

RESEARCH ARTICLE

Can Inner Peace be Improved by Mindfulness Training: A Randomized Controlled Trial

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Abstract

This article reports a randomized controlled trial to investigate whether mindfulness training can successfully improve inner peace in participants with no known mental disorder. Fifty-seven participants were randomized to either mindfulness training ($n=29$) or wait-list control ($n=28$). The experience sampling method was used to measure the fleeting momentary experience of inner peace in participants. In addition, we used an experimental approach to assessing ability to focus attention: the Meditation Breath Attention Score, as well as the self-report Five-Facet Mindfulness Questionnaire (FFMQ). Compared with the wait-list control group, mindfulness training led to an increase in scores of inner peace, Meditation Breath Attention Score and FFMQ, using analysis of repeated measures analysis of variance. Change in inner peace was not, however, mediated by changes in self-rated mindfulness (FFMQ) nor by increased attentional focus. The findings provide first evidence suggesting that using mindfulness training improves the participants' inner peace. The focus here was on the immediate effects and future studies need to use follow-up. © 2013 The Authors. Stress and Health published by John Wiley & Sons Ltd.

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Keywords

mindfulness; inner peace; ESM; randomized controlled trial

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Mindfulness has been called the 'heart' of Buddhist meditation (Kabat-Zinn, 2003; Thera, 1962), an essential tool to help identify the inner causes of suffering, the possibility of freedom from suffering and the means to realize such freedom (Wallace & Shapiro, 2006). Over the past 30 years, mindfulness has received a great deal of research attention within educational, health and psychiatric settings, because of its demonstrated links to psychological and physical health benefits (Baer, 2003; Keng, Smoski, & Robins, 2011). Mindfulness-based interventions, such as the mindfulness-based stress reduction (MBSR) (Kabat-Zinn, 1990) and mindfulness-based cognitive therapy (Barnhofer et al., 2009; Segal, Williams, & Teasdale, 2002), have been shown to be successful in alleviating a variety of types of suffering, including reducing pain (Kabat-Zinn, Lipworth, & Burney, 1985; Kabat-Zinn, Lipworth, Burney, & Sellers, 1987; Samuelson, Carmody, Kabat-Zinn, & Bratt, 2007), stress (Astin, 1997), depression (Segal et al., 2002) and anxiety (Delgado et al., 2010). Several studies also demonstrate the benefits of mindfulness-based practice in non-clinical samples. For example, mindfulness training has been shown to improve one's social relationships

(Bowen et al., 2006), produce increased positive affect, better immune system responses (Davidson et al., 2003) and better physiological responses to stress and negative emotions (Tang et al., 2009, 2007). Moreover, mindfulness meditation is associated with changes in grey matter concentration in brain regions involved in emotion regulation (Hölzel et al., 2011).

In Buddhism, inner peace is taught as the most important thing in our life. Gautama Buddha described nirvana as the ultimate goal (Mitchell, 2002). Nirvana is an ancient Sanskrit term used in Buddhism to describe the profound peace of mind that is acquired with liberation, which refers to a state of well-being that is not contingent on the presence of external or internal pleasurable stimuli (Mitchell, 2001). Moreover, in Taoist practice, achieving inner peace is the ultimate intention (Lee, Lin, Huang, & Fredrickson, 2013). Thus, the two important schools of ancient teaching that have influenced Chinese culture emphasize the importance of inner peace in life (Lee et al., 2013).

Mindfulness, described by Kabat-Zinn (2003, p145), is 'paying attention in a particular way: on purpose, in the present moment, and non-judgmentally', which involves consciously attending to one's moment-to-moment

experience (Brown & Ryan, 2003). There are several books that emphasize the relationship of mindfulness and peace (Nhat Hanh, 1992; Williams & Penman, 2011), and an earlier study with a sample of experienced meditators found that one of the primary intentions for engaging in meditation practice was inner peace (Shapiro, 1992). In one recent study, people with higher capacities for active inhibition were more able to act with awareness and had more peace of mind (Lee et al., 2013). However, whether mindfulness practices might ultimately increase an individual's inner peace in their everyday life has not been studied empirically.

