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Authors

Malaktaris, Anne
Lang, Ariel J
Casmar, Pollyanna
et al.

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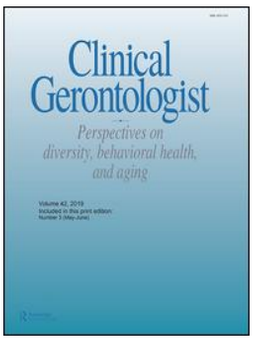

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Pilot Study of Compassion Meditation Training to Improve Well-being Among Older Adults

Anne Malaktaris PhD[a,b], Ariel J. Lang PhD[a,b,c], Pollyanna Casmar PhD[a,b], Selena Baca BS[d], Samantha Hurst PhD[c], Dilip V. Jeste MD[b,e,f], and Barton W. Palmer PhD[a,b,e]

[a]Center of Excellence for Stress and Mental Health, Veterans Affairs San Diego Healthcare System, San Diego, California, USA;; [b]Department of Psychiatry, University of California, San Diego, California, USA; [c]Department of Family Medicine and Public Health, University of California, San Diego, La Jolla California, USA; [d]Department of Psychology, San Diego State University, San Diego, La Jolla California, USA; [e]Center for Healthy Aging/Stein Institute for Research on Aging, University of California, San Diego, La Jolla California, USA; [f]Department of Neurosciences, University of California, San Diego, La Jolla California, USA

ABSTRACT

Objectives: Compassion meditation (CM) training has demonstrated potential in improving well-being and psychosocial functioning. However, most prior studies of CM training have focused on younger adults. The generalizability of the effectiveness of CM training with older adults requires further study. This pilot study was intended to inform future randomized controlled studies of CM training in older adults.

Methods: Participants included 24 older adults who attended a 10-week group CM training. Exploratory outcome measures were administered prior to, during, and after the intervention. Participants also completed logs of mood and meditation practice, and provided descriptive comments in response to open-ended questions administered at the end of treatment.

Results: High treatment completion rates (87.5%) and reported adherence (85.7% of assigned meditation) were observed. Descriptive feedback from participants indicated older adults are interested in and capable of learning and applying new concepts and skills in support of their well-being. Pre- to post-intervention changes were explored with a variety of self-report measures. Weekly journals suggested increased feelings of love, closeness, or trust, and decreased feelings of stress, nervousness, or being overwhelmed.

Conclusions: These findings provide preliminary support for the feasibility of CM training in community-dwelling older adults, and suggest the need for future efficacy and effectiveness clinical trials.

Clinical Implications: CM training offers potential benefits for improving well-being among older adults, and, as an example of a strengths-based approach, can be tailored to the specific needs of older adults.

KEYWORDS

Loneliness; compassion/empathy; meditation; psychotherapy; positive psychiatry; positive psychology; healthy aging; wisdom

Introduction

Although advancing age is often associated with stressful psychosocial and physical health changes (e.g., loss of purpose and independence, declines in physical, cognitive, and functional abilities, bereavement and other interpersonal stressors; Murayama, Yamazaki, Yamaguchi, Hasebe, & Fujiwara, 2020), it can also be a time of improvements in mental well-being (Carstensen et al., 2011; Thomas et al., 2016). In the latter vein, the past decade has been a time of increasing public and research interest in healthy psychosocial, cognitive, and physical aging (Jeste, Palmer, Rettew, & Boardman, 2015). However, a recent U.S. national survey by the American Association of Retired Persons (AARP) revealed a 35% prevalence of loneliness among people ages ≥ 45 years (Anderson & Thayer, 2018). Loneliness and social isolation are known to have adverse impact on health (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015), but other positive psychological characteristics may mitigate such effects (Lee et al., 2019; Murfield, Moyle, Jones, & O'Donovan, 2019; Nguyen et al., in press; Tavares, Vagos, & Xavier, 2020). There is also some evidence that positive psychological interventions, focused on building strengths or skills rather than addressing deficits,

CONTACT Barton W. Palmer bpalmer@health.ucsd.edu Department of Psychiatry, Veterans Affairs San Diego Healthcare System, UC San Diego, La Jolla, CA 92037

Supplemental data for this article can be accessed on the publisher's website.

can be effective in improving an individual's positive psychological functioning (Bartholomaeus, Van Agteren, Iasiello, Jarden, & Kelly, 2019; Kim & Knight, 2017). One such intervention is compassion meditation (CM) training.

CM is a contemplative practice focused on cultivating compassion and empathy for self and others based on an awareness of common humanity, which generates a sincere wish that the self and others may be free from suffering (Gilbert, 2014). Prior research, albeit mostly conducted with younger adults, has shown CM and related practices to be associated with increases in positive emotion, mindfulness, and empathy, and reduction in perceived stress, emotional suppression, and negative mood, as well as reduction in loneliness/improvement in feelings of social connectedness and belonging (Ash et al., 2020; Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008; Jazaieri et al., 2014; Kirby, 2017; Koopmann-Holm, Sze, Jinpa, & Tsai, 2020; Lang et al., 2012; Wallmark, Safarzadeh, Daukantaitė, & Maddux, 2013). CM and related meditative practices have also been shown to have beneficial effects on stress-related physiological functions that can affect health and mortality (Creswell et al., 2012; Mascaro, Negi, & Raison, 2017; Pace et al., 2009).

Previous work has shown that meditation-based interventions can be helpful for older adults. For example, mindfulness has been shown to decrease depression and loneliness in this population (Creswell et al., 2012; Kishita, Takei, & Stewart, 2017; Li & Bressington, 2019). However, although there is some overlap among various meditation techniques, including mindfulness and compassion meditation, the foci of various practices differ. Specifically, the focus of mindfulness meditation is on non-judgmental awareness of present-moment experiences, whereas the focus of CM is on cultivating the heartfelt wish to alleviate suffering. There is also some evidence that various meditation practices yield differential benefits (Lang et al., 2012).

There is presently a dearth of empirical research on CM training with older community-dwelling adults to determine whether the feasibility and effectiveness of CM training generalizes to this population. In determining the feasibility of CM training in older adults, it is also important to consider age-appropriate adaptations (cf. Kishita & Laidlaw, 2017; or Knight & Poon, 2008). Such adaptations may include alterations to compensate for a higher prevalence of sensory or other physical deficits, ensuring age-relevant content (e.g., frustration/difficulty coping with changes in physical health and role functioning; loneliness and loss; reduction in sense of purpose and independence), and consideration of normal age-related cognitive changes (such as decreased processing speed and free recall skills). As the need for alterations may also differ from individual to individual, it is also important that an individual can readily contact the trainer(s) for assistance with specific barriers to engagement.

The present study was a non-randomized pilot study of a 10-week CM training group for self-referred, community-dwelling older adults. Primary outcomes were treatment attendance and reported adherence (time spent meditating). We also examined qualitative feedback provided by participants following their CM training session. Exploratory analyses included preliminary effect size estimates for pre- to post-intervention changes in a range of potentially relevant outcomes for future studies. Together, these data are intended to guide the design of future larger scale randomized controlled trials of the effectiveness of CM training to foster physical and mental well-being and increase social connectedness, as well as age-appropriate modifications, to enhance relevant outcomes among community-dwelling older adults.

Method

Participants

Participants included 24 older adults (ages 66–73 years) recruited at a San Diego area senior community center. Volunteers were recruited through word of mouth, short presentations at the community center, and flyers. Inclusion criteria were intentionally minimal but included: a) current age ≥ 60 years, b) English fluency, and c) intention to reside in the San Diego region for the duration of study involvement. Exclusion criteria were: a) self-reported diagnosis of dementia, or any other disabling illness that would prevent participation in the entire study, and b) inability to attend study activities on a regular basis. Mean age was 73.6

(SD = 5.3) years, and mean education was 16.7 (SD = 3.1) years. A majority of participants (75%) were women and non-Latino Caucasians (91.7%). Forty percent of the participants reported an annual income of ≥ 100,000 USD per year.

Procedures and measures

Each participant met individually with a trained research staff member to complete the screening and informed consent process for enrollment. In addition, participants completed a battery of self-report measures, described below, during this baseline visit and during a post-intervention visit (within 30-days after attending their final group session). This program was provided at a community center co-located with a religious place of worship in the San Diego area; this community center regularly offers educational programs to supplement the members' spiritual growth and well-being, and our CM intervention was included among other educational offerings. This protocol was reviewed and approved by the UC San Diego Human Research Protections Program as well as the administration of the senior community center. All participants provided informed written consent to participate.

Compassion training

The intervention for this study was adapted with permission from Cognitively-Based Compassion Training (CBCT®; Negi, 2013). CBCT is a manualized, secularized CM training based in part on Tibetan Lojong tradition, which is literally translated as "mind training." Accordingly, CBCT is a systematic, structured program using analytical meditation techniques to cultivate compassion, the heartfelt wish for freedom from suffering. CBCT participants are first guided in creating a strong foundation by learning to stabilize and focus attention and then become familiar with one's inner experiences and the causes of one's own satisfaction, and conversely, suffering. These insights about the nature of one's one experiences then facilitate an awareness of the suffering of others, and ultimately, a genuine urge to alleviate the suffering of others.

CBCT was administered by one of the coauthors of the present paper (PC), who is a licensed clinical psychologist and certified as an instructor of CBCT®. The intervention consisted of ten 90-minute group sessions. Three sequential groups were conducted in order to keep each group within the optimal size of 5–10 participants. Each CBCT session consisted of a review of homework and previous topics (15– 30 minutes), experiential exercises and discussions of a treatment topic (30– 45 minutes), and formal seated meditation practice (6– 15 minutes). The content of the sessions was as follows: Sessions 1–4 introduced the structure and concepts of the training, and then focused on training and practice of basic mindfulness breathing practices. Sessions 4– 8 focused on analytical meditation practices, or the use of logical reasoning processes to foster well-being and facilitate compassion for self and others. The final two sessions (9 and 10) reviewed content and assisted with skills maintenance. See Table 1 for session by session content details. (An example of detailed session content and homework from session 5 is available in Online Supplement Table S1.)

The structure of the CBCT sessions has been used previously with Veterans who have PTSD, and was modified for this older adult sample to target loneliness, chronic pain, and anxieties about memory loss and bodily changes while keeping the more essential topics intact. Age-appropriate modifications for the current sample included use of larger font in the participant manual and replacing pictures in within-session presentations and in the participant manual so that they reflected a healthy and active multiracial and multi-gender aging population. CM training age-related adaptations included a modification of the rationale presented for CM training (e.g., to address concerns relevant to healthy aging and addresses challenges specific to older adults) and application of CM concepts and practices to age-related concerns (e.g., working with pain or bodily discomfort during seated meditation; seeing aging, illness, and even death as universal human experiences; adapting kindness toward self while acknowledging impermanence of physical abilities, relationships, roles, etc.; recognizing interdependence and fostering gratitude to counteract isolation/loneliness). Additionally, a research associate worked individually with participants to assist them in completing measures,

Table 1. Compassion meditation: session content.

Session Number	Title	Session Content
1	Introduction to Compassion Meditation Training	Brief overview of the 10 group sessions; basic breathing meditation; rationale for compassion meditation training to address unique challenges faced by older adults
2	Focusing Attention	Didactics: benefits of attending to the breath; address common misconceptions about getting rid of thoughts and emotions; research outcomes of meditation studies related to well-being in older adults
3	Creating Space	Practice present moment focused awareness; use sensory distractions to heighten their attention instead of continuing to tie their attention to the breath; working with pain and other distractions during meditation
4	Mindful, Open, and Aware	Continued practice on present moment focused awareness; mindful listening to a partner in class (experiential exercise)
5	Reengaging Heroic Spirit	Introduction of positive cognitive reflection; even superheroes have flaws; perfectionism and self-blame are barriers to self-awareness and compassion; aging through the lens of impermanence/ universal human experiences
6	Seeing Ourselves in Others	All beings want to avoid suffering and find satisfaction in life; behavior and not humanity can be inappropriate; begin building a more open acceptance of others
7	Appreciation and Gratitude	Create an awareness of interdependence and build appreciation and gratitude for the human family; decreasing loneliness/isolation
8	Empathy and Engaged Compassion	All people have bad habits; change is difficult for all people; build the wish to relieve suffering for others; compassion and purpose and meaning in later life
9	Putting It All Together (1)	Review and relapse prevention session; create meditation cards to keep for instant coping; personalized meanings of the sessions are shared among members
10	Putting It All Together (2)	Create coping cards for applying meditation in everyday actions; review completed homework; lessons on how to avoid compassion fatigue and continue to build positive emotions

understanding how to access the technological portions of the intervention, as well as to answer general questions after normal business hours.

Participants were assigned formal seated meditation practice and other informal exercises and practices after each session; time spent meditating between sessions was recorded in daily journals completed by the participants (see Online Table S1 for an example). Participants were assigned progressively longer daily meditation practices: 42 minutes for intervention week 1 (6 minutes daily), 84 minutes per week for intervention weeks 2–4 (12 minutes daily), and 105 minutes per week for intervention weeks 5–9 (15 minutes daily). Positive and negative affect of each participant was evaluated weekly with the self-administered mDES (Fredrickson, Tugade, Waugh, & Larkin, 2003) at the beginning of each intervention session. Within their journals participants also indicated the amount that they experienced each of the following feelings during their average at home practice that week: (a) grateful, appreciative, or thankful, (b) interested, alert, or curious, (c) love, closeness, or trust, (d) angry, irritated or annoyed, (e) sad, downhearted, or unhappy, and (f) stressed, nervous, or overwhelmed. Each of those six emotions was rated 0 "not at all", 1 "a little bit", 2 "moderately", 3 "quite a bit", or 4 "extremely."

Feasibility and adherence

Feasibility was assessed with session attendance and treatment completion (defined *a priori* as ≥ 7 of the 10 group training sessions). Self-reported meditation adherence was evaluated in terms of percentage of time meditating (ascertained from daily meditation logs) relative to the total assigned number of meditation minutes for the corresponding week.

Descriptive feedback

Although not intended as a formal qualitative study, we were interested in participants' experience of and suggestions for the CM intervention training. Thus, after completing the training groups, participants were also asked to provide descriptive feedback to five questions/prompts: 1) "*What motivated you to join this study?/What changes were you hoping it might bring about?*"; 2) "*What particular strengths or understandings did you gain that have influenced more fulfillment in your life now?*"; 3) "*I'm going to mention three different categories (healthy aging, social network, meditation). With each area I will ask how you believe your life has been influenced by the intervention you have completed.*"; 4) "*What changes to the intervention do you believe would make the*

intervention more relevant and more helpful to others in circumstances similar to yours?"; and 5) "W*hat do you think might motivate other seniors to enroll in our compassion meditation study?*" These questions were presented in written form to the participant, but the research assistant then reviewed the completed form with the participant to ensure participants understood the questions and had provided complete responses. Two of the authors (AM and BP) subsequently reviewed the written responses and identified themes and exemplar excerpts reflecting participants' descriptions of their experience with and suggestions for the CM intervention.

Exploratory pre- vs. post-intervention changes

Participants were evaluated prior to the first intervention visit, and after their final intervention session using a variety of measures. Physical and mental well-being were assessed with the 12-item Physical and Mental Component Scores from the Medical Outcomes Survey Short Form (SF-12; Ware, Kosinski, & Keller, 1996) and the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). Sleep quality was measured with the PROMIS Sleep Disturbance and Sleep Impairment scales (fixed 8-item versions; Yu et al., 2012).

Other pre- vs. post-intervention measures included the Brief Symptom Inventory Derogatis (BSI-18; Derogatis, 2001), which yields a Global Severity Index, as well as Somatization, Depression, and Anxiety subscale scores, the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983), and the Ruminative Thought Style Questionnaire (RTS; Brinker & Dozois, 2009). Positive and negative emotions were measured with a modified Differential Emotions Scale (mDES; Fredrickson et al., 2003). The mDES subscales each consist of 10 items with a range of response from 0 "not at all" to 4 "extremely" yielding a potential range of 0–40 on each subscale. Pre- to post-intervention measures also included the Social Connectedness Scale (SCS-R; Lee, Draper, & Lee, 2001), UCLA Loneliness Scale – Third edition (UCLA-3; Russell, 1996), and the Toronto Empathy Questionnaire (TEQ; Spreng, McKinnon, Mar, & Levine, 2009). Positive psychological measures included the 10-item version of the Connor-Davidson Resilience Scale (CD-RISC; Campbell-Sills & Stein, 2007)), CES-D Happiness subscale (Fowler & Christakis, 2008), Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007), and the UC San Diego Wisdom Scale (SD-WISE; Thomas et al., 2019).

Statistical analyses

Descriptive statistics included mean (and SD) number of sessions completed and number of minutes of meditation per week. Mean values of positive and negative affect (mDES) pre- to post-intervention, and at each intervention group meeting, were plotted on line graphs with 90% confidence intervals (CIs; 5% uncertainty in each of the two tails), calculated as 1.64*Standard Error of the mean to evaluate trajectory of changes over the intervention sessions. Additional exploratory analyses focused on effect size magnitude of pre- vs. post-intervention changes, using Cohen's *d* calculated with Neath's online calculator based on the "G*Power" formula (Neath, 2018). We also examined statistical significance of the pre- to post-intervention changes via dependent *t*-tests, with two-tailed significance defined as $p < .05$ (uncorrected for multiple comparisons).

Results

Feasibility/reported adherence

Twenty-one of the 24 participants (87.5%) met the *a priori* criterion for treatment completion (attending 7 or more of the 10 group sessions), and mean attendance was 8.5 (SD = 2.2) of the 10 sessions. In terms of self-reported adherence, participants consistently completed a mean of 84% or more of the assigned meditation practice minutes. The overall median percentage reported adherence was 85.7%, and the percentage of completed assigned CM practice was relatively stable over the intervention weeks, even though the absolute number of assigned minutes increased during the course of the intervention (see Figure 1).

Participants' descriptive feedback

Review of participants' feedback to each of the prompts revealed several key points relevant to

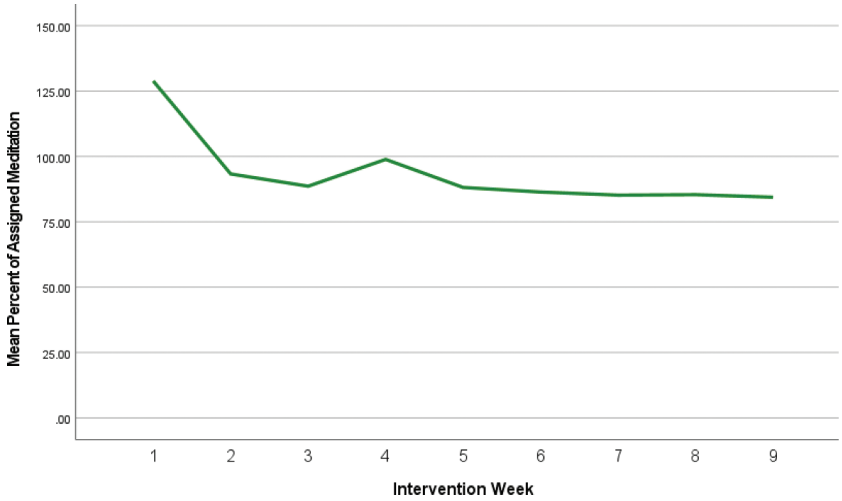

Figure 1. Average total weekly meditation (minutes) relative to assigned minutes. Values expressed as percentage of minutes of completed meditation (as self-reported in participants' journals) relative to the number of meditation minutes assigned for the corresponding week. The latter include: Intervention week 1 = assigned 42 minutes, weeks 2–4 = 84 minutes per week, weeks 5–9 = 105 minutes per week.

the feasibility, impact, and potential age-appropriate modifications to the CM intervention for future clinical trials in the older adult population. Details of the specific themes, with additional exemplar quotes, are provided in Table 2. In brief, however, participants' stated motivations for participation generally reflected realistic goals appropriate to the intent and nature of the intervention. Some of the identified themes included improving positive and negative internal and psychosocial experiences (e.g. "I was interested in being more peaceful and calm;" "I wanted to bring about less mind wandering, less stress and anxiety"), and related health/wellness factors (e.g. "I was hoping to be able to reduce my blood pressure without medicine"), as well as desire to learn about CM, how to meditate, and/or improvement of existing skills (e.g., "I was hoping I would be more consistent about my meditation"). Moreover, themes that emerged in relation to participants' self-reported gains from the training were generally in accord with those initial motivations or goals. These included relevant information learning and skill development, interpersonal benefits (e.g. "I am more compassionate;" "it influenced how I respond to people and myself"), behavioral change and mental health benefits (e.g., "not being hard on [myself] about everything"), and the informational learning about meditation and other study concepts (e.g. "I learned the difference between empathy and compassion"). Some of the responses were similar in regard to mental health when participants were asked about effects on healthy aging, but additional themes included physical health changes (e.g. some participants mentioned improved sleep and better blood pressure control), as well as general improvements (e.g., "it helped me learn to adapt to new perspectives and new ideas;" "not being quite so hard on myself and accepting the aging process"). When asked specifically about effects on social matters, themes included the gain in closeness/connectedness with other group members, improved communication skills (e.g., "listening to what others have to say to me and accepting it even though I don't necessarily agree with it"), as well as general openness. When asked about the influence on meditation practice, themes included more consistency and frequency (e.g., "forced me to meditate every day so it gave me the experience and gave me a chance to chip away at the mountain of meditation and getting discipline"). On the other hand, there were a few responses that indicated no notable changes or influences of the training on healthy aging, social skills or connections, or meditation practice. Thus, there is clearly room to improve or better tailor the intervention for some individuals.

There were also several themes in participants' responses to probes about improving the intervention as well as motivating others to participate (see

Table 2. Themes and exemplar quotes from participants' descriptive feedback.

Motivation for Participation/Expectations

1) *increase in positive experiences or psychosocial characteristics*, e.g.,
- "I also wanted … more mindfulness"
- "make me more compassionate"

2) *interest in, curiosity about, or desire to learn more about meditation*, e.g.,
- "thought it would be interesting"
- "I wanted to learn more about meditation"
- "curiosity about the type of meditation"

3) *decrease in mental health problems/reduction in stress*, e.g.,
- "see if it would help me emotionally"
- "approach it [depression] in a more positive way"

4) *desire to improve existing meditation practice*, e.g.,
- "I wasn't good at [meditation], so I thought it could help"
- "I wanted more practice with meditation"

4b) subtheme: *desire for greater consistency with or motivation for meditation practice*, e.g.,
- "do it and not just skip over it"

5) *improved physical health or increase general wellness*, e.g.,
- "I was curious if meditation could help relieve any physical pain"
- "my doctor wanted me to learn to meditate"

Strengths or Understanding Gained from Training

1) *interpersonal benefits*, e.g.,
- "it helped me be more sensitive, compassionate, non-judgmental and aware of the people in the group"
- "learning to listen more carefully to others"
- "as shocking as it was to find out, I am not the sun and everything doesn't revolve around me"
- "there are others that have the same issues that I do"

2) *behavioral changes and mental health benefits*, e.g.,
- "it altered some of my behaviors … ruminating on things … I did that a lot less"
- "it calms me down"

3) *increase in knowledge/learning*, e.g.,
- "I learned something new that I am enjoying"
- "I found it intellectually interesting"
- "learning a new skill"

4) *specific content understanding of mindfulness or compassion*, e.g.,
- "I learned the difference between empathy and compassion"
- "I have an awareness and 'presentness' that I didn't have before"

5) *Miscellaneous*, e.g.,
- "one statement that I go back to, 'pain isn't optional, but suffering is'"
- "I was surprised at how quickly and easily I was able to meditate"
- "I have a lot more self-awareness"

Influence of training on healthy aging

1) *general changes*, e.g.,
- "I want to live a healthy lifestyle and being calmer lets you do that"
- "I have a little more control over my perceptions, my mood, and me overall"
- "acknowledging that we can control our reactions to what happens to us … we can and still have control of our lives regardless of the state we are in and our ageing"

2) *mental health changes*, e.g.,
- "it helps relieve ruminating on negative thoughts"
- "it has helped me think of other possibilities and solutions to things like anxiety"

3) *physical health changes*, e.g.
- "I used to have trouble falling asleep … now I use these techniques and I go to sleep"
- "my blood pressure lowered and it wasn't just for a week. It stayed lower … I have easily dropped 40 points"

4) *Little or none*, e.g.,
- "I don't know that I was affected"
- "I couldn't say that it applies to me"

Influence of training on social networks/networking

1) *closeness/connection with other group members*, e.g.
- "I got to know some people at a deeper level … I feel a sort of kindship towards them"
- "I got to know the people in class"

2) *improvements in communication with others*, e.g.,
- "the listening portion has helped me be more compassionate and a better listener to others"
- "I have expanded in my communications with being more open to other people and willing to share and communicate"
- "reconfirmed that I should stop and listen more"

3) *changes in managing challenging behavior by others*, e.g.,
- "it may have given me a more relaxed perspective on irritating behaviors of other people"

4) *other/general changes*, e.g.,
- "I am more spontaneous"
- "I guess just being more open in social situations and less critical"
- "I have gone back to my older days when I was more open socially"
- "I definitely am more aware of the fact that everyone really does have stuff going on"

5) *Little or none*, e.g.
- "I don't know that it has … I'm a very social person so I think it's stayed the same"
- "I wouldn't say that affected me that much"

(*Continued*)

Table 2. (Continued).

Motivation for Participation/Expectations
Influence of training on meditation practice
1a) *consistency*, e.g.,
• "I was reminded how good it is for me to meditate and I tend now not to skip it and do some every day"
• "100%, 1000%, I make it happen"
1b) *increased frequency, though not as consistent as desired*, e.g.,
• "I don't do it as much as in the class, but when I feel myself shifting into an uncomfortable or anxious situation if it is appropriate I will sit down and try to breathe, get aware of my body"
• "Yes I am meditating a tiny bit, maybe 10 minutes a week just sitting in a chair without the audio")
2) *Little or none*, e.g.
• "It hasn't been influenced, I haven't done it. I did it like 2–3 times after the group but that's it"
• "I don't do it as much as I'd like to"
Suggestions for changes to the intervention
1a) *changes to session agenda/content*, e.g.,
• "there was too much time spent on people talking about their experiences and not enough time spent talking about what we were supposed to be doing"
• "more time spent meditating and not just going through the class lecture"
• "more time [so that] more people can share what is going on in their lives"
• "compassion for yourself could have been stressed more"
1b) *changes to intervention rationale*, e.g.,
• "an explanation about what it does and what we should expect from the group"
• "I don't think that we dealt enough with reasons to meditate, like motivation and factual benefits of it"
2) *changes to overall structure, length, or organization*, e.g.,
• "the group needs to be longer"
• "having a refresher course, like a month after it ends"'
• "I wish it would go on longer … we all didn't want it to end"
3) *changes to prerecorded meditation practices*, e.g.,
• "too long to focus"
• "audio recording gets wordier and wordier … more straightforward would be better"
4) *changes to homework assignment*, e.g.,
• "there was too much homework"
• "homework was often vague, it wasn't always clear what to answer"
5) *changes to pace of instruction or complexity of materials*, e.g.,
• "went through it quickly … I needed more time to assimilate"
Suggestions for increasing others' motivation for participation
1) advertising, e.g.,
• "I think it's a matter of publicizing it"
• "testimonies of people that have participated"
• "just awareness that is exists"
2) better communicate rationale for the training and its potential benefits, e.g.,
• "we need more compassion for others. People need a hug. We need to understand what is going on with others and their feelings"
• "address stressful things specific to seniors, like mortality. Try to be specific about the problems you want to help seniors with"
• "tell them what the outcome could be, that it will help with relaxation, stuff like that")
3) *addressing practical issues*, e.g.,
• "if seniors had it offered through their health network"
• "a central location and keeping in mind traffic flow for timing is important"
4) *identifying barriers to participation*, e.g.
• "some seniors are scared of getting involved in a program like this because of lack of experience meditating or that it will be too challenging to start at this age"
• "should be clearer why you want to do this and what you might gain from it"

Table 2). Examples include themes of changes to the agenda/content or explanation of rationale regarding the interventions. One participant suggested more focus on practicing meditation with less didactic presentation, although other participants suggested that more information be provided. There were also suggestions regarding structure such as increased time for in-group sharing of experiences. The participants also gave several suggestions about the homework assignments and materials. In terms of motivating or reaching other older adults, suggestions included increasing advertisements (e.g., "including testimonies of people that have participated"), paying attention to practical issues such as location of the sessions, and addressing personal barriers to participation such as anxiety from such a new experience (e.g., "recommendation from a good mental or physical health provider might encourage participation").

Exploratory examination of pre- to post-intervention and between session changes

Overall, participants showed a small to medium effect size improvement in satisfaction with life, $d = 0.46$ ($t(21) = -2.25$, $p = .035$), a medium effect size reduction in rumination, $d = .62$ ($t(20) = 2.85$, $p = .010$), and an unexpected medium effect size

worsening of resilience, d =.54 ($t(2)$ = 2.43, p = .025). There were no other statistically significant (p <.05) pre- to post-intervention changes. Given the exploratory nature of the study, other changes showing at least a "small" effect size change ($d \geq 0.20$) may also be candidates for further study, although no conclusions about reliable changes in these domains can be drawn from the present data. These (non-significant) small effect size changes included decreased loneliness (d = 0.31), increased empathy (d = 0.25), and an increase in the decisiveness component of wisdom (d = 0.41). There were also non-significant but small effect size reductions in mental well-being (d = 0.20) and social connectedness (d = 0.26). Pre- and post-intervention means, SDs and effect sizes for all variables are provided in Online Supplement Table S2.

Changes in mean positive and negative affect (mDES subscale total scores) with 90% CIs (5% uncertainty in each of the two tails) from the pre- to post-intervention visits, as well as at each of the 10 intervention visits, are illustrated in Figure 2. The 90% confidence intervals for positive and negative subscales did not overlap, indicating that participants reported consistently higher positive relative to negative emotions at every visit. However, the between-visit CIs within each subscale generally overlapped, suggesting no significant change in positive or negative emotions. Comparing the mDES scores from the first intervention visit to those completed at each participant's final intervention visit revealed a small effect size improvement in the positive affect subscale (d = 0.30), although this change did not reach statistical significance, $t(20)$ = 1.36, p = .190, and there was no substantive change in the mDES negative subscale score (d = 0.06). Of note, however, within this sample, positive emotions were consistently within the mid-range of the scale (averaging 20– 23 of 40 possible points) and negative emotions were relatively rare/low range (averaging 5 to 9 points of 40 possible points).

As illustrated in Figure 3, participants' weekly journal ratings for each of three positive emotions were consistently higher than those for the three negative emotions. To reduce clutter in Figure 3, CIs are not presented, but were generally overlapping for each emotion across the nine weeks of journal ratings. Visual inspection suggests a possible trend for increase in feeling love, closeness, or trust, as well in feeling gratitude, appreciative, or thankful, and a decrease in feeling stressed, nervous, or overwhelmed.

Discussion

The present study is among the first to pilot CBCT® in a non-psychiatric or caregiver sample of

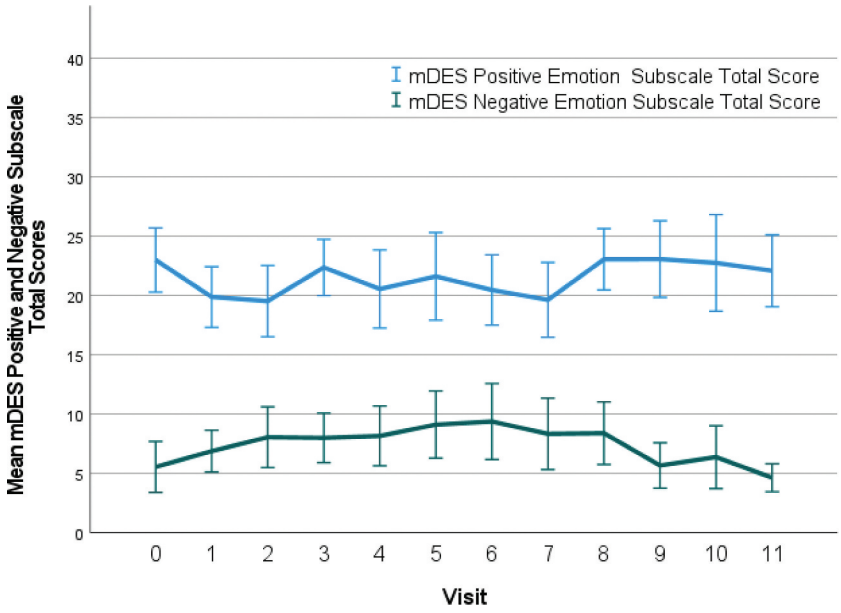

Figure 2. Weekly changes in positive and negative affect. mDES = modified Differential Emotions Scale, Study Visits 0, 11 = pre-, post intervention, Visits 1– 9 = Intervention Visit week; error bars = 90% confidence interval.

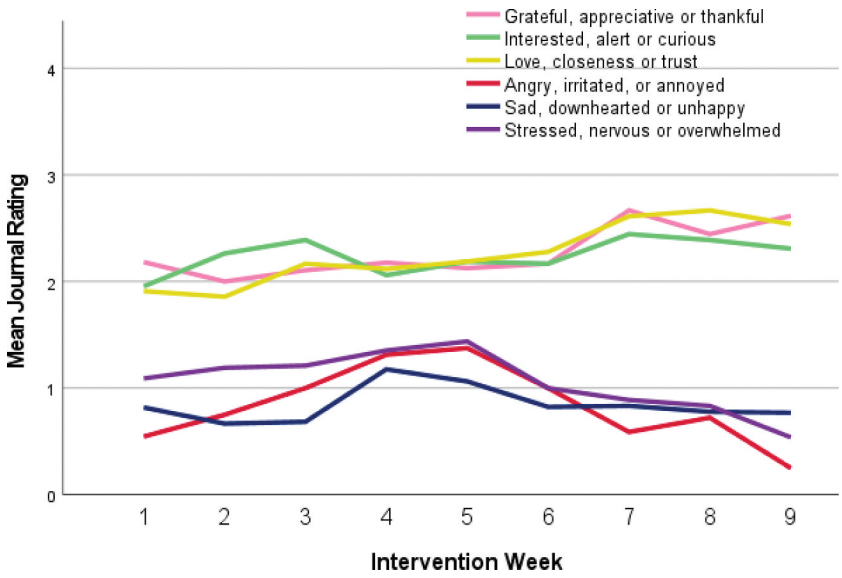

Figure 3. Weekly participant journal ratings for six emotions. Each category was rated weekly in the participants' journal on a scale from 0 "not at all" to 4 "extremely"; for clarity of presentation, error bars not included.

community-dwelling older adults. Feasibility of our approach was supported by high completion rates and self-reported adherence to assigned meditation. We also observed significant pre- to post-intervention improvement in satisfaction with life and reductions in rumination. The participants' stated motivations for participation reflected generally appropriate goals, and their self-reported changes andeffects of training were generally in accord with those motivations and goals. We did not include a specific measure of previous experience with meditation, though participants' descriptive feedback indicated some prior experience with meditation and a desire to improve upon or renew consistency with current knowledge and practices of meditation. Although there was between-person variability in self-perceived changes, some participants did report that they experienced no substantive changes in mental, physical or social functioning. The latter finding underlines the importance of matching interventions to the particular goals, strengths, and areas for growth in each person.

Although not statistically significant ($p > .05$), there were small-effect size reductions in loneliness ($d = .31$) and increases in empathy ($d = .25$) and decisiveness ($d = .41$). There were also some unexpected changes including a significant reduction in self-reported resilience, as well as non-statistically significant but small effect size reductions in mental well-being ($d = .20$) and social connectedness ($d = .26$). Of note, however, the participants' open-ended descriptive responses indicated self-perceived improvements in a number of these domains, such as improved mental health, compassion and self-compassion, and interpersonal skills.

The observed 87.5% rate of treatment completion and 85.7% self-reported completion of assigned meditation practice are each notably higher compared to our previous study of CM among Veterans with PTSD (61% treatment completion and 75.5% self-reported meditation adherence; Lang et al., 2019). Although most prior research has been conducted with younger adults, our study of older adults is consistent with other studies finding evidence of positive psychological and psychosocial changes following CM training, including increased satisfaction with life (Fredrickson et al., 2008; Jazaieri et al., 2014; Kirby, 2017), and decreased rumination (Jazaieri et al., 2014; Lang et al., 2019). We also found some indications that CM training may be associated with improvements in loneliness (Fredrickson et al., 2008; Lang et al., 2019), empathy (Lang et al., 2019), and decisiveness (statistically non-significant, small ESs). However, unlike previous studies that have found an association between CM training and increases in social

connectedness and psychological well-being (Fredrickson et al., 2008; Kirby, 2017; Lang et al., 2019), we found a medium effect size reduction in resilience. Although such reduction may reflect "regression to the mean," there have also been suggestions that for some individuals meditation may initially affect such measures in the negative direction due to increase in awareness/attunement as well as reduction in efforts to suppress or deny unpleasant feelings (Britton, 2019; Lang et al., 2017). We also did not find increases in positive emotions; however, the participants' ratings from meditation journals indicated that this sample reported high levels of positive emotions and low levels of negative emotions at baseline. This was a community-dwelling sample not selected for any specific mental health or physical health challenges, and participants' positive emotion levels were already substantially higher than negative emotions at baseline. Therefore, findings from this relatively high-functioning sample may not generalize to those with more psychological distress, feeling fewer positive and/or more negative emotions. Future studies should extend exploration of feasibility of CM to specific clinical populations (e.g., older adults with depression or anxiety).

This study was designed as a feasibility rather than efficacy study, but some of our findings illuminate steps and future directions for research. Although most of the pre- to post-intervention changes were not statistically significant, the improvement in satisfaction with life, decreased rumination, as well as the unexpected decrease in resilience were associated with p-value below the alpha-level of .05. Although it is possible that even these three changes reflect inflated type I error due to multiple comparisons, satisfaction with life and rumination are among the potential outcomes that should be considered in future randomized controlled trials of CM training among older adults. The non-significant results require even more caution in interpretation as they provide no current evidence for rejection of the corresponding null-hypotheses. Nonetheless, those with small-to-medium effect sizes, such as loneliness, empathy, and the decisiveness component of wisdom may be appropriate as potential candidates for further exploration in larger samples, particularly as the measures of these three constructs add minimal participant or study burden.

Of note in regard to loneliness, in a sample of 40 older adults, Creswell et al. (2012) have shown an 8-week Mindfulness-Based Stress Reduction program not only reduced loneliness, but also resulted in a down-regulation of pro-inflammatory gene expression. That latter is of relevance as chronic inflammation is among the leading "suspects" in regard to the biological mechanism by which chronic loneliness affects health.

Meditation journal ratings also indicated potential increases across time in feelings of love, closeness, or trust, and decreases in feeling stressed, nervous, or overwhelmed; changes in affect associated with meditation practice also warrant specific follow-up study. However, self-reported emotions from meditation journals also indicated that this sample experienced relatively high positive emotion and low negative emotion which, together with the low baseline values on measures such as the BSI (Online Supplement Table S2). These levels suggest a well-functioning group prior to intervention with less room for improvement than might be present in a more distressed group of older individuals. Future studies should examine the impact of CM training on older adults experiencing mild to moderate psychological distress. As psychologically distressed older adults tend to present to primary care rather than mental health care clinics, it might be helpful to examine the effectiveness of CM training within primary care settings (Blais, Tsai, Southwick, & Pietrzak, 2015).

As an exploratory study, and in accord with the positive mental health movement, we were interested in exploring areas for which CM might prove beneficial in not just addressing distress, but also fostering positive growth (Harmell, Kamat, Jeste, & Palmer, 2016; Jeste & Palmer, 2013). The exploratory analyses are helpful in suggesting potentially new targets for which CM might prove helpful, and some unexpected null findings in domains most directly relevant to the goals of CM training may also illuminate future directions. Of particular note, although having a small-effect size, the pre- to post-intervention changes on the measure of empathy were not statistically significant, nor were there significant changes in the mindfulness scale nor the pro-social subscale of the wisdom scale. These

constructs are all of particular relevance to the goals of CM training (Gilbert, 2014), and thus there appears room for improvement in the efficacy of the intervention when applied to older adults. Example of potential modifications or supplements might include adding further experiential and behavioral activation tasks that are more concretely tailored to the specific goals and specific environment of each older adult participant. Supplementary interventions might also include the addition of modules to direct further target loneliness and social connectedness (O'Rourke, Collins, & Sidani, 2018).

Despite the limitations of a pilot study in terms of evaluation of efficacy, the present findings provide strong support for the feasibility of employing CM training for use with older adults. As a form of strengths-based intervention, this approach may carry less stigma and be more acceptable to an older adult population (Kitchen et al., 2013). Descriptive feedback from our participants suggests that contrary to socio-cultural biases, older adults are interested in and capable of learning and applying new concepts and skills in support of their health and well-being. In conclusion, if confirmed through randomized controlled trials, CM training may prove to be a novel option for improving life satisfaction among older adults.

Clinical implications

- CM training offers potential benefits for improving well-being among older adults.
- CM training can be tailored to the specific needs of older adults, resulting in high levels of reported adherence to meditation practice and completion of the intervention sessions.

Disclosure statement

The authors have no conflicts to disclose. The contents do not represent the views of the U.S. Department of Veterans Affairs or the United States Government.

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ORCID

Anne Malaktaris PhD http://orcid.org/0000-0002-6714-1356
Ariel J. Lang PhD http://orcid.org/0000-0002-2468-115X
Samantha Hurst PhD http://orcid.org/0000-0001-9843-2845
Dilip V. Jeste MD http://orcid.org/0000-0002-1161-7351
Barton W. Palmer PhD http://orcid.org/0000-0002-7618-3144

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