBCT, do not improve attentional capacities (e.g. Lao et al. 2016). Less is known about the relative importance of different aspects of mindfulness practice for the cultivation of mindful attention. Studies by Soler et al. (2014) and Tortella-Feliu et al. (2018) found that both the number of years of practice and the frequency of practice were associated with higher levels of mindful attention, which is consistent with the correlation results in the present study. Similarly, the current regression findings are consistent with those from Chan (2003), who found that the frequency of practice was a better predictor of attention than the number of years of meditation practice.

COMPONENTS AND PRACTICE OF MINDFULNESS

Those studies did not, however, examine length of session. The importance of the length of session was demonstrated in the present study and also in a 2019 study by Pang and Ruch. They found that past meditators (i.e., those who practiced in the past but do not practice now) who had practiced for more than 10 minutes in a session, more than once a week, and for more than a year, scored higher on all facets of the FFMQ than those who had practiced less regularly in the past.

While past meditators were not included in the present study, only mindful attention was found to be significantly and positively associated with the three mindfulness practice factors assessed (years of practice, frequency of practice, and length of sessions). Further, the multiple regression results indicated that variance in mindful attention was explained by frequency of practice and the length of sessions (with the latter making the largest unique contribution), but not by years of practice. These results suggest that intensity of current practice is more important than years of practice, which is consistent with the findings of Carmody and Baer (2008) that time spent in formal home practice of meditation significantly related to all components of mindfulness. However, Pang and Ruch's (2019) finding that the FFMQ scores for past regular meditators were equivalent to the scores for current meditators, suggests that benefits of regular practice (at least weekly for at least 10 minutes) for at least a year, may have continuing benefit even after cessation of any practice. What is not clear from Pang and Ruch's (2019) findings is if such benefits can be maintained for many years without practice or if they will diminish over time.

Limitations and Future Research

The interpretation of findings from the present study are affected by an inability to examine the influence of the type of meditation undertaken by participants, with this being due to the broad range of meditation types reported (e.g., Zen, Vipassana, Art of Living, Isha, MBSR) across many small groups of participants. However, participants were asked to

COMPONENTS AND PRACTICE OF MINDFULNESS

identify themselves as 'meditators', if they practiced mindfulness meditation or any other form of meditation that incorporated mindfulness component. For this purpose, 'mindfulness' was defined in the questionnaire as 'paying attention to whatever is happening in the present moment inside and outside of oneself'. This, and past research affected by similar limitations, demonstrate clearly that our understanding of mindfulness would benefit from researchers collecting more detailed information to better capture and investigate the diversity of ways in which individuals practice mindfulness. To better understand the impact of meditation, future research could compare the results from this study with the effects of a specific type of meditation, e.g., MBSR in naive meditators.

It is also important that such research is conducted using a variety of trait mindfulness scales, besides CEDMI, to determine the robustness of the current findings. As the study is correlational, causality cannot be inferred. It is possible that those who are more mindful and attentive may meditate more intensely. Additionally, a longitudinal randomised-controlled study investigating key types of mediation and varying practice factors would do much to increase our understanding of the essential components of mindfulness and its diverse effects. As noted by Pang and Ruch (2019), such studies will need to address potential ceiling effects in measures of mindfulness and also determine how to measure mindfulness practice variables appropriately, starting with a move from the use of ordinal measurement (as in the present study) to more meaningfully analysable and interpretable data (e.g., exact numbers of years, days, minutes). Although the sample in the current study includes individuals from different parts of the world, further research is needed to establish cross-cultural generalisability of the study's findings.

An additional factor that should be noted when deciphering the findings is the possibility that differences in the understanding of mindfulness, meditation and associated

COMPONENTS AND PRACTICE OF MINDFULNESS

concepts may lead meditators and non-meditators to interpret and respond differently to mindfulness items (Baer et al. 2008). Similar differences in understanding may also exist between meditators who engage in different types of meditation practices. For example, while almost every mindfulness meditation practice focuses on attentional training, some practices additionally emphasise the cultivation of acceptance and non-judging. Consequently, there is a possibility that some participants may have responded in ways that have led to either the over or under-estimation of their levels of mindfulness and/or its components.

Such issues hamper our ability to address the question of whether mindfulness is best understood to be a trait, a state achieved through practice, or both. Differences between meditators and non-meditators may be better elucidated through the addition of second person reports or behavioural measures, such as mind-wandering and sustained attention. Such an approach may also help to overcome any limitations/confounds associated with self-reports, given that meditators and non-meditators may over or under-report some aspects of mindfulness to better reflect intentions rather than actual manifestations.