Why do we suggest that inner peace might be improved through mindfulness meditation? One possibility is that mindfulness training teaches 'reperceiving', the ability to step away from the contents of consciousness and view one's moment-by-moment experience with greater clarity and objectivity (Shapiro, Carlson, Astin, & Freedman, 2006). Through mindfulness practice, a person learns to stand back and simply be aware of their personal narrative or life story, just like a mirror that reflects it, without being immersed or entangled in it. This brings about a profound shift in one's relationship to thoughts and emotions, the result being greater clarity, perspective, objectivity and ultimately equanimity (Shapiro et al., 2006). This process has been suggested to be associated with a perceptual shift where one's thoughts and feelings are recognized as events occurring in the broader field of awareness (Carmody, 2009). Consistent with this suggestion, studies have found functional and structural differences between meditators and non-meditators in the insula (Lazar et al., 2005; Lutz, Brefczynski-Lewis, Johnstone, & Davidson, 2008), which is known to be involved in interoceptive/visceral awareness (Critchley, Wiens, Rotshtein, Öhman, & Dolan, 2004) and has been postulated to play a key role in the process of awareness (Craig, 2009).

The second possibility for why mindfulness meditation may promote inner peace is *acceptance*, in which participants are invited to accept their physical sensations, emotional feelings and thoughts without judgement. Acceptance may represent emotional equanimity that comes with the letting go of a struggle to regain what is lost or being taken away (Prigerson & Maciejewski, 2008). One study using a phenomenological hermeneutical method to analyse interviews from persons 85 to 90 years old found that an important subtheme was 'feeling an inner peace (that) comes from an acceptance of oneself as one is, and one's life as it has been and as it is' (Nygren, Norberg, & Lundman, 2007), (p1067).

The third possibility is that mindfulness allows for 'a deep, penetrative non-conceptual seeing into the nature of mind and world' (Kabat-Zinn, 2003, p146), to learn and to recognize the impermanent nature of all phenomena experientially and phenomenologically, which is a fundamental insight of Buddhism (Nanamoli & Bodhi, 1995). Through mindfully attending to

negative phenomena, such as self-critical thinking (such as 'my life is worthless'), one learns that such emotions and thoughts need not be feared or avoided and that they eventually pass away (Segal et al., 2002). In addition, seeing clearly the transient nature of stimulus-driven pleasures, people learn to identify the sources of genuine well-being (Wallace & Shapiro, 2006). Inner peace is acquired as a side-effect of liberation from the sense of 'urgent need' to avoid the negative and to pursue the positive in a reactive way. It arises naturally alongside more considered and mindful responses to the actual contingencies of moment-to-moment living (Williams, Teasdale, Segal, & Kabat-Zinn, 2007). Consistent with this view, a recent study showed that increases in grey matter concentration within the left hippocampus were found only in mindfulness meditation (Hölzel et al., 2011). This study provided a neurophysiological mechanism that might underline the feeling of inner peace, since the hippocampus is known to be critically involved in emotional control (Corcoran, Desmond, Frey, & Maren, 2005; Milad et al., 2007).

In summary, we propose that inner peace would be improved by the increase of reperceiving, acceptance of physical sensations, feelings and thoughts and insight into the impermanent nature of all phenomena during the mindfulness meditation process. Therefore, change in these three factors should mediate the relationship between training and change in inner peace. However, given that there is no questionnaire or scale to measure these factors, we sought to examine whether inner peace may be improved by mindfulness training itself. The definition of mindfulness may partially reflect reperceiving and acceptance. Therefore, we propose that change in inner peace could be brought about by mindfulness training and that any change in inner peace would be partly mediated by change in self-rated mindfulness.

