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Brief Compassion Meditation and Recall of Positive-Emotion Words

Evangeline A. Wheeler

Nathan W. Lenick

Towson University

A study was done to investigate whether a brief induction of compassion meditation would affect memory for emotionally laden words. One group of participants listened to twenty-five minutes of compassion meditation instructions while another group listened for the same amount of time to relaxation music. Both groups were given a verbal learning test composed of words which were positive, neutral and negative in valence, and then asked to recall those words in a free-recall test. Results revealed that while the number of negative and neutral words recalled did not differ between the groups, the compassion meditation group tended to recall more positive words. This small effect was perhaps not due to an improved mood in the meditation group. Results are discussed in terms of the effects of compassion meditation on memory for emotional stimuli.

Corresponding author:

Correspondence concerning this article should be addressed to Evangeline A. Wheeler, Towson University, Department of Psychology, 8000 York Road, Towson, MD 21252. Email: ewheeler@towson.edu

The purpose of this study was to determine whether memory for certain kinds of words is affected by being in a state of compassion. In studies of “mood congruence,” researchers look at factors involved in the general finding that memory is better when the material to be remembered is congruent with a person’s current mood (Fiedler, 2001). A person in a pleasant mood should remember pleasant material better than unpleasant material, whereas a person in an unpleasant mood should remember unpleasant material better. In a typical study, mood is measured or manipulated then people learn lists of words that are positive (pleasant), negative (unpleasant) or neutral. Then their recall is tested after several minutes or longer. Another way to examine mood congruence is to compare non depressed people and people tending toward depression. In these studies where a participant rates whether character trait words apply to themselves and are later asked to recall all the words from the list, non-depressed people tend to recall a greater percentage of positive trait words (Ellis & Moore, 1999).

While a state of compassion induced through meditation does not attempt to directly influence mood, it is an ancient meditative practice that aims to cultivate positive affect towards oneself as well as towards all other living beings. The practice involves the deliberate nurturing of thoughts and emotions which promote the wish that all living beings be free from suffering. It has several stages which include the development of a conscious awareness of suffering, an empathetic concern whereby one is emotionally moved by the suffering of others, a wish to relieve the suffering of others, and a readiness to help relieve another individual’s suffering (Jazaieri, McGonigal, Jinpa, Doty, Gross, & Goldin, 2013). It builds on attentional processes in the attempt to elicit a particularly affective state characterized by feelings of care and concern for other people (Jha, Krompinger, & Baime, 2007). Training in compassion via a meditative state increases prosocial behavior towards strangers (Leiberg, Klimecki, & Singer, 2011) and enhances empathic accuracy (Mascaro, Rilling, Tenzin Negi, & Raison, 2013). It is associated with changes to brain areas active in emotion regulation and social cognition (Lazar, Bush, Gollub, Fricchione, Khalsa, & Benson, 2000; Mascaro, Rilling, Tenzin Negi, & Raison, 2013; Véronique, Joshua, Véronique, Geneviève, Estelle, Sébastien, & ... Mario, 2011; Weng, Fox, Shackman, Stodola, Caldwell, Olson, Rogers, & Davidson, 2013). It affects the processing of emotional and cognitive states (see Desbordes, Negi, Pace, Wallace, Raison, & Schwartz, 2012). Though practicing compassion for others does not remove their pain or suffering, it will theoretically increase interpersonal connectedness and prevent negative judgmental feelings from adding to another’s burdens and suffering. Feeling connected to others improves psychological and physical well-being (Brown, Nesse, Vinokur, & Smith, 2003; De Vries, Glasper, & Detillion, 2003) and decreases the risk of psychological depression and physical ailments (Hawkey, Masi, Berry, & Cacioppo, 2006). In ancient traditional practice compassion takes years to train and develop, but contemporary researchers have developed lab-based analogs that are able to show effects of compassion training in brief training sessions. For instance, Cognitively-Based Compassion Training (CBCCT) is a type of contemplative practice that teaches active contemplation of loving-kindness, empathy and compassion towards loved ones, strangers, and enemies (Reddy, Negi, Dodson-Lavelle, Ozawa-de Silva, Pace, Cole & ... Craighead, 2013). CBCCT employs a variety of cognitive restructuring and affect generating practices with the long-term goal of developing an equanimity of mind that

fosters acceptance and understanding of others. It takes six weeks.