Conclusions

The present finding that meditators differed from non-meditators in relation to levels of mindful attention but not acceptance or non-judging, is consistent with the many Buddhist traditions of mindfulness. Specifically, the Buddhist literature, for example, the *Satipatthana Sutta*, describes mindfulness or 'right mindfulness' as paying attention to body, feelings, mind and the mind objects (Anālayo 2006) and training the mind to attend consistently to the present moment (Bodhi 1998). There is no reference to acceptance or non-judging in *Satipatthana Sutta*. Instead, mindfulness is typically deployed to identify the unwholesome qualities in oneself; not to accept them or judge them, but to replace with wholesome nurturing ones. The present findings are also consistent with how many Buddhist texts

COMPONENTS AND PRACTICE OF MINDFULNESS

describe the *brahmavihārā* as objects of meditation (Bodhi 1998). According to the noble eightfold path, to develop *Samadhi* or concentration, one can use *brahmavihārā* as objects to focus on (Bodhi 1998). *Brahmavihārā* and empathy can be developed through specific forms of meditation practice as extensions to mindfulness meditation (Anālayo 2015). For example, to cultivate loving-kindness, individuals are encouraged to practice loving-kindness meditation or *Metta Bhavana* (Pali). Therefore, this study's finding that the *brahmavihārā* were not significantly higher in meditators than non-meditators, although unexpected, is not inconsistent with how mindfulness is described by the Buddhist scholars, e.g. Bodhi (2011).

Furthermore, the findings of this study are also consistent with how mindfulness is typically portrayed by MBIs, being that practice is central to the cultivation of mindful attention. Specifically, the frequency of mindfulness practice and the average length of sessions, rather than how many years one has practiced, were found to explain levels of the mindful attention. Finally, we suggest that future research investigates more thoroughly the role of different types of meditation and practice factors on mindfulness and its related qualities.

Conflict of interest

The authors declare that they have no conflict of interest

Ethical standards

The manuscript does not contain clinical studies or patient data

COMPONENTS AND PRACTICE OF MINDFULNESS

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COMPONENTS AND PRACTICE OF MINDFULNESS

Table 1. Educational and employment details of the participants in the study

	All Participants (<i>N</i> = 241)	Meditators (<i>N</i> = 122)	Non- meditators (<i>N</i> = 119)	<i>t</i>	χ^2	<i>p</i>
Age						
<i>M</i> (<i>SD</i>)	40.34 (14.77)	40.68 (14.76)	39.98 (14.83)	0.37		.71
Range	18-81 years	18-81 years	19-81 years			
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)			
Sex						
Female	154 (63.9)	81 (66.4)	73 (61.3)		0.91	.34
Male	82 (34.0)	38 (25.2)	44 (37)			
Other	5 (2.1)	3 (2.5)	2 (1.6)			
Education						
Year 12 and less	28 (11.6)	15 (12.3)	12 (10)		11.35	.124
Technical education (certificate/diploma, trade certificate)	10 (4.1)	5 (4)	5 (4.2)			
Undergraduate university degree	82 (34.0)	34 (27.9)	48 (40.3)			
Postgraduate diploma or degree	101 (41.9)	58 (47.5)	44 (37)			
Doctoral degree	20 (8.3)	10 (8.2)	10 (8.4)			
Employment						
Employed full-time	91 (37.8)	49 (40.1)	60 (50.4)		9.92	.27
Employed part- time/casual	62 (25.7)	31 (10.7)	14 (11.8)			
Unemployed or other (e.g., home duties)	27 (11.2)	13 (10.7)	14 (11.8)			
Student	61 (25.3)	29 (23.8)	32 (26.9)			
Residence						
Asia	20 (8.3)	11 (9.0)	9 (7.5%)			
Australia	114 (47.3)	54 (44.3)	60 (50.4)			
Europe	52 (21.6)	26 (21.3)	26 (21.8)			
N. America	54 (22.4)	31 (25.4)	23 (19.3)			
Africa	1 (0.04)		1 (0.1%)			

COMPONENTS AND PRACTICE OF MINDFULNESS

Table 2. Descriptive statistics for key variables

	All participants (N = 241)	Meditators (N = 122)	Non-meditators (N = 119)	<i>t</i>	<i>p</i>	<i>d</i>
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>			
CEDMI						
Mindfulness total	3.52 (0.58)	3.57 (0.61)	3.47 (0.54)	1.44	.27	
Attention	3.27 (0.80)	3.51 (0.73)	3.03 (0.80)	4.80	<.001	0.63
Non-judging	3.42 (0.91)	3.37 (0.94)	3.48 (0.88)	-0.91	.37	
Acceptance	3.95 (1.04)	3.92 (1.03)	3.98 (1.07)	-0.41	.68	
SOFI						
PQTS	14.01 (3.70)	14.28 (3.51)	13.74 (3.87)	1.13	.26	
PQTO	15.84 (2.66)	15.92 (2.47)	15.76 (2.84)	0.45	.66	
TEQ						
Empathy	48.16 (7.77)	49.52 (7.49)	46.76 (7.83)	2.80	<.01	0.37
MC-SDS						
Social desirability	17.70 (5.43)	17.69 (5.92)	17.71 (4.89)	-0.04	.97	