In this article, we report a study in which we investigated effects of mindfulness training on inner peace (sampled repeatedly during the day) in non-clinical people using a parallel, randomized controlled design. We compared the immediate effects of mindfulness training to wait-list control. We hypothesized that participants in the mindfulness training condition would show significant increases in inner peace and mindfulness, whereas no such changes were expected in the control group. To measure the fleeting momentary experience of inner peace in an ecologically valid and reliable manner, the experience sampling method (ESM) was used (Geschwind, Peeters, Drukker, van Os, & Wichers, 2011). ESM is a momentary assessment technique in which participants are prompted to report on their current experiences several times during the day. ESM is therefore ideally suited to investigate changes in people's emotional reactions to their daily environment (Csikszentmihalyi & Larson, 1987). To assess the extent to which mindfulness training increased the ability to focus attention, we chose to

use an experimental approach: the Meditation Breath Attention Task (Frewen, Evans, Maraj, Dozois, & Partridge, 2008). To assess dispositional mindfulness and changes in mindfulness, we used a mindfulness questionnaire, the Five-Facet Mindfulness Questionnaire (FFMQ) (Deng, Liu, Rodriguez, & Xia, 2011; Simpson *et al.*, 2007). Furthermore, mediation analysis was used to test whether changes in inner peace were mediated by changes in mindfulness.

Method

Participants

Participants were recruited through introductory lectures that were open both to students and the general public, hosted in the spring and fall semesters in several universities in Beijing. The theme of the lecture is 'Mindfulness: The way to reduce stress and improve well-being'. At the end of the lecture, we explained that this training was supported by a research project and all the participants were invited to participate. About 15% of audiences submitted the application form after the lectures. In total, we received 83 application forms. The participants who submitted applications were screened in a telephone interview, in which we introduced more details about the research and investigated their mental health state at the same time. Of this total, 18 did not participate. The rest were all enrolled in the present study.

Among the 65 participants (all Han Chinese), there were 51 university students and 14 non-students. All participants signed an informed consent form. They were randomized into the study, with 33 in the mindfulness training group (with eight non-students) and 32 in the wait-list control group (with six non-students). Eight participants dropped out before the post-training phase assessments, four from each group.

Characteristics of the two groups are summarized in Table I along with the results of *t*-tests for continuous variables and χ^2 -test for binary variables. The two groups were comparable in their sociodemographic characteristics, including age, gender distribution, their relationship status, years of education and employment. The difference between students and non-students was not significant for any of the variables.

Intervention (mindfulness training)

The mindfulness training was based on the protocol for mindfulness-based cognitive therapy (Segal *et al.*, 2002). However, some content that focused on depression and coping was not suitable for non-clinical people in the present study and was replaced with other meditation practices from MBSR (Kabat-Zinn, 1990), such as Yoga, and a whole day's mindfulness practice as in MBSR. The intervention emphasized being aware of what happened here and now, what occurred within the body and mind without judgment.

The intervention lasted for 8 weeks, involved 2.5 h of group sessions every week and 30 ~ 45 min homework exercises every day, combined with one full day's practice. Group sessions included guided mindfulness meditation and discussions. After group sessions, participants received audio recordings with guided practices and were assigned daily home practice exercises. Mindfulness training involved body scan, sitting meditation, walking meditation and yoga. The instructors had personal experience of mindfulness practice for more than 2 years.

Experience sampling method procedure

Experience sampling method is a momentary self-assessment method to assess the subjective experience of participants in their daily life. Usually, subjects were asked to describe their present experience by answering one or more brief questions several times a day over consecutive days. ESM provides repeated in-the-moment measurements of affect in a manner that is ecologically valid (Csikszentmihalyi & Larson, 1987; Peeters, Nicolson, Berkhof, Delespaul, & deVries, 2003). Compared with retrospective questionnaires and interviews, ESM reduces many of the potential biases inherent in other assessment methodologies (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004) and is generally considered the 'gold standard' (Csikszentmihalyi & Larson, 1987).

In the current study, to assess inner peace, we asked 'How peaceful do you feel now? Please answer with a number from very peaceful (0) to very un-peaceful (10)' to all participants by a cell phone message sender. Participants were asked to assess their current mood

Table I. Baseline demographic and characteristics per group

	Training group, M(SD)	Wait-list group, M(SD)	Test statistic	<i>p</i>
Age (years)	27.66(7.21)	26.21(6.38)	<i>t</i> = 0.80	ns
Gender (% male)	31.0	28.6	χ^2 = -0.04	ns
Education (%)	—	—	χ^2 = 0.37	ns
Undergraduate	48.3	46.4	—	—
Graduate	51.7	53.6	—	—

SD: standard deviation; ns: not significant.

and reply with a message once they saw the question on their cell phones. The cell phone message sender can send a message to 100 persons at the same time. This question was sent every 2 h from 8:00 to 20:00 h on five consecutive days, resulting in a maximum of 35 replies per person. In the present study, the scores were reversed so that a score of 10 represented very high inner peace.

Assessment of mindfulness

Self-rated mindfulness: Five-facet mindfulness questionnaire

Mindfulness levels were assessed by FFMQ. This measure was derived from an exploratory factor analysis of several previously developed mindfulness questionnaires (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The FFMQ is a five-factor, 39-item measure designed to assess mindfulness across five facets including observing, describing, acting with awareness, non-judging of inner experience and non-reactivity to inner experience (Simpson et al., 2007). Items are rated on a five-point scale ranging from 1 (never or very rarely true) to 5 (very often or always true). In the current study, we used the Chinese revised version of FFMQ (Deng et al., 2011). The internal consistencies of the subscales in the current study were total score, 0.83; observing, 0.76; describing, 0.86; acting with awareness, 0.87; non-judging of inner experience, 0.77 and non-reactivity to inner experience, 0.69.

Attentional focusing: Meditation breath attention score

Mindfulness as a process-ability was measured by the Meditation Breath Attention Score (MBAS), developed by Frewen et al. (2008). In brief, participants completed a mindfulness meditation exercise with instructions to sit upright and comfortably, to close their eyes and to pay attention to their breathing as a target of focused conscious experience for about 2 min. Then participants were led in the same sitting meditation for 15 min during which the experimenter rang a meditation bell every 3 min (i.e. at 3, 6, 9, 12 and 15 min during the meditation). At these times, participants were instructed to press a counter in their hand if their attention was focused on their breathing and to not press the counter if their attention had wandered. The experimenter recorded the number of times they had been focused on their breathing during the sitting meditation as a frequency score from 0 to 5. This experimental paradigm was to test the participants' mindfulness level as process ability (Frewen et al., 2008).

Procedure

Participants were recruited through introductory lectures in several universities in Beijing. Audiences submitted the application for training and research after the lectures. The participants who submitted

applications were screened in a telephone interview. After participants confirmed their participation in our research after the telephone interview, they were invited for assessment.

The assessment consisted of two parts. One part was inner peace measurement by ESM in the participants' everyday life. The other part of the assessment consisted of the self-report FFMQ and the MBAS administered individually in the laboratory.

Participants signed the agreement form when they visited our laboratory for the second part at pre-assessment. University students paid ¥200 (i.e. \$32) as a training fee, and non-students paid ¥400. (This fee was requested since pilot work showed that students tend to drop out of free courses. The arrangement in this study was that the fee would be repaid to participants at the end of the study). The self-report FFMQ and the MBAS were administered by research assistants. The research assistants did not enrol in the mindfulness training and were kept blind to the group assignment.

After the pre-assessment, participants were assigned randomly to the mindfulness or wait-list control condition by training assistants who were independent from the trial assessment and did not participate in administering any assessment. Randomization to the training condition was stratified according to age and sex. Participants were informed about their assignment by the training assistants.

The mindfulness group attended 8 weeks of mindfulness training, and the wait-list control group received no intervention. After the 8 weeks' mindfulness training or equivalent waiting time, all participants completed post-assessments. The wait-list control group attended mindfulness training after the post-assessments. Participants were compensated with their ¥200 (¥400 for non-students) being returned to them following these assessments.

The ethical approval of this study was obtained from Academic Committee of Department of Psychology, College of Education, Capital Normal University.

Statistical methods

We used the mean score of the messages returned to represent the degree of the participant's inner peace and changes in level of mindfulness as assessed by self-report on the FFMQ and performance on the MBAS. We calculated the validity of inner peace by examining correlations with FFMQ and MBAS. We tested the improvement of the participants' inner-peace and mindfulness level by repeated measures analyses of variance (ANOVAs) and *t*-tests.

Results

Participants who completed assessments attended an average of 6.14 [standard deviation (SD) = 1.51] classes in mindfulness training. Baseline and post-assessment

Table II. Five-Facet Mindfulness Questionnaire, Meditation Breath Attention Score and inner peace: means and standard deviations

	Training group, M(SD)		Wait-list group, M(SD)	
	Pre-assessment	Post-assessment	Pre-assessment	Post-assessment
FFMQ				
OB	25.24(5.46)	28.62(6.15)	24.25(4.93)	24.36(4.92)
DS	25.59(5.43)	28.38(5.19)	27.46(4.93)	27.71(4.81)
AAS	26.66(6.12)	29.48(5.74)	26.04(5.78)	25.82(4.68)
NJ	24.31(4.90)	27.97(5.52)	23.75(5.76)	23.61(4.14)
NR	19.93(4.63)	22.03(3.68)	18.39(2.85)	18.89(3.62)
T-FFMQ	122.25(15.60)	136.48(16.23)	119.89(12.81)	120.39(10.79)
MBAS	2.71(1.33)	3.24(1.39)	2.82(1.31)	2.50(1.48)
IP	6.39(1.23)	7.01(1.35)	6.18(1.45)	5.29(1.67)

SD: standard deviation; FFMQ: Five-Facet Mindfulness Questionnaire; OB: observing; DS: describing; AAS: acting with awareness; NJ: non-judging of inner experience; NR: non-reactivity to inner experience; T-FFMQ: the total score of FFMQ; MBAS: Meditation Breath Attention Score; IP: inner peace.

scores of variables used in the analyses, stratified by treatment group, are shown in Table II. There were no significant differences between groups at baseline. There were also no significant differences for any of the variables between student and non-student participants at baseline, nor at post-assessment, in either group. No known harms or unintended training effects were reported in either group.

Using Harman's single-factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), we took all variables in this study (inner peace, FFMQ and MBAS) into an exploratory factor analysis and examined the unrotated factor solution to determine the number of factors that were necessary to account for the variance in the variables. Results showed that there were three factors and that no factor could account for the majority of the covariance among the measures. From the results, we concluded that there were no common method biases in the study.

Correlations

Correlations at pre-assessment are presented in Table III and show that inner peace was significantly

positive correlated with mindfulness (FFMQ) total score ($r=0.31$, $p=0.022$), as well as the subscales acting with awareness ($r=0.43$, $p=0.001$) and non-judging of inner experience ($r=0.30$, $p=0.027$). Inner peace was also correlated with the MBAS ($r=0.37$, $p=0.006$).

Experience sampling method measures

Participants returned 3278 ESM inner peace reports in total (29 members in the mindfulness training group, 28 members in the control group). There were 3146 (96%) valid returns (i.e. replies within 1 h). Two participants did not reply to ESM in post-assessment, one in each group. On average, participants completed 28.6 (of 35, $SD=4.3$) valid replies in pre-assessment and 27.8 (of 35, $SD=5.2$) in post-assessment. No differences were found in the number of replies between the mindfulness training group and the wait-list control group at pre-assessment or post-assessment.

The mean score of the messages returned by each participant was taken to indicate the degree of that participant's inner peace at each assessment. A mixed

Table III. Correlations between variables (pre-assessment)

	IP	OB	DS	AAS	NJ	NR	T-FFMQ
OB	-0.06	—	—	—	—	—	—
DS	-0.07	0.18	—	—	—	—	—
AAS	0.43***	0.01	0.27*	—	—	—	—
NJ	0.23	-0.17	-0.01	0.46***	—	—	—
NR	0.30*	0.32*	0.06	0.16	0.04	—	—
T-FFMQ	0.31*	0.47**	0.56***	0.73***	0.50***	0.49***	—
MBAS	0.37**	0.23	0.04	0.35**	0.18	0.24	0.38**

IP: Inner-peace; OB: observing; DS: describing; AAS: acting with awareness; NJ: non-judging of inner experience; NR: non-reactivity to inner experience; T-FFMQ: the total score of Five-Facet Mindfulness Questionnaire; MBAS: Meditation Breath Attention Score.

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

2 (training versus wait-list) \times 2 (pre-assessment versus post-assessment) repeated measures ANOVA of inner peace with time as the within-subjects factor and group as the between-subjects factor yielded a significant time by treatment interaction, $F(1, 53) = 19.76$, $p = 0.000$, partial $\eta^2 = 0.27$. Given the significant interaction, a separate paired-samples t -tests were conducted for each group. Results of the paired-samples t -tests (pre-assessment versus post-assessment) showed that more inner peace was found in the mindfulness training group at post-assessment, $t(27) = 2.95$, $p = 0.007$, Cohen's $d = 0.48$, whereas a significantly less peaceful mind was found in the wait-list control group at post-assessment, $t(26) = -3.33$, $p = 0.003$, Cohen's $d = 0.57$. Results of independent t -test at post-assessment showed that the mindfulness training group showed more inner peace than the wait-list control group, $t(53) = 4.20$, $p < 0.001$, Cohen's $d = 1.15$.

Five-facet mindfulness questionnaire

Result of the 2 (training versus wait-list) \times 2 (pre-assessment versus post-assessment) repeated measures ANOVAs of FFMQ scores is shown in Table IV. We found significant interactions between group and time in all variables except for non-reactivity to inner experience. Separate paired-samples t -tests showed significant increase in all variables in the mindfulness training group and non-significant changes in the wait-list control group. Compared with the wait-list control group, the mindfulness training group had a significant increase in total scores on the FFMQ and in subscale scores of observing, describing, acting with awareness and non-judging of inner experience.

Meditation breath attention score

The 2 (training versus wait-list) \times 2 (pre-assessment versus post-assessment) repeated measures ANOVA of MBAS yielded a significant group by time interaction, $F(1, 51) = 4.06$, $p = 0.049$, partial $\eta^2 = 0.07$. No significant

difference was found in either the mindfulness training group or the wait-list control group through separate paired-samples t -tests (pre-assessment versus post-assessment) in each group. And independent t -test of the between-group difference at post-assessment showed a trend for more attentional focus in mindfulness training group than the wait-list control group. However, the difference was not significant, $t(51) = 1.87$, $p = 0.067$, Cohen's $d = 0.51$.

Mediation

According to mediation analysis developed by Baron and Kenny (1986), the mediating effect occurs as follows: (i) when the predictor significantly predicts the proposed mediator; (ii) when the predictor significantly predicts the dependent variable; and (iii) when the predictor and the mediator simultaneously predict the dependent variable, and the regression coefficient of the predictor is lower than in the second equation. Moreover, the Sobel test can be used to investigate whether the indirect effect is significant (Baron & Kenny, 1986). In order to see if the changes in inner peace were mediated by changes either in self-rated mindfulness (FFMQ) or in attentional focus (MBAS), we first examined the correlations between changes in these variables from pre-assessment to post-assessment (shown in Table V). There was no evidence that changes in inner peace correlated with changes in the total score or subscales of FFMQ; so no formal mediation analyses were conducted. There was a significant association between change in inner peace and change in attentional focus (D-MBAS; $r(49) = 0.28$; $p < 0.05$); so mediation analysis was used to investigate whether change in attentional focus mediated the correlation between group (mindfulness training versus wait-list control) and change in inner peace. Results showed that attentional focus did not significantly mediate change in inner peace (Sobel = 1.12; $p = 0.26$).

Table IV. The results of repeated measures analyses of variance and t -tests for Five-Facet Mindfulness Questionnaire

	$F_{\text{Interaction}}$	Partial η^2	t_{MT}	$d_{\text{Cohen's}}$	t_{CONTROL}	$d_{\text{Cohen's}}$
T-FFMQ	18.92***	0.26	5.67***	0.89	0.25	0.04
OB	8.67***	0.13	3.62***	0.58	0.18	0.02
DS	5.11*	0.09	3.31**	0.53	0.34	0.05
AAS	6.93*	0.11	3.21**	0.48	-0.29	-0.04
NJ	8.65**	0.14	3.48**	0.70	-0.19	-0.03
NR	2.80	0.05	2.59*	0.50	1.02	0.15

T-FFMQ: the total score of the Five-Facet Mindfulness Questionnaire; OB: observing; DS: describing; AAS: acting with awareness; NJ: non-judging of inner experience; NR: non-reactivity to inner experience.

$F_{\text{Interaction}}$ is the interaction of group by time using repeated measure analyses of variance.

t_{MT} is the separate t -tests between pre-assessment and post-assessment of mindfulness training group.

t_{CONTROL} is the t -tests between pre-assessment and post-assessment of wait-list control group.

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Table V. Correlations between *change scores (D)* in inner peace, *changes* in attentional focus on the breath (MBAS) and *changes* in self-rated mindfulness (FFMQ) and group (mindfulness versus control)

	D-IP	D-MBAS	D-FFMQ	D-OB	D-DS	D-AAS	D-NJ	D-NR
D-MBAS	0.28*	—	—	—	—	—	—	—
D-FFMQ	0.22	0.12	—	—	—	—	—	—
D-OB	0.10	0.09	0.67***	—	—	—	—	—
D-DS	0.09	−0.15	0.61***	0.50***	—	—	—	—
D-AAS	0.24	0.06	0.70***	0.27*	0.29*	—	—	—
D-NJ	0.15	0.22	0.65***	0.21	0.03	0.38**	—	—
D-NR	0.13	0.17	0.53***	0.11	0.13	0.25	0.32*	—
Group	0.52**	0.27*	0.51**	0.37**	0.29*	0.33*	0.37**	0.22

D-: changes from pre-assessment to post-assessments; OB: observing; DS: describing; AAS: acting with awareness; NJ: non-judging of inner experience; NR: non-reactivity to inner experience; FFMQ: Five-Facet Mindfulness Questionnaire; MBAS: Meditation Breath Attention Score; IP: inner peace.

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Discussion

The aim of this study was to conduct a randomized controlled trial to investigate whether mindfulness training can successfully improve inner peace in participants. Our results support the hypothesis that mindfulness training significantly enhanced the participants' experience of inner peace, compared with baseline and compared with the control group. Numerous research studies have found that mindfulness training can decrease suffering for patients (Brown & Ryan, 2003), and the present results showed that, for non-clinical participants, mindfulness training can improve inner peace during their daily life.

This is the first trial that has measured inner peace in an ecologically valid and reliable manner by using experience sampling. Inner peace (at pre-assessment) was positively correlated with the ability to focus on the breath (MBAS) and with total mindfulness (FFMQ), as well as the specific facets of 'acting with awareness' and 'non-reactivity'. The facet of non-reactivity to inner experience is close to reperiencing. Items in this facet include 'I watch my feelings without getting lost in them' and 'I "step back" and am aware of the thought or image without getting taken over by it'. The facet of acting with awareness refers to the ability to prevent oneself from being 'lost' in automatic pilot and so is also related to reperiencing to some extent. In addition, the MBAS assesses, through experiment rather than self-report, the ability to act with awareness and concentration. Therefore, the results showing that these variables are significantly correlated with inner peace suggest some convergent validity between these aspects of mindfulness and our experience sampling of inner peace.

Interestingly, inner peace was not significantly correlated with the FFMQ facet of 'observing', 'describing' and 'non-judging' in the present study. Observing facet includes items on observing,

attending to, rather than stepping back from sensations, thoughts and feelings. Describing includes items on describing, labelling with words. The two facets do not measure *stepping back* from the contents of consciousness, which may account for the non-significant correlation.

We proposed that acceptance was one factor contributing to inner peace. However, a non-significant correlation was found between 'non-judging of inner experience', which is close to acceptance, and inner peace. One possibility may be that this subscale assesses extent of non-judging of inner experience. It does not assess acceptance, although it is close to it (e.g. item 'I criticize myself for having irrational or inappropriate emotions', participants may not criticize themselves when they have irrational emotions. However, it does not mean that they accept themselves completely in such a situation). Therefore, a high score on this facet may not reflect high acceptance of inner experience, which may account for the non-significant correlation. Further research should examine the hypothesis that the way these particular items are phrased affects their success in measuring the underlying trait.

Several researchers have suggested that inner peace is a potentially important outcome of meditation training (Shapiro, 1992). However, it has never been assessed systematically. From repeated measures ANOVAs and *t*-tests, we found that, compared with a control group, the participants' inner peace was improved by mindfulness training. As we have discussed, maintaining inner peacefulness is closely associated with the mode of being that is pointed to in Buddhism and Taoism (Lee *et al.*, 2013; Mitchell, 2001). The present study provides the first empirical evidence that mindfulness meditation brings more inner peace in participants. Although results showed that degree of inner peace increased in the mindfulness training group, we also found that the degree of inner peace

in the control group decreased after 8 weeks. One possibility may be that a majority of the participants were university students, and most of the participants were entering mid-semester during which students had to face a series of examinations. If this is true, it gives more support for mindfulness training, since the majority of participants allocated to the mindfulness group were university students, too. Their inner peace increased even when facing the stress of mid-semester.

The results for FFMQ and MBAS showed that the mindfulness training had the predicted effect on core outcomes: the fact that mindfulness training changed self-rated mindfulness and attentional focus was reassuring. Compared with the wait-list control group, the mindfulness training group showed improvement in total score and four subscales of the FFMQ, except the subscale of non-judging of inner experience. MBAS was used to assess the effect of mindfulness on attentional focus and was found to be improved by mindfulness training. The study of Frewen et al. (2008) did not compare changes in MBAS with mindfulness training versus a control group. Our finding indicates that participants are able to maintain their attention more on the present after mindfulness training.

The present study also found that the MBAS was significantly correlated with the FFMQ total score and the acting with awareness subscale of FFMQ, which is similar to the study of Frewen et al. (2008). In their study, MBAS was significantly correlated with dispositional mindfulness measured by the Mindful Attention Awareness Scale and three subscales of the Kentucky Index of Mindfulness Skills (the fore runner to the FFMQ). Since 'describing' facet includes items on describing (labelling with words), it is not surprising that the correlation between it and the MBAS was not significant. The other non-significant correlation between observing ($r=0.23$), non-judging ($r=0.18$) and non-reactivity ($r=0.24$) may be due to the small sample size in present study ($n=57$).

In this study, we also found that change in inner peace was positively correlated with change in MBAS. However, the change of inner peace was not positively correlated with the change of FFMQ (Table V). The possible reason was that the correlation between inner peace and the score of FFMQ was small ($r=0.31$).

We found that changes in FFMQ and MBAS from pre-assessment to post-assessment did not mediate the changes in inner peace. One possibility for this non-significant mediation is that the sample size is small ($n=57$) in the present study. The other possibility is that change in FFMQ and MBAS is not the primary factor behind the improvement in inner peace. We suggest that reperceiving, acceptance and 'insight of impermanence' inherent in mindfulness training would promote inner peace. However, as we have discussed, the MBAS and FFMQ facets of acting

with awareness and non-reactivity are related to reperceiving to some extent. They do not assess reperceiving directly. The other facets of FFMQ do not assess reperceiving, acceptance or insight of impermanence. Therefore, it is not surprising to find that changes in FFMQ or MBAS did not mediate the changes in inner peace. A future study should develop scales to test reperceiving, acceptance and insight of impermanence specifically so that their possible role in mediation in relation to mindfulness training and inner peace could be studied more directly.

While the current study extends previous research by using a randomized controlled design and blind assessments, there are a number of limitations that need to be taken into account. Firstly, this study was carried out in an Asian context; so it is not possible to say if these results could also be found in a Western context. Another point about the sample is that only 15% of the lecture audience submitted an application after the introductory lecture. There was therefore a bias in the representativeness of the sample, since only the people interested in mindfulness applied to join the study. A second limitation is the inactive wait-list control group employed in the current study. We cannot exactly say whether the significant positive effects in the present study were caused by the mindfulness practice or just by the non-specific support provided by a weekly group. Ideally, the control group should be a support group without the other critical 'mindfulness' component. A third limitation of the study is that the main findings are based on self-reports, which are subject to biases. Ideally, these measures would have been complemented by observer-rated measures of peace, such as electroencephalography or cognitive function. However, we used multiple methods in this study. Experience sampling is well recognized as providing important, valid and reliable information that goes beyond self-report by questionnaire recorded at only one point in time, and the MBAS is an experimental measure. All measures in this study converged on the same conclusion, strengthening our confidence in them.

In conclusion, this small-scale randomized controlled trial comparing mindfulness training to control provides preliminary evidence suggesting that using mindfulness meditation can improve inner peace in non-clinical participants. The focus here was on immediate effects, and future studies need to not only replicate the current findings but also should use follow-up, as well as controlling for non-specific effects of the mindfulness training.

Conflict of interest

The authors have declared that they have no conflict of interest.

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