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Promoting Altruism Through Meditation: An 8-Week Randomized Controlled Pilot Study

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Abstract The purpose of this study was to investigate the effects of a Buddhist meditation intervention on empathy, perceived stress, mindfulness, self-compassion, and of particular interest, the dispositional tendency to feel empathic concern rather than personal distress when perceiving another as in need, termed altruistic orientation. Participants were randomly assigned to an intervention group (n=20) or a waiting list control group (n=22). Results indicated a trend towards increases in altruistic orientation in the intervention group—an increase that significantly correlated with meditation time, decreases in perceived stress, and increases in self-compassion and mindfulness. Additionally, compared to the controls, significant increases in mindfulness and self-compassion and a significant decrease in perceived stress were obtained for the intervention group.

Keywords Empathy · Altruism · Stress · Mindfulness · Self-compassion · Meditation

Introduction

A wide range of experiments have shown that the capacity for compassion and altruism exists in humans (Batson 2011), and it has also been observed in nonhuman primates (de Waal 2008). Altruism is defined as "a motivational state with the ultimate goal of increasing another's welfare" (Batson and Shaw 1991) and is linked to several beneficial interpersonal outcomes, such as decreased aggression (Harmon-Jones et al. 2004; Miller and Eisenberg 1988), improved attitudes towards stigmatized groups (Batson et al. 1997), and enhanced social closeness and decreased loneliness (Crocker and Carnevello 2008), and to an increased tendency to give during a "prisoner's dilemma" when the other already has defected (Batson and Ahmad 2001).

Because altruism has been shown to be associated with promising interpersonal benefits (for review, see Batson 2011), we argue that psychological interventions targeting such an ability are a worthy scientific goal. In this pilot study, we explore whether an intervention based on the Buddhist meditations of loving-kindness, compassion, empathic joy, and equanimity (i.e., the four immeasurables), as well as the practice of Tonglen, can develop the dispositional tendency to respond altruistically.

One of the well-established antecedents to altruistic motivation is *empathic concern* (EC) (Batson and Shaw 1991; Piliavin and Charng 1990; Schroeder et al. 1988). It is defined as "an other-oriented emotion elicited by and congruent with the perceived welfare of someone in need" (Batson 2011, p. 11) or "feelings of warmth, compassion, and sympathy that an observer has for an unfortunate other" (Davis 1983, p. 167)—definitions that closely overlap with the terms *compassion* (Goetz et al. 2010) and *sympathy* (Eiseberg and Eggum 2011). When a valued other is perceived to be in need, EC is elicited, bringing forth a motivational force aimed at reducing the perceived discrepancy between the actual state and the valued state of the other. This motivation to bring another to the valued appetitive state is termed "altruistic motivation" (Batson 2011).

EC is not to be conflated with the broader term *empathy* (Decety 2011). Whereas EC is an other-oriented response which entails feeling *for* the other (Batson 2011), empathy is most commonly defined as an automatic response stemming from the perception of an other's emotional state (Preston and de Waal 2002), which is similar to what the other person is feeling (Eisenberg and Eggum 2011).

Prior research shows that empathic arousal occurs when another is perceived to be in an aversive emotional situation

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(Bandura and Rosenthal 1966; Berger 1962). The arousal, however, is not in itself a sufficient basis for engaging in altruistic motivated behavior, but it may evolve into EC, personal distress (PD), or both (Eisenberg and Eggum 2011; Piliavin and Charng 1990). Emotion regulation is understood to be crucial for regulating and adapting the empathic response (Decety 2011) and preventing overarousal (associated with PD) (Eisenberg and Fabes 1992). Whereas EC is related to feelings of compassion, tenderness, and warmth felt for the other, PD is related to feelings of being alarmed, disturbed, and upset (Batson et al. 1987; Davis 1983).

It has also been shown that EC and PD exhibit distinct motivational consequences: EC promotes altruistic responding, whereas PD promotes self-focused efforts and alleviation of one's own distress rather than that of the other (Batson et al. 1987; Batson and Shaw 1991; Eisenberg et al. 1989; Piliavin and Charng 1990; Schroeder et al. 1988). Although EC and PD are two distinct emotional states with different motives, they have been shown to correlate moderately (r=0.52), as measured by the Interpersonal Reactivity Index (IRI; Davis 1983). Individuals experiencing high *general levels* of emotional reactivity may be prone to both high levels of PD and EC (Davis 1994). It is plausible, however, that a *high* dispositional level of EC paired with a *low* level of PD constitutes a specific altruistic disposition in contrast to being generally emotionally reactive. Measuring the difference between the two (EC minus PD) is a complementary approach which can tap the dispositional tendency to act altruistically as opposed to (1) merely being emotionally aroused or (2) engaging in self-focused efforts aimed at alleviating PD. This measured discrepancy (EC minus PD) is further referred to as "altruistic orientation."

Another important factor related to altruistic motivation is perspective taking (PT), defined as the ability to adopt the perspective of the other (Davis 1983). PT is thought to be associated with mental flexibility and cognitive top-down regulation of the default egocentric perspective (Decety and Jackson 2004). Adopting the perspective of another has been widely and successfully used to induce EC in laboratory settings from the classical experiment by Stotland (1969) and onwards and is understood to be an important way for coming to value other's thoughts and emotions (Batson 2011). PT has indeed been pinpointed as an effective strategy for reducing stereotyping and prejudice (Batson and Ahmad 2009) that seems to facilitate greater social connectedness and prevents perceived differences between the self and the out-group (Galinsky and Moskowitz 2000).

The use of mental imagery for putting oneself in the place of another has recently been highlighted as an effective way to cultivate altruism (Decety and Lamm 2011). By integrating motivation, attention, cognitive, and emotional aspects (Wallace and Shapiro 2006), meditation may offer a method by which such imagery can be utilized. Mindfulness-based interventions are mainly understood to target attention and emotional awareness and seem to be a valid approach for promoting empathy (Shapiro and Izett 2008). However, we argue that the four immeasurables which builds on mindfulness, but also involving an active affective/motivational engagement with an imagined other, is a more powerful and suitable method for developing EC and altruistic motivation.

The four immeasurables, also called the *brahma viharas* (Buddhagosa 1975), which consist of (1) *loving-kindness* (pali: *metta*), (2) *compassion* (*karuna*), (3) *empathetic joy* (*mudita*), and (4) *equanimity* (*upekkha*), are drawn from the Buddhist tradition. The first three (loving-kindness, compassion, and empathetic joy) are altruistic motivations applicable to contextual valence (baseline, aversive, and appetitive) in which another is perceived to be, and the fourth (equanimity) is concerned with valuing the other in his or her own right. Equanimity is aimed at reducing biases that hinder altruism, and it involves the wish that we may let go of liking, disliking, and indifference towards others so that our altruistic motivation may become unbiased and truly immeasurable (Patrul Rinpoche 1994).

The approach here is adopted from Chödron (2009) and McLeod (2001) and consists of (1) stabilizing attention by noticing the inflow and outflow of the breath for a period of time, followed by (2) imagining a valued other in a valenced condition (baseline, aversive, or appetitive) in front of oneself, (3) directing the corresponding altruistic motivation (e.g., compassion when the other is perceived in an aversive state) to the other, (4) practicing in a continuous moment-to-moment awareness of sensations/emotions correlated with directing such motivation, and (5) gradually expanding the practice by moving onwards from the highly valued other to a less and less valued other, maintaining the heartfelt altruistic motivation. A more detailed description regarding the intervention can be found in Safarzadeh and Wallmark (2011).

Mindfulness training promotes flexible emotion regulation (Chambers et al. 2009), such as an enhanced ability to regulate the empathic response and the default self-perspective (Decety and Jackson 2004). This potentially increases the tendency to experience EC rather than PD (Eisenberg and Eggum 2011) as well as adopt the perspective of the other (Decety 2011). Greater flexibility may consequently make way for valuing the other's welfare in his or her own right, rather than based on personal preferences of what the other may bring to the self (Batson 2011).

Even though studies investigating the effects of the four immeasurables are few, interest in the field is rapidly growing (Hofmann et al. 2011). In a recent experiment by Hutcherson et al. (2008), participants were instructed to first imagine two loved ones standing beside one's self, directing love to them by repeating words that bear the motivation of

loving-kindness. After 4 min, they were instructed to redirect and maintain loving-kindness towards a photograph of a neutral stranger. Results showed that just a total of 7 min of loving-kindness meditation done by the meditation-naïve participants significantly altered the social evaluative judgments for the neutral stranger on both implicit and explicit measures. This was furthermore generalized to other neutral strangers (not included in the meditation), but only on explicit levels. The procedure, in which one begins where the aspirations arise more naturally, followed by a gradual expansion, breaking down the barriers of learned preferences, is in line with how the practice is traditionally used (Wallace 2010).

Altering of emotional experiences through training in the four immeasurables has been specifically investigated by Fredrickson et al. (2008). In this study, participants underwent an 8-week loving-kindness meditation program involving a daily assessment of time spent meditating as well as measures of positive and negative emotions. Results showed an increase in daily experience of positive emotions after completing the study—changes that in turn were related to increases in mindful attention, self-acceptance, positive relations with others, and a good physical health. These changes were linked to increased satisfaction with life and reduced depressive symptoms.

In addition to the four immeasurables discussed above, the practice of *Tonglen* or "sending and taking" (Kyabgon 2007), traditionally included in the larger framework of *Lojong* "the seven-point mind training" (Chödron 1994), is considered a main practice aimed for the development of altruism (Dalai Lama and Cutler 1998). In Tonglen, one simultaneously combines the four immeasurables with mindfulness of breathing in one single method (McLeod 2001). By reducing our habitual tendencies to respond with aversion to other's distress and cling to our own happiness, Tonglen is regarded as promoting a radical shift in how we relate to experience, promoting altruism and insight (Chödron 1994; Kyabgon 2007; McLeod 2001).

To date there are no studies known to the authors investigating the effects of Tonglen. Pace et al. (2009), however, examined the effects of compassion meditation drawn from the practice of Lojong, but only in the context of altered stress responses and not related empathy or altruism. The 6-week program they adopted showed no reductions in stress response (as measured by plasma cortisol or interleukin-6 concentration) between meditation and control groups, but significant correlations were obtained between meditation practice time and reduced stress levels.

The primary purpose of this randomized controlled pilot study is to investigate the effects of this intervention on the dispositional tendency to feel EC rather than PD when perceiving another as in need, named altruistic orientation. A secondary purpose is to further examine the effects of the intervention on mindfulness, self-compassion, and perceived stress, factors thought to affect levels of empathic accuracy and concern for others' well-being (Shapiro and Izett 2008).

Based on previous studies, we expected that the intervention group (1) would increase their dispositional tendency to feel EC rather than PD as compared to controls, indicating an increased altruistic orientation from engaging in the program, and (2) would exhibit an increased tendency to adopt the perspective of others as compared to the controls, demonstrating an increased valuing of the other's perspective.