Notes: CEDMI: Carolina Empirically Derived Mindfulness Inventory; SOFI: Self-Other Four Immeasurables; PQTS: Positive Qualities towards Self; PQTO: Positive Qualities towards Others; TEQ: Toronto Empathy Questionnaire; Marlowe-Crowne Social Desirability Scale

Table 3. Pearson product-moment correlations between different variables in non-meditators (*N* = 119)

Variable	1	2	3	4	5	6	7
1 Mindfulness	-						
2 Attention	.32**	-					
3 Acceptance	.83**	-.08	-				
4 Non-judging	.78**	-.21*	.70**	-			
5 Positive Qualities towards Self	.52**	.21*	.44**	.36**	-		
6 Positive Qualities towards Others	.13	.00	.07	.10	.36**	-	
7 Empathy	.19*	.11	.10	.11	.13	.37**	-

** $p < .001$, * $p < .05$ (2-tailed)

COMPONENTS AND PRACTICE OF MINDFULNESS

Table 4. Pearson product-moment correlations between different variables in meditators ($N = 122$)

Variable	1	2	3	4	5	6	7	8	9	10
1 Years of Practice	-									
2 Frequency of practice	.32**	-								
3 Length of session	.00	.10	-							
4 Mindfulness	.16	.18*	.15	-						
5 Attention	.22*	.27**	.29**	.37**	-					
6 Acceptance	.09	.10	.03	.83**	-.02	-				
7 Non-judging	.03	.04	.03	.83**	-.09	.70**	-			
8 Positive Qualities towards Self	.08	.14	.00	.36**	.12	.36**	.29**	-		
9 Positive Qualities towards Others	.05	.13	.02	.16	.28*	.08	.01	.40**	-	
10 Empathy	.19*	.18*	.17*	.20*	.30**	.05	.06	-.20*	.11*	-

** $p < .001$, * $p < .05$ (2-tailed)

Table 4a. Zero-order correlation between different variables in meditators ($N = 122$)

Variable	1	2	3	4	5	6	7
1 Sex	-						
2 Age	-.26**	-					
3 Education	-.02	.27**	-				
4 Social desirability	-.15	-.36**	.10	-			
5 Years of practice	.13	.40**	.21*	-.06	-		
6 Frequency of practice	.04	.25**	.14	.22*	.31*	-	
7 Length of session	-.14	.20*	.07	.07	.32**	.11	-

** $p < .001$, * $p < .05$ (2-tailed)

COMPONENTS AND PRACTICE OF MINDFULNESS

Table 5. Descriptive statistics for practice factors, length of practice, frequency of practice and length of each session

	<i>N</i> (%)	<i>M</i>	<i>SD</i>
Years of practice		3.11	3.57
Less than 1 year	35 (28.7)		
1 to 2 years	27 (22.1)		
2 to 3 years	16 (13.1)		
3 to 4 years	9 (7.4)		
4 to 5 years	3 (2.5)		
5 years or more	32 (26.2)		
Frequency of practice		3.57	1.86
Less than 1 time a week	27 (22.1)		
1 time a week	13 (10.7)		
2 times a week	17 (13.9)		
3 times a week	21 (17.2)		
4 times a week	16 (13.1)		
5 times or more a week	28 (23.0)		
Length of each session		2.90	1.25
Less than 5 minutes	17 (13.9)		
5 to 10 minutes	33 (27.0)		
10 to 20 minutes	34 (27.9)		
20 to 30 minutes	21 (17.2)		
30 minutes or more	17 (13.9)		

Table 6. Hierarchical multiple regression predicting mindful attention for each predictor variable

Predictor	Zero-order correlation (<i>r</i>)	β	<i>p</i>	<i>sr</i> ²
Age	.09	-.12	.58	-.01
Sex	-.10	-.05	.56	-.00
Education	-.25*	-.19	<.001	-.04
Social desirability	.16*	.06	.09	.00
Years of practice	.22*	.16	.07	.02
Frequency of practice	.27*	.25	<.05	.05
Length of session	.29*	.26	<.05	.06

** *p* < .001, **p* < .05 (2-tailed)

COMPONENTS AND PRACTICE OF MINDFULNESS

Table 7. Hierarchical multiple regression predicting mindful empathy for each predictor variable

Predictor	Zero-order correlation (r)	β	<i>p</i>	<i>sr</i> ²
Age	-.02	-.15	.18	-.01
Sex	.18*	-.21	.02	.04
Education	-.04*	-.09	.35	-.01
Social desirability	.09	.17	.09	.02
Years of practice	.19*	.23	.03	.03
Frequency of practice	.18*	.09	.32	.01
Length of session	.18*	.15	.11	.02

** *p* < .001, **p* < .05 (2-tailed)