



Implicit or Explicit Compassion? Effects of Compassion Cultivation Training and Comparison with Mindfulness-based Stress Reduction

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Abstract

Mindfulness-based interventions generally include compassion implicitly, but it remains to be seen whether implicit compassion training can be effective, or if it needs to be trained explicitly through specific meditations and relational practices. This research study had two specific goals. The first was to expand the literature on the effects of compassion-based interventions (CBIs) by assessing the impact of the Compassion Cultivation Training program (CCT) on anxiety, depression, stress, life satisfaction, happiness, mindfulness, empathy, self-compassion, compassion for others, and identification with all humanity, through a wait-list randomized controlled trial in a community sample (study 1). Secondly, this research addressed the following question: Does a CBI—an explicit compassion training—have a differential impact in terms of empathy, compassion, and identification with all humanity, compared to a mindfulness-based intervention (mindfulness-based stress reduction (MBSR)) in which compassion is taught implicitly? (study 2). Groups were assessed at baseline, post-intervention, and 2-month follow-up, and analyses involved repeated-measures of analysis of variance (ANOVA) for group contrasts. Compared to the wait-list group, CCT participants showed significant improvements in psychological well-being (decreased depression and stress, increases in life satisfaction, happiness, mindfulness, and self-compassion) and compassion skills. Both MBSR and CCT were effective in generally enhancing psychological well-being and increasing mindfulness and compassion, but CCT had a greater impact on developing compassionate skills, especially empathic concern and identification with all humanity. This research highlights the potential for a complementary (rather than competitive) relationship between mindfulness- and compassion-based interventions.

Keywords Compassion · Mindfulness · Empathy · Meditation · Training

Introduction

Several meta-analyses on the effects of mindfulness-based interventions (MBIs) have concluded that they may help a broad range of individuals to cope with their clinical and non-clinical problems, especially stress, anxiety, and depression (Baer 2003; Eberth and Sedlmeier 2012; Hofmann et al.

2010). Although they include basic aspects of focused-attention practices, MBIs emphasize the practice of open monitoring meditation. More recently, a different family of contemplative practices, sometimes referred to as *generative practices* or *constructive practices*, particularly loving kindness and compassion meditation, has begun to receive attention from scientific and clinical communities.

Although loving kindness and compassion practices tend to be taught together in the traditional Buddhist teachings of the Four Immeasurables, or in modern secular programs such as Compassion Cultivation Training (CCT), loving kindness differs from compassion. Whereas loving kindness involves an appreciation of all beings together and the wish for them to be happy, compassion is the openness, sensitivity, and courage to encounter suffering in oneself and others, along with the motivation to relieve or prevent it. In other words, loving kindness is the vision of the happiness of all beings and

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commitment to it, whereas compassion is sensitivity to suffering and the motivation to act skillfully to face and relieve this suffering.

The meditation practices of loving kindness and compassion date from the times of the historical Buddha and can be found in some of the earliest scriptures of the Pali Canon, such as the Karaniya Metta Sutta and the Brahmavihara Sutta (Bodhi 2001, 2012), but they have only become the object of scientific research in the past few decades (Dahl et al. 2015; Gilbert 2005, 2009; Goetz et al. 2010; Hofmann et al. 2011; Lutz et al. 2009; Strauss et al. 2016). In this category of contemplative practices, the meditator purposefully strengthens his/her natural capacity for loving kindness and compassion by intentionally generating compassionate thoughts, feelings, and motivations toward different objects, including him/herself. As in mindfulness meditation, concentration and meta-awareness are involved and strengthened in constructive practices; however, the focus of these two types of practice is quite different: whereas in mindfulness, the meditator is trained to observe his/her thoughts, emotions, and perceptions in the present moment with a warm and non-judgmental attitude, in loving kindness and compassion training, the practitioner intentionally orients his/her motivational, cognitive, and affective states to nurture more harmonious inter- and intra-relationships.

In Buddhist contexts, constructive practices are major aspects of the path (Chödrön 1991; Jinpa 2011; Salzberg 1995). However, the development of secular training protocols based on constructive practices such as loving kindness and compassion are very recent, and research on their effectiveness is still in its infancy (Gu et al. 2017; Strauss et al. 2016). Several compassion-based interventions (CBIs) have been developed in the past 10 years, including: Cognitive-Based Compassion Training (Pace et al. 2009, 2010); Mindful Self-Compassion (Neff and Germer 2013); Compassionate Mind Training (Gilbert et al. 2011; Gilbert and Procter 2006); the Mindfulness-Based Compassionate Living program (van den Brink and Koster 2015); Attachment-Based Compassion Therapy (García-Campayo et al. 2016); and the CCT; Jinpa 2010; Jazaieri et al. 2013, 2014), the intervention that was used in this study.

In CCT, the sequence of exercises progressively helps to cultivate compassion for the self and others. This 8-week training program where practitioners develop compassionate qualities in increasingly challenging situations employs a progressive series of meditative practices, such as guided imagery; relational exercises (e.g., mindful speaking, empathic listening, non-reactivity); reflection on the theme of the class, and informal practices (e.g., in everyday life identifying the suffering underlying negative attitudes of others).

Only one wait-list (WL) randomized control trial was previously carried out on the effects of CCT. The results were published in two articles (Jazaieri et al. 2013, 2014). Jazaieri

et al. (2013) explored the impact of CCT on self-compassion and participants' fear of compassion, showing a significant increase in self-compassion and a decrease in fear of compassion from others, to others, and for themselves. Jazaieri et al. (2014) assessed changes in mindfulness, affect, and emotion regulation from pre- to post-intervention. In terms of affect, CCT participants presented significant decreases in worry ($p < .001$), but no significant changes in happiness or perceived stress were found. In terms of emotion regulation strategies, CCT participants significantly decreased the frequency of emotional suppression. These two studies offered initial evidence that CCT could be effective in enhancing psychological well-being and emotion regulation. However, they did not address the question of whether CCT actually increases empathy, compassion for others, and perceived common humanity.

Although commonly accepted as an important attitudinal aspect of mindfulness practice (Kabat-Zinn 1990), compassion is, in general, not explicitly taught in MBIs. Compassion is taught implicitly as an attitudinal foundation of mindfulness practice and it is mainly conveyed through the instructor's way of relating to the participants (Neff and Dahm 2015), thus modeling a compassionate way participants can relate to their own experiences. Mindfulness-based stress reduction (MBSR) teachers have the option to include a *metta* (loving kindness) meditation in which participants focus on feelings of love, warmth, and compassion toward oneself and others during the silent retreat between weeks 6 and 7 of the program, but this is not required.

Kabat-Zinn (2008) has referred to mindfulness “as an umbrella term that subsumes all the other elements of the Eightfold Noble Path, and indeed, of the Dharma itself, at least in implicit form” (p. 29). In mindfulness-based cognitive therapy (MBCT), the use of explicit compassion techniques is discouraged in clinical populations because, according to the program's authors, it might trigger difficult emotions (Segal et al. 2002). However, it is included when MBCT is offered in non clinical settings (Williams and Penman 2012) and, according to Kuyken et al. (2010), self-compassion is a key predictor of therapeutic change. Although the intention to implicitly teach compassion in MBIs is commendable, it is still not clear whether compassion can be trained implicitly, or if it is necessary to train compassion explicitly through specific meditations and relational practices in order to enhance compassionate qualities in participants.

This research project had two specific goals. First, it attempted to extend the available literature assessing the effects of CCT on empathy, compassion, and psychological well-being through a wait-list randomized controlled trial conducted in a community sample in Santiago de Chile (study 1). Secondly, this research addressed the question of whether a CBI (CCT)—an explicit compassion training program—would have a unique and differential effect in terms of

changes in empathy and compassion, identification with all humanity, and empathic distress, compared to an MBI (MBSR) in which compassion is taught implicitly (study 2).

Study 1

Method

Participants

Participants (ages 18 and up) were recruited in the city of Santiago de Chile. The minimum age of 18 was established in order to assess the impact of the program in an adult population capable of giving legal consent, and primary education was required to ensure the capacity to understand written material adequately. The sample consisted of 50 participants enrolled in a wait-list randomized control trial from the community (CCT, $n = 26$; WL, $n = 24$). Participants' ages ranged from 19 to 74, and included both males ($n = 25$) and females ($n = 25$). Regarding marital status, most participants were single ($n = 28$; 56%), followed by married ($n = 14$; 28%), divorced ($n = 4$; 8%), and living with a partner ($n = 4$; 8%). The participants' occupations were healthcare professional ($n = 17$; 34%), education professional ($n = 8$; 16%), business/sales ($n = 5$; 10%), other professions ($n = 9$; 18%), student ($n = 6$; 12%), retired/unemployed ($n = 4$; 8%), and other ($n = 1$; 2%).

Procedure

Potential participants for the study were invited to a meeting 2 weeks before beginning the study. At the meeting, they were informed about general aspects of the study, and the commitment involved in enrolling as a participant. After 1 week, participants who had signed the informed consent and responded to the pre-intervention measures were randomly assigned to the CCT and WL, using a computerized random number generator. Five participants (two in the CCT group and three in the WL group) had scheduling incompatibilities with the group to which they were assigned; therefore, they were moved to the other group. No additional adjustments were made in group composition. A CCT program was offered to the WL group at the end of the research. The study was approved by the ethics committee of Sofia University and carried out in accordance with the Declaration of Helsinki (Fig. 1).

The CCT group participated in a 9-week Compassion Cultivation Training program that consisted of attending nine 2-h experiential classes held one evening a week. In addition, they had to commit to half an hour of daily practice at home (MP3 files with guided meditations for each week were provided) and other informal practice, usually consisting of observing certain aspects of their daily experiences and reflecting on the perspectives offered in the course.

The CCT program consists of six steps (Jinpa 2010; Jazaieri et al. 2013, 2014). Step 1 involves settling the mind and learning to focus it. Steps 2 through 5 pertain to actual compassion cultivation. They include loving kindness and compassion for a loved one (step 2); loving kindness and compassion for oneself (step 3); establishing the basis for compassion toward others by embracing shared common humanity and appreciating the deep interconnectedness between the self and others (step 4); and compassion toward others, including all beings (step 5). These first five steps are followed by active compassion practice (step 6), which involves imagining taking away others' pain and sorrow and offering them one's own peace and happiness. Finally, in week 8, CCT participants learn an integrated compassion practice based on the integration of the preceding steps, which can be adopted as a daily compassion meditation once the course is over (for a summary, see Table 1).

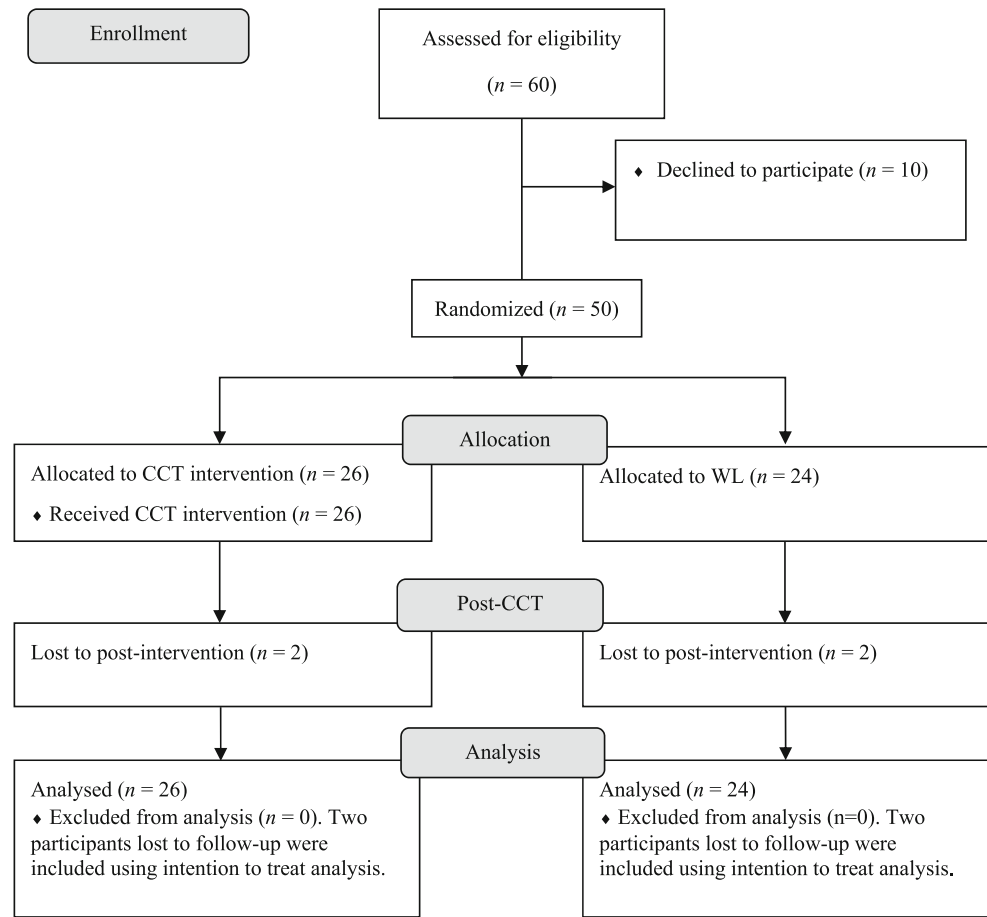
From the second step through the rest of the program, participants are exposed to images of suffering in the guided meditations and they are constantly invited to reflect on suffering. Although at first this strategy may seem counter-intuitive for a meditation program expected to generate well-being, it is completely consistent with the understanding of compassion transmitted in the program: awareness of suffering and a sincere motivation to relieve it. By consciously connecting with images of suffering and generating the desire to relieve suffering during meditation periods, participants train themselves to change the reactive habit of avoiding suffering, in order to develop tolerance to distress and the inner strength to face suffering with a constructive and proactive attitude.

This program was designed to help practitioners develop compassionate qualities ranging from easier to more difficult. The tools used consist of a combination of meditative practices (concentrative, open awareness, compassion meditation, and loving kindness meditation); use of imagery (e.g., developing an ideal image of a compassionate being); relational exercises in dyads, triads, and whole group (e.g., mindful conversation, empathic listening, non-reactivity); reflection on the theme of the class; and informal practices (e.g., in everyday life by identifying the suffering behind negative attitudes of others, or reflecting on the fact that "just like me" this person also wants to be happy and free from suffering).

Measures

Anxiety The Beck Anxiety Inventory (BAI; Beck and Steer 1993) is a widely used questionnaire that measures common cognitive and physiological symptoms of anxiety, such as numbness or tingling, hands shaking, and fear of losing control. It is composed of 21 items scored from 0 = not at all to 3 = severely ("I could barely stand it."). The Spanish version of this instrument, developed by Sanz and Navarro (2003),

Fig. 1 Diagram for randomized controlled trial of CCT versus WL control condition



presents good internal consistency ($\alpha = .88$). The instrument was adapted and validated with Chilean adolescents (Cova et al. 2009), confirming its good psychometric properties and reporting internal consistency of $\alpha = .92$. In the present study, the BAI presented a Cronbach's $\alpha = .88$ (for this and the following instruments, the Cronbach's alphas reported for this study correspond to the first application of the instruments for the three groups combined).

Depression The second version of the Beck Depression Inventory (BDI-II; Beck et al. 1996) consists of 21 groups of statements that measure a broad spectrum of depressive symptoms present over the previous 2 weeks. Each item has four alternatives rated on a Likert scale ranging from 0 (no symptom) to 3 (intense symptomatology). The BDI-II validation in Chilean populations (Cova et al. 2009; Melipillán et al. 2008) showed high internal consistency (Cronbach's α between 0.91 and 0.93), proper test-retest reliability, and the capacity to effectively discriminate between clinical and nonclinical populations. In the present study, the BDI-II presented very good internal consistency ($\alpha = .89$).

Stress The Perceived Stress Scale (Cohen et al. 1983) is the most widely used instrument to measure the global perception

of stress or the degree to which situations in the respondent's life are appraised as stressful. The scale includes direct queries about current levels of stress, as well as more general evaluations of the perception of how unpredictable and uncontrollable life is. The version used in this study consists of 14 items rated from 0 (never) to 4 (very often). This instrument has been translated into Spanish and it was adapted and validated with Chilean populations (Tapia et al. 2007), obtaining adequate concurrent validity with a previously validated stress scale and good internal reliability ranging from $\alpha = .79$ to $.89$. In the present study, the PSS-14 showed excellent internal reliability ($\alpha = .91$).

Life Satisfaction The Satisfaction with Life Scale (SWLS; Diener et al. 1985) is a widely used instrument to evaluate global life satisfaction, understood as the cognitive component of subjective well-being. It consists of five statements (e.g., "I am satisfied with my life," "So far I have gotten the important things I want in life"), rated on a 7-point Likert scale ranging from 1 (unsatisfied) to 7 (satisfied). Diener et al. (1985) reported test-retest reliability of $.82$ and a Cronbach's alpha of $.87$. A Spanish version of this scale was validated in Chile by Vera-Villaruel et al. (2012), obtaining good internal consistency of $.82$ and a one-factor structure in exploratory and

Table 1 Compassion cultivation training (CCT) protocol

Compassion cultivation training (CCT)	
Week	
1	Step 1. Settling and focusing the mind Introduction of basic skills to still and focus the mind through breath focus meditation. This step is considered the foundation for any other practice in this program
2	Step 1. Settling and focusing the mind (continued) The practice of breath awareness is continued and deepened. Aspects introduced are open awareness (mindfulness) practice and how it relates to cultivating a spacious mind where love and compassion can arise
3	Step 2. Loving-kindness and compassion for a loved one Learning to recognize how the experiences of love and compassion feel when they occur naturally. The meditation and practical exercises offered in this step aim to help practitioners recognize the physical and physiological signs of feelings of warmth, tenderness, concern, and compassion
4	Step 3a. Compassion for oneself Learning to develop qualities such as greater self-acceptance, tenderness, nonjudgment, and caring in self-to-self relations. Connecting with one's own feelings and needs and relating to them with compassion is the basis for developing a compassionate stance toward others
5	Step 3b. Loving-kindness for oneself Learning to develop qualities of warmth, appreciation, joy, and gratitude in self-to-self relationship. While the previous step focused on self-acceptance, this step focuses on developing appreciation for one's self
6	Step 4. Embracing shared common humanity and developing appreciation of others. Establishing the basis for compassion toward others through recognizing our shared common humanity and appreciating the kindness of others and how human beings are deeply interconnected
7	Step 5. Cultivating compassion for others On the basis of the previous step, participants begin to cultivate compassion for all beings by moving from focusing on a loved one to focusing on a neutral person, then on a difficult person, and finally on all beings
8	Step 6. Active compassion practice This step involves explicit evocation of the altruistic wish to do something about others' suffering. In formal sitting practice, this essentially takes the form of a visualization practice where the practitioner imagines taking away the suffering of others and giving them what is beneficial in oneself. This practice is known as <i>tonglen</i> or "giving and taking" in Buddhism
9	Integrated practice The essential elements of all six steps are combined into an integrated compassion meditation practice that can continue to be done daily by participants who choose to adopt it

confirmatory factor analyses. In the present study, the SWLS showed very good internal consistency ($\alpha = .89$).

Happiness The Subjective Happiness Scale (SHS; Lyubomirsky and Lepper 1999) consists of four items rated on a 7-point Likert scale to evaluate self-perceived happiness. In the initial Chilean validation (Vera-Villaruel et al. 2011), the subjective happiness scale showed acceptable to good internal consistency, with Cronbach's alphas of .73 in adults and .76 in college students. The Chilean adaptation of the scale showed good internal consistency ($\alpha = .84$).

Mindfulness The Mindful Awareness Attention Scale (MAAS) is a self-report scale that measures the global capacity of an individual to be aware and present in everyday life (Brown and Ryan 2003). This 15-item scale has been largely used with

meditators and non-meditators to assess the central factor of mindfulness as attention to and awareness of present moment phenomenology. The MAAS shows good internal consistency across a wide range of samples ($\alpha = .80$ – $.87$) and excellent test-retest reliability over a 1-month time period ($r = .81$) (Christopher and Gilbert 2010). Although there are no validation studies of the MAAS with a Chilean population, there is a Spanish adaptation of the MAAS (Soler et al. 2012) that shows a high reliability index ($\alpha = .89$) and good temporal stability. The Spanish version used in the present study is based on Soler et al. (2012), but the author of this study made a few linguistic adaptations to Chilean Spanish. In the present study, the MAAS showed excellent internal reliability ($\alpha = .90$).