Compassion Meditation (CM) has the characteristic of wishing that others be free from suffering, while the related practice of Loving-Kindness Meditation (LKM) has the characteristic of wishing for the happiness and welfare of others. Hutcherson, Seppala, & Gross (2008), for example, used a 7-minute loving-kindness meditation wherein participants heard instructions to imagine, with eyes closed, themselves standing between two loved ones and sending love their way. Participants repeated a series of phrases designed to bring attention to the other, and to wish them health, happiness, and well-being. After four minutes, participants were told to open their eyes and redirect these feelings of love and compassion toward the photograph of a neutral stranger. Participants in the loving kindness group reported becoming more positive (i.e. calm, happy, loving) after the meditation compared to a group that was instructed in imagining how two people looked. Compassion meditation may contribute to an attentional state whereby participants are able to “let go” of negative incoming stimuli and focus on more positively valenced words, as was found by Roberts-Wolfe, Sacchet, Hastings, Roth, and Britton (2012), who concluded that since meditators showed greater increases in positive word recall that the operative mechanism might work by altering attention to emotional content. In other words, compassion meditation may induce a cognitive state whereby negative stimuli are attended to very briefly and then released from attention with subsequent cognitive processing (see Lutz, Slagter, Dunne, & Davidson, 2008).

Individuals in a positive mood state can recall more words than those in a negative mood state (Isen & Simmonds, 1978). Since compassion meditation enhances positive mood (Hofmann, Grossman & Hinton, 2011) and positive mood affects memory for affective stimuli, it seems reasonable to hypothesize that compassion meditation might enhance memory for positive stimuli delivered while in this mood. On the other hand, there could be an aspect unique to compassion meditation that leads to a better memory for more positive stimuli, irrespective of positive mood. The intentional focus in compassion meditation on extreme states like someone’s suffering and happiness might activate in the mind a cognitive schema including representations of the full continuum of these states, improving memory for emotional valence of stimuli. This, along with the intention to wish others well via deliberate imagery, could account for the effect. Using a meditative technique akin to compassion meditation, Hunsinger, Livingston, & Isbell (2013) examined the impact of loving-kindness meditation on affective learning and found that participants who trained in loving-kindness were significantly more likely than controls to associate positivity with neutral stimuli, but they did not assess whether this was due to the loving-kindness group being in a more positive mood.

This raised a couple of questions for us: Can the effect be extended beyond loving-kindness meditation, to compassion meditation? Is the effect of positivity due to participants being in a good mood because of the meditation induction? And since many studies on meditation use experienced meditators, we wondered whether the effect on positive words is restricted to those with extended experience in meditation? We used a group of participants naïve to meditation and tested the effects of a brief (25 minute), one-session compassion meditation, and included a measure of mood. We hypothesized that the recall of positive words would be greater in the compassion meditation group, and would be independent of mood.

Method

Participants

Volunteers were recruited from a university online research pool advertising a study to examine the effects of meditation on mental rotation. Participants were screened for any previous experience with meditation (“Have you ever practiced meditation?”). Sixty-five undergraduate psychology majors (45 women and 20 men, M age = 19.7 years) from a mid-sized university participated and received extra credit toward a course grade for volunteering their time. The ethnic demographics of our sample mirrored that of the university (74% White). Twenty-six percent of our undergraduate students identify as being of a racial or ethnic minority. This includes students who identify themselves as being African-American/Black, American Indian or Alaska Native, Asian, Hispanic/Latino, Native Hawaiian or Pacific Islander, or multiracial. The study was approved by the university’s IRB ethics committee.

Materials and Procedure

Mood measurement. We used the well-known Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), to measure mood. Each item was rated on a 5-point scale ranging from 1 = *very slightly* or not at all to 5 = *extremely* to indicate the extent to which the respondent felt a particular way (for example, “alert”) at the current moment. Higher scores indicated higher affect. The full version of the PANAS consists of two 10-item scales for positive affect and negative affect, respectively. After signing the consent form and completing the baseline PANAS, each participant was seated comfortably alone at a desk in a small, quiet, walled cubicle next to a desktop computer with a 17 inch monitor and fitted by the experimenter with a Logitech headset for listening. The walls of the cubicle were bare and the lighting was from an overhead fixture.

Meditation induction. An independent groups design was used whereby participants were randomly assigned to either a compassion meditation ($N = 32$; 28% males) or a relaxation control condition ($N = 30$; 30% males), and tested individually. Participants in the compassion meditation condition listened for 25 minutes to a streaming audio of a male voice in a verbally guided compassion meditation taken from the Santa Barbara Institute of Consciousness Studies (sbinstitute.com) podcast. All instructions were given by a former Tibetan monk and meditation instructor with 40 years of teaching experience. They were instructed, through the headset, to first imagine compassion (for instance, silently repeating phrases like “May I be free of suffering and pain”) for themselves and then gradually to extend these same thoughts of compassion to their family members, then to their friends, then to neighbors and strangers, to enemies, and finally all beings everywhere. Participants in the relaxation condition listened to 25 minutes of acoustic flute music from an audio CD entitled “Satori: Music for Yoga and Relaxation.” They received no specific instruction except to listen and relax. At the end of this induction, the PANAS was administered a second time.

Memory task. After the meditation/relaxation induction, each participant completed a computerized visual verbal learning test created through a Powerpoint slideshow. Participants were instructed to focus on the center of the computer screen and to watch for words to appear which they would read to themselves silently. Words were

shown black against a white background in size 48 font. Participants read, in random order, ten positive (e.g., “delight”, “friendly”), ten negative (e.g., “death”, “hell”), and ten neutral (e.g., “dog”, “cup”) words at the rate of one word per two seconds, followed by a two second delay during which they saw a blank white screen. The thirty words were taken from the standardized Affective Norms of English Words (ANEW) list (Bradley & Lang, 1999). The list of 30 words was presented just once. A transcript of the compassion meditation induction was examined to confirm that all of the words on the recall list were different from any words that were heard in the meditation induction.

Upon completion of the memory task, participants played five minutes of the video game Tetris on the computer as a distractor task to prevent overt rehearsal of the words. Tetris is a spatial rotation task that does not involve any emotional or verbal components. No data were collected on performance in this task, and prior experience with the game was not a consideration. At the end of five minutes of play, participants were stopped, handed paper and pen, and asked to recall and write down as many words as they remembered from the verbal learning task. They were given five minutes maximum to complete this task.

Data Analysis

Data for three participants were dropped from the analysis, one because the participant was running late for a class and could not complete the session, and two because participants failed to follow instructions and properly perform the experiment. For a test of the main hypothesis, the totals of correctly recalled positive, negative and neutral words served as the dependent variables. There was no analysis of incorrectly recalled words since there were so few of them; just 2.5% of the words recalled were ones which had not appeared at all in the verbal learning task.

A one-way multivariate analysis of covariance (MANCOVA) was conducted to determine the effect of induction on the recall of positive, negative and neutral words. Pre and post positive mood scores from the PANAS scale were entered in the model as covariates. There were no significant effects of negative mood, and since the hypothesis concerned positive mood, these data are excluded from this analysis.

Results

Results of the four tests (Pillai’s Trace, Wilks’ Lambda, Hotelling’s Trace, and Roy’s Largest Root) in the overall multivariate analysis indicated that one of the covariates (the positive mood at baseline) had a significant effect ($F(3,54) = 2.783, p = .05, \eta_p^2 = .134$, power = .64). This would seem to indicate that an initial positive mood did indeed affect recall. The second covariate (positive mood measured after the treatment) was not significant ($p = .278$). However, tests from the multivariate results revealed an overall effect of condition on the recall of words that is marginally significant ($F(3, 54) = 2.596, p = .06, \eta_p^2 = .126$, power = .61), once the effect of mood is statistically removed. Table 1 shows the PANAS scores per group.

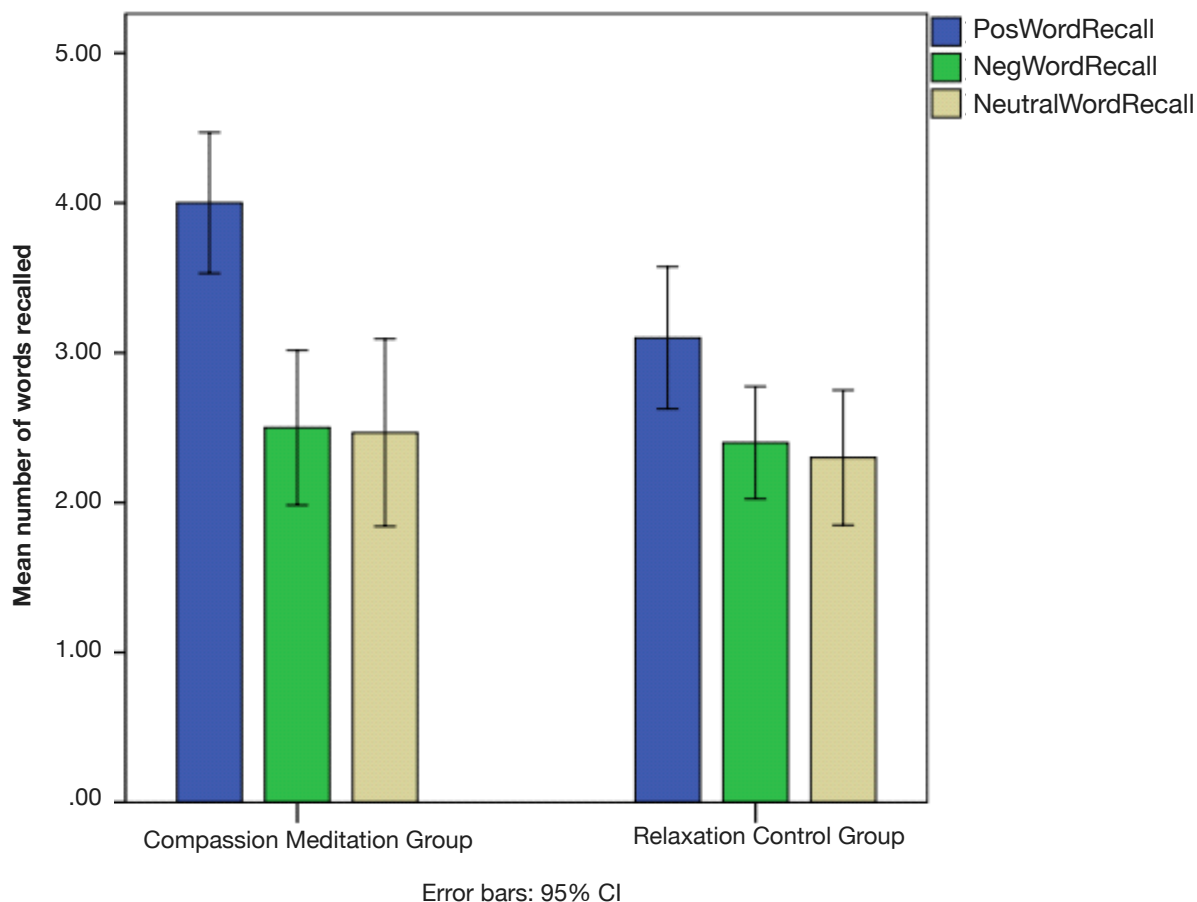
Follow-up univariate tests revealed a significant effect of condition on only the recall of positive words ($F(1, 56) = 7.78, p = .007, \eta_p^2 = .122$, power = .78). The effect of condition on the recall of negative ($p = .745$) and neutral words ($p = .352$) was not significant. Also in the univariate analysis, the influence of the baseline positive mood

Table 1: Positive mood scores per group. Higher scores indicate more positive mood.

Group	Baseline PANAS-positive M (SD)	Post-Induction PANAS-positive M (SD)
Compassion Meditation	30.13 (7.02)	28.63 (9.47)
Relaxation	26.40 (6.70)	24.77 (8.40)

Note. The Positive and Negative Affect Scale (PANAS) is from Watson, Clark & Tellegen, (1988).

scores (the first covariate) was revealed in the recall of neutral words ($F(1, 56) = 7.551$, $p = .008$, $\eta_p^2 = .119$, power = .77). We followed up with a bivariate correlation test using the baseline positive mood scores and the number of neutral words recalled. This resulted in a marginally significant negative correlation ($r(60) = -.234$, $p = .07$). The more positive the mood at baseline, the fewer neutral words were recalled. Figure 1 shows the unadjusted mean number of words recalled by condition.

Figure 1: Mean number of positive, negative and neutral words recalled by group.

Discussion

In this study we asked whether compassion meditation improves the recall of words with a positive emotional content. We predicted that participants in the meditation group would recall more positive words, and that this effect on recall would not be attributed to meditators being in a more positive mood. The compassion meditation group tended to recall on average, one more positive word than the control group, and this was a medium effect. With mood controlled, we found a marginally significant difference in the number of positive words, and no difference between the meditation and control groups in the number of neutral and negative words recalled. However, baseline positive mood had a marginally significant effect on recall of neutral words for both the meditation group and the control.

Though only marginally significant, the finding that compassion meditation may lead to better memory of positively valenced stimuli is important, since no other comparison study exists. We looked to the mindfulness literature (since mindfulness and compassion meditation share some characteristics) and discovered that our finding contrasts with those studies showing a decrease in memory for negative stimuli for mindfulness meditation groups, while finding no differences in the positive (Alberts and Thewissen, 2011; Collard, Avny, and Boniwell, 2008). We think this difference in results is explained by the unique contributions of compassion meditation which focus attention on specific positive thoughts directed toward others, whereas mindfulness allocates equal attention to all thoughts. However, compassion meditation forces the consideration of others' suffering as well, which could lead to a memory of more negatively valenced words, so it is possible that the focus on positive *well-wishes* directed toward self and others (for example, "May I be free of suffering") is the important feature which overrides the negativity. Perhaps the intended fixation on polar states like suffering and happiness initiates cognitive schema activating the full range of these states, which, along with the well-wishing intention, would have a facilitating effect of memory. A comparison group instructed with sham compassion meditation – "I think of all being as happy" rather than "May all beings be happy" – might tease this apart and help to explain via an intention-superiority hypothesis (Penningroth, 2011), the exact mechanism of the compassion meditation effect. We considered whether the effect could be explained by priming since the meditation induction was verbal and contained positive emotion words. However, there was no greater recall of negative words, which could be hypothesized to occur since the induction also contained words related to negative emotions. And, the total number of words recalled was about the same across conditions.

The first limitation of our study is that we cannot explain why the meditation group was in a better mood at the beginning of the study, though conditions were identical except for the induction. Random assignment to a treatment group was determined for each participant, and the same trained experimenter conducted all sessions. This fact limits our interpretation of the results since we cannot say with any confidence or evidence that it was compassion meditation per se, that affected the result. Second, we did not measure whether the compassion meditation induction worked. We could have at least used the Self-Other Four Immeasurables (SOFI) scale (Kraus & Sears, 2009). Nowhere in the literature did we locate a prior study that used our procedure for inducing compassion. Most research employs a compassion training which requires several weeks. Nor did we measure whether mindfulness had been induced inadvertently in either the experimental or control group.

Because mindfulness is one measure of attention training, it is possible that an element of mindfulness could have been the factor which induced positive recall and not necessarily compassion meditation training. We could not locate any research on whether brief periods of relaxation induce mindfulness. Future studies should investigate this possibility.

As a final matter, we did not find that compassion meditation improved positive mood. In fact, positive mood scores dipped for both meditation and control groups, though not at levels that reached significance. The study was conducted with each participant seated upright in a computer desk chair where they listened to the instructions via headset. Previous studies have had participants sit on meditation cushions or yoga mats. Possibly participants were physically uncomfortable listening to the audio guided instructions for so long, and this accounts for why positive mood scores dipped following the induction. Future studies could tease this apart by having the groups practice on a cushion, a pillow, or a yoga mat.

Conclusion

While the effect sizes were small, and some results were evident only in trends, these results are encouraging for future research in this area. Most research on positivity and meditation is dominated by multi-session training with the emphasis on mindfulness, and not short sessions on compassion. Yet, compassion meditation training can lead to greater acts of altruism, social connection and compassionate behavior (Condon, DeSteno, Desbordes, & Miller, 2013; Hutcherson, Seppala, & Gross, 2008). Though a lab-based variant of the compassion meditation envisioned by traditional Buddhist practices might not be optimal for development of full compassion, short sessions of meditation might be of benefit in a contemporary culture of speed and general busy-ness. Like loving-kindness meditation, compassion meditation might be expected to have a long-lasting effect on positive emotions which leads to changes in personal levels of growth and life satisfaction (Fredrickson, Coffey, Pek, Cohn, & Finkel, 2008). Compassion can be cultivated with training, resulting in greater altruistic behavior emerging from increased engagement of neural systems implicated in understanding the suffering of other people. So, one important contribution of this study is the demonstration that effects of compassion meditation on emotion-related cognitive processing can be obtained in a single training session with novices inexperienced in compassion meditation, even if the benefit is limited to an increase of just one positive word. Deep connections between words and sensory perception (Lupyan & Ward, 2013) can extend to our emotions, affect brain processes and bond us in compassionate ways to other people. Even though our compassion meditation group was inexplicably in a better mood even before the induction, this did not account for their greater recall of positive words. Something about inducing compassion leads to a memory of the positive.

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