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THE EFFECTIVENESS OF COMPASSIONATE MIND TRAINING (CMT) FOR UNDERGRADUATE STUDENTS

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Abstract

The study aimed to investigate the feasibility and effectiveness of face-to-face, group-based Compassionate Mind Training (CMT) for undergraduate students.

Following a 12-week CMT intervention, a cohort of undergraduate students in the CMT group (n = 45) and their counterparts in the passive control group (n = 21) were asked to fill out assessments before, during, immediately after, and three months following the completion of the intervention. These measures encompassed a range of factors, including self-compassion, negative affect, various forms of positive affect, depression, anxiety, stress, life satisfaction, and dysfunctional attitudes.

Compared with the control group, participants belonging to the CMT group showed significant increases in self-compassion and self-warmth, along with decreases in negative affect, self-coldness, dysfunctional attitudes, depression, and stress. However, mediation analyses, when applied within longitudinal models, did not establish the significance of self-compassion, self-coldness, or self-warmth as mediators in the context of the CMT's impact on negative affect and soothing positive affect.

The results support the effectiveness of a 12-week, group-based, face-to-face CMT for undergraduate students. Yet, they also cast doubt on self-compassion as the primary mechanism driving these changes, given the absence of supporting longitudinal evidence.

Keywords: self-compassion, intervention, students, CMT, affect.

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Undergraduate students report reduced well-being and increased psychological distress compared to the general community (Bore et al., 2016; Larcombe et al., 2016; Regehr et al., 2013), therefore it is essential to design effective interventions in order to reduce their distress and improve their well-being. Several factors can constitute sources of distress: academic performance, pressure to succeed, post-graduation plans, financial worries, quality of sleep, relationship with friends, relationship with family, general health issues, body image, and self- esteem (Beiter et al., 2015). Given that they are particularly vulnerable to perfectionism-related distress (Arpin-Cribbie et al., 2012) and self-criticism is a transdiagnostic factor in psychopathology (McIntyre et al., 2018), it is also crucial to develop interventions that can effectively manage their self-criticism. One promising way to reach these goals is through the cultivation of self-compassion (Dundas et al., 2017; Mantelou & Karakasidou, 2017). Self- compassion can be described as a healthy attitude towards one's pain and suffering, which is an integral part of human life. It implies a gentle, understanding, and supportive approach towards oneself, instead of employing harsh self-criticism (Germer, 2009; Neff, 2003a). Furthermore, self-compassion is a provably acquirable skill with numerous advantages (Ferrari et al., 2019, Póka et al., 2023).

In addition to longer and more complex self-compassion programs, such as the Mindful-Self Compassion (MSC) program (Neff & Germer, 2012) and Compassionate Mind Training (CMT; Irons & Heriot-Maitland, 2021), researchers are also investigating the effectiveness of simpler, shorter interventions for improving distress and well-being levels. For example, writing self-compassionate letters (an exercise most commonly used in studies to elicit and increase self-compassion) can reduce negative emotional states (Leary et al., 2007) and depression, as well as increase happiness levels in the general population (Shapira & Mongrain, 2010).

Promising results emerge from meta-analyses investigating interventions aimed at enhancing self-compassion (Ferrari et al., 2019) and general well-being (Zessin et al., 2015). They also demonstrate effectiveness in fostering positive affect, mindfulness, life satisfaction, eating behaviors, and body image; furthermore, these interventions show efficacy in mitigating negative affect, eating pathology, depression, stress, anxiety, self-criticism, and rumination (Ferrari et al., 2019; Póka et al., 2023; Turk & Waller, 2020; Wakelin et al., 2022). Notably, the acquisition of self-compassion is particularly attainable within group settings and through in-person intervention methods (Ferrari et al., 2019; Póka et al., 2023). However, it appears that self-compassion interventions commonly utilized among college students, such as self- compassion writing exercises, exhibit reduced benefits compared to their general effectiveness (Ferrari et al., 2019; Póka et al., 2023). It is therefore important to develop and adapt interventions tailored towards them, potentially yielding greater success in fostering self- compassion, enhancing well-being, and alleviating distress. A promising avenue in this pursuit is Compassionate

Mind Training (CMT; Irons & Heriot-Maitland, 2021), a group intervention conducted in person and rooted in the principles and application of Compassion-Focused Therapy (Gilbert 2009a, 2009b, 2014), which appears to hold considerable promise for achieving these objectives.

The Compassionate Mind Training

The Compassionate Mind Training (CMT; Irons & Heriot-Maitland, 2021) is a group- based, 8-session program, split into 2.5-hour sessions every week. The program integrates a solid theoretical foundation encompassing written, imaginative, meditative, and body based exercises (Gilbert 2009a, 2009b, 2014). Throughout the training, participants acquire knowledge about the development and operation of the mind, what functions it serves, and what factors influence it. This accumulation of insights contributes to a reduction in feelings of shame and blame. Participants realize that we all have a brain, a mind, that although it has many benefits, it is also likely to create problems for us, but it wasn't our choice to be built that way. Furthermore, we did not choose the context in which we were born, although these aspects have a huge influence on how we function today. The key message conveyed through this methodology emphasizes that one is not at fault, but at the same time, one bears a sense of responsibility. Participants are introduced to the definition of compassion as a motive (compassion being defined as the sensitivity to suffering, as well as the attempt and commitment to alleviate or prevent it), the three flows of compassion (self-compassion, compassion for others, and compassion from others), the two psychologies of compassion (engagement and action), the competencies required for compassion, the three main qualities of compassion (strength, wisdom, engagement), the three basic emotion regulation systems (threat, drive, and soothing system), and the function of compassion in regulating these systems (Gilbert, 2009a, 2009b, 2014). Through the program, participants engage in a range of activities aimed at cultivating a compassionate mindset. These activities include imaginative exercises like the compassionate place and compassionate image, body-centered exercises like compassionate breathing and compassionate touch, and written exercises such as composing compassionate letters and exploring the concept of "multiple selves," among others. Moreover, participants can openly discuss their experiences within small group settings, as well as with the larger group as a whole.

The results of the preliminary investigations show that CMT is a feasible and effective intervention for the general population. It has the potential to improve all three flows of compassion while nurturing positive emotions and a sense of well-being (including physiological well-being measured by heart rate variability) (Irons & Heriot-Maitland, 2021; Matos et al., 2017). Furthermore, it has been shown to reduce self-criticism, shame, fears of compassion, and distress (Irons & Heriot-Maitland, 2021; Matos et al., 2017). Findings have highlighted the importance of improving one's self-compassion for overall increases in well- being and decreases

in psychological distress (Irons & Heriot-Maitland, 2021). The results of Matos and colleagues' (2022) study further confirmed that self-compassion was the main mechanism of change in a two-week CMT intervention. Self-compassion acted as a mediator for the intervention's impact on various factors, including self-criticism, depression, stress, and shame, as well as positive emotional states like safe and relaxed feelings. These interventions are particularly recommended for individuals grappling with elevated levels of shame and self- criticism, who find it challenging to engage in self-soothing and self-acceptance (Gilbert, 2009a, 2009b, 2014; Gilbert & Procter, 2006). Given that college students are exceptionally vulnerable to perfectionism-related distress (Arpin-Cribbie et al., 2012), and self-criticism is a transdiagnostic factor that can predict symptoms of psychopathology among them (especially depression) (McIntyre et al., 2018), this group-based intervention may be optimal for this population in reducing their distress levels.

Beaumont and Martin (2016) emphasized the importance of developing self-compassion and compassion for others in therapy students using Compassionate Mind Training. Given the high rates of burnout and high levels of psychological distress experienced by psychological therapists (especially younger and newer therapists), self-compassion can be an important personal resource for them, increasing their well-being and reducing distress (Boellinghaus et al., 2013; Finlay,-Jones et al., 2017; Yela et al., 2020), as well as the levels of burnout among them (Eriksson et al., 2018; Gerber & Anaki, 2021). Beaumont et al. (2021) adopted a mixed-methods approach, employing both qualitative and quantitative techniques to investigate the effectiveness of a 12-week CMT intervention for students pursuing careers in helping professions. Their findings also demonstrated promising outcomes regarding the viability and effectiveness of the intervention within an academic setting. However, it's worth noting that this study primarily focused on self-compassion and self-criticism and did not encompass clinical outcomes (such as negative affect, depression, anxiety, stress, etc.) or markers of well-being (like positive affect, life satisfaction, etc.). The results of the qualitative data suggested that personal practice and self-reflection are important aspects of cultivating a compassionate mindset and increasing levels of self-compassion (Beaumont et al., 2021).

Objectives

The main objective of the current study was to investigate the effectiveness of Compassion Mind Training for improving undergraduate students' well-being and reducing their distress. The primary outcomes examined encompass the influence on negative affect and soothing positive affect. Secondary outcomes include several other distress indicators (i.e., depression, anxiety, and stress), as well as indicators of well-being (i.e., activating positive affect and life satisfaction). We also aimed to explore the pathways leading to the impact of the intervention using mediation

analyses. Given that cross-sectional analyses may indicate the existence of a significant indirect effect, even if the true longitudinal indirect effect is shown to be zero (Goldsmith et al., 2018; Maxwell et al., 2011), the present study sought to explore the longitudinal mediation roles of self-compassion and dysfunctional attitudes concerning the clinical benefits resulting from the intervention, particularly focusing on the primary outcomes: the aforementioned negative and soothing positive affect, respectively.

Based on the importance of distinguishing between self-warmth (positive dimensions of self-compassion, compassionate behaviors) and self-coldness (negative dimensions of self- compassion, uncompassionate behaviors) (Chio et al., 2021; Muris and Petrocchi, 2016), we also aim to investigate the individual longitudinal mediation roles of self-warmth and self- coldness.

Hypotheses

Based on the literature, it was expected that the implementation of Compassionate Mind Training would effectively reduce students' negative affect and improve their soothing positive affect. Following the intervention, it was anticipated that students belonging to the intervention group would report lower levels of negative affect and higher levels of soothing positive affect compared to those in the control group. Additionally, our hypotheses proposed that this training regimen would lead to enhancements in self-compassion, self-warmth, and other indicators of well-being, such as activated positive affect and life satisfaction. Concurrently, we hypothesized that it would also result in a reduction in self-coldness, dysfunctional attitudes, and other signs of distress, including depression, anxiety, and stress.

Finally, we predicted that the effects of the intervention on negative affect and soothing positive affect would be mediated by self-compassion. This implies that participation in Compassionate Mind Training would lead to the observed reduction in negative affect and an increase in soothing positive affect through the growth of self-compassion, particularly by addressing self-coldness.

Method

Participants

We conducted an a priori power analysis using G*Power 3 (Faul et al., 2007) to determine the required sample size. For a mixed ANOVA involving two groups and four measurements, with a significance level of 0.05 and a desired statistical power of 0.80, the analysis indicated that a sample size of $n = 24$ would be needed to detect a medium effect size ($f = 0.25$). In the case of an independent t-test, also

with a significance level of 0.05 and a desired statistical power of 0.80, the analysis showed that a sample size of n = 128 would be required to detect a medium effect size (d = 0.5). The intervention group consisted of second- year undergraduate students majoring in Psychology, while the control group comprised second-year undergraduate students from other majors. The allocation was non-random (i.e., the Psychology students sought students to be part of the control group, matched in terms of age and declared gender). The participant recruitment and flow are depicted in Figure 1.

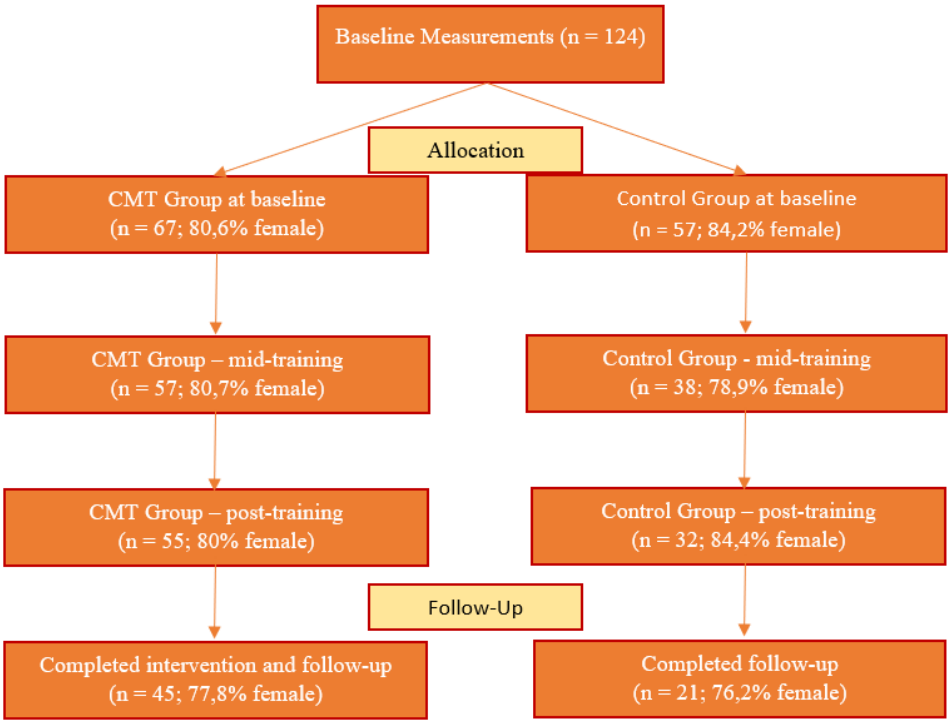

Figure 1. Participants' Flow

Initial measurements were carried out by 124 students, with 67 being from the CMT group and majoring in psychology, while 57 belonged to the control group and pursued other majors. A substantial proportion of the participants were identified as female, accounting for more than 80% of the total. Notably, the overall dropout rate was 46.77%, with a comparatively lower dropout rate observed in the CMT group at 32.83%, as opposed to the control group's rate of 63.15%.

Instruments

Self-Compassion, Self-Warmth, and Self-Coldness

Self-compassion, self-warmth, and self-coldness were assessed using the Self-Compassion Scale – Short Form (SCS-SF; Raes et al., 2011), a 12-item version of the original Self-Compassion Scale (SCS; Neff, 2003b). The SCS-SF appraises each facet of self- compassion (i.e., self-kindness, self-judgment, common humanity, isolation, mindfulness, over-identification) through two items for each component (e.g., "I try to see my failings as part of the human condition"). Participants responded on a five-point Likert scale. To calculate self-compassion results, the average of the six items measuring self-compassionate behaviors (self-kindness, common humanity, mindfulness) was computed, while scores for uncompassionate behaviors towards oneself (self-judgment, isolation, over-identification) were reverse-coded and averaged. Similarly, self-warmth (self-compassionate behaviors) and self-coldness (uncompassionate behaviors) scores were determined by averaging the respective subscale items (items measuring uncompassionate behaviors were not reverse-coded to calculate self-coldness). Elevated scores on self-compassion, self-warmth, and self-coldness indicated higher levels of those qualities. The scale exhibited acceptable internal consistency for the global self-compassion indicator ($\alpha = .76$) and self-coldness ($\alpha = .75$, while the internal consistency of the self-warmth subscale was considered questionable ($\alpha = .64$).

Depression, Anxiety, and Stress

Levels of depression, anxiety, and stress were assessed using the 21-item version of the Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995). Participants provided ratings on a scale ranging from 0 (*does not apply to me at all*) to 3 (*applies to me very much, or most of the time*) to indicate the frequency of their typical experience of each symptom. Subsequently, scores for the variables were obtained by summing up the seven items pertaining to stress, depression, and anxiety, respectively. The total score for each subscale was then doubled. Higher scores indicate higher levels of depression, anxiety, and stress. In the current study, the DASS-21 demonstrated good internal consistency for depression ($\alpha = .87$), along with acceptable consistency for both anxiety ($\alpha = .77$) and stress ($\alpha = .77$).

Negative Affect

To measure the subjective dimension of distress (i.e., negative affect), we used the abbreviated Hungarian version of the Emotional Distress Profile (Profilul Distresului Emoțional - PDE; Opriș & Macavei, 2005). The scale was originally developed and validated in Romania and presents good psychometric properties and excellent internal consistency ($\alpha = 0.94$) as a complex indicator of emotional distress.

The original scale consists of 26 adjectives describing negative affect, such as "sad" and "depressed". The present study utilises 12 items that had adequate face validity according to the translation. Participants were asked to rate on a five-point Likert scale the extent to which the given affective items were typical of their experiences in the past two weeks. The scale exhibited very good internal consistency ($\alpha = 0.89$) in measuring negative affect in the present sample.

Soothing and Activating Positive Affect

The various types of positive affect (i.e., soothing and activating positive affect) were assessed using the Types of Positive Affect Scale (Gilbert et al., 2008), which consists of 18 items appraising three distinct types of positive affect (soothing, relaxing, and activating positive affect). Participants rated their alignment with each statement on a scale ranging from 1 (*Not characteristic of me*) to 5 (*Very characteristic of me*). The scale measures the extent to which participants experience these feelings frequently. The variable scores were calculated by summing the dedicated items. In this study, the focus was on measuring soothing and activating positive affect. The subscale assessing soothing positive affect exhibited questionable internal consistency ($\alpha = .60$), while the subscale evaluating activating positive affect demonstrated acceptable internal consistency ($\alpha = .75$). The results mirror those of the original English instrument, where the activating positive affect subscale displayed higher internal consistency ($\alpha = 0.83$) compared to the subscale measuring feelings of safeness/contentment positive affect ($\alpha = 0.73$).

Dysfunctional Attitudes

The Dysfunctional Attitude Scale (DAS; Weissman & Beck, 1978*)* is a self-report instrument designed to measure the presence and intensity of dysfunctional attitudes. The Hungarian version of the DAS *(*Kopp, 1985) is composed of 35 items, with each of the seven categories of dysfunctional attitudes (need for approval, need for love, need for achievement, perfectionism, entitlement, omnipotence, and autonomy) encompassing five items. These are rated on a 5-point Likert scale ranging from -2 (*strongly disagree*) to 2 (*strongly agree*). As an illustration, an item assessing the need for approval is: "I need other people's approval in order to be happy". For the purposes of this study, an aggregate measure of dysfunctional attitudes was computed by summing the individual item scores. The scale exhibited good internal consistency in capturing dysfunctional attitudes ($\alpha = .83$).

Life Satisfaction

The five-item Hungarian version of the Satisfaction with Life Scale (SWLS; Diener et al., 1985; Martos et al., 2014) was chosen as the tool to gauge participants' alignment with statements concerning their overall perceived well-being. These statements include phrases such as "In most ways, my life is close to ideal", and participants rate their agreement on a scale from 1 (*strongly disagree*) to 7 (*strongly*

agree). The variable scores were derived by summing the item ratings. The SWLS has shown high internal consistency, test-retest reliability, and validity (Diener et al., 1985). Additionally, good internal consistency was also confirmed in the current study ($\alpha = .80$).

Procedure and Design

The study was undertaken following the Code of Ethics of the American Psychological Association and was approved by the local Ethics Committee. Employing an interventional design, this study followed a parallel non-randomized allocation involving multiple assessments, specifically a 2 (group: intervention, passive control) by 4 (time: T1: baseline, T2: mid-test, T3: post-test, T4: 3-month follow-up) matrix. The data collection process was conducted online using Google Forms at each of the four time points (T1: early October 2022, T2: mid-November 2022, T3: mid-January 2023, and T4: mid-April 2023).

The primary focus of measurement encompassed negative affect and soothing positive affect. However, additional factors were also assessed, including various indicators of distress (such as depression, anxiety, and stress) and well-being (such as activating positive affect and life satisfaction). Furthermore, the study also evaluated potential underlying mechanisms, including self-compassion, self-coldness, self-warmth, and dysfunctional attitudes.

The intervention group consisted of second-grade undergraduate students majoring in Psychology, while the control group comprised second-grade undergraduate students from other majors matched in terms of age and declared gender. No group intervention was administered to the control group throughout the study period. This pragmatic trial was conducted to assess the feasibility and effectiveness of Compassionate Mind Training within an academic setting, reflecting real-world circumstances.

The Compassionate Mind Training (CMT) for students embodies a 12-session group program, each lasting about 2 hours, including a ten minutes break mid-session. This intervention was developed by drawing upon existing protocols and manuals for cultivating a compassionate mindset (Beaumont & Martin, 2016; Gilbert, 2009b; Irons & Beaumont, 2017; Irons & Heriot-Maitland, 2021). The training was delivered weekly in a face-to-face format in an academic context by an accredited CBT and CFT psychotherapist (the first author). A two- week break was incorporated during holidays, during which participants were encouraged to continue practicing. The sessions had the following structure: 1) Beginning (grounding exercise, reviewing the weekly practice); 2) Exploration of the designated session theme (psychoeducation, experiential activities, writing tasks, reflections in small- and large group settings); 3) Ending (session summary and reflections, outlining practices for the following week).

Participants exclusively shared personal information and experiences that related to the model, and only engaged in exercises they felt comfortable with.

During exercises, participants were guided to focus on mild to moderate concerns, avoiding overwhelming issues. A short outline of each session is provided in Table 1. Supplementary materials were available to aid weekly practices, including audio files, written handouts encompassing ideas discussed in each session, and worksheets to facilitate independent practice during the week. Encouragement was extended for daily practice, and at the start of each session, discussions centered on home practice, encountered challenges, and strategies for managing them.

Data Analysis

Preliminary analyses and evaluations of the intervention's impact on primary outcomes, secondary outcomes, and potential mechanisms were conducted using SPSS 20 software. A series of Mixed-Model ANOVA and Mixed-Model ANCOVA analyses were performed, followed by Sidak post-hoc tests. Effect sizes were quantified using partial eta squared (η_p^2) and Cohen's *d*, wherein values of $\eta_p^2 = .14$ and $d = .8$ corresponded to a large effect size, $\eta_p^2 = .06$ and $d = .5$ denoted a medium effect size, and $\eta_p^2 = .01$ and $d = .2$ indicated a small effect size (Cohen, 2013; Tabachnick & Fidell, 2013).

To examine mediation effects, Structural Equation Modeling (SEM) was employed within the SPSS AMOS 20 software, utilizing Maximum Likelihood (ML) estimation. The bootstrap method was applied to assess longitudinal indirect effects, generating 5000 samples to establish a 95% confidence interval. The significance of effects was determined based on whether the confidence intervals derived from the bootstrap analysis excluded zero (Hayes, 2018; Preacher & Hayes, 2004).

We also used the PRECIS – 2 (Loudon et al., 2015) toolkit to assess how this intervention works in a real-world setting, and therefore to evaluate the applicability of the results. The following nine domains were rated on a five-point scale, ranging from 1 – *very explanatory* to 5 – *very pragmatic*: Eligibility Criteria (5), Recruitment Path (5), Setting (3), Organisation intervention (4), Delivery (5), Adherence (4), Follow up (5), Outcome (5), and Analysis (3). Values in parentheses represent the scores assigned to each domain. Participants in the study were similar to those who would benefit from this intervention (we had no exclusion criteria). Recruitment of participants from the intervention group also did not demand extra effort. Although the intervention setting was similar to the usual care setting (academic setting), we did not include more academic settings in this research. We gave a score of 4 for Organisation, based on the resources and provider expertise required to deliver the CMT intervention. We also gave a score of 5 for flexibility of implementation (for example, there was a 2-week break during the holiday period). Our evaluation also showed a high degree of flexibility in terms of adherence (similar to the flexibility of usual care). In terms of the Follow- up and Primary outcome, we also rated this study as pragmatic rather than explanatory, but we scored pragmatism lower based on the primary analyses.

Table 1. Outline of the 12-week CMT group for students (CMT)

Session	Content	Practices	Home Practices
1	Exploration of the model, defining compassion Reality checks concerning suffering Understanding the concept of the „tricky brain" Building capacities for compassion	Compassionate Landing Mindfulness of breath Mindfulness of body sensations Mindfulness of thoughts	Compassionate Landing Reflections
2	Exploration of the three emotion regulation systems (i.e., threat, drive, and soothing), and the importance of balance between them	Compassionate Landing Three Emotional System Visualisation The Exploration of the Three Emotion Systems in Personal Life (Global)	Compassionate Landing The Exploration of the Three Emotion System in Personal Life (Day by Day) Reflections
3	Conceptualization of one's own situation and reflection Identifying primary fears, coping strategies, and unexpected outcomes Building compassionate motivation	Compassionate Landing Conceptualization of own situation Public Speech Visualisation Soothing Rhythm Breathing Calming Smile, Touch, and Internal Voice	Soothing Rhythm Breathing Conceptualization of own situation Reflections
4	Building compassionate motivation Exploring the concept of compassion and its attributes Delving into the dual psychologies underlying compassion	Compassionate Landing Contemplating the realities of life Compassionate Place Compassionate Color	Soothing Rhythm Breathing Compassionate Place Reflections
5	Unraveling the notion of multiple selves Compassion as Flow – directing compassion to others Addressing fears, blocks, and resistance	Compassionate Landing Compassionate Memory – Feeling Compassion for Others Compassionate Self – Acting and Embodiment „He/ She is just like me"	Compassionate Self – Acting and Embodiment Displaying compassion in everyday life Reflections
6	Compassion as Flow – embracing compassion from others Addressing fears, blocks, and resistance	Compassionate Landing Memories of Compassionate Others Compassionate Creature Role Play	Observing and describing the compassionate attitudes of others Reflections
7	Compassion as Flow – focusing on self-compassion Discussing fears, blocks, and resistance	Compassionate Landing The Compassionate Self helps the other Self who is suffering Mirror practice Writing a compassionate letter to the Self	Compassionate Self – Acting and Embodiment Self-Compassion Journal Reflections

Session	Content	Practices	Home Practices
8	Recapitulating the three emotional regulation systems (i.e., threat-, drive- and soothing systems) Learning about the three directions of compassion	Compassionate Landing The Exploration of the Three Emotion System in the Last Week The Compassionate Self helps the other Self who is suffering „He/ She is just like me" Role Play	Compassionate Self – Acting and Embodiment Displaying Compassion in Everyday Life Observing and Describing the Compassionate Attitudes of Others Reflections
9	Discussing the concept of multiple selves Exploring different emotional reactions, and directing compassion towards them	Compassionate Landing „Multiple Selves" exercise	Compassionate Self – Acting and Embodiment Self-Compassion Journal Reflections
10	Exploring the functions of self-criticism and shame, and directing compassion towards it	Compassionate Landing Directing Compassion Towards Shame Awareness of the Inner Critic Two Teachers The Compassionate Self helps the Inner Critic Multiple Self Exercise	Compassionate Self – Acting and Embodiment Self-Compassion Journal Reflections
11	Using the compassionate mind in the context of work and study	Compassionate Landing Compassion Towards Shame Compassionate Letter Awareness of the Inner Critic Replacing shame-based self-criticism with compassionate self-correction The ideal teacher/boss „Multiple Selves" exercise	Compassionate Self – Acting and Embodiment Self-Compassion Journal Reflections
12	Sustