

# The interventional effects of loving-kindness meditation on positive emotions and interpersonal interactions

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**Abstract:** The study aimed to investigate the effects of loving-kindness meditation on positive emotions, intragroup interactions, and complex understanding of others. A total of 50 freshmen not receiving any training in meditation intervention were randomly divided into the meditation group (25 subjects) and the control group (25 subjects). The meditation group was implemented with group meditation intervention for 4 weeks, three times a week, about 30 minutes each time. The results revealed that the effect sizes in interpersonal interaction and complex understanding of others in the meditation group were both above 0.8, indicating strong effects. It was concluded that loving-kindness meditation can effectively improve positive emotions, interpersonal interactions, and complex understanding of others in college students.

**Keywords:** positive emotions, intergroup interactions, loving-kindness meditation, positive rate, complex understanding of others

## Introduction

Meditation is a comprehensive psychological and behavioral experience. Individuals involved produce subtle changes in psychological experience during the meditation process. Studies have shown that loving-kindness meditation (LKM) enhances social connection and positivity toward strangers.<sup>1,2</sup> Evidence also shows that LKM enhances individuals' daily positive emotional experiences.<sup>3-5</sup> Meditation process not only generates positive emotional experience, but can be extended to individuals' daily life and can reshape individuals' personality traits.

Positive emotions are regarded as the ones that can inspire individuals to produce some similar behaviors or behavioral tendencies. Isen et al found that positive emotions can promote problem-solving in interpersonal relationships, consultation, and negotiation.<sup>6</sup> Interpersonal interaction, the precondition for the relationship, is the interaction and communication among people in the psychological and behavioral aspects. Turner proposed that almost every aspect of a human's cognition, behavior, and social organization is driven by emotions.<sup>7</sup> It is widely accepted that joy and other positive emotions bring people closer and is necessary for forming and maintaining interpersonal relationships. Isen<sup>8</sup> discovered that positive emotions activate the dopaminergic system in the brain responsible for executive control and flexible thinking. In addition, positive emotionality predicts greater involvement in social activities.<sup>9</sup>

In terms of social functioning, emotion coordinates individual-society interaction and social relationships.<sup>10</sup> Through positive emotions, people can communicate easier with others, and induce a positive effect in others.<sup>11</sup> Measurement of relationships of college students with their friends by the Inclusion of Other in Self Scale (IOS)

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showed that temporal enhancement of positive emotion enables people to perceive more self–other overlapping.<sup>12</sup> In a prospective study, Waugh and Fredrickson<sup>13</sup> found that positive emotions predict increase of self–other overlapping of first-year college students with new roommates, which in turn predicts better mutual complex understanding of the students. These studies indicate that positive emotions promote interaction between self and others.

Herein, we report a prospective study assessing effects of LKM on individuals' positive emotions and complex understanding of others in college students. We found that LKM significantly promoted the students' positive emotions and social functions.

## Methods

### Participants

A total of 55 freshmen in a university, nine males and 46 females, aged 18–22 years (average 18.5 years, standard deviation =0.65), were recruited via voluntary participation by signing an informed consent form. The study was approved by the Ethical Committee of Ningxia University. The volunteers were all in good health and had not received any training about meditation. The subjects were randomized by random number generation method into the meditation group (25 people) and the control group (30 people). However, five subjects in the control group were excluded from the study because of their invalid experimental data. All participants voluntarily signed consent forms and the study was approved by Ethical Committee of Ningxia University.

### Means and materials

Two types of assessments were performed in this study. The first type was to measure intervention variables by using the Differential Emotions Scale (DES) for evaluation of both positive and negative emotions. The other type included two measurements, the measurement using the IOS for analyzing a subject's ability to integrate self with others, and the measurement of ability of complex understanding by using complex understanding scale. Detailed information about these scales will be provided upon request. Each meditation intervention was composed of four video clips of meditation, each lasting about 30 minutes. The contents in each clip included breath relaxation training of 5–10 minutes, a simple physical exercise of 8–10 minutes, and meditation practice of 10–15 minutes.

The DES measured positive and negative emotions, as described elsewhere.<sup>14</sup> The 25 subjects in the control group

were retested with DES with an interval of 4 weeks, and the test–retest reliability of the positive and negative emotion scale was 0.77 and 0.63, respectively. The IOS measured the interpersonal situation with seven different sets of overlapping circles.<sup>15</sup> Retest with IOS in the 25 subjects in the control group at an interval of 4 weeks revealed a test–retest reliability of 0.71.

The complex understanding scale is derived from the revised attributed program of antonyms group<sup>16,17</sup> to measure the subjects' level of complex understanding of others. It provides the subjects with 15 groups of characteristic phrases of contrary meaning, among which, eleven groups are from Sande et al's method<sup>17</sup> and four from Nisbett et al's initial scale.<sup>16</sup> The level of complex understanding is defined as the number of selections of "both of the two characteristics" by the subject. Retest of the 25 subjects in the control group with the complex understanding scale at a 4-week interval demonstrated a test–retest reliability of 0.85.

### Procedure

The control group performed their regular daily activities, without intervention, while the study group received meditation intervention as follows: 5 days prior to meditation intervention, all participants were evaluated with DES, IOS, and complex understanding scale. In DES evaluation, 19 emotions were scored within a range of 0–4, with 0 indicating none and 4 indicating often. In IOS questionnaire, relationship/overlapping with a roommate was classified into 7 degrees, with 7 as the highest overlapping. While on complex understanding scale, extent of agreement with the 15 pairs of antonymous words were evaluated in three levels, A to C, with A = one of the two, B = both, and C = none. On day of meditation intervention, the subjects received training in meditation. During the intervention, the participants stayed quiet, watched meditation video in the multimedia classroom and followed the instruction in the video to practice meditation. The meditation exercises included LKM, self-acceptance, and self-wake, etc, to help the subjects accept themselves, understand and forgive others. In LKM, the subjects were asked to close their eyes and recall people close to them who have brought them feelings of joy and happiness, and comprehend that feeling. Four minutes later, the subjects were asked to open their eyes to watch photos of strangers on the screen, and to release the feeling of joy and happiness to and put the feeling of love and compassion on the strangers. They were also asked to release this feeling to people around them. The exercises of self-acceptance and self-wake through voice prompts allowed the subjects to

experience inner emotional levels and understand the mortal meaning of themselves. By virtue of breathing, relaxation, body scanning emotional perception and emotional release, the subjects experienced mental and physical pleasure. One day post meditation intervention, retest with all the measurements mentioned above was done on both groups.

The total time period within which the last measurement was done was 7 days for both groups.

## Statistics

Independent Student's *t*-test was conducted to compare baseline levels of all measurements between the meditation group and the control group. And 2×2 analysis of variance (ANOVA) was used to examine effect of the mediation intervention, with group (meditation versus control) as a between-subject factor and test time (pretest versus posttest) as a repeated within-subject factor, respectively.  $P < 0.05$  was considered as statistically significant.

## Results

As shown in Table 1, no significant differences existed in four aspects, including positive emotions, negative emotions, interpersonal interaction, and complex understanding between the mediation intervention group and the control group before the intervention, which indicated comparable conditions in the studied subjects and no intergroup composition bias.

We used 2×2 ANOVA to assess the interventional effects of mediation on the subjects (Table 2). The results showed that the interaction of group and test time were significant for both positive and negative emotions, with  $F(1,48) = 95.81$  and  $87.05$ , respectively. In order to examine the impact of meditation intervention on positive and negative emotions, interpersonal interaction and complex understanding of others, Cohen's *d* effect sizes

$$\left( d = \frac{(\text{mean}_1 - \text{mean}_2)}{\sqrt{(SD_1^2 + SD_2^2)/2}} \right) \quad (1)$$

were calculated as described elsewhere (Cohen, 1992).<sup>18</sup> The results showed that, comparing that of control group, higher

effect sizes were present in meditation group for both positive and negative emotions, interpersonal interaction, and complex understanding of others. However, the effective sizes for negative emotions were significantly lower in meditation group. The data indicated that, on one hand, the mediation intervention apparently enhanced the subjects' positive emotions, interpersonal interaction, and complex understanding of others; and on the other hand, the meditation intervention remarkably decreased negative emotions in the subjects. In addition, all the effect sizes of the meditation group were greater than 0.8, suggesting that the effects were all strong.<sup>18</sup>

## Discussion

In Guo et al's study of 1,547 cases, psychiatric symptoms are relatively common (7.8%) in Chinese freshmen due to a variety of reasons, including personality dysfunction, parental rejection, increase in age, disliked institute and/or major, and lack of orientation.<sup>19</sup> Psycho-emotional support is therefore important for them to overcome their neuropsychiatric difficulties and hardship. Accumulating data have shown that meditation practice generates positive outcomes of various psychosocial aspects. It not only enhances an individual's physical pleasure but also emotional happiness, executive control, and self-regulation. The results of the current study, in a college setting, demonstrate that LKM can enhance an individual's positive emotions, reduce negative emotions, promote interpersonal interaction, and strengthen complex understanding of others through meditation.

Studies on positive emotions are largely dependent on the emotions induced in laboratories, with visual, auditory or smell materials. Emmons and McCullough<sup>20</sup> questioned the validation of the experimental data collected in these settings. They believe that formation of personal resources needs more positive emotional experience which cannot be formed on a single occasion. In addition, data from different researchers suggest that the reproducibility of inducing positive emotions in an experimental environment tends to decline along with repeating of the induction conditions. With disappearance of fresh experience, a subject's emotions gradually return to baseline levels.

**Table 1** Baseline statistics between meditation group and control group (mean ± standard deviation)

| Variable                        | Meditation group (n=25) | Control group (n=25) | Student's t-test (P-value) |
|---------------------------------|-------------------------|----------------------|----------------------------|
| Positive emotions               | 2.54±0.48               | 2.47±0.62            | 0.43 (P=0.667)             |
| Negative emotions               | 1.27±0.30               | 1.24±0.44            | 0.30 (P=0.766)             |
| Interpersonal interactions      | 5.28±0.84               | 5.04±0.94            | 0.95 (P=0.345)             |
| Complex understanding of others | 11.44±1.66              | 10.72±1.86           | 1.44 (P=0.155)             |

**Table 2** Invention effect between meditation group and control group

| Variables                       | Meditation group     |           |                               | Control group        |           |                               | Interactions effect<br>F(1,48) |
|---------------------------------|----------------------|-----------|-------------------------------|----------------------|-----------|-------------------------------|--------------------------------|
|                                 | Posttest<br>(M ± SD) | Cohen's d | Student's<br>t-test (P-value) | Posttest<br>(M ± SD) | Cohen's d | Student's<br>t-test (P-value) |                                |
| Positive emotions               | 3.06±0.41            | 1.16      | -19.20**<br>(P=0.000)         | 2.16±0.42            | 0.58      | 3.86**<br>(P=0.001)           | 95.81**                        |
| Negative emotions               | 0.77±0.26            | 1.79      | 18.46**<br>(P=0.000)          | 1.45±0.38            | 0.52      | -3.01**<br>(P=0.006)          | 87.05**                        |
| Intergroup interactions         | 6.28±0.84            | 1.19      | -4.20**<br>(P=0.000)          | 5.04±0.89            | 0.00      | 0.00<br>(P=1.000)             | 100.00**                       |
| Complex understanding of others | 13.20±1.19           | 1.22      | -11.30**<br>(P=0.000)         | 10.48±1.66           | 0.14      | 1.24<br>(P=0.228)             | 64.66**                        |

Note: \*\*P<0.01.

Abbreviation: SD, standard deviation.

With no doubt, more reliable means to rouse positive emotions are in great need. Meditation is one of the options to meet this need. Meditation process not only enhances positive emotional experience, but also produces positive effects that can be extended to individuals' daily life and reshape one's personality traits.<sup>21</sup> Our data demonstrated that LKM can effectively enhance positive emotions, improve college students' interpersonal interactions and complex understanding of others.

There are several limitations to this study. Although the present study showed that LKM positively affects individuals' emotions, our study did not focus on specific types of positive emotions, such as joy and hope. In addition, the study was conducted in a population in a college setting with a relatively small sample size. More data with subjects from different populations are required for generalization of our conclusion. To provide better practical behavioral guidance for the college students, we also need better understanding of the psychoneurological mechanisms of meditation.

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## Disclosure

All the authors declare that they have no conflict of interest.

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