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ORIGINAL PAPER

Heart of Joy: a Randomized Controlled Trail Evaluating the Effect of an Appreciative Joy Meditation Training on Subjective Well-Being and Attitudes

Xianglong Zeng[1] · Rong Wang[2,3] · Tian P. S. Oei[4,5] · Freedom Y. K. Leung[6,7]

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Abstract

Many studies support the beneficial effects of the "four immeasurable meditations" (FIM) that originate from Buddhism, but most psychological interventions adopt FIM that cultivate loving-kindness and compassion. The current study developed and evaluated a 4-week training program named "Heart of Joy" (HOJ) that is based on FIM that cultivate appreciative joy. Participants were randomly assigned to HOJ training ($n = 59$) or a wait-list condition ($n = 42$), and the final sample consisted of 41 participants in each condition. Satisfaction with life, appreciative joy, envy, emotions, and attitudes toward oneself and others were measured at pre-training, at post-training, and at a 1-month follow-up. The time × condition (M)ANOVA showed that HOJ participants had significantly higher low-arousal positive emotions and lower high-arousal and low-arousal negative emotions at both the post-training and follow-up assessments, as well as higher medium-arousal positive emotions at the post-training assessment only. HOJ participants also reported significantly higher life satisfaction at both the post-training and follow-up assessments and significantly lower envy at the follow-up assessment. The results had a medium effect size (Cohen's d values ranging from 0.52 to 0.69). Appreciative joy, all attitudes, high-arousal positive emotions, and medium-arousal negative emotions did not show significant results. Further investigations revealed that changes in appreciative joy were more closely associated with changes in high-arousal than low-arousal positive emotions, and changes in envy were more closely associated with changes in attitudes toward oneself than attitudes toward others; this outcome indicates that appreciative joy and envy were impacted during this intervention. This study suggests that HOJ is a promising training program to improve subjective well-being and envy, and the implications for research were discussed.

Keywords Appreciative joy · Sympathetic joy · Loving-kindness meditation · Buddhism · Envy

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✉ Freedom Y. K. Leung
fykleung@psy.cuhk.edu.hk

[1] Beijing Key Laboratory of Applied Experimental Psychology, National Demonstration Center for Experimental Psychology Education (Beijing Normal University), Faculty of Psychology, Beijing Normal University, Beijing, China

[2] College of Management, Shenzhen University, Shenzhen, People's Republic of China

[3] Beijing Key Laboratory of Applied Experimental Psychology, Faculty of Psychology, Beijing Normal University, Beijing, People's Republic of China

[4] School of Psychology, University of Queensland, Brisbane, QLD, Australia

[5] Department of Psychology, James Cook University Singapore, Singapore, Singapore

[6] Department of Psychology, The Chinese University of Hong Kong, HKSAR, People's Republic of China

[7] Shaw College, Chinese University of Hong Kong, Shatin, Hong Kong

Introduction

Buddhism cultivates four pro-social attitudes called the "four immeasurables": (a) loving-kindness, which represents unselfish friendliness; (b) compassion, which represents a willingness to cease the suffering of the distressed; (c) appreciative joy, which represents feeling happiness for people with success, good fortune, or happiness; and (d) equanimity, which represents calmness toward the fates of others based on wisdom (Kraus and Sears 2009; Zeng et al. 2015a). The purpose of cultivating each of the four immeasurables is to counter their opposites (Kraus and Sears 2009). For example, appreciative joy refers to feeling happy for others when seeing others' goodness; thus, its opposite is envy, which is a feeling of aversion in response to seeing others' superiority (Smith et al. 1999; Sujiva 2007). Some Buddhists have also noted that the four immeasurables are accompanied by positive emotions, which is another indication of how cultivating the four immeasurables benefits one's subjective well-being (Zeng et al. 2013). The four immeasurables are widely practiced by Buddhists and have been integrated as a part of Eastern culture. As an example, based on the concept of appreciative joy, people sometimes comment "appreciative joy and admiration" (Suixi Zantan) in online social networks in response to the achievements of others (see Zeng et al. 2017d).

In Buddhism, the four immeasurables are systematically cultivated by the so-called four immeasurable meditations (FIM), with each subtype of the FIM cultivating one specific attitude (Zeng et al. 2017a). Briefly, the FIM can be considered to be repeated blessings for imagined targets: the loving-kindness meditation calls for imagining a person with a neutral or peaceful smile and blessings with phrases such as "may you be happy"; the compassion meditation calls for imagining a suffering person and wishing them well with phrases such as "may you be free from suffering"; the appreciative joy meditation (AJM) calls for imagining a person with success, happiness, good fortune, or good virtues and wishing for him or her to gain more and to not lose what he or she has using phrases such as "I wish for you to not lose what you have gained and to be happy like this every day"; and the equanimity meditation involves imagining various fates and cultivating a calm attitude with Buddhist wisdom, though this is not further illustrated here (Zeng et al. 2017a).

The number of empirical studies on the effects of the FIM has increased sharply in recent years (see Galante et al. 2014). One branch of research is concerned with the effects of the FIM on subjective well-being, which is defined in psychology as a higher satisfaction with life, a greater number of positive emotions, and a lower number of negative emotions (Diener et al. 2003). A series of studies have shown the effects of the FIM on the generation of positive emotions (see Zeng et al. 2015a for review), but evidence of a decrease in negative emotions is inconsistent even with the same protocol (e.g., Fredrickson et al. 2008; Kok et al. 2013). Moreover, Buddhism advocates a peaceful rather than an excited mind, and it is believed that the FIM are likely to generate peaceful positive emotions (Kearney et al. 2014). This belief has been supported by some studies (e.g., Kearney et al. 2014), but debates and opposing findings also exist (Lumma et al. 2015; Koopmann-Holm et al. 2013). For satisfaction with life, the effects were also inconsistent across studies. Some studies found that FIM trainings successfully enhanced satisfaction with life (e.g., Bluth et al. 2016; Fredrickson et al. 2008), while other studies reported no significant effects (e.g., Uchino et al. 2016; Weytens et al. 2014). Another line of research has investigated attitudes toward others and oneself. Studies have reported that FIM training enhanced compassion and helping behaviors in simulated settings (e.g., Condon et al. 2013; Leiberg et al. 2011), and another study found that participation in several FIM trainings enhanced compassionate attitudes toward oneself (Neff and Germer 2013; Shahar et al. 2015). Additionally, FIM trainings have been preliminarily used for improving clinical or subclinical symptoms (see Shonin et al. 2015 for review).

One issue with previous psychological research on the FIM is that the four subtypes of the FIM in Buddhism have been combined, but recent experiments in laboratory settings have shown that different subtypes of the FIM have different effects, which indicates the necessity of distinguishing those subtypes (Zeng et al. 2017a). Specifically, it was noted that most of the trainings reported in previous empirical studies were based on loving-kindness meditation, compassion meditation, or an integration of all four types of FIM, but none were focused purely on AJM (Zeng et al. 2017a). One previous study showed that AJM generated more feelings of happiness than compassion meditation, which implies that AJM might be quite efficient at generating positive emotions (Zeng et al. 2017a). Considering that AJM involves imagining or recalling positive experiences related to oneself and others, AJM training might enhance one's awareness of positive aspects of life and thus enhance one's satisfaction with life. Furthermore, Buddhists claim that the purpose of cultivating appreciative joy is to counter envy (Sujiva 2007), which highlights the necessity of evaluating the potential unique effects of AJM training. It is also notable that no previous study, as far as we know, has evaluated the effects of FIM trainings on appreciative joy and envy.

In the present study, we investigated the effectiveness of the "Heart of Joy" (HOJ), a training program based on AJM, using a randomized controlled trial with a wait-list control group. Appreciative joy, envy, satisfaction with life, and positive emotions were selected as primary outcomes. The primary hypotheses were that when compared with the control group, the training group would show (a) significantly higher appreciative joy and lower envy, (b) significantly higher overall satisfaction with life, and (c) significantly higher medium-

and low-arousal positive emotions. Additionally, negative emotions and attitudes in general were explored as secondary outcomes, and donation behavior was used as an additional behavioral measurement. It was hypothesized that the training group would show improved attitudes in general along with increased donation behaviors.

Method

Participants

A total of 101 participants (mean age = 27.55, SD = 10.11, 71 females) completed pre-training assessments. They included 58 participants from mainland China, 41 from Hong Kong, and 2 from Taiwan; there were 38 undergraduate students, 27 graduate students, 23 university staff members, and 13 people not associated with a university. As seen in Fig. 1, these participants were randomly assigned to the AJM group ($n = 59$) or the wait-list control group ($n = 42$) in a 3:2 ratio. This 3:2 ratio was adopted to compensate for the potentially higher dropout rate in the training group; it also allowed for the exploration of data within the training group. This ratio has also been used in previous studies on the FIM (e.g., Shahar et al. 2015). In the AJM group, eight participants dropped out before the training program due to time conflicts, and 10 participants dropped out after attending the first session. A total of 41 participants returned for post-training measures and 40 returned for follow-up measures. In the control group, 41 participants returned for post-training measures and 35 returned for follow-up measures. In sum, the attrition rates were 30.5% in the training group and 19.8% in total. Fourteen of the 82 participants who completed the post-training measures reported previous experience in meditation, but none of them practiced the FIM. A power analysis was not conducted, and the research group recruited as many participants as possible with the available resources.

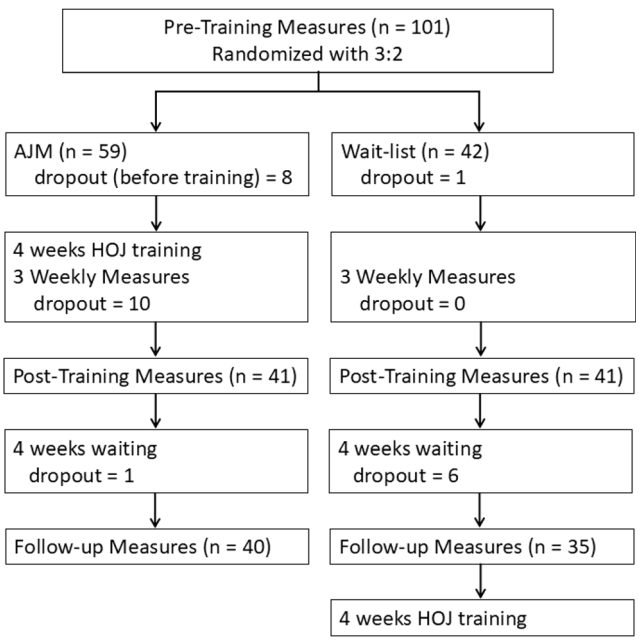

Fig. 1 Flowchart of the study

Procedure

The participants were recruited from one university in Hong Kong and one university in mainland China, and they received training at different times and in different places. The HOJ program was described as "a positive psychology meditation training that enhances the well-being of healthy people" and was advertised through mass e-mails and posters. The inclusion criteria were the ability to speak and understand Chinese (Mandarin) and having no self-reported current or previous mental disorders. Volunteers enrolled via an online system, where the project introduction and consent form were presented to them.

Participants completed pre-training measures online 1 week before the training and were then randomly assigned into the HOJ training group or the control group by a computer-generated randomizer. Participants in both groups completed assessments at the end of each week during the training period, post-training, and at a 1-month follow-up. Due to ethical considerations, participants in the control group received the same training after completing all of the assessments. Consent forms were collected during the first session, and token payments of 100 RMB/HKD were paid at the end of the follow-up session.

The HOJ program was designed and delivered by the first author of present article, who has 7 years of meditation experience (e.g., attendance at meditation retreats), including 3 years of daily FIM practice. The program consisted of four weekly group sessions that included meditation practice, didactic teachings, and group discussions. Each session lasted 90 min, and each group included 6 to 14 participants. The topics during the 4 weeks were appreciative joy for friends, for oneself, for strangers, and for disliked people (see Table 1). Participants were asked to practice AJM at home at least 5 days per week by following a recorded script that lasted from 12 to 15 min. The meditation practice sessions were iterative; that is, the AJM for friends and oneself were also practiced in later weeks. All meditation practices in the weekly sessions and practices at home were AJM. The only exception is that in the first weekly group session, two 5-min breathing meditation practice periods were included before the introduction of AJM. The purpose was to introduce the basic principles of meditation: that distraction is inevitable even in the simplest form of meditation (i.e., breathing meditation), and thus, practitioners must learn to accept distraction and simply bring attention back to the meditation that they will actually learn

Table 1 Group sessions and meditation practices for each week

	Components of group session	Practice at home
Week 1	1. Overall introduction of the full training 2. Didactic component: what is meditation 3. Practice and discussion: breathing meditation 4. Didactic component: importance of friendship, appreciative joy 5. Practice and discussion: AJM for friends	12-min practice: AJM for friends
Week 2	1. Discussion: feedback on last week 2. Practice: AJM for friends 3. Didactic component: kind attitude toward oneself 4. Practice and discussion: AJM for friends and oneself 5. Didactic component: unconditional self-acceptance	12-min practice: 6-min AJM for friends and then 6-min AJM for oneself
Week 3	1. Discussion: feedback on last week 2. Didactic component: appreciation 3. Practice and discussion: AJM for friends, oneself, and strangers 4. Didactic component: connection with strangers 5. Practice and discussion: AJM for friends, oneself, and strangers	15-min practice: 3-min AJM for friends, 3-min AJM for oneself, and 7-min AJM for strangers
Week 4	1. Discussion: review and feedback on last week 2. Didactic component: Buddhist background of AJM 3. Practice and discussion: AJM for friends, oneself, and difficult targets 4. Didactic component: how to overcome negative attitudes 5. Practice and discussion: AJM for friends, oneself, and difficult targets	15-min practice: 3-min AJM for friends, 3-min AJM for oneself, and 7-min AJM for difficult targets

in the current training program (i.e., AJM). The HOJ program is designed as a secular training program, with no religious belief requirement. Thus, the didactic components that support the meditation practice are based on positive psychology or secular philosophy rather than Buddhist doctrines or beliefs. For example, the HOJ program introduces the ideas that some philosophers have claimed a person can perceive oneself and all beings as one thing and that many scholars in traditional society endorse the value of service to people. Participants are invited to feel similar feelings during meditation practice, but not necessarily to accept such philosophical or value judgments. Moreover, the HOJ program tells participants that the purpose of the program is to enhance one's own happiness, and the adoption of a specific meditation (i.e., AJM) also serves this purpose. Although being kind to other people is also moral, the cultivation of morality or virtues is not the primary concern. Table 1 summarizes the components of the weekly sessions and meditation practices, and scripts of the meditation practices used at home are available in the Online Resources. Further details can be requested through the contact information in the "Acknowledgements" section.

Measures

An Emotional Words List (EWL) was used to measure the frequency of emotions over the previous week and was used at all six measurement times. The EWL contained 24 emotional words (e.g., happy) separated into six groups that varied in arousal (high/medium/low) and valence (positive/negative), and all of them were rated on a 1- (never) to 5-point (always) Likert scale (see Lee et al. 2013 for details). The alpha coefficients ranged from 0.658 to 0.823 in the current study.

The Self and Other Four Immeasurables (SOFI) scale was used to measure attitudes toward oneself and others over the previous week (Kraus and Sears 2009). This scale was used at all six measurement times. Each item combined a word from the four immeasurables (e.g., "friendly") or its opposite (e.g., "angry") with either "toward others" or "toward myself." Thus, this scale contained a total of 16 items that represented four dimensions, positive/negative attitudes toward oneself/others. This scale has been validated in Chinese (Zeng et al. 2017d), and the four dimensions had alpha coefficients from 0.714 to 0.779 in the current study.

The Satisfaction with Life Scale (SLS) was used to measure satisfaction with life (Diener et al. 1985). It consisted of five items (e.g., "The conditions of my life are excellent") rated on a 1- to 7-point Likert scale. Its Chinese version has been widely used (e.g., Zeng et al. 2015b), and its alpha coefficient was 0.806 in the current study. As a trait-like scale, it was used for pre-training, post-training, and follow-up measures only.

The Appreciative Joy Scale (AJS) was used to measure appreciative joy for general others (Zeng et al. 2017d). This scale included 14 items and consisted of three dimensions: sense of joy (e.g., "I would be sincerely happy for others' achievements"), positive interpersonal bias (e.g., "I can always notice the many little kind acts performed by other people"), and self-transcendence (e.g., "Even when I am experiencing misfortune, I still hope that other people lead a happy life"). The items were rated on a 1- (Not at all like me) to 9-point (Totally like me) Likert scale. This scale was originally developed in Chinese (e.g., Zeng et al. 2017d), and the alpha coefficients of the three dimensions ranged from 0.784

to 0.856. This trait-like scale was also used for pre-training, post-training, and follow-up measures only.

The Dispositional Envy Scale (DES) was used to measure envy (Smith et al. 1999). It consisted of eight items (e.g., "I feel envy every day") that were rated on a 1- (strongly disagree) to 5-point (strongly agree) Likert scale. Its Chinese version has been shown to exhibit good reliability and validity (Guo et al. 2013), and its alpha coefficient was 0.885 in the current study. This trait-like scale was also used for pre-training, post-training, and follow-up measures only.

Donation Behavior At the post-training evaluation, participants were asked if they wanted to donate their participation reward and if so, how much they wanted to donate (0 to 100 RMB/HKD) to people who needed help. Participants understood that the donation would be taken from their reward payment based on their answer.

Additional measurements such as the amount of meditation practice completed and difficulty experienced during meditation practice were also measured but will not be presented here, as these data were complex and will be presented in a future paper.

Data Analyses

The data were analyzed using SPSS 20.0, and the effect sizes were transformed into Cohen's d (0.2, 0.5, 0.8 for small, medium, and large effect sizes, respectively). There were no significant differences in the psychological variables in the pre-training assessments, nor were there differences in demographic variables between the training group and the control group (all $ps > 0.182$; see Table S1 in the Online Resources for the details of each group), which indicated that the randomization was successful. For all repeated-measures outcomes, changes from pre-training to post-training and the 1-month follow-up were analyzed by 2 (time) × 2 (conditions) ANOVA (for satisfaction with life and envy) or MANOVA (for emotions, attitudes, and appreciative joy). Further explorations of the weekly changes in emotions and attitudes are presented in the Online Resources section. This preliminary study was mainly concerned with how participants changed after they completed the entire training program. Thus, the results below were based on participants who completed the training program and returned for the post-training assessments. An intent-to-treatment (ITT) analysis is presented in the Online Resources section and is briefly mentioned below. In the analysis below and in the ITT analysis, the missing data were interpolated using the mean of the two nearest available data points from the same participant or the last observation if no later observation was available. Such interpolations led to more conservative results as it limited the change between time points.

Results

Feasibility of the Training

After the start of the training program, the dropout rate at the post-training assessment was significantly higher in the training group ($n = 10$; 19.6%) relative to the control group ($n = 1$; 2.4%): chi-square = 6.554, $p = 0.010$. The effects of the variables of gender, age, and identification (i.e., undergraduate, graduate, staff, out of university) on the dropout rate were non-significant ($ps > 0.442$). The dropout rate among the participants in Hong Kong ($n = 8$; 21.1%) was higher than that of participants in mainland China ($n = 2$, 3.8%; $p = 0.009$). Participants who did not drop out in the training group attended 3.46 sessions (SD = 0.67) on average and practiced meditation 14.07 times at home (SD = 4.17) during the training period. Of the 40 participants who returned for follow-up assessments in the training group, 29 participants (72.5%) had continued the meditation practices after the end of the training period, with an average of 8.28 times (SD = 7.10) in 1 month. Based on a 0–100 point scale (0 = did not like at all, 100 = liked it very much), the average likability of the training program in the training group was 74.86 (SD = 14.92).

Effects on Emotions

From pre-training to post-training, the 2 (time) × 2 (condition) MANOVA with six types of emotions as dependent variables showed significant interactions (F (6, 75) = 2.624, $p = 0.023$, Cohen's $d = 0.915$). Consistent with the primary hypothesis, significant interactions in the univariable analysis showed that HOJ training increased medium-arousal positive emotions and low-arousal positive emotions with medium effect sizes (Table 2). Additionally, significant interactions also indicated that the HOJ program significantly decreased high-arousal negative emotions and low-arousal negative emotions with medium effect sizes. Table S2 in the Online Resources further explores the weekly changes in emotions and shows that the changes in the four emotions above occurred gradually over the 4 weeks. From pre-training to follow-up, the 2 (time) × 2 (condition) MANOVA also showed significant interactions (F (6, 75) = 2.492, $p = 0.030$, Cohen's $d = 0.892$). As summarized in Table 2, the interaction with medium-arousal positive emotions was no longer significant ($p = 0.070$), but the interaction with medium-arousal negative emotions became significant, which showed that the training group had fewer medium-arousal negative emotions compared with the control group. The ITT analysis had similar results (Table S3 in the Online Resources), except that low-arousal negative emotions only had a significant interaction at the follow-up assessment and medium-arousal negative emotions were not significantly different at the follow-up assessment.

Table 2 Changes in outcome variables

	PRE (mean ± SD)		POST (mean ± SD)		PRE to POST (*F*, *p*, Cohen's *d*)	FU (mean ± SD)		PRE to FU (*F*, *p*, Cohen's *d*)
	Training	Control	Training	Control		Training	Control	
SWL	3.65 ± 1.12	3.80 ± 0.86	4.06 ± 1.10	3.80 ± 0.96	6.244 (0.015, 0.557)	4.38 ± 1.19	3.93 ± 1.17	8.589 (0.004, 0.656)
DES	2.26 ± 0.83	2.41 ± 0.76	2.11 ± 0.81	2.45 ± 0.82	1.946 (0.167, 0.314)	1.94 ± 0.77	2.38 ± 0.70	5.710 (0.019, 0.536)
AJS-SOJ	5.86 ± 1.66	5.80 ± 1.66	6.06 ± 1.69	5.76 ± 1.64	0.633 (0.428, 0.180)	6.35 ± 1.57	5.86 ± 1.64	2.549 (0.114, 0.358)
AJS-PIB	5.95 ± 1.41	6.11 ± 1.24	6.08 ± 1.44	6.07 ± 1.27	0.313 (0.577, 0.128)	6.28 ± 1.42	6.19 ± 1.40	0.783 (0.379, 0.201)
AJS-ST	5.20 ± 1.71	5.38 ± 1.71	5.19 ± 1.77	5.09 ± 1.82	0.641 (0.426, 0.180)	5.74 ± 1.73	5.27 ± 1.73	5.400 (0.023, 0.519)
Emo-HP	2.87 ± 0.78	2.76 ± 0.52	2.93 ± 0.78	2.71 ± 0.57	0.677 (0.413, 0.180)	3.04 ± 0.79	2.84 ± 0.63	0.430 (0.514, 0.142)
Emo-MP	2.94 ± 0.70	2.91 ± 0.54	3.18 ± 0.75	2.77 ± 0.70	6.236 (0.015, 0.557)	3.27 ± 0.84	2.95 ± 0.72	3.365 (0.070, 0.408)
Emo-LP	2.85 ± 0.70	3.05 ± 0.65	3.04 ± 0.77	2.81 ± 0.68	7.298 (0.008, 0.606)	3.16 ± 0.78	2.89 ± 0.70	9.440 (0.003, 0.689)
Emo-HN	2.26 ± 0.74	2.12 ± 0.58	1.87 ± 0.49	2.14 ± 0.56	8.458 (0.005, 0.652)	1.94 ± 0.53	2.22 ± 0.72	8.184 (0.005, 0.640)
Emo-MN	2.30 ± 0.68	2.37 ± 0.64	1.99 ± 0.65	2.12 ± 0.45	0.193 (0.662, 0.009)	1.98 ± 0.56	2.37 ± 0.64	4.477 (0.037, 0.473)
Emo-LN	2.93 ± 0.72	2.76 ± 0.64	2.45 ± 0.64	2.65 ± 0.53	5.394 (0.023, 0.519)	2.43 ± 0.68	2.73 ± 0.63	8.378 (0.005, 0.648)
Att-PS	2.77 ± 0.77	2.71 ± 0.68	3.12 ± 0.80	2.76 ± 0.65	2.248 (0.138, 0.333)	3.24 ± 0.77	2.77 ± 0.69	5.294 (0.024, 0.514)
Att-NS	2.03 ± 0.68	2.06 ± 0.67	1.69 ± 0.57	2.07 ± 0.76	4.399 (0.039, 0.468)	1.77 ± 0.59	2.14 ± 0.74	4.064 (0.047, 0.449)
Att-PO	3.08 ± 0.63	3.12 ± 0.66	3.18 ± 0.82	2.87 ± 0.67	3.989 (0.049, 0.444)	3.24 ± 0.79	2.99 ± 0.72	2.742 (0.102, 0.370)
Att-NO	1.84 ± 0.66	1.71 ± 0.53	1.54 ± 0.54	1.68 ± 0.76	3.557 (0.063, 0.434)	1.59 ± 0.51	1.85 ± 0.83	5.767 (0.019, 0.536)

F tests are time × group interactions; all $df = 1, 80$

PRE pre-training, *POST* post-training, *FU* 1-month follow-up, *SOJ* sense of joy, *PIB* positive interpersonal bias, *ST* self-transcendence, *Emo-HP* high-arousal positive emotions, *Emo-MP* medium-arousal positive emotions, *Emo-LP* low-arousal positive emotions, *Emo-HN* high-arousal negative emotions, *Emo-MN* medium-arousal negative emotions, *Emo-LN* low-arousal negative emotions, *Att-PS* positive attitudes for oneself, *Att-NS* negative attitudes for oneself, *Att-PO* positive attitudes for others, *Att-NO* negative attitudes for others

Effects on Attitudes

The 2 (time) × 2 (condition) MANOVA with four types of attitudes as dependent variables showed marginally significant interactions from pre-training to post-training (F (4, 77) = 2.382, $p = 0.059$, Cohen's $d = 0.703$) and from pre-training to follow-up (F (4, 77) = 2.293, $p = 0.067$, Cohen's $d = 0.689$). Table 2 shows that none of the significant differences in a univariate analysis could survive rigorous corrections for multiple comparisons. Considering that the attitudes were secondary outcomes without specific hypotheses, all four dimensions of attitudes were considered as non-significant; this was the same in the ITT analysis (Table S3 in the Online Resources). Notably, it seems that positive attitudes toward others increased gradually during the training program, while negative attitudes toward oneself immediately decreased after the first week of the training (Table S4 in the Online Resources).

Effects on Appreciative Joy

Appreciative joy was also analyzed using a 2 (time) × 2 (condition) MANOVA with three dimensions as dependent variables. The interaction was not significant at the post-training (F (3, 78) = 0.242, $p = 0.867$, Cohen's $d = 0.191$) or follow-up assessments (F (3, 78) = 2.132, $p = 0.103$, Cohen's $d = 0.574$). The univariate analysis indicated that the dimension of "self-transcendence" improved in the HOJ training group at the follow-up assessment when compared with the control group, but this finding did not survive rigorous correction for multiple comparisons (Table 2). Considering that there is no specific hypothesis for each dimension of appreciative joy, this finding was still considered to be non-significant. The findings regarding appreciative joy were maintained in the ITT analysis (Table S3 in the Online Resources). Additionally, the correlations between the changes in variables are presented in Table S5 in the Online Resources. It is notable that changes in appreciative joy were correlated with high- and medium-arousal positive emotions but not low-arousal positive emotions.

Effects on Envy

The 2 × 2 ANOVA for envy showed that the interaction was significant from pre-training to follow-up but not from pre-training to post-training (Table 2), which indicated that the training group had lower envy levels 1 month after training with a medium effect size. This finding was maintained in the ITT analysis (Table S3 in the Online Resources). Additionally, an interesting finding was that the decrease in envy was significantly associated with improved attitudes toward oneself, but not improved attitudes toward others (Table S5 in the Online Resources).

Effects on Satisfaction With Life

The 2 × 2 ANOVA for satisfaction with life showed that the interaction was significant from pre-training to post-training as well as from pre-training to follow-up with a medium effect size (Table 2). These findings indicate that participants in the training group had larger increases in satisfaction with life than their counterparts in the control group. These findings were maintained in the ITT analysis (Table S3 in the Online Resources). Changes in life satisfaction were significantly associated with changes in positive emotions, positive attitudes, appreciative joy, and envy (Table S5 in the Online Resources).

Effects on Donation Behavior

Finally, there was no significant difference in the demonstration of donation behaviors between the training group (mean = 54.93, SD = 46.68) and the wait-list group (mean = 56.44, SD = 37.04) in non-parametric comparisons ($p = 0.696$ in the Mann-Whitney U test, $p = 0.174$ in the Kolmogorov-Smirnov test). Floor effects and ceiling effects were observed in both groups, as many participants donated none (29.3% in the training group, 9.8% in the control group, chi-squared = 4.970, $p = 0.026$) or all of their rewards (43.9% in the training group, 36.6% in the control group, chi-squared = 0.456, $p = 0.499$).

Discussion

The Feasibility of HOJ Training

HOJ is a special training program that focuses on AJM. The attrition rate was comparable to previous studies of FIM programs (e.g., Fredrickson et al. 2008). It is notable that 8 out of 18 dropouts in the training group occurred before the first session of training due to conflicts in time and should thus not be attributed to the quality of the AJM training itself. Additionally, more participants from Hong Kong dropped out compared to those from mainland China, which indicated a potential impact from the fact that Mandarin was not first language of many participants in Hong Kong. Nevertheless, the likability and attendance rate results were acceptable, especially considering that similar data with previous FIM trainings were usually between 70 and 90% (e.g., Graser et al. 2016; Orellana-Rios et al. 2018). More importantly, most of the participants reported continuing meditation practice after the training program ended. This indicated that most of the participants who completed the training program had positive experiences with it. Additionally, most FIM interventions begin with breathing or mindfulness meditation (e.g., Weng et al. 2013), and AJM is usually practiced after loving-kindness and compassion meditations (e.g., Wallmark et al. 2013). The current study indicated that initiating AJM with minimal practice of other meditations is acceptable, and future research could further investigate how to organize the structure and components of FIM training.

The Effects of HOJ Training on Appreciative Joy

Appreciative joy is the core of the entire training program, but the data did not show a significant improvement in it. It is possible that appreciative joy requires more time or practice to be cultivated, but another important consideration is that the trait-life appreciative joy scale might not be sensitive to short-term changes. Although appreciative joy did not improve at the group level, the results showed that appreciative joy was associated with changes in high- and medium-arousal positive emotions but not low-arousal positive emotions. These results are consistent with previous cross-sectional findings that appreciative joy did not have higher correlations with low-arousal positive emotions than high-arousal positive emotions (Zeng et al. 2017d). The current results further showed that even after receiving training in appreciative joy, the experiences of appreciative joy in one's daily life were still strongly linked with excitement rather than peacefulness. Excitement may be impacted by positive situations that trigger appreciative joy (e.g., a wedding), and this finding thus does not negate the idea that appreciative joy itself is a relatively peaceful emotion. It is also possible that people with high- and medium-arousal positive emotions felt more appreciative joy. Nevertheless, it has been consistently shown that appreciative joy is accompanied by some excitement in daily life (current study) and during AJM (Zeng et al. 2017b), although the generation of low-arousal positive emotions could also be observed at the same time during AJM (Zeng et al. 2017b). Taken together, it seems that the overall effects of Buddhist training (e.g., HOJ) bring peacefulness to one's life for the reasons discussed above, but the core practice in this training (AJM) and the cultivated core feature (appreciative joy) did not necessarily bring peace by themselves. These findings highlight the necessity of distinguishing the effects of entire interventions and the effects of the meditations used in those interventions, which are typically consistent and, thus, not well distinguished in previous studies (e.g., Zeng et al. 2015a). An emphasis on such a distinction is important not only for drawing conclusions from studies with different designs (e.g., structured interventions versus one-time practices) but also for determining applications for meditations (e.g., searching for a peaceful life or skills for immediate stress reduction).

The Effects of HOJ Training on Envy

Dispositional envy was lower at the follow-up assessment, which partially supports the hypothesis that the HOJ program

could decrease envy. Considering that envy is a common problem and difficult to change (Smith and Kim 2007), the effect of the HOJ program is very promising, although this type of finding may suffer from an expectancy effect, so replications are needed. Additionally, as far as we know, no other studies of FIM training have evaluated its effect on envy, and future studies should investigate whether AJM is more effective at countering envy than other FIM subtypes.

One interesting finding in the current study was that while envy involves ill will toward other people, the decrease in envy actually had a closer relationship with changes in attitudes toward oneself rather than changes in attitudes toward others. In the fourth session, several strategies for better blessings for disliked people were suggested, which included the idea that practitioners should try to believe that they could also have good futures regardless of the status of others or try to bless both themselves and disliked people to enjoy their own lives (without meeting or annoying each other forever). It is possible that these perspectives, which promote a positive belief in oneself or a positive attitude toward oneself, could help a person overcome hostile or envious feelings, although more investigation is required to explore this possibility.

The Effects of Training on Satisfaction With Life

The hypothesis that the HOJ program increases satisfaction with life was well supported, as satisfaction with life improved at the post-training assessment, and this improvement was maintained during the follow-up period. As an overall evaluation of one's life, satisfaction with life could be impacted by many factors. Specifically, satisfaction with life involves an evaluation of one's life over the long term, for example, "If I could live my life over again, I would change almost nothing" (Diener et al. 1985). AJM involved recalling positive past experiences and being aware of positive aspects of life at the present time, as well as wishing for further blessings for the future. Thus, future studies could explore whether participants evaluated their past or future lives more positively. In group discussions, some participants mentioned that they were aware of many positive events in their lives (e.g., their own successes, their friends, even kind strangers). Such phenomena imply that AJM that focuses on the positive sides of life is quite effective at enhancing satisfaction with life, and the underlying mechanism for this could be further investigated in the future. The current study did not compare HOJ with other training programs that also improved satisfaction with life (e.g., Fredrickson et al. 2008), and future studies could better evaluate the effects of AJM training on satisfaction with life through a comparison with an active control group.

The Effects of HOJ Training on Emotions

HOJ training significantly increased medium- and low-arousal positive emotions when compared to the control group, which supports the hypothesis and was consistent with previous studies on FIM training (e.g., Kearney et al. 2014). It is understandable that training explicitly focused on "joy" increased medium-arousal positive emotions and that meditation training increased the feeling of calmness in one's life. It is notable that the weekly emotions reflected the overall emotional states and were impacted by many factors. Thus, the increased positive emotions during training should not simply be attributed to the practice of AJM or appreciative joy in daily life. Many previous studies of FIM training observed an increase in positive emotions (Zeng et al. 2015a), and some studies used positive emotions as mediators for other outcomes (e.g., Fredrickson et al. 2008). However, how meditation practice leads to emotional change in daily life is an important unsolved question (Zeng et al. 2017c), and the current study did not investigate these details.

As for negative emotions, the high-arousal negative emotions included "hostility," which was concerned with negative interpersonal attitudes. Considering that HOJ training fostered positive attitudes, and especially that the last week of training discussed how to change attitudes toward those who are disliked, it is reasonable to speculate that HOJ training could significantly decrease hostility. The high-arousal negative emotions studied also included "nervous," "fearful," and "distressed," which might also drive the change. For example, a kind attitude toward oneself was mentioned during the second group session, and one previous study showed that self-compassion (a concept that emphasizes a kind attitude toward oneself) reduced anxiety (Arch et al. 2016). The current study cannot separate these into reliable measurements, so future studies could further test the effects of HOJ training on certain types of negative emotions. For the decrease in low-arousal negative emotions, it is possible that participating in training and practicing meditation daily made participants more active, and thus decreased their feelings of being bored.

The Effects of HOJ Training on Attitudes

As secondary outcomes, positive and negative attitudes toward oneself and others were explored. Although all dimensions of attitudes changed in the expected directions, the effects were not large enough to survive the corrections for multiple comparisons. It is possible that more practice is required to obtain significant changes. One interesting point was that negative attitudes toward oneself decreased sharply after the first week of training despite the fact that attitudes toward oneself was not the theme until the second week. It is possible that the reduction in negative attitudes came from the basic principle of meditation discussed in the

first week, that is, to accept the inevitable distractions during meditation, which could also be applied to daily life. Nevertheless, more studies are required to investigate these details and to draw solid conclusions.

The Effects of Training on Donations

Finally, the donation assessment did not show the group differences that were expected, and the training group had even more participants choose not to donate compared with the wait-list group. It is notable that the donations came from the compensation for participation, which, as reviewers pointed out, was an unusual measure. As a result, participants in the training group received the participation fee after a greater personal cost in time and effort compared to the participants in the wait-list group who received the money before they received training. This might explain why more participants in the training group donated nothing. At the same time, it seems that the reward was too low, and thus, many participants donated all of it, which led to a ceiling effect. Overall, the donation measure in the current study is problematic, and future studies could improve this measure. It is also notable that the finding that FIM training improved helping behaviors was mainly based on training programs with compassion meditations (e.g., Condon et al. 2013; Leiberg et al. 2011). Whether AJM, which focuses on joy for happy or successful people, impacts helping behaviors in people who are suffering is an interesting question. Future studies could try to compare AJM with compassion meditations.

Limitations and Future Research

The current study provided an initial evaluation of the HOJ program as a multi-week psychological training program focused on AJM. This randomized controlled trial supported the feasibility and effects of this program. However, several limitations in this preliminary study should be noted. First, because the program was described as "positive psychology meditation training," the participants were people who were already interested in meditation and personal growth. Additionally, the results presented above were based on completers, which clearly limited the effect to people who finished the training program. The current study did not collect the reasons during the program, and it is possible that some participants had unpleasant experiences during FIM as a previous study reported (e.g., Galante et al. 2016). Thus, although the findings were generally maintained in the ITT analysis, the conclusions should not be over-generalized. Second, the group leader (one author of this article) was not blind to the study design and procedure, and the fidelity of the intervention was not measured. The training program delivered many ideas explicitly to participants. The participants were recruited from universities and thus may have been more prone to demand effects. Thus, potential expectancy and demand effects may have strongly impacted the results, especially considering that all of the significant results were based on self-report methods. More objective measures, such behavioral or biological indicators, are necessary in the future to provide more reliable evidence. Third, as a preliminary study, the current study simply compared an HOJ training group with a wait-list control group. Future studies could compare HOJ training with an active control group in order to extract the contribution of AJM from the influence of non-specific factors (e.g., a supportive group) or to compare AJM with other subtypes of FIM or other types of meditation. Additionally, the current study explored several outcome variables, which increased the possibility of false positives due to its multi-comparison nature. Clear priori hypotheses and pre-registration could improve the quality of these studies in the future, as reviewers suggested. Despite these limitations, the current study showed that the HOJ program for AJM training is promising for improving subjective well-being and envy, although more research is required before solid conclusions and clinical implications can be made.

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Authors' Contribution XZ and FL designed the study, XZ developed the training, XZ and RW collected and analyzed the data, and XZ and TO collaborated in the writing of the paper. All authors discussed the findings and reviewed and commented on the manuscript.

Compliance with Ethical Standards

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The procedures were approved by Survey and Behavioral Research Ethics Committee in the Chinese University of Hong Kong and Shenzhen University. Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The first author of this article is the developer of the Heart of Joy program.

References

Arch, J. J., Landy, L. N., & Brown, K. W. (2016). Predictors and moderators of biopsychological social stress responses following brief self-compassion meditation training. *Psychoneuroendocrinology, 69*, 35–40.

Bluth, K., Gaylord, S. A., Campo, R. A., Mullarkey, M. C., & Hobbs, L. (2016). Making friends with yourself: A mixed methods pilot study of a mindful self-compassion program for adolescents. *Mindfulness, 7*(2), 479–492.

Condon, P., Desbordes, G., Miller, W. B., & DeSteno, D. (2013). Meditation increases compassionate responses to suffering. *Psychological Science, 24*(10), 2125–2127.

Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71–75.

Diener, E., Oishi, S., & Lucas, R. E. (2003). Personality, culture, and subjective well-being: Emotional and cognitive evaluations of life. *Annual Review of Psychology, 54*(1), 403–425.

Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., & Finkel, S. M. (2008). Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential personal resources. *Journal of Personality and Social Psychology, 95*(5), 1045–1062.

Galante, J., Galante, I., Bekkers, M. J., & Gallacher, J. (2014). Effect of kindness-based meditation on health and well-being: A systematic review and meta-analysis. *Journal of Consulting and Clinical Psychology, 82*(6), 1101–1114.

Galante, J., Bekkers, M. J., Mitchell, C., & Gallacher, J. (2016). Loving-kindness meditation effects on well-being and altruism: A mixed-methods online RCT. *Applied Psychology: Health and Well–Being, 8*(3), 322–350.

Graser, J., Höfling, V., Weßlau, C., Mendes, A., & Stangier, U. (2016). Effects of a 12-week mindfulness, compassion, and loving kindness program on chronic depression: A pilot within-subjects wait-list controlled trial. *Journal of Cognitive Psychotherapy, 30*(1), 35–49.

Guo, R., O-Yang, Y., Deng, Y., Feng, S., He, W., & Liu, H. (2013). Reliability and validity of the Chinese version of dispositional envy scale in Chinese college students. *Chinese Journal of Health Psychology, 121*(5), 701–703.

Kearney, D. J., McManus, C., Malte, C. A., Martinez, M. E., Felleman, B., & Simpson, T. L. (2014). Loving-kindness meditation and the broaden-and-build theory of positive emotions among veterans with posttraumatic stress disorder. *Medical Care, 52*, S32–S38.

Kok, B. E., Coffey, K. A., Cohn, M. A., Catalino, L. I., Vacharkulksemsuk, T., Algoe, S. B., et al. (2013). How positive emotions build physical health perceived positive social connections account for the upward spiral between positive emotions and vagal tone. *Psychological Science, 24*(7), 1123–1132.

Koopmann-Holm, B., Sze, J., Ochs, C., & Tsai, J. L. (2013). Buddhist-inspired meditation increases the value of calm. *Emotion, 13*(3), 497–505.

Kraus, S., & Sears, S. (2009). Measuring the immeasurables: Development and initial validation of the self-other four Immeasurables (SOFI) scale based on Buddhist teachings on loving kindness, compassion, joy, and equanimity. *Social Indicators Research, 92*(1), 169–181.

Lee, Y. C., Lin, Y. C., Huang, C. L., & Fredrickson, B. L. (2013). The construct and measurement of peace of mind. *Journal of Happiness Studies, 14*(2), 571–590.

Leiberg, S., Klimecki, O., & Singer, T. (2011). Short-term compassion training increases prosocial behavior in a newly developed prosocial game. *PLoS One, 6*(3), e17798.

Lumma, A. L., Kok, B. E., & Singer, T. (2015). Is meditation always relaxing? Investigating heart rate, heart rate variability, experienced effort and likeability during training of three types of meditation. *International Journal of Psychophysiology, 97*(1), 38–45.

Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology, 69*(1), 28–44.

Orellana-Rios, C. L., Radbruch, L., Kern, M., Regel, Y. U., Anton, A., Sinclair, S., & Schmidt, S. (2018). Mindfulness and compassion-oriented practices at work reduce distress and enhance self-care of palliative care teams: A mixed-method evaluation of an "on the job" program. *BMC Palliative Care*. https://doi.org/10.1186/s12904-017-0219-7.

Shahar, B., Szsepsenwol, O., Zilcha-Mano, S., Haim, N., Zamir, O., Levi-Yeshuvi, S., & Levit-Binnun, N. (2015). A wait-list randomized controlled trial of loving-kindness meditation programme for self-criticism. *Clinical Psychology & Psychotherapy, 22*(4), 346–356.

Shonin, E., Van Gordon, W., Compare, A., Zangeneh, M., & Griffiths, M. D. (2015). Buddhist-derived loving-kindness and compassion meditation for the treatment of psychopathology: A systematic review. *Mindfulness, 6*(5), 1161–1180.

Smith, R. H., & Kim, S. H. (2007). Comprehending envy. *Psychological Bulletin, 133*(1), 46–64.

Smith, R. H., Parrott, W. G., Diener, E. F., Hoyle, R. H., & Kim, S. H. (1999). Dispositional envy. *Personality and Social Psychology Bulletin, 25*(8), 1007–1020.

Sujiva, V. (2007). *Loving-kindness meditation*. Available from http://enlight.lib.ntu.edu.tw/FULLTEXT/JR-MAG/mag140106.pdf.

Uchino, B. N., Bowen, K., de Grey, R. G. K., Smith, T. W., Baucom, B. R., Light, K. C., & Ray, S. (2016). Loving-kindness meditation improves relationship negativity and psychological well-being: A pilot study. *Psychology, 7*(01), 6–11.

Wallmark, E., Safarzadeh, K., Daukantaitė, D., & Maddux, R. E. (2013). Promoting altruism through meditation: An 8-week randomized controlled pilot study. *Mindfulness, 4*(3), 223–234.

Weng, H. Y., Fox, A. S., Shackman, A. J., Stodola, D. E., Caldwell, J. Z., Olson, M. C., et al. (2013). Compassion training alters altruism and neural responses to suffering. *Psychological Science, 24*(7), 1171–1180.

Weytens, F., Luminet, O., Verhofstadt, L. L., & Mikolajczak, M. (2014). An integrative theory-driven positive emotion regulation intervention. *PLoS One, 9*(4), e95677.

Zeng, X., Liu, S., & Liu, X. (2013). The application and empirical studies on loving-kindness meditation from psychological perspective. *Advances in Psychological Science, 21*(8), 1466–1472.

Zeng, X., Chiu, C., Wang, R., Oei, T., & Leung, F. (2015a). The effect of loving-kindness meditation on positive emotions: A meta-analytic review. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2015.01693.

Zeng, X., Li, M., Zhang, B., & Liu, X. (2015b). Revision of the Philadelphia mindfulness scale for measuring awareness and equanimity in Goenka's Vipassana meditation with Chinese Buddhists. *Journal of Religion and Health, 54*(2), 623–637.

Zeng, X., Chan, V. Y., Liu, X., Oei, T. P., & Leung, F. Y. (2017a). The four immeasurables meditations: Differential effects of appreciative joy and compassion meditations on emotions. *Mindfulness*. https://doi.org/10.1007/s12671-016-0671-0.

Zeng, X., Chan, V. Y., Oei, T. P., Leung, F. Y., & Liu, X. (2017b). Appreciative joy in Buddhism and positive empathy in psychology: How do they differ? *Mindfulness*. https://doi.org/10.1007/s12671-017-0690-5.

Zeng, X., Chio, F. H., Oei, T. P., Leung, F. Y., & Liu, X. (2017c). A systematic review of associations between amount of meditation practice and outcomes in interventions using the four Immeasurables meditations. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2017.00141.

Zeng, X., Liao, R., Zhang, R., Oei, T. P., Yao, Z., Leung, F. Y., & Liu, X. (2017d). Development of the appreciative joy scale. *Mindfulness, 8*(2), 286–299.