In line with prior research indicating differences between meditators and non-meditators in emotion regulation tendencies, such as decreased stress levels (Davidson et al. 2003), self-compassion (Neff 2003), and mindfulness (Chambers et al. 2009; Ortner et al. 2007), we expected (3) significant changes on these measures among those who completed the 8-week program as compared to those in the control condition and that (4) the amount of time participants spent practicing meditation during the 8 weeks would correlate with increases in EC and PT, mindfulness and self-compassion, as well as decreases in perceived stress and PD.

Method

Participants

Data for 42 participants were analyzed: 22 in the control group and 20 in the intervention group. The mean age of participants was 33.8 (intervention group: M=32, SD=11, range=22–57; control group: M=35, SD=15, range=22–69). In both groups, 86 % of the participants were women and the majority of the participants were well-educated (i.e., bachelor/master's degree). No significant differences were found between groups on demographic variables.

Participants were recruited from nonprofit organizations, a nearby sports center, and in the vicinity of Lund University in Sweden. The study was marketed as "an opportunity to learn meditation, get greater balance and harmony in everyday life" and referred to as "an introduction course in meditation" without mentioning keywords such as "empathy" or "altruism." Individuals who registered for the study (n=105) were subsequently screened for inclusion (see Fig. 1 flow diagram). This involved questions about drug and alcohol habits and whether applicants could participate during the intended period, spending approximately 30 min meditating per day.

Selected items from the Clinical Outcomes in Routine Evaluation (Evans et al. 2002) scale (0–3 scale) were used to

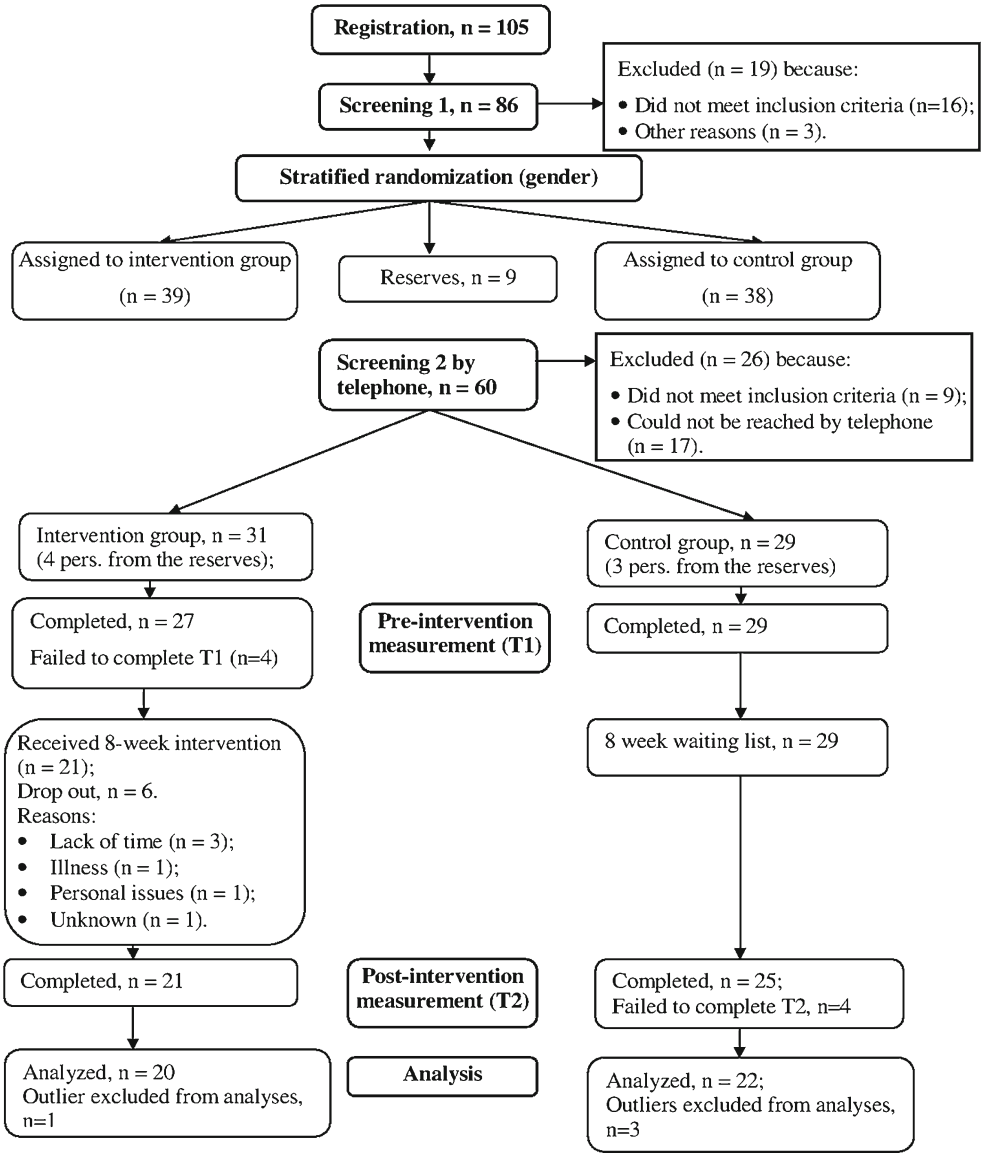

Fig. 1 Flowchart of participants through each stage of the study

gauge mental distress and/or somatic illness and pain. Applicants were disqualified for a rating of 3 (almost all the time) on items assessing generalized anxiety, panic anxiety, depression, and/or somatic illness/pain. For suicidal thoughts, self-injury, and positive psychotic symptoms, applicants were disqualified for a rating of 2 (sometimes) or above. Illicit drug use in the last 6 months was also exclusionary. Applicants were furthermore excluded if they had any prior meditation experience or more than 2 years of continuous practice of yoga, Tai Chi, or Qigong.

Design and Procedure

We conducted a randomized controlled experiment. The intervention was conducted one evening a week for 8 weeks, and it consisted of nine group sessions in a picturesque medieval meditation hall at the Swedish Church in Lund, Sweden. Due to practical factors, such as a lack of physical space, the meditators (n=20) were divided into two smaller groups (n=10 and 10) and two meditation sessions were conducted in successive order during the evenings.

Due to an overrepresentation of female applicants, participants were stratified by gender and randomly assigned to either the intervention or control group using the web-based tool *Research Randomizer* (Urbaniak and Plous 2011). Participants in the control condition were placed on a waiting list, receiving the same program after the study.

The length of each weekly session was 75 min and included (a) 30 min of lecture focused on the week's topic, (b) 10 min of mindful movements, (c) 20 min of meditation on the week's immeasurable, and (d) 15 min for question and answer. Each session began (with the exception of

sessions 1 and 9) with 5 min of "mindfulness of breathing" meditation and concluded with weekly homework assignments relating to the topic of the week (see Table 1). Homework assignments were designed to help participants incorporate the formal sitting meditation practice into everyday life.

All participants also received a handout at the end of each session summarizing the content. Participants also received an audio CD with guided meditations and were instructed to follow the CD for their meditation practice two or three times before doing them on their own.

The guided meditation of session 1 was based on the vipassana body scan meditation described by S.N. Goenka. The guided meditations of the four immeasurables and homework assignments (sessions 2 to 6) were based on Pema Chödrons audiobook "Perfect Just as You Are" (Chödron 2009). The guided meditations of Tonglen (sessions 7 and 8) were based on Pema Chödrons "Going To the Places That Scare You" (Chödron 2002). The program was conducted by the authors, Kousha Safarzadeh and Erik Wallmark, who both have significant personal familiarization and experience with the applied techniques.

Measures

The *IRI* (Davis 1983) taps four separate aspects of the global concept "empathy." The subscales are fantasy, PT, EC, and PD. Each subscale has seven items rated on a five-point scale from 0 (does not describe me well) to 4 (describes me very well). For the present study, the authors have chosen to exclude the subscale fantasy. The Swedish version of IRI is translated and validated by Cliffordson (2001) and shows acceptable alpha values ranging from 0.71 to 0.80. In this study, obtained alpha values were 0.83, 0.66, and 0.81 for PT, PD, and EC, respectively.

The *Perceived Stress Scale* (PSS; Cohen et al. 1983) is a 14-item measure designed to tap the degree to which situations in one's life are appraised as stressful. The items are rated on a five-point scale from 1 (never) to 5 (very often). The Swedish version is validated by Eskin and Parr (1996)

Table 1 Topic and content of each session

Session	Topic	Summary of content
1	Mindfulness	Meditation: mindfulness of breath and bodily sensations
		Lecture: introduction to sitting and laying down postures, the experience of moment-to-moment sensations
2	Receiving loving-kindness	Meditation: receiving love from others
		Lecture: definition of loving-kindness, coming to know one's ongoing emotional experience
3	Loving-kindness	Meditation: loving-kindness for self and others
		Lecture: contemplation over the common human desire for happiness, directing and expanding loving-kindness (seven-step expansion introduced)
4	Compassion	Meditation: compassion for self and others
		Lecture: contemplation over the common human desire to avoid suffering, developing courage to stay with painful experiences through non-judgmental observation and applying "on-the-spot" compassion
5	Empathetic joy	Meditation: joy with others and self
		Lecture: contentment in daily life, attention to sources of happiness, cultivating joy in one's own and other's good fortune, identifying and working with competitiveness and jealousy
6	Equanimity	Meditation: noticing liking, disliking, and indifference;
		Lecture: introducing the relative nature and impermanence of phenomena, noticing and letting go of judgments/opinions, likes/dislikes
7	Tonglen for oneself	Meditation: Tonglen, transforming self-directed shame and guilt into forgiveness and spaciousness
		Lecture: uniting the four immeasurables, seeing actions and their consequences, non-conceptual wisdom
8	Tonglen for others	Meditation: Tonglen for others in need
		Lecture: utilizing difficult emotions to promote altruism, helping through Tonglen when help is not possible
9	Closure[a]	Silent meditation session, concluded with how to continue the practice

[a] The session was included to enable collection of meditation time data from the intervention group

with an alpha value of 0.82. In this study, the alpha value was 0.85.

The *Self-Compassion Scale* (SCS; Neff 2003) is a 26-item measure with six subscales, tapping the construct of self-compassion. The subscales are self-kindness, self-judgment, common humanity, isolation, mindfulness, and overidentification. The internal consistency for the total 26-item SCS was found to be 0.92 (Neff 2003). The Swedish translation of SCS is being validated by Strömberg (2010, unpublished manuscript). Obtained alpha values in this study were 0.85 for self-kindness, 0.81 for self-judgment, 0.80 for common humanity, 0.80 for isolation, 0.64 for mindfulness, and 0.78 for overidentification.