Empathy The Interpersonal Reactivity Index (IRI) integrates the multidimensionality of empathy by assessing four

components: fantasy (the tendency to identify with fictitious characters); perspective taking (the capacity to take the perspective of others, also referred to as cognitive empathy); empathic concern (the other-focused emotion of caring for others who are suffering); and personal distress (the self-focused emotion of feeling distressed in the face of others' suffering (Davis 1980). It is scored on a Likert scale ranging from 0 ("does not describe me at all") to 4 ("describes me very well"). The Spanish version of the IRI was adapted and validated in Chile by Fernández et al. (2011) and showed high internal consistency and temporal stability. In the present study, only three of the four subscales were considered for the analyses. The perspective taking (PT) subscale was used to assess cognitive empathy, the personal distress (PD) subscale was used to measure empathic distress, and the empathic concern (EC) subscale was used to measure empathic concern. In the present study, internal reliability for the scale as a whole and for these three subscales was good (IRI, $\alpha = .78$; empathic concern, $\alpha = .78$; personal distress, $\alpha = .85$; perspective taking, $\alpha = .82$).

Self-compassion The Self-Compassion Scale (SCS), developed by Neff (2003), is a self-administered 26-item questionnaire, scored from 1 (almost never) to 5 (almost always), that consists of the combination of three bipolar constructs related to self-kindness (vs. self-judgment), common humanity (vs. isolation), and mindfulness (vs. over-identification). The original internal consistency reported for the SCS was $\alpha = .92$ (Neff 2003). The SCS was recently validated in Chile and showed adequate psychometric properties (Araya et al. 2017). In the present study, the SCS presented excellent internal consistency ($\alpha = .93$).

Compassion for Others The Compassion Scale (Pommier 2011) assesses compassion for others in similar dimensions to self-compassion. Responses are given on a 5-point scale ranging from 1 (almost never) to 5 (almost always). Pommier's (2010) results suggest that this scale presents good internal consistency and adequate convergent validity. A Spanish adaptation of Pommier's scale was developed for this study. The English version was translated by the researcher and refined with a team of psychologists and mindfulness instructors following a committee approach (Graham et al. 2003); finally, it was back translated by native English speakers. The Spanish version of the Compassion Scale presented very good internal consistency in the present study ($\alpha = .89$).

Identification with all Humanity The Identification with All Humanity Scale (IWAH) (McFarland et al. 2012) measures caring for all humanity as opposed to caring just for the in-groups. Answers range from 1 (not at all) to 5 (very much). The sum of all the items is referred to as IWAH. The scale presents adequate internal consistency and test-retest

reliability. A Chilean adaptation of this scale was developed for this study in consultation with a bilingual committee. In the present study, the Chilean version of the test showed good internal consistency ($\alpha = .88$).

Data Analyses

Baseline analyses were conducted, applying Student's *t* tests for continuous data and chi-square tests for categorical variables. Normality hypothesis was assessed by Shapiro-Wilk test and homoscedasticity assumptions by Levene's test for equality of variances. Sphericity was assumed because measure of variance between pairs had only two levels. Separate 2 (group: CCT, WL) \times 2 (time: pre, post) repeated-measures of analysis of variance (rm-ANOVA) were carried out for each study measure. Although normality and homoscedasticity were not met for some measures, parametric tests were used because the rm-ANOVA method was still robust and reliable (Schmider et al. 2010). Within-group effect sizes were reported by Cohen's *d*, based on Botella and Sánchez-Meca (2015). All statistical analyses were performed based on completers, using IBM SPSS version 23 for Windows.

Results

Sociodemographic and participant data are shown in Table 2. No significant between-group differences were observed for any baseline variables, including sociodemographic and clinical data. Shapiro-Wilk tests were non-significant for all outcome measures, revealing normal distribution of data, except for BAI, BDI, SWLS, SHS, and Compassion scale in WL group, as well as for PSS and SHS in CCT group (all $ps < .05$). Levene's test was non-significant for all measures, indicating equality of variances, but not for BAI ($p < .05$), and BDI ($p < .05$) at baseline. Most of the participants (70%) reported no meditation experience regardless of the condition (CCT or WL) (see Table 2 for detailed information). All the participants enrolled in study 1 completed both pre- and post- assessments.

Affect Repeated-measures ANOVA revealed a significant time \times group interaction on BDI ($F(1,48) = 16.472$; $p < .05$; $\eta^2 = .255$) and PSS ($F(1,48) = 16.612$; $p < .05$; $\eta^2 = .257$), where the CCT group scored lower than the control group at post-intervention. No significant interaction effects were found for the BAI measure. A significant pre-post change was observed on the BDI and PSS measures in within-group comparisons for the CCT group, with large effect sizes (from .82 to .87) (see Table 3). Non-significant within-group change was observed for WL.

Life Satisfaction and Happiness No time \times group effects were observed on the SWLS and SHS scores. Within-group comparisons revealed a significant pre-post change for both the

Table 2 Sociodemographic and participant data in CCT, WL, and MBSR groups

	CCT (<i>n</i> = 26)	WL (<i>n</i> = 24)	MBSR (<i>n</i> = 32)
Age	37.08 (11.68)	35.25 (13.24)	41.84 (12.23)
Sex			
Male	11 (42.3%)	14 (58.3%)	12 (37.5%)
Female	15 (57.7%)	10 (41.7%)	20 (62.5%)
Marital status			
Single	13 (50%)	15 (62.5%)	9 (28%)
Married	9 (34.6%)	5 (20.8%)	18 (56.3%)
Divorced	2 (7.7%)	2 (8.3%)	3 (9.4%)
Live-in partner	2 (7.7%)	2 (8.3%)	2 (6.3%)
Occupation			
Health care	8 (30.8%)	9 (37.5%)	10 (31.3%)
Education	6 (23.1%)	2 (8.3%)	2 (6.3%)
Other professions	7 (26.9%)	2 (8.3%)	8 (25%)
Student	1 (3.8%)	5 (20.8%)	1 (3.1%)
Business/sales	3 (11.5%)	2 (8.3%)	7 (21.9%)
Retired/unemployed	0	4 (16.7%)	2 (6.3%)
Other	1 (3.8%)	0	2 (6.3%)
Meditation experience			
Yes	10 (38.5%)	8 (33.3%)	11 (34.4%)
No	16 (61.5%)	16 (66.7%)	21 (65.5%)

Means and standard deviations (SD) were represented

CCT compassion cultivation training, WL waiting list, MBSR mindfulness-based stress reduction

SWLS and SHS measures in the CCT group, with small to medium effect sizes (Cohen's *d* ranging from $-.42$ to $-.37$) (see Table 3). No significant changes were found for WL.

Mindfulness A significant time \times group interaction effect was observed on MAAS ($F(1,48) = 10.619$; $p < .05$; $\eta^2 = .181$), indicating higher scores in the CCT condition compared to the WL control group at post-intervention. Results of within-group comparisons showed a significant pre-post change in the mindfulness measure for the CCT group, with a moderate to large effect size ($d = -.65$), and a non-significant change for WL (see Table 3).

Empathy Results revealed a significant time \times group interaction on empathic concern (EC; $F(1,48) = 9.673$; $p < .01$; $\eta^2 = .168$) and personal distress (PD; $F(1,48) = 28.398$; $p < .001$; $\eta^2 = .372$). No significant interaction effects were observed on perspective taking (PT) scores. Within-group comparisons yielded a significant pre-post change on all empathy measures in the CCT group (with moderate effect sizes) and a non-significant effect for WL (see Table 3).

Self-Compassion A significant time \times group interaction was observed for the SCS score ($F(1,48) = 26.657$; $p < .01$; $\eta^2 = .357$), where CCT participants reported higher mean scores than the WL group. A significant pre-post change

was revealed in self-compassion in the CCT group, with a large effect size ($d = -1.22$), and a non-significant change in WL ($d = .03$) (see Table 3).

Compassion for Others Results yielded a significant time \times group interaction effect for compassion for others ($F(1,48) = 9.013$; $p < .01$; $\eta^2 = .158$). Within-group analyses showed a significant pre-post change in the CCT group, with a moderate to large effect size ($d = -.69$), and a non-significant pre-post change in the WL group ($d = -.11$) (see Table 3).

Identification with all Humanity A significant time \times group interaction for the IWAH measure was indicated ($F(1,48) = 8.579$; $p < .05$; $\eta^2 = .152$). Results of within-group comparisons showed a significant pre-post change in the CCT group, with a medium to large effect size ($d = -.68$). No significant change was observed in the control group ($d = -.13$) (see Table 3).

Discussion

The objective of study 1 was to assess the impact of CCT on several psychological and relational variables through a wait-list randomized control trial comparing CCT to a wait-list condition. Results suggest that CCT is effective in decreasing stress, depression, empathic distress, and enhancing mindfulness, self-compassion, compassion for others, empathic

Table 3 Levels of measures and within-group comparisons in CCT, WL, and MBSR groups

	CCT group (n = 26)			WL group (n = 24)		
	Pre	Post	Pre vs. post Mean. dif. d (95% CI)	Pre	Post	Pre vs. post Mean. dif. d (95% CI)
BAI	6.46 (4.72)	5.23 (5.03)	1.23; .28 (.01, .56)	8.42 (7.34)	10.25 (7.96)	2.17; .45 (.05, -.84)
BDI-II	12.19 (9.26)	4.38 (5.65)	7.81***; .82 (.37, 1.26)	11.21 (10.08)	11.13 (9.63)	6.84***; .71 (.24, 1.18)
PSS	24.42 (10.79)	14.69 (8.08)	9.73***; .87 (.39, 1.36)	23.50 (10.07)	23.88 (10.56)	7.67***; .71 (.23, 1.19)
SWLS	24.69 (7.37)	27.92 (6.72)	-3.23***; -.42 (-.74, -.10)	23.83 (6.51)	24.67 (6.66)	-3.10***; -.55 (-.94, -.16)
SHS	20.65 (4.53)	22.38 (5.09)	-1.73***; -.37 (-.72, -.02)	20.69 (5.2)	20.67 (5.34)	-2.49***; -.53 (-.91, -.15)
MAAS	59.00 (14.75)	68.88 (11.78)	-9.89***; -.65 (-1.06, -.23)	60.75 (12.01)	60.42 (12.01)	-8.23***; -.54 (-.96, -.12)
EC	20.35 (4.81)	23.12 (3.20)	-2.77***; -.56 (-.94, -.18)	21.33 (4.68)	20.96 (4.43)	-.24; -.05 (-.47, .38)
PD	11.69 (5.94)	7.58 (5.20)	4.12***; .67 (.34, 1.00)	10.46 (5.50)	11.58 (5.75)	2.82***; .46 (.02, .89)
PT	17.62 (5.01)	20.27 (4.44)	-2.65***; -.51 (-.85, -.16)	19.29 (5.57)	19.92 (4.10)	-2.34***; -.45 (-.84, .06)
SCS	2.96 (6.4)	3.78 (7.5)	-.82***; -.122 (-1.75, -.68)	3.13 (7.1)	3.11 (7.5)	-.70***; -.105 (-1.51, -.59)
CS	4.09 (4.8)	4.43 (3.5)	-.34***; -.69 (-1.06, -.32)	4.17 (5.2)	4.23 (3.3)	-.25***; -.49 (-.87, -.10)
IWAH	31.46 (6.54)	36.04 (5.88)	-4.58***; -.68 (-1.03, -.32)	32.04 (6.75)	32.92 (7.22)	-4.15***; -.62 (-.93, -.30)

	MBSR group (n = 32)		
	Pre	Post	Pre vs. post Mean. dif. d (95% CI)
BAI	9.78 (8.80)	5.03 (3.62)	4.75***; .53 (.11, .94)
BDI-II	9.09 (5.10)	3.81 (3.10)	5.28***; 1.01 (.42, 1.60)
PSS	21.25 (7.71)	14.63 (4.96)	6.63***; .84 (.37, 1.30)
SWLS	28.06 (4.16)	29.63 (4.58)	-2.00***; -.37 (-.62, -.12)
SHS	21.31 (4.07)	23.41 (3.24)	-2.09***; -.50 (-.82, -.19)
MAAS	58.41 (12.88)	67.72 (9.64)	-9.31***; -.71 (-1.07, -.35)
EC	21.69 (4.41)	22.06 (4.30)	-.38; -.08 (-.37, .20)
PD	11.50 (6.47)	8.97 (4.90)	2.53***; .38 (.12, .64)
PT	18.88 (5.63)	20.91 (4.77)	-2.03***; -.35 (-.63, -.08)
SCS	3.10 (7.9)	3.55 (5.5)	-.45***; -.56 (-.89, -.22)
CS	4.17 (5.5)	4.29 (4.8)	-.12; -.21 (-.47, .04)
IWAH	31.60 (6.65)	31.43 (6.88)	.42; .02 (-.21, .26)

Means and standard deviations (SD) are represented

d Cohen's d effect size, CI confidence interval, FW 2-month follow-up, CCT compassion cultivation training, WL waiting list, MBSR mindfulness-based stress reduction, BAI Beck Anxiety Inventory, BDI Beck Depression Inventory, PSS Perceived Stress Scale, SWLS Satisfaction with Life Scale, MAAS Mindful Attention Awareness Scale, SHS Subjective Happiness Scale, EC Empathic Concern Subscale, PD Interpersonal Distress Subscale, PT Perspective Taking Subscale, SCS Self-Compassion Scale, CS Compassion for others Scale, IWAH Identification with All Humanity

*p < .05; **p < .01; ***p < .001

concern, and identification with all humanity. Although there was no group \times time interaction in happiness and life satisfaction between CCT and WL, the CCT group showed significant pre-post changes in these variables.

Previous research on CBIs suggests that programs promoting constructive emotional states enhance psychological well-being and diminish psychological symptoms. For example, loving kindness and compassion for others have been empirically related to decreased depression and stress and enhanced well-being (Cosley et al. 2010; Fredrickson et al. 2008; Steffen and Masters 2005). In addition, Gilbert's Compassionate Mind Training had significant effects on self-reported anxiety and depression in people with high shame and self-criticism (Gilbert and Procter 2006), and significant decreases in depression, anxiety, and paranoia in patients with schizophrenia (Mayhew and Gilbert 2008).

It might seem paradoxical that reflecting upon, visualizing, and caring for one's own and others' suffering in the CCT program could diminish stress and depression; however, it seems that cultivating openness, warmth, and curiosity toward what is difficult, instead of avoiding or suppressing it, brings a sense of well-being and inner peace. According to the self-centeredness/Selflessness Happiness Model (SSHM; Dambrun and Ricard 2011), a lower level of self-centeredness promoted by compassion training should enhance happiness. Previous studies have shown that mindfulness and self-compassion were predictors of happiness (Campos et al. 2016), and that loving kindness training was effective in increasing purpose in life (Fredrickson et al. 2008).

The CCT protocol involves clarifying and connecting with personal values and the pursuit of intrinsic goals and values has been theoretically and empirically linked to enhanced emotion regulation, eudaimonic well-being, and happiness, especially in Self-determination Theory (Huta and Ryan 2009), Acceptance and Commitment Therapy (Hayes et al. 1999), and Logotherapy (Frankl 1967). Therefore, it could be hypothesized that clarifying and connecting with personal values is a relevant mediator of enhancements in psychological well-being in compassion training programs, particularly in CCT, which opens up an interesting venue for future research. Further studies should be carried out to analyze the effects of CBIs on happiness and satisfaction with life. An additional aspect to consider is that a ceiling effect may explain the modest positive changes observed in these variables (i.e., CCT participants started the program with relatively high levels of happiness and life satisfaction, and, therefore, they did not have much room for improvement on these variables), and it could be hypothesized that clinical samples with lower initial levels of these variables could achieve greater improvements.

Previous research on CCT (Jazaieri et al. 2013) showed that this program was effective in enhancing self-compassion and diminishing fear of compassion. Our research corroborates the positive impact of CCT on self-compassion while adding

evidence that CCT might be effective in enhancing empathic concern, compassion for others, and identification with all humanity and decreasing empathic distress. These findings suggest that interventions like CCT could be particularly relevant for populations at risk of professional burnout (e.g., school teachers, caretakers, nurses, MDs, psychologists, social workers), for whom staying emotionally connected while downregulating emotional contagion and empathic distress is a key to sustaining mental and physical health.

Study 2

Method

Participants

A convenience sample composed of 58 participants was used in study 2. Data from participants assigned to the CCT group in study 1 ($n = 26$) and participants from an MBSR group ($n = 32$) were included in this study. Participants in the MBSR condition were adults who signed up for a regular MBSR class offered at the university where this research was conducted. Participants ranged in age from 19 to 74, and included both males ($n = 23$) and females ($n = 35$). Regarding marital status, most participants were married ($n = 27$; 46.6%), followed by single ($n = 22$; 38%), divorced ($n = 5$; 8.6%), and living with a partner ($n = 4$; 6.8%). The participants' occupations were healthcare professional ($n = 18$; 31%), education professional ($n = 8$; 13.8%), business/sales ($n = 10$; 17.2%), other professions ($n = 15$; 25.9%), student ($n = 2$; 3.5%), retired/unemployed ($n = 2$; 3.5%), and other ($n = 3$; 5.2%).

Procedure

Participants in the MBSR condition went through the regular screening procedure that the Mindfulness Unit at Alberto Hurtado University already had in place. Potential participants in the MBSR signed up for a group interview in which they received general orientation about the program, its benefits, and the time and effort it would involve. Pre-intervention measures were usually completed right after this group interview, but participants were also given the opportunity to complete them at home and bring them to the first session. Data from participants at pre- and post-intervention, and 2-month follow-up were collected in both groups (CCT and MBSR).

The MBSR followed the original format from the University of Massachusetts (Kabat-Zinn 1990), which involves (a) eight 2.5-h sessions (one session per week), including experiential exercises and different mindfulness meditations (sitting, walking, lying, and movement meditation) didactic discussions about coping with stress and psychophysiology, and the process of bringing these techniques into

everyday life; (b) 40 to 60 min of daily practice at home, using guided-meditation instructions in audio and written format; and (c) an intensive 7-h-day-long retreat between sessions 6 and 7.

Two clinical psychologists and experienced meditation practitioners who had received extensive formal training in MBSR through the Center for Mindfulness facilitated the programs, adhering to the program guidelines. The CCT intervention was described in study 1.

Measures

The instruments used for the pre-, post-, and follow-up measures throughout this study were the same ones used in study 1.

Data Analyses

Baseline analyses were conducted, applying Student's *t* tests for continuous data and chi-square tests for categorical variables. Differences at baseline were taken into account in subsequent analyses. Normality hypothesis was assessed by the Shapiro-Wilk test, homoscedasticity assumptions by Levene's test for equality of variances, and sphericity assumptions by Mauchly's test. Although normality and homoscedasticity were not met for some measures, a parametric test was conducted because rm-ANOVA method was still robust and reliable (Schmider et al. 2010). Sensitivity analyses were performed to assess the robustness of the findings in terms of different methods for handling missing data (Thabane et al. 2013). Analyses using intention-to-treat (ITT) with the expectation maximization (EM) algorithm were reported. Separate 2 (group: CCT, MBSR) \times 3 (time: pre, post, follow-up) mixed repeated-measures of analysis of variance (ANOVA) were carried out for each study measure. The Huynh-Feldt correction, which makes an adjustment to the degrees of freedom was applied where sphericity assumption could not be assumed (Haverkamp and Beauducel 2017). Effect sizes were reported by Cohen's *d*, based on Botella and Sánchez-Meca (2015). All statistical analyses were performed using IBM SPSS version 23 for Windows.

Results

Sociodemographic and participant data are shown in Table 2. No statistical differences were found between groups on any sociodemographic variable or clinical data, except the satisfaction with life scale (SWLS), where participants in the MBSR group ($M = 28.06$; $SD = 4.16$) scored higher than the CCT group ($M = 24.42$; $SD = 7.37$) at baseline ($t(37.58) = -2.195$; $p < .05$). The Shapiro-Wilk test was non-significant for all outcome measures, revealing normal distribution of data, except for BAI, EC, and CS. Results for CCT group regarding normality assumption have been reported in study 1. The

Mauchly test showed non-sphericity for BAI, BDI, MAAS, PT, IWAH, and compassion for others scale (all $ps < .05$). Levene's test was significant ($p < .05$), indicating non-equality of variances for BAI (at pre), BDI (pre, and post), PSS (at post), and SHS (at post). All participants completed their respective interventions and both pre- and post-intervention assessments. At the 2-month follow-up, 11 participants (19%) did not complete the assessment (CCT, $n = 2$; MBSR, $n = 9$). Data were missing completely at random (MCAR) ($p > .05$).

Affect No significant time \times group interactions were found for any affect measures, including depression, stress, and anxiety. Within-group analysis showed significant pre-to-post and pre-to-follow-up changes in the CCT group on the BDI and PSS, and no change in BAI scores. In the MBSR group, results revealed a significant change (pre-to-post and pre-to-follow-up) for all measures of affect (see Table 3).

Life Satisfaction and Happiness Repeated-measures analysis of covariance (ANCOVA), including baseline SWLS scores, was conducted for life satisfaction, and repeated-measures ANOVA for SHS. No significant time \times group interactions were found on the life satisfaction and happiness measures. Analyses of within-group comparisons yielded a significant change (pre-to-post and pre-to-follow-up) in both the CCT and MBSR groups, except for pre-to-follow-up SHS in MBSR (see Table 3).

Mindfulness Compared to baseline, a significant change (pre-to-post and pre-to-follow-up) was observed on the MAAS measure for the CCT and MBSR groups, with moderate to large effect sizes (from $-.64$ to $-.71$) (Table 3). No significant time \times group interactions were found on the mindfulness scores.

Empathy Results revealed a significant group \times time interaction on the EC subscale ($F(2, 112) = 4.239$; $p < .05$; $\eta^2 = .070$) and non-significant interaction effects on the PD and PT subscales. For EC, within-group comparisons showed a significant pre-post change in the CCT group (previously reported in study 1), but it was non-significant from pre- to follow-up. There were no significant changes in the MBSR group at post-intervention or follow-up. Regarding the PD and PT scales, results of within-group analyses revealed significant changes (pre-to-post and pre-to-follow-up) in both groups, except for the change in PT from pre- to follow-up in the MBSR group (see Table 3).

Self-compassion Results showed no time \times group interaction effects on SCS. Compared to baseline, both groups presented significant changes at post and follow-up, with large effect sizes for CCT (from -1.05 to -1.22) and moderate for MBSR (from $-.55$ to $-.62$) (see Table 3).

Compassion for Others No time \times group interactions were found on the compassion for others scale. Within-group comparisons revealed a significant change (pre-to-post and pre-to-follow-up) in the CCT group, whereas no change was found in the MBSR group (Table 3).

Identification with all Humanity Results showed a significant time \times group interaction for identification with all humanity ($F(1.890, 112) = 6.849; p < .01; \eta^2 = .109$), indicating that participants in the CCT group scored higher than those in the MBSR group at post-intervention. Within-group analyses revealed a significant change at post and follow-up, compared to baseline, in CCT, and no change in the MBSR group (see Table 3).

Discussion

The objective of the second study was to analyze the differential impact of an explicit compassion intervention through a CBI (CCT), compared to an MBI that implicitly included compassion (MBSR). To the best of our knowledge, only one previous study compared the differential effect of an MBI and a CBI. Feliu-Soler et al. (2017) compared a short training program in loving kindness and compassion meditation after a Dialectical-Behavioral Therapy Mindfulness Skills Program (Linehan 1993), versus continuation of training, in patients with borderline personality disorder, finding greater changes in acceptance in the former group.

The results of study 2 support the idea that participants who engaged in explicit compassion training increased their levels of empathic concern and identification with all humanity significantly more than the implicit training group. Moreover, although there were no significant group \times time interactions in terms of compassion for others (CS), the CCT group showed significant within-group changes that were maintained at follow-up, whereas the MBSR group did not present significant changes in this variable (see Table 3). These results suggest that when compassion is explicitly taught, there seems to be an enhancement of a pro-social orientation, compared to implicit training in compassion, as in MBSR.

Both trainings were highly effective in enhancing mindfulness and self-compassion. These results suggest that self-compassion and mindfulness are not only theoretically but also empirically related constructs, and that both skills are relevant aspects of CBIs and MBIs (Cebolla et al. 2017). Theoretically, mindfulness is considered a core aspect of self-compassion (Germer 2009; Gilbert and Choden 2013; Neff 2003, 2012), and both mindfulness and self-compassion are considered important aspects of cultivating compassion for others (Dalai Lama 1995; Jinpa 2010). The fact that MBSR does not include a specific session on self-compassion may partially explain the relatively lower (but still significant) increases in self-compassion for this group. Nevertheless, self-compassion is an important attitudinal

principle in MBSR and other MBIs in which participants are not only taught to pay attention to the present moment, but also to do so with a warm and accepting attitude toward their experiences, particularly difficult feelings, thoughts, and emotions (Shapiro et al. 2006). Furthermore, MBSR was not effective in improving levels of self-reported compassion for others, whereas the CCT results suggest that this skill, at least on self-report measures, can be enhanced in a secular, short-term intervention.

The results of this study support the hypothesis that an explicit compassion training like CCT would have a significant effect on enhancing empathic concern and identification with all humanity, compared to an implicit teaching process through MBIs. The fact that both CCT and MBSR participants increased their capacity to perceive other peoples' inner world (perspective taking), and at the same time became less reactive to other people's suffering (empathic distress), suggests that mindfulness—which is present in both programs but is fundamental in MBSR—might be effective in enhancing some aspects of empathy. The decreases in empathic distress in both CCT and MBSR suggest that this effect could also be related to the mindfulness component of both trainings.

Mindfulness enhances the capacity for self-awareness and facilitates the capacity to maintain awareness of the self-other distinction, which, in turn, allows the emergence of empathy instead of simply experiencing emotional contagion when perceiving another's emotional state. Emotional contagion consists of the tendency to automatically adopt the emotional state of another (Bernhardt and Singer 2012). This can be seen for instance, when an infant cries and other infants around him/her also cry, or when a baby cries and the mother feels the anxiety in her own body and feels moved to relieve the baby. In this rudimentary form of empathy, what happens to others may produce a similar emotion in the self, but without a clear separation of self and other, as emotional contagion depends on subcortical primary processes rather than higher-order processes related to self-other differentiation (Bernhardt and Singer 2012; De Waal 2008).

When someone experiences emotional contagion instead of empathy when faced with suffering, a threat-based response is triggered, and the empathizer becomes the sufferer and a potential recipient of compassion. Mindfulness and related higher-order cognitive processes (e.g., theory of mind, perspective taking) allow the perceiver of suffering to maintain a healthy self-other differentiation, becoming more able to regulate his/her own instinctive threat-based reaction in order to offer a stable compassionate presence.

In CCT, the gradual and consistent exposure to suffering imagery while consciously choosing to generate a compassionate motivation to relieve that suffering, instead of reacting from a threat-based mentality (e.g., avoidance, denial, or over-identification), may explain the significant pre-to-post increases in empathic concern and compassion and the decrease

in empathic distress (measured by the personal distress subscale, see Table 3). Related to this, Jazaieri et al. (2014) found that CCT participants decreased worry and emotional suppression, which supports more adaptive functioning in the face of suffering. In qualitative reports of CCT participants, this phenomenon is expressed as feeling stronger and more empowered to face suffering with greater empathy and compassion while feeling less overwhelmed (i.e., empathically distressed) by that suffering (Brito 2014). In other words, CCT participants seem to decrease their threat-based reactivity while increasing their compassion-based responsiveness to suffering, thus becoming more sensitive and skillful in dealing with suffering.

Some studies that have tested MBSR effects on empathy using the same instruments as in the present study (the four subscales of the Interpersonal Reactivity Index, IRI) found no effect on any subscale (Galantino et al. 2005), only reductions in empathic distress (Beddoe and Murphy 2004) or, similar to the present study, a reduction in empathic distress and an increase in cognitive empathy (Birmie et al. 2010). No increases in empathic concern have been found in MBSR studies. Decreases in empathic distress in the MBSR group could be related to a more general stress reduction effect of this program. Considering the results of this study, it could be stated that, whereas MBSR was effective in enhancing the cognitive aspect of empathy (i.e., the mind's capacity to imagine someone else's perspective), CCT participants also improved in the affective (emotional resonance) and motivational (desire to help) aspects of empathy. It must be noted that the significant increase in empathic concern was not maintained at the two-month follow-up, which could be related to a lack of practice maintenance. Further research should be carried out to better understand these results.

Although both CCT and MBSR were effective in reducing self-reported depression and stress, only the MBSR group showed significant decreases in anxiety, which may be partially explained by the fact that MBSR participants presented relatively higher initial anxiety levels. Finally, both CCT and MBSR led to significant improvements in self-reported life satisfaction and happiness, and these changes were maintained at follow-up, except for happiness in the MBSR group. These findings are congruent with previous studies that linked mindfulness and compassion to happiness and well-being (Baer et al. 2012; Hollis-Walker and Colosimo 2011), and they also suggest that compassion may have greater impact on happiness than mindfulness does (i.e., Campos et al. 2016). This is an important issue that needs to be explored in future studies on the differential effects of compassion and mindfulness trainings.

General Discussion

The present research explored the effects of CCT on a broad range of psychological outcomes and compared the

differential effects of explicit and implicit training in compassion. These results partially confirm the idea that self-compassion and compassion can be taught through implicit and explicit methods, but the explicit method seems to be more effective in enhancing compassion-related dimensions, especially in increasing empathy and decreasing in-group bias to favor caring for all humanity. Furthermore, the fact that only CCT participants significantly increased their scores on self-reported measures of compassion for others (pre-to-post and pre-to-follow-up), whereas no change was found in this dimension in the MBSR group, suggests that both programs partially cover similar grounds and promote well-being, but they also differ significantly in other areas, which makes them highly complementary.

The improvement in these altruistic dimensions has several research implications. First, and perhaps most importantly, these results suggest that empathy and compassion can be trained in a systematic and secular way, even in a relatively short period of time. Although the idea that an altruistic outlook can be taught has been present in contemplative traditions—particularly in Buddhism for millennia—this possibility has only begun to be systematically researched, and most explorations tend to remain philosophical rather than empirical (e.g., Pence 1983; Wear and Zaroni 2008). To date, most empirical research on compassion has focused on either self-compassion or well-being and mental health benefits of compassion training programs.

Another aspect that requires further investigation is the complementarity between mindfulness and compassion trainings. Whereas MBSR seems to have a more intrapersonal focus, CCT also includes the interpersonal and transpersonal dimensions in a more explicit way. This complementarity suggests that an integrated training sequence that explicitly develops mindfulness, self-compassion, and compassion for others might have greater positive intra-, inter-, and transpersonal effects. Further research will be needed to design and evaluate such integrated trainings.

In the future, research that involves longer, more in-depth training in these practices, particularly the cultivation of loving kindness and compassion, could shed light not only on the immediate effects, but also on the effects of these types of practices in the long term.

This study was limited to researching CCT, a specific compassion cultivation methodology, among several others. Therefore, it was not expected to convey or explore the application of the vast richness offered by contemplative traditions and psychological research with regard to compassion. The practices taught in the CCT program are largely inspired by the *lojong* or *mind training* tradition of Tibetan Buddhism (Jinpa 2006, 2011), a set of teachings that date from at least the eleventh century CE. The focus of these traditional teachings is the use of pithy, essential instructions in everyday difficulties as opportunities to transform the mind from its habitual reactive mode to unlimited love and wisdom. Naturally,

such teachings are not meant to be practiced for just 8 weeks, but instead are taught as a lifelong endeavor—even a multi-life endeavor in its traditional cultural context. Moreover, although these practices might be effective in reducing stress or enhancing well-being, they were not traditionally taught for these ends. Arguably, these ancient practices have much more to offer, and contemporary research is only scratching the surface of their potential.

Limitations

There are several limitations that should be highlighted in the present studies. It is important to keep in mind that both studies included a relatively modest sample size; therefore, the results should be interpreted with caution. Furthermore, it should be taken into account when interpreting the results that all the study outcomes were self-reported measures. Another limitation refers to the use of several small statistical tests along with a large number of variables, thus increasing the probability of error in the results and conclusions. In addition, normality, homoscedasticity and sphericity assumptions could not be considered for all the variables. Nevertheless, parametric tests (repeated-measures ANOVA) were performed for all outcomes because statistical method adequacy, robustness, and reliability could still be assumed (Schmider et al. 2010). Moreover, the Huynh-Feldt correction was applied, making an adjustment to the degrees of freedom, where sphericity assumption was violated (Haverkamp and Beauducel 2017). Effect sizes by Cohen's *d* and IC 95% were provided, which are not based on ANOVA assumptions. Randomization was only used to assign participants to CCT or WL-CCT (study 1), but not to assign participants to the CCT or MBSR conditions (study 2). Both CCT and MBSR participants were highly motivated to participate, as both programs demanded a high degree of commitment and dedication; therefore, expectancy bias was probably present in both groups. Finally, another limitation is the lack of data about practice adherence, as previous studies suggested that adherence to practice is a variable that mediates several outcomes (Parsons et al. 2017) and should be included in future studies.

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Author Contributions GBP designed and executed the study, analyzed the data, and wrote the paper. DC and AC: analyzed the data, wrote the results, and collaborated in the writing and editing of the final manuscript.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no competing interests.

Research Involving Human Participants and/or Animals All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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