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Does loving-kindness meditation elicit empathic emotions? The moderating role of self-discrepancy and self-esteem on guilt

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Abstract

Our understanding of the emotions elicited by loving-kindness meditation (LKM) at early stages of practice is limited, despite the influence that these emotions may have on later engagement. Past work suggests that LKM may elicit emotional ambivalence at early stages of the practice, but it is still unclear whether the content of LKM activates this ambivalence and who is more likely to experience it. Given the specific content of LKM, we defend that this meditation is likely to elicit empathetic emotions, both positive (compassion and gratitude) and negative (guilt), to a greater extent than an active control. Guilt is likely to be elicited by memories of incidents where naïve meditators were not able to experience compassion and/or by the difficulties in sending compassionate love to disliked others during the meditation. Furthermore, individuals with greater self-discrepancy and lower self-esteem are more likely to experience guilt. These hypotheses were tested in two experimental studies with community and student samples ($n = 55$ and $n = 33$, respectively) and

using a brief intervention. The results support the hypotheses. These findings have implications for instructors of LKM, especially when organizing meditation practices with naïve meditators who should be aware of the potential negative emotions elicited by this meditation.

KEYWORDS

compassion, gratitude, guilt, loving-kindness meditation, self-discrepancy, self-esteem

INTRODUCTION

Loving-kindness meditation (LKM hereafter) is a meditation technique that involves cultivating positive emotions towards oneself and others (Fredrickson et al., 2017). Whereas other meditation practices involve maintaining attention focused on the present moment in a non-judgemental way (Acabchuk et al., 2021), LKM implies sending a set of messages of unconditional love (e.g., "may you be free from danger, may you be happy") to oneself and other beings, including someone with whom the practitioner experiences a difficult or conflicting relationship, and finally extending these caring feelings to all beings without distinction (Salzberg, 1995).

Past scholarship has paid attention to the emotions elicited by this practice. Many experimental studies have demonstrated that LKM increases positive emotions after both brief and long interventions (Aspy & Proeve, 2017; Feldman et al., 2010; Galante et al., 2014; Shonin et al., 2015; Zeng et al., 2015), notably compassion and love (Hutcherson et al., 2008; Leiberg et al., 2011). However, less attention has been given to the potential negative emotions elicited by LKM. Extant phenomenological evidence shows that LKM meditators acknowledge experiencing negative emotions at the first stages of the practice (Boellinghaus et al., 2013; Galante et al., 2016; Przyrembel et al., 2019).

Together, this evidence suggests that LKM raises both positive and negative emotions among naïve meditators, thus triggering what is called "emotional ambivalence" (Watson & Stanton, 2017). However, there are no experimental studies that examine whether LKM elicits emotional ambivalence at early stages of the practice to a greater extent than other forms of meditation, the discrete emotions elicited, and who is more likely to experience this ambivalence. This study aims to redress these gaps, responding to calls made by several authors (Galante et al., 2016; Przyrembel et al., 2019).

Understanding whether LKM content elicits emotional ambivalence at early stages of practice is fundamental, since these first experiences might be critical for future engagement with the practice (Compson, 2018; Harel et al., 2019). In fact, a study found that more meditators drop out from an LKM-based course than from a positive emotion regulation course that integrated different techniques to enable self-regulation of positive emotions (Weytens et al., 2014). Additionally, identifying who is more prone to experience this ambivalence will help instructors protect meditation participants, especially vulnerable populations (Gilbert, 2020; Lindahl

et al., 2017), since they can help their students understand and cope with their early experiences and engage with the practice (Compson, 2018). Similarly, it can help provide better guidance for novice meditators who increasingly engage in informal practices facilitated by meditation websites and apps (Heppner & Shirk, 2018).

We specifically focus on empathetic emotions comprising positive (compassion and gratitude) and negative (guilt) emotions. Empathetic emotions are those that activate "a feeling of social attachment" (Batson & Shaw, 1991; Eisenberg, 2000). Given that LKM encourages meditators to send love and caring messages towards the self, liked others and disliked others (Fredrickson et al., 2008; Tsong-Kha-Pa., 2004; Zeng et al., 2015), it should elicit compassion and gratitude, as past studies have shown (Zeng et al., 2015).

However, sending loving kindness to all beings can be challenging and may be accompanied by strong negative emotions (Galante et al., 2016; Przyrembel et al., 2019). The empathetic response potentially caused by the reflections involved in LKM may activate compassionate feelings and, at the same time, empathetic distress or "a strong aversive and self-oriented response to the suffering of others, accompanied by the desire to withdraw from a situation in order to protect oneself from excessive negative feelings" (Singer & Klimecki, 2014, p. 875). Specifically, LKM may elicit guilt, since this emotion is experienced when individuals see themselves as responsible for the suffering or harm of other beings (Kugler & Jones, 1992, p. 320; Orth et al., 2006). During the practice, LKM meditators may remember occasions when they created or did not relieve others' suffering, or they may struggle sending love to others (Galante et al., 2016; Zeng et al., 2019) and experience guilt as a result (Baumeister et al., 1994). Notwithstanding, given that LKM also encourages sending compassionate wishes to oneself, it is intriguing why it should activate guilt. However, studies on self-help (Wood et al., 2009; Yeung & Lun, 2016) have shown that exposure to positive self-statements may activate negative emotions.

Moreover, we defend that those individuals with greater self-discrepancy and lower self-esteem are more likely to experience guilt when practicing LKM. These two traits have been associated with proneness to experience guilt (Orth et al., 2006). Self-discrepancy is the distance between the assessment of the actual self and the ideal self (Barnett et al., 2017). Consistent with self-discrepancy theory (Higgins, 1987), perceived self-discrepancy is accompanied by "dejection" and "agitation" emotions (Higgins, 1987), notably guilt (Barnett et al., 2017; Eisenberg, 2000; Mason et al., 2019; Tangney, 1999; Tangney et al., 1992), but also sadness, fear, anger, and disappointment (Mason et al., 2019). Greater self-discrepancy elicits guilt, since guilt signals that the individual's identity has not been realized or is incongruent with the ideal self (Carver & Scheier, 1990; Higgins, 1987). Moreover, guilt is activated when such discrepancy is associated with internal, unstable, controllable, and specific attributions (Tangney et al., 2007; Woods & Proeve, 2014). Conversely, lower self-discrepancy levels have been associated with positive emotions such as cheerfulness or happiness (Mason et al., 2019). Providing further support for the proposed moderating role of self-discrepancy, a recent meta-analysis showed that self-discrepancy is significantly associated with rumination, one of the explanations suggested by other authors to explain the experience of negative emotions among LKM meditators (Mason et al., 2019).

We also examine the moderation of self-esteem on the experience of guilt among LKM meditators. Baumeister et al. (1996, p. 5) define self-esteem as "a favourable global evaluation of oneself." Self-esteem represents the self-evaluation of one's competence and adequacy (Varni et al., 1991). Higher self-esteem is associated with defense mechanisms that protect against adverse effects of current and past actions (Gerrard et al., 2000); thus, people with higher self-

esteem are less prone to experience distress when confronted with stressful experiences, information, or events (Orth et al., 2006). In contrast, people with lower self-esteem are more emotionally unstable (Baumeister & Boden, 1998) and more prone to experience guilt (Faccini et al., 2020; Piotrowski et al., 2021). Reinforcing this argument, past studies have shown that lower self-esteem correlates with other mechanisms suggested to explain the experience of negative emotions, namely, an unsafe attachment system (Shaver et al., 2007), higher levels of rumination (Kuster et al., 2012), and self-criticism (Stolow et al., 2016).

In view of these arguments, we hypothesize that LKM meditators will report more positive empathic emotions—gratitude and compassion (H1a)—and more negative empathic emotions—guilt (H1b)—than control meditators. Guilt will be more intense for LKM meditators with higher levels of self-discrepancy (H2) or lower self-esteem (H3).

We test these hypotheses in a set of two experimental studies carried out in a large city in Spain. The first study examines the discrete positive and negative emotions activated by LKM (focusing especially on empathetic emotions) and explores the participants' attributions of their emotions through their own written narratives. The second study replicates the first study and tests the two proposed moderators of guilt.

Both studies are based on a short meditation (Heppner & Shirk, 2018) for three reasons. First, given that emotions are short-lived, examining emotional outcomes after a short meditation increases internal validity and gives researchers greater control over confounding factors compared with long interventions (Creswell, 2017; Fox et al., 2016). Second, a meta-analysis found that the length of intervention and time spent on practice did not influence the emotions felt (Zeng et al., 2015), so we would not expect a distortion in emotional outcomes due to the short length of practice. Finally, brief interventions have been defended as more adequate settings to test moderating mechanisms (Heppner & Shirk, 2018; Kreplin et al., 2018).

STUDY 1

Method

Participants

Sixty-two participants (75.8% women, $M_{age} = 42.35$ years) responded to a public call to take part in a meditation activity on the university premises. For randomization, each participant was given a colored-labeled sticker that corresponded to either the LKM group ($n = 30$) or the active control group ($n = 32$). The participants were then instructed to go to the corresponding room. The participants and researchers were blinded to the experimental conditions (Davidson & Kaszniak, 2015).

Intervention

The structure of the session was similar in the two groups. After completing the first questionnaire, with the baseline measures (*demographic variables*, *dispositional compassion*, and *meditation practice*), the participants were requested to listen to an audio recording. Two recordings were used that contained instructions to guide the practice in each group. The two recordings were equal in length (11 min), beginning with a 3-min breathing exercise and ending with a

1-min silent period. All audios were recorded by a certified meditation instructor (Davidson & Kaszniak, 2015).

Following Kristeller and Johnson (2005), the participants were instructed to repeat the sentences "may I be happy," "may I dissolve my suffering," "may I be healthy," "may life smile at me and be fulfilled," and "may the peace be in my heart." The participants were then asked to shift their focus to interpersonal meditation and expand their awareness gradually towards relatives, strangers, a difficult person, humanity, and finally the whole universe, sending them compassionate care and love messages (Zeng et al., 2015).

The participants in the active control group (focused breathing) were asked to pay attention to the awareness of the physical sensations and a nonjudgemental stance towards emotions, thoughts, and feelings that could emerge during the breathing practice (Feldman et al., 2010). The content of this audio was designed following the recommendations of initial formal meditation practices (Carmody & Baer, 2008). We used an active control group since previous studies show that using waitlist controls makes it difficult to distinguish between the specific and nonspecific effects of meditation (Zeng et al., 2015). After listening to the audio, the participants were given 5 min to reflect on a piece of paper about their experience during the meditation practice. Finally, they were asked to respond to postintervention questions (*control check* and *emotional experiences*). The participants were then debriefed and thanked.

Measures

Dispositional compassion was used as a control variable. It was measured using the Santa Clara brief compassion scale developed by Hwang et al. (2008) to measure "feelings, cognitions, and behaviors that are focused on caring, concern, tenderness, and an orientation toward supporting, helping, and understanding the other(s)" (Sprecher & Fehr, 2005, p. 630) ($\alpha = .651$).

Meditation practice

Following Fox et al. (2016), the frequency of meditation was used on a 6-point scale from daily to never.

Control check

The participants had to indicate, from 1 (*not at all*) to 10 (*very much so*), how much they felt that they were truly meditating during the exercise (Johnson et al., 2015).

Emotional experiences were measured via an adaptation of the modified differential emotions scale (Fredrickson et al., 2003), which is a comprehensive measure of emotions widely used in past meditation studies (e.g., Fredrickson et al., 2017). This 20-item, 5-point Likert scale measures the degree to which participants experienced different positive and negative emotions (including gratitude, compassion, and guilt, among other emotions) during the meditation.

Statistical analyses

MANOVA was used to jointly test whether several variables had equal means between the two groups. Furthermore, two-sample t tests were employed to test mean equality between the two groups for each of the variables of comparison. In the case of binary variables (e.g., gender), a two-sample test of proportions was employed. To mitigate the risk of false-positive results, due to multiple comparison tests, in addition to p values, sharpened false discovery rate (FDR) q values were provided, computed according to Anderson's (2008) code and procedure. Cohen's d was reported to estimate the effect size in the two-sample comparisons.

The participants′ short reflections were thematically coded for five themes defined a priori based on the classification of emotions used in Zeng et al. (2015) and the classification of difficulties presented by Zeng et al. (2019). Two coders separately coded each narrative for the five themes as present (1) or absent (0). Agreement among coders was substantial for three of the coded themes and almost perfect for the remaining two (Neuendorf, 2016): experienced relaxation (Cohen's kappa = .63), experienced positive emotions other than relaxation (Cohen's kappa = .64), experienced negative emotions other than distraction (Cohen's kappa = .83), attribution of negative emotions to difficulties in prosocial engagement (Cohen's kappa = .90), and attribution of negative emotions to difficulties in maintaining attention (Cohen's kappa = .68). The few disagreements were jointly resolved.

Results

Control and attrition checks

Following Aspy and Proeve (2017), the seven participants who answered the control check question with a score lower than 5 were dropped from the sample. This variable took values from 1 to 10 (M = 6.6. median = 7). MANOVA showed no significant differences between these individuals and the rest of the participants in the control variables (age, gender, meditation practice, and dispositional altruism) (Wilks' lambda = .932; p = .456). With these exclusions, the valid sample size for each group was 26 (LKM) and 29 (control). Although identical results were obtained when these participants were kept in the analyses, given that this study was designed in accordance with per-protocol principles, we opted to exclude them. Three participants reported meditating at least 5 times per week. The results did not change when these participants were excluded from the sample, so we retained them in the analysis. Post hoc power analyses (Faul et al., 2007) revealed that the power for the t tests was .83, indicating that the present design yielded adequate power to detect the effects of interest in the data (Cohen, 1992).

Randomness check

To test homogeneity between groups on the control variables jointly considered, MANOVA was conducted. The results showed that both groups were equivalent (Wilk's lambda = .883, p = .232). T tests (or a proportion test for gender) showed no differences across groups. Table 1 displays the descriptive statistics and correlations for the measured variables for the final sample.

TABLE 1 Descriptive statistics and correlations in Study 1 ($n = 55$)

	Mean	SD	[1]	[2]	[3]
[1] age	42.18	17.85			
[2] female (%)	72.70	44.50	.07		
[3] no previous meditation experience (%)	65.30	48.10	−.18	.15	
[4] dispositional compassion	4.92	.89	.31*	.19	−.01

*Significant correlation at 5% level.

As hypothesized, the LKM participants reported significantly more intense levels of gratitude ($M_{LKM} = 2.654$; $M_{control} = 1.586$; $t = 3.160$; $p = .003$, Cohen's d $= .854$), compassion ($M_{LKM} = 2.154$; $M_{control} = .586$; $t = 5.109$; $p < .001$, Cohen's d $= 1.380$) and guilt ($M_{LKM} = .692$; $M_{control} = .207$; $t = 2.551$; $p = .013$, Cohen's d $= .689$). These results support H1a and H1b. Moreover, the results provide evidence of the simultaneous experience of positive and negative empathetic emotions, as a positive and significant correlation between gratitude and compassion ($r = .434$, $p < .001$) and marginally significant correlations between the other two emotional pairings (guilt and gratitude, $r = .238$, $p = .081$; guilt and compassion, $r = .239$, $p = .078$) were observed.

MANOVA rejected that, jointly considered, the mean levels of all 20 emotions were equal in the LKM group compared to those in the active control group. (Wilks' lambda $= .296$; $p < .001$). Table 2 shows the descriptive analysis by groups for each emotion score and t test results for each discrete emotion.

These results show that the LKM participants reported significantly more sadness, guilt, contempt, anger, and disgust than the participants in the control group ($p < .050$). Regarding the positive emotions, the LKM participants also reported significantly more love, gratitude, compassion, happiness, and pride than the control group participants ($p < .050$).

Correlation analyses in the LKM group showed significant and positive correlations between guilt and sadness ($r = .542$; $p = .004$) and guilt and fear ($r = .528$; $p = .006$), which showed that the same individual tended to report these negative emotions. No significant correlations were found between guilt and any other negative emotion.

Thematic analysis of short narratives

The thematic analysis showed that the narratives in both groups similarly referred to experiences of relaxation or calm ($X^2 = 1.00$; $p = .317$). However, the LKM meditators more frequently mentioned positive ($X^2 = 14.64$, $p < .001$) and negative emotions ($X^2 = 8.695$; $pe = .003$). The LKM meditators described positive emotions such as "I could feel love in a pure way" or feeling a "deep connection with other beings." Regarding negative emotions, discomfort was related to the difficulties arising when the participants were asked to send messages of care and love to a person they disliked. This attribution of the experienced negative emotions was mentioned only in the LKM group ($X^2 = 7.45$, $p = .006$), whereas attribution of negative emotions to distractions or difficulties in maintaining focus was equally mentioned in both groups ($X^2 = 2.27$; $p = .132$). This resistance or struggle was conveyed in the short narratives as "allowing myself to give affection to [the disliked other] struck me," "I felt some internal

TABLE 2 Average scores in emotions

Emotion	LKM	Control group	*p* value	*q* value	Cohen's d
Positive emotions					
Serenity	3.500 (.762)	3.345 (.936)	.506	.407	.181
Love	**3.308** (1.011)	**1.414** (1.323)	**<.001**	**.001**	**1.597**
Satisfaction	2.808 (1.266)	2.379 (1.237)	.210	.193	.343
Gratitude	**2.654 (1.263)**	**1.586 (1.240)**	**.003**	**.014**	**.854**
Interest	2.577 (1.474)	1.897 (1.633)	.112	.103	.436
Compassion	**2.154 (1.434)**	**.586 (.780)**	**<.001**	**.001**	**1.380**
Happiness	**2.000 (1.327)**	**1.138 (1.125)**	**.012**	**.029**	**.704**
Hope	1.846 (1.488)	1.207 (1.320)	.097	.097	.456
Pride	**1.269 (1.251)**	**.552 (1.021)**	**.023**	**.037**	**.632**
Awe	1.000 (1.233)	1.069 (1.193)	.834	.478	.057
Fun	.846 (.881)	.724 (1.131)	.660	.478	.120
Negative emotions					
Sadness	**.962 (1.216)**	**.276 (.649)**	**.011**	**.029**	**.715**
Stress	.731 (1.002)	.759 (.951)	.916	.478	.029
Guilt	**.692 (.788)**	**.207 (.620)**	**.014**	**.029**	**.689**
Contempt	**.615 (.983)**	**.034 (.186)**	**.003**	**.014**	**.844**
Anger	**.462 (.948)**	**0 (0)**	**.013**	**.029**	**.702**
Fear	.423 (.857)	.310 (.712)	.596	.466	.144
Disgust	**.346 (.689)**	**.034 (.186)**	**.023**	**.037**	**.633**
Shame	.269 (.533)	.310 (.761)	.819	.478	.062
Humiliation	.192 (.567)	.138 (.581)	.727	.478	.095

Note: Standard deviations between parentheses, in bold significant differences at 5%.

discord," or "a kind of rebellion emerged in myself." However, some participants noted that although they experienced these negative emotions or struggles, they eventually were able to overcome such feelings and finish the practice with a feeling of reconciliation with the disliked other, thus evidencing an experience of ambivalence. The process commonly started with relaxation and positive emotions when caring for the loving ones ("it was very pleasant"; "a moment of happiness and inner peace"); then some type of internal struggle appeared when thinking about the disliked target (e.g., "confusion," "nervousness," and "a desire to run away"); and, finally, serenity and peace of mind were aroused: "I have visualized a classmate whom I don't like and do not consider a good person; it has been hard for me to send my love to her, but I have been able to see that she also suffers. Then, I felt comfort and well-being." This further shows that the participants' attribution of the negative feelings in both groups was very different. In the LKM condition, they struggled to comply with the moral norm embedded in the LKM instruction of sending love to individuals they do not like. In contrast, in the control group, their negative feelings were attributed to the difficulty of the practice; since this does not trigger the perception of a moral failing self, it does not activate guilt.

STUDY 2

Method

Participants

The second study is based on a student sample. It is well established that young adults report greater average levels of both positive and negative affect (Diener et al., 1985) and that age is associated with a shift from negative to positive and from active to passive emotions (Ross & Mirowsky, 2008). This may partly reflect better emotional adjustment with age, as reflected in lower levels of anxiety and depression (Phillips & Allen, 2004). The choice of a student sample intends to obtain a richer and more intense emotional palette, especially for the negative emotions.

The initial sample consisted of 39 students who responded to a call to take part in a brief meditation activity in the university lab (51.3% women, M_{age} = 21.7 years, 71.1% had no previous meditation practice). The participants were randomly assigned to each of two groups depending on the final number of their ID number: odds were the LKM group (n = 19) and even the control group (n = 20).

Intervention

We followed the same procedure as in Study 1. After completing the baseline measures (*demographic questions*, *dispositional compassion* scale, *meditation practice*, and *self-discrepancy and self-esteem*), the participants listened to the same audio recordings described above. Then, the participants were given 5 min to reflect about their experiences during meditation practice as a pause to finally respond to postintervention questions (*control check* and *emotional experiences*).

Measures

Self-discrepancy

An ideographic measure of self-discrepancy based on Higgins et al. (1986) selves questionnaire was used. To rate the actual and ideal discrepancies, the respondents were asked to reflect about their ideal and actual self by describing themselves using 10 attributes they believed they possessed and 10 attributes they would like to possess. The magnitude of discrepancies was measured following the two-step procedure established by Higgins et al. (1986) and Strauman and Higgins (1988) so that matches (presence of same attributes or synonyms in actual and ideal selves), mismatches (the use of antonyms in ideal and actual selves), and mismatches of extent (when the attributes were synonyms but differed in their extent ratings) were measured and included in the overall self-discrepancy score.

Self-esteem

We used the validated Spanish version of the widely used Rosenberg self-esteem scale (Rosenberg, 1965). This four-point scale measures positive or negative attitudes, beliefs, and feelings towards oneself. The participants indicated their level of agreement with 10 statements (e.g., "At times I think I am no good at all") (α = .812).

The rest of the questionnaire used the same measures as those in Study 1 (dispositional compassion scale, $\alpha = .830$).

Analysis

We replicated the same analyses described in Study 1. To test the moderating role of self-esteem or self-discrepancy on guilt, linear regression with an interaction term was employed. This was done using the PROCESS macro by Hayes (2017). When reporting the results of moderation, the effects of the intervention on the dependent variable were reported at three levels of the moderating variable: medium (mean), low (mean minus one standard deviation) and high (mean plus one standard deviation).

Results

Control and attrition checks

As in Study 1, the six participants who answered the control check question with a score lower than 5 were dropped from the sample. This variable took values from 1 to 10 (M = 6.5, median = 7.5). With these exclusions, the valid sample size for each group was 16 (LKM) and 17 (control). No significant differences were found between these individuals and the rest of the participants in the control variables (age, gender, meditation practice, and dispositional compassion), as shown by the MANOVA (Wilks's lambda = .951; $p = .787$). One participant reported meditating at least five times per week. The results did not change when this participant was excluded from the sample, so it was retained. Post hoc power analyses revealed that the power for main effects was .86; however, the power for the interaction term was .54, indicating that the design of the study could be slightly underpowered to detect small differences between the groups in moderation analyses. To avoid the risk of overstating the effect sizes, we offer the confidence intervals for the coefficients in the moderation analyses.

Randomness check

MANOVA and t tests were conducted to test the homogeneity between the LKM and control groups on the control variables. No differences were found for any of them, which showed that despite the sample sizes, the random allocation mechanism worked well (Wilks's lambda = .900; $p = .565$). Table 3 displays the descriptive statistics and correlations for the variables for the final sample.

As expected, the participants in each condition reported more intense negative emotions in Study 2 than in Study 1 ($M_{students} = 6.121$; $M_{community} = 3.309$; $t = 2.162$; $p = .033$; Cohen's d = .476). Specifically, the greatest differences were found in guilt ($M_{students} = .970$; $M_{community} = .436$; $t = 2.335$; $p = .033$; Cohen's d = .514) and shame ($M_{students} = .818$; $M_{community} = .291$; $t = 2.543$; $p = .013$; Cohen's d = .560).

Replicating the findings of Study 1, the LKM participants reported significantly more intense levels of gratitude ($M_{LKM} = 2.938$; $M_{control} = 1.529$; $t = 2.746$; $p = .010$; Cohen's d = .957), compassion ($M_{LKM} = 2.625$; $M_{control} = .941$; $t = 3.857$; $p < .001$; Cohen's d = 1.343)

TABLE 3 Descriptive statistics and correlations in Study 2 ($n = 33$)

| | Mean | SD | **Correlations** | | | | |
			[1]	[2]	[3]	[4]	[5]
[1] Age	21.78	2.38					
[2] Female (%)	51.50	50.80	.14				
[3] No meditation experience (%)	78.10	42.00	.06	.11			
[4] Dispositional compassion	5.31	0.92	.17	.15	.08		
[5] Self-esteem	2.24	0.46	−.26	−.07	.25	.11	
[6] Self-discrepancy	3.09	2.00	−.03	−.15	.06	−.31	−.28

and guilt ($M_{LKM} = 1.687$; $M_{control} = .294$; $t = 3.250$; $p = .003$; Cohen's d = 1.132) than those in the control group. These results confirm Study 1, supporting H1a and H1b.

In addition to differences in the empathic emotion triad, significant differences were found for love and awe, which were more intensely reported among the LKM participants (see Table 4). Regarding negative emotions, the LKM participants reported significantly more sadness, contempt, and anger than the control group participants ($p < .05$). Correlation analyses provide evidence of the experience of emotional ambivalence, as positive and significant correlations were found between compassion and gratitude ($r = .744$; $p = <.001$), guilt and gratitude ($r = .430$; $p = .012$) and guilt and compassion ($r = .516$; $p = .002$). In addition, the data showed strong, positive correlations between guilt and sadness ($r = .731$; $p = .001$) and guilt and fear ($r = .794$; $p = <.001$), which suggested that the same individual tended to report several negative emotions.

The moderating effect of self-discrepancy on the relationship between the type of intervention and level of guilt reported was tested using the PROCESS macro (version 3.5) for SPSS created by Hayes (2017). A total of 10,000 bootstrap samples, bias-corrected, were generated to compute 95% confidence intervals around the estimate of the interaction of self-discrepancy measure[1] and group (LKM, control) on the guilt score. This was made by means of a linear regression model that included guilt as the dependent variable and a dummy variable that captures the intervention group (1: LKM, 0: control group), self-discrepancy, and an interaction term between these two variables as explanatory variables. Table 5 presents the model estimates. The model was significant ($F = 4.43$; $p = .011$; $R^2 = .418$). The interaction term also was positive and significant (ß $= .391$; $p = .041$, $F[1, 29] = 4.56$, 95% CI [0.116, 0.766]). These results show that the higher the level of self-discrepancy is, the higher the impact of an LKM short intervention on the reported guilt (Figure 1). However, in the control group, self-discrepancy has no influence on the level of guilt felt, also because the intensity of this emotion is almost negligible. Therefore, these results lead us to confirm Hypothesis 2.

The same procedure was used to test whether the effect of the intervention on guilt was moderated by self-esteem.[2] Using the moderation analysis of Hayes' PROCESS, the model was significant ($F = 12.79$; $p < .001$; $R^2 = .448$). Table 6 presents the model estimates. The coefficient of the intervention dummy variable was positive and significant (ß $= -4.592$; $p = .002$), and the interaction term was negative and significant (ß $= -1.560$; $p = .018$, $F[1, 29] = 6.29$, 95% CI $[-2.831, -0.288]$). These results showed that the lower the self-esteem level is, the higher the reported guilt among the LKM participants (Figure 2). Self-esteem did not moderate the experience of guilt in the active control group. Therefore, H3 is supported.

TABLE 4 Average scores in emotions

Emotion	LKM	Control group	*p* value	*q* value	Cohen's d
Positive emotions					
Serenity	3.687 (.602)	3.353 (.862)	.208	.191	.448
Love	**3.250** (1.125)	**1.412** (1.372)	**<.001**	**.001**	**1.460**
Gratitude	**2.938** (1.289)	**1.529** (1.625)	**.010**	**.030**	**.957**
Satisfaction	2.688 (1.078)	2.294 (1.213)	.333	.231	.342
Compassion	**2.625** (1.204)	**.941** (1.298)	**<.001**	**.001**	**1.343**
Happiness	2.313 (1.448)	1.529 (1.179)	.097	.108	.595
Hope	2.313 (1.250)	1.588 (1.502)	.144	.145	.522
Awe	**2.125** (1.147)	**1.235** (1.200)	**.037**	**.064**	**.757**
Interest	1.875 (1.310)	2.059 (1.249)	.683	.404	.144
Pride	**1.688** (1.493)	**.706** (1.105)	**.039**	**.064**	**.751**
Fun	.688 (1.014)	.706 (1.047)	.959	.506	.018
Negative emotions					
Guilt	**1.688** (1.537)	**.294** (.849)	**.003**	**.019**	**1.132**
Sadness	**1.563** (1.590)	**.353** (.862)	**.010**	**.030**	**.954**
Contempt	**1.188** (1.424)	**.235** (.752)	**.021**	**.044**	**.844**
Fear	1.125 (1.455)	.294 (.985)	.063	.090	.673
Shame	1.063 (1.482)	.588 (1.064)	.297	.217	.370
Stress	.875 (1.088)	.706 (1.105)	.661	.404	.154
Anger	**.813** (1.109)	**.059** (.243)	**.010**	**.030**	**.953**
Humiliation	.625 (1.258)	.235 (.752)	.285	.217	.379
Disgust	.500 (1.155)	.235 (.437)	.385	.257	.307

Note: Standard deviations between parentheses, in bold significant differences at 5%.

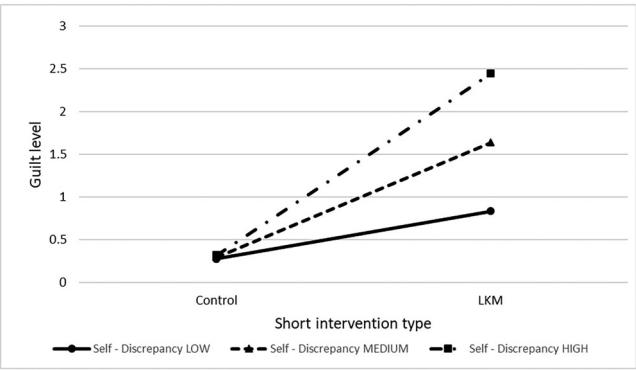**TABLE 5** Model estimates for moderation of self-discrepancy on guilt

Dependent variable: Guilt	
LKM	.0110 (.065)
Self-discrepancy	.171 (.493)
Interaction term	.391** (.183)
R^2	.418
F (3, 29)	4.43
p value F	.011**
No. obs	33

Note: Robust standard errors between parentheses.

*Significant variable at 10% significance level.

**Significant variable at 5% significance level.

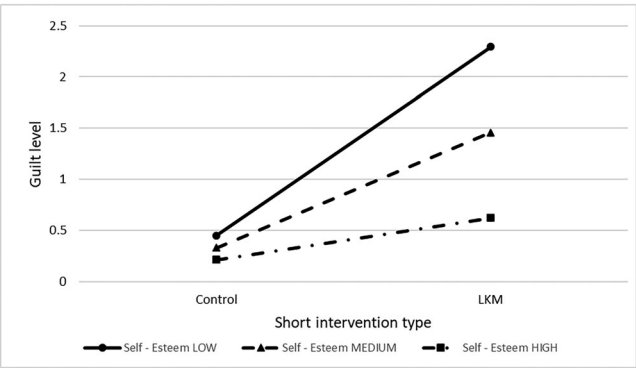***Significant variable at 1% significance level.

FIGURE 1 Moderation effect of self-discrepancy on guilt. Levels of self-discrepancy are evaluated at mean (3.00) (medium), mean minus one standard deviation (1.00) (low) and mean plus one standard deviation (5.00) (high)

TABLE 6 Model estimates for moderation of self-esteem on guilt

Dependent variable: Guilt level	
LKM	4.592*** (1.376)
Self-esteem	−.257 (.284)
Interaction term	−1.560** (.622)
R^2	.448
F(3,29)	12.79
p value F	<.001***
No. obs	33

Note: Robust standard errors between parentheses.
*Significant variable at 10% significance level.
**Significant variable at 5% significance level.
***Significant variable at 1% significance level.

FIGURE 2 Moderation effect of self-esteem on guilt. Levels of self-esteem are evaluated at mean (2.22) (medium), mean minus one standard deviation (1.76) (low) and mean plus one standard deviation (2.68) (high)

DISCUSSION

Whereas much research has examined the positive emotional effects of LKM, studies—notably, experimental studies—that examine the discrete negative emotions activated by LKM at early stages of the practice or the emotional ambivalence triggered by LKM are scarce. After two short interventions, this study shows that the practice of LKM is more emotionally rewarding and challenging than an active control (focused breathing); otherwise, it triggers more emotional ambivalence than focused breathing. The LKM meditators reported more empathetic emotions, both positive and negative. As other studies have shown (Hutcherson et al., 2008; Leiberg et al., 2011), LKM elicits compassion and gratitude to a greater extent than the control.

This study extends this body of work by showing that the LKM participants also felt emotionally distressed after the practice. Confirming our hypothesis, LKM meditators also experienced guilt to a greater extent than the control group. Additionally, we offer evidence that individuals with greater self-discrepancy and lower self-esteem report more intense experiences of guilt during the practice of LKM. The content of LKM may have raised the salience of self-discrepancy for those meditators, thus activating guilt. This is the explanation provided by meditators in their short narratives: the LKM participants refer to their struggle between their difficulties in showing unconditional love for individuals they disliked and the motivation to comply with such instruction. In contrast, in the active control group, the participants who reported negative experiences alluded to problems in staying focused on the practice difficulties that have been more frequently reported by mindfulness meditators (Osin & Turilina, 2022). The study also showed that LKM meditators with lower self-esteem are more likely to report guilt. This trait also has been found to be a moderator of other outcomes (such as fear of compassion for the self) of compassion meditation training programs (Goldin & Jazaieri, 2020).

The study also found that those experiencing guilt also reported other negative emotions, such as fear, sadness, or anger. This correlation among negative feelings is not surprising; research on emotions has shown that emotions are usually perceived by individuals as unitary or blended (Watson & Stanton, 2017). This perception explains why respondents usually mark different emotions in surveys to better reflect what they phenomenologically experience (Baumeister et al., 2007).

Our findings have implications for instructors of LKM, especially when organizing meditation practices with naïve meditators. Instructors play a fundamental role in helping learners manage these negative emotions. First, instructors can perform a previous assessment of participants' traits to diagnose who might encounter more difficulties in the previous stages of meditation. Second, instructors may guide meditators to interpret and mitigate the negative emotional experiences that may arise. As Gilbert (2020) states, these negative emotions should not be seen as a problem but as evidence that training is working. In these cases, instructors should help participants recognize these emotions and develop the courage they need to engage with practice. Indeed, the paradox would be that those who suffer more in the beginning would be those who will obtain more benefits from compassion training, such as LKM. As a recommendation, websites and apps proposing LKM practices to beginners may include short profiling questionnaires based on which customized messages can be proposed to alert participants of the possible negative emotions that may arise. They can also send messages to normalize this experience and encourage participants not to give up. Moreover, when identifying participants with serious "fears, blocks, and resistances" (Gilbert, 2020, p. 22) instructors may recommend to follow personalized training.

This study presents some limitations. First, the results are dependent on the content of LKM chosen in the intervention. Other implementations of LKM may lead to different emotional reactions, particularly if meditators are invited to consider fewer targets and/or if difficult targets—such as disliked ones—are not included. Second, participants were not specifically instructed to visualize the suffering of themselves and others. The emotional reactions may have been different were this instruction included in the practice. Additionally, future studies could test the moderation of other related constructs, such as fear of compassion (Rockliff et al., 2008), self-criticism (Longe et al., 2010), self-kindness (Przyrembel et al., 2019) or brooding (Barnhofer et al., 2010). Finally, the design in Study 2 was underpowered for the moderating effect due to the small sample size. Although the underpowered sample size did not prevent identifying significant moderating effects, it is advisable to replicate this study using a larger sample size and in other cultural settings to obtain more generalizable results.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

ETHICS STATEMENT

All participants gave their informed consent prior to their inclusion in the studies. The present study was approved by the appropriate ethics committee and was therefore performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

DATA AVAILABILITY STATEMENT

The datasets generated during and/or analyzed during the current study are available from the corresponding author on request.

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ENDNOTES

[1] The model uses this variable in its raw values, ranging from 0 to 7.

[2] The model uses this variable in its raw values, in a continuous range from 0 to 3

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