The *Five-Facet Mindfulness Questionnaire* (FFMQ; Baer et al. 2006**)** is a 39-item scale designed to measure five factors of mindfulness: observing, describing, acting with awareness, non-judging, and non-reactivity. Items are rated on a five-point scale from 1 (never or very rarely true) to 5 (very often or always true). The subscales showed satisfactory alpha values ranging from 0.75 to 0.91 (Baer et al. 2006). Alpha coefficients for the Swedish version of the FFMQ total scale and its five subscales ranged from 0.80 to 0.92 (Lilja et al. 2010). In this study, the obtained alpha values were 0.82 for observing, 0.93 for describing, 0.88 for acting with awareness, 0.93 for non-judging, and 0.88 for non-reactivity.

Statistical Procedures

All data analyses were carried out using the Statistical Package for the Social Sciences (SPSS) version 19.0 (SPSS Inc., Chicago, IL, USA). Preliminary data checks were conducted to ensure that there was no violation of the assumptions of normality, homogeneity of variances, linearity, and homogeneity of regression slopes. A Levene's test, indicating that the group variances are not equal, was found to be significant for the *describe* facet of FFMQ ($p<0.02$). Because the largest variance was no more than four times the smallest, the analysis is most likely to be valid (Howell 2010). In this case, the largest variance was approximately twice the smallest, indicating that the violation was not severe.

Independent-samples t test was used to compare the pretest scores of all dependent variables for the intervention and control groups. Analysis of covariance (ANCOVA) was conducted to investigate the effect of the four immeasurables intervention on outcome measures of altruistic orientation, empathy, mindfulness, self-compassion, and stress, controlling for pretest differences on these measures in the intervention and control groups. Paired-samples t test (one-tailed) was used to assess changes within groups. Pre–post effect sizes (Cohen's d) were calculated using the formula suggested by Rosenthal (1984) for matched-pairs data ($d=t/\sqrt{df}$).

A Bonferroni correction was employed to control for multiple comparisons and to minimize the type I error rate in the absence of distinct hypotheses at the subscale level for the FFMQ and SCS. Only differences of $p<0.01$ were considered significant.

Results

Randomization Check

A t test for independent samples indicated that the intervention group scored significantly lower on self-kindness, t (40)=−2.03, $p<0.05$, $d=0.62$; PD, t (40)=2.18, $p<0.05$, $d=0.67$; and other-oriented tendency (EC−PD), t (40)=−2.51, $p<0.05$, $d=0.77$, as compared to the control group. No other significant differences (all other $p>0.10$) on dependent variables were found between groups.

Post-Intervention Difference in Altruistic-Oriented Tendency (EC−PD)

A one-way between-groups ANCOVA was used to explore the effect of the four immeasurables intervention on altruistic-oriented tendency (i.e., EC−PD). A small difference on post-intervention scores was obtained, showing a tendency ($p=0.10$) towards significance (see Table 2). Because of the significant differences between groups on pre-intervention scores, additional analyses were performed to assess changes within groups. A paired t test showed significant changes in altruistic-oriented tendency scores, t (19)=−3.16, $p=0.005$, $d=0.73$, for the intervention group. Cohen's d (0.73) indicated a large effect size. No significant within-groups change was found for the control group.

Post-Intervention Difference in Perceived Stress, Empathy, Mindfulness, and Self-Compassion

ANCOVA was also used to compare the effects of training in the four immeasurables on stress, empathy, mindfulness, and self-compassion. After adjusting for pre-intervention scores, significant differences were found between intervention and control groups on post-intervention scores for all measures except EC, PD and the FFMQ facet *non-judge* (see Table 2).

The intervention group reported significantly lower post-intervention scores on perceived stress as compared to the control group, F (1, 39)=8.17, $p=0.01$, $\eta^2=0.17$, indicating that the four immeasurables intervention contributes significantly to decreased levels of perceived stress.

Table 2 Means and standard deviations (in parentheses), correlations between pre vs post scores, Cohen's *d* for paired means, one-way ANCOVA, and effect sizes for all variables

Variable	Intervention group (n=20)				Control group (n=22)				ANCOVA		
	Pre	Post	r	d	Pre	Post	r	d	F	p	η^2
PSS	40.15 (6.39)	34.40 (5.57)	0.44	0.93	42.23 (8.84)	40.59 (8.27)	0.71	0.26	8.17	0.01	0.17
IRI											
EC	28.70 (4.04)	29.25 (4.33)	0.83	0.23	30.27 (2.76)	29.68 (3.54)	0.54	0.20	0.95	0.34	0.02
PT	25.80 (4.77)	27.20 (3.53)	0.82	0.52	25.91 (4.55)	25.68 (3.64)	0.72	0.07	4.88	0.03	0.11
PD	21.85 (3.75)	19.45 (4.89)	0.72	0.72	19.23 (4.02)	19.23 (3.26)	0.72	0.00	3.07	0.09	0.07
EC−PD	6.85 (6.32)	9.80 (7.12)	0.81	0.73	11.05 (4.41)	10.45 (4.18)	0.37 ns	0.12	2.71	0.10	0.07
FFMQ, total	121.6(20.70)	139.5(19.04)	0.52	0.94	120.77(25.77)	123.59(25.31)	0.86	0.21	10.46	0.001	0.21
Observe	25.40 (6.28)	28.43 (5.24)	0.74	0.90	25.18 (6.66)	26.18 (6.87)	0.93	0.40	8.15	0.01	0.17
Describe	27.55 (5.01)	30.85 (5.84)	0.65	0.73	29.18 (7.37)	29.73 (8.58)	0.93	0.17	4.73	0.04	0.11
Act with awareness	23.95 (5.86)	27.25 (6.07)	0.49	0.57	21.36 (6.81)	20.50 (5.95)	0.60	0.15	11.38	0.001	0.23
Non-judge	25.35 (6.96)	30.20 (6.62)	0.67	0.90	25.14 (8.72)	27.82 (8.14)	0.78	0.49	2.03	0.16	0.05
Non-reactivity	18.25 (5.21)	22.05 (3.62)	0.16 ns	0.67	18.68 (5.82)	19.36 (5.64)	0.81	0.20	5.70	0.02	0.13
SCS, total	72.50 (16.35)	88.20 (13.15)	0.63	1.24	80.95 (18.23)	80.32(18.38)	0.89	0.08	19.59	0.001	0.33
Self-kindness	13.95 (4.56)	17.25 (3.06)	0.52	0.86	16.64 (4.03)	16.68 (4.28)	0.83	0.02	5.71	0.02	0.13
Self-judgment	16.20 (3.93)	12.50 (4.06)	0.72	1.26	14.14 (4.63)	13.00 (4.43)	0.74	0.36	4.60	0.04	0.11
Common humanity	11.70 (3.69)	13.95 (2.70)	0.73	0.92	13.23 (3.57)	12.86 (3.41)	0.82	0.18	11.37	0.001	0.23
Isolation	11.62 (3.79)	9.52 (2.98)	0.71	0.78	11.59 (3.91)	12.00 (4.08)	0.83	0.18	12.00	0.001	0.24
Mindfulness	11.50 (2.31)	13.20 (2.50)	0.60	0.81	12.59 (3.19)	11.77 (3.05)	0.77	0.40	12.28	0.001	0.24
Overidentification	14.80 (2.86)	12.15 (2.52)	0.55	1.06	13.77 (3.48)	14.00 (3.12)	0.80	0.11	15.28	0.001	0.28

All other r values are significant at at least $p<0.05$

ns nonsignificant, *PSS* Perceived Stress Scale, *IRI* Interpersonal Reactivity Index, *EC−PD* empathic concern subscale minus personal distress subscale, *FFMQ* Five-Facet Mindfulness Questionnaire, *SCS* Self-Compassion Scale

Regarding post-intervention differences in empathy-related measures, a significant between-groups difference was found only on PT post-intervention scores, F (1, 39)= 4.88, p=0.03, η^2=0.11, while no significant post-intervention differences were found on either EC or PD. However, when scores on PD were inspected in both groups at the two time points, a notable decrease in scores was observed for the intervention group while scores for the control group remained almost unchanged. Additional analyses were thus performed to assess changes within groups. A paired t test showed significant changes in PD scores, t (19)=3.13, p=0.005, d=0.72, for the intervention group. Cohen's d (0.72) indicated a large effect size. No significant within-groups change was found for the control group.

Regarding post-intervention differences in mindfulness as measured by the FFMQ, the largest between-groups differences were found on the composite FFMQ post-intervention scores, F (1, 39)=10.46, p<0.001, η^2=0.21, and FFMQ facet *act with awareness*, F (1, 39)=11.38, p< 0.001, η^2=0.23, implying a significant increase in mindfulness for the intervention group.

Table 3 Pearson correlations between total meditation time and pre–post changes on all measures for the intervention group

Change in	Total meditation practice time	
	r	*p*
PSS	−0.47	0.04
IRI		
EC	0.31	0.18
PT	0.37	0.11
PD	−0.34	0.15
EC−PD	0.46	0.04
FFMQ, total	0.45	0.05
Observe	0.18	0.45
Describe	0.43	0.06
Act with awareness	0.38	0.10
Non-judge	0.31	0.19
Non-reactivity	0.41	0.07
SCS, total	0.22	0.35
Self-kindness	0.03	0.80
Self-judgment	−0.28	0.23
Common humanity	0.12	0.62
Isolation	−0.09	0.72
Mindfulness	0.50	0.03
Overidentification	−0.23	0.32

PSS Perceived Stress Scale, *IRI* Interpersonal Reactivity Index, *EC−PD* empathic concern subscale minus personal distress subscale, *FFMQ* Five-Facet Mindfulness Questionnaire, *SCS* Self-Compassion Scale

Regarding post-intervention differences in self-compassion, significant between-groups differences were found on all six subscales, with the largest differences obtained on the composite SCS, F (1, 39)=19.59, p<0.001, η^2=0.33, and its subscales: *overidentification*, F (1, 39)=15.28, p<0.001, η^2=0.28; *isolation*, F (1, 39)=12.00, p<0.001, η^2=0.24; and *common humanity*, F (1, 39)=11.37, p<0.001, η^2=0.23, indicating a higher degree of self-kindness, sense of common humanity, and a more balanced approach to one's own inner experiences for those who participated in the intervention as compared to those who did not.

Relationship Between Meditation Time and Pre–Post Changes

Table 3 shows the correlations between total meditation practice time and pre–post-intervention changes on all dependent variables. Total meditation time during the intervention period was significantly related to a decrease in perceived stress, r=−0.47, p=0.04, and an increase in the mindfulness composite scale, r=0.45, p=0.05. Furthermore, a moderate, significant association was found between meditation time and altruistic orientation, r=0.46, p=0.04, implying that meditation time tends to be important for the development of the dispositional tendency to feel EC rather than PD in situations of perceiving another as in need.

Table 4 Correlations between pre- and post-intervention change scores for four empathy measures and other measures concerning stress, mindfulness, and self-compassion for the intervention group

Change in	IRI			
	EC	PT	PD	EC−PD
PSS	0.19	−0.46**	0.52**	−0.31
FFMQ, total	0.41*	0.38*	−0.27	0.46**
Observe	0.05	0.25	−0.30	0.27
Describe	0.52**	0.26	−0.12	0.40*
Act with awareness	0.50**	0.05	−0.11	0.38*
Non-judge	0.14	0.25	−0.15	0.21
Non-reactivity	0.38*	0.62***	−0.29	0.46**
SCS, total	0.02	0.11	−0.47**	0.39*
Self-kindness	−0.08	0.03	−0.44**	0.31
Self-judgment	−0.12	−0.09	0.23	−0.26
Common humanity	0.11	0.12	−0.31	0.32
Isolation	0.20	0.35	0.25	−0.09
Mindfulness	0.21	0.37	−0.50**	0.53**
Overidentification	−0.01	−0.36	0.44*	−0.36

PSS Perceived Stress Scale, *IRI* Interpersonal Reactivity Index, *EC−PD* empathic concern and personal distress difference scores, *FFMQ* Five-Facet Mindfulness Questionnaire, *SCS* Self-Compassion Scale

*p<0.10; **p<0.05; ***p<0.01

Relationships Between Pre–Post Change Scores For Empathy-Related Measures and Other Variables

As shown in Table 4, associations between pre and post change scores between the IRI scales (including *altruistic orientation*) and other variables were observed. The increase in EC was found to be related to increases in the mindfulness facets *describe*, $r=0.52$, $p<0.05$, and *act with awareness*, $r=0.50$, $p<0.05$. Increases in PT showed a strong, significant positive correlation with changes in the mindfulness facet *non-reactivity*, $r=0.62$, $p<0.01$, and negative correlation with changes in perceived stress, $r=-0.46$, $p<0.05$. Decreases in PD showed a strong positive correlation to decreases in perceived stress, $r=0.52$, $p<0.05$, as well as a negative correlation with the composite SCS, $r=-0.47$, $p<0.05$. Furthermore, increases in non-reactivity, $r=0.46$, $p<0.05$, and mindfulness, both as measured by FFMQ, $r=0.46$, $p<0.05$, and by SCS, $r=0.53$, $p<0.05$, were all associated toward increases in altruistic orientation (EC−PD).

According to Cohen's (1988) conventions for the correlation coefficient that itself is a measure of effect size, $r=\pm0.50$ indicates a large effect size. Majority of the correlations were close or above the threshold for a large effect size, indicating importance of the examined relationships.

Discussion

Participants who engaged in the four immeasurables program showed very beneficial outcomes as compared to those who remained on the waiting list. They displayed increased levels of dispositional PT, self-compassion, and mindfulness and decreased levels of perceived stress. Engaging in the four immeasurables thus seems to facilitate the tendency for adopting the perspective of others, promote greater non-judgmental kindness towards oneself, viewing suffering as a common shared experience, and foster the relation to emotions with mindful attention rather than over-identifying.

Surprisingly, no significant changes were observed on dispositional EC and PD—the measures of main significance for altered altruistic orientation. A tendency towards significance was, however, obtained, and results of a paired *t* test (i.e., within-group changes from pre- to post-intervention) furthermore showed a significant change in altruistic orientation for the intervention group, whereas no change was observed for the control group. The significant change among meditation participants indicates that the intervention altered altruistic orientation for those engaging in the practice. Moreover, change in altruistic orientation among the intervention group exhibited a significant correlation with the amount of time spent practicing meditation during the intervention period. This important finding is in line with our predictions and indicates that it is the actual engaging in the meditations that cultivates altruism and not just attending the group sessions.

In line with Birnie et al. (2010) exploring the effects of 8-week mindfulness-based programs on empathy, we similarly obtained significant pre to post changes on dispositional PT, but not on dispositional EC, as measured with the IRI (Davis 1983). There are at least five likely explanations for these results. First, and perhaps the most plausible explanation, is the unfortunate pretest heterogeneity between the control and intervention groups on dispositional EC. Second, it may be that 8 weeks is too short of a time period for changes in dispositional EC. Third, it is also possible that there are construct validity issues concerning "compassion" as cultivated in meditation and "EC" as measured by the IRI scale. The latter concept is highly correlated with personality traits such as emotional reactivity, $r=0.52$ (Davis 1983, 1994), whereas compassion in its traditional context is expected to be associated with calmness, insight, and a natural inclination towards kindness (Dalai Lama and Cutler 1998; McLeod 2001). No association between changes in EC and self-compassion furthermore point to the need for additional definitional clarifications in the field. Fourth, it may be that meditation on the four immeasurables does not alter dispositional EC—a possible but highly unlikely alternative. A fifth more plausible explanation may be that EC is cultivated in the four immeasurables through activating the "valuing the other path" via PT (Batson 2011) which thus may exhibit a "delay effect" (as observed in Batson et al. 1997)—from enhanced tendency to adopt the perspective of others to the increased tendency to feel EC. A follow-up measure on participant's levels of EC could investigate such hypothesis.

Interestingly, changes in PT in the intervention group were significantly related to increases in the mindfulness (FFMQ) facet *non-reactivity*. In line with Decety and Lamm's (2011) assertion that facilitated inhibition (of the self-perspective) enhances the ability to adopt the perspective of another, self-regulation may hence be a pathway by which mindfulness skills promote PT. As noted above, increased PT has important interpersonal implications such as reducing prejudice (Batson and Ahmad 2009) and promoting greater social connectedness (Galinsky and Moskowitz 2000). Consequently, meditations on the four immeasurables seem to be viable approaches for increasing the tendency to adopt the perspective of others.

Although dispositional PD showed no significant between-groups differences, a paired-samples *t* test showed a significant *change* between pretest and posttest scores for the intervention group, whereas no significant change was obtained for the controls. This result is not clear-cut, but it may indicate that engaging in the meditations of the four immeasurables decreases PD. Decreased levels of PD in the

intervention group were most notably associated with increases in self-compassion. This implies that self-compassion reduces the tendency for feeling alarmed, disturbed, and upset when facing other's distress, reducing self-focused efforts to alleviate one's own distress rather than the other's distress. This finding is furthermore in line with studies indicating that self-compassion is positively linked to mental health (Neff 2003) and inversely linked to psychopathology (Van Dam et al. 2011).

Significant differences between groups on post-intervention scores for all six self-compassion subscales were found in this study. This result implies a higher degree of self-kindness, sense of common humanity, and a more balanced approach to one's own inner experiences. Meditation time was, however, surprisingly not related to self-compassion, except for the mindfulness subscale—possibly due to the relatively small sample size.

A central theme in the four immeasurables training as adopted here (Chödron 2009) was to let go of "the storyline"—that is, to let go of thought content and returning to ongoing moment-to-moment direct experience and notice the emotional effect of engaging in the practice. The four immeasurables entail mindfulness (Hofmann et al. 2011). As expected, significant changes in mindfulness for the intervention group were found, confirming previous studies on the effects of mindfulness-based interventions (e.g., Baer 2003; Davidson et al. 2003). Decreased levels of stress were also obtained here for those participating in the intervention. Thus, this study makes an important contribution by showing that the meditations of the four immeasurables cultivate stress-reducing effects, though this was not explicitly emphasized. Time spent practicing the four immeasurables was furthermore correlated with both reduced perceived stress as well as increased mindfulness. The finding that the amount of meditative experience is related to the degree of mindfulness is in line with the findings by Lykins and Baer (2009).

Limitations of the Present Study

Although EC, as measured by the IRI (Davis 1983), has been linked to helping and experiences of EC (Davis 1994), the relationship between IRI and altruistic motivation is not clear (Batson 2011). Batson et al. (1986), for example, showed that correlations between EC (as measured with the IRI) and helping vanished when participants were in an easy-escape condition as compared to a difficult-escape condition, indicating an egoistic motivation for viewing oneself as altruistic rather than an actual desire to increase the other's welfare may be in play. There is ambiguous evidence for correlations between IRI (Davis 1983) scores and neuroimaging data investigating empathic activation (Decety and Lamm 2011).

A second limitation in this study is the small sample size, which can lead to attenuated statistical power and an increased risk of type II error. However, large effect sizes indicate noteworthy changes in many studied outcomes for those who completed the intervention as well as in the importance of the studied relationships. The small sample size may explain why the random assignment procedure failed to yield more homogenous groups. Also, participants in this study were recruited using convenience sampling. All individuals were well-educated and strictly screened for pathology and substance abuse. They were also highly motivated to participate in meditation practice. Generalization of the findings is thus limited, warranting further investigation.

Conclusions and Future Directions

Meditation may offer a powerful source for human development. This study presents a number of significant and important effects of engaging in the Buddhist meditations of loving-kindness, compassion, joy, and equanimity, as well as the practice of Tonglen ("taking and sending"). The findings suggest that engaging in the meditations facilitates the tendency for adopting the perspective of others, promotes non-judgmental kindness towards oneself, helps view suffering as a common shared experience, and fosters relations to emotions with mindful attention rather than over-identifying with them. This study further contributes to extant findings showing that not only mindfulness- and relaxation-focused interventions (e.g. Baer 2003) but also meditations based on the four immeasurables contribute to decreased levels of perceived stress. Prominent increases in mindfulness and self-compassion suggest that these meditations also lead to improved emotional regulation strategies entailing a balanced awareness with one's ongoing emotional experience, without the need to either suppress or express it (Neff 2003).

Training the mind through meditation offers an exciting new path of inquiry in psychology, and the field is currently only in its infancy. This study introduced the meditations of the four immeasurables as a promising approach for the cultivation of compassion and interpersonal kindness. This may go beyond individuals and have practical applications for professional clinical psychologists. Grepmair et al. (2007), for example, showed that psychotherapists who engaged in mindfulness meditation were more successful in therapy as compared to non-meditators. Patients of meditating therapists showed a significant decrease in symptom severity and rated their therapist significantly higher on clarification and problem-solving skills as compared to patients treated by non-meditating therapists. Further studies with more rigorous and multifaceted methods are required for a deeper exploration of this new and promising approach.

Batson (2011) offers in his "empathy-induced altruism hypothesis" (EAH) an intriguing model where altruistic

motivation mainly emerges from the antecedents (1) perceiving the other as in need and (2) valuing the other's welfare. Further studies may investigate the four immeasurables in the experimental paradigm of EAH and especially whether the four immeasurables can alter valuing other's welfare. If this is so, the four immeasurables may be a uniquely powerful method, utilizing focused attentional resources for coming to cherish others' subjective experience of life.

Altruism research has, to date, mainly been concerned with aversive states such as when perceiving another as in need. Life is, however, in constant flux, entailing all sorts of valenced conditions. We, therefore, encourage further investigation of altruism also in the context of perceiving others in neutral and appetitive conditions.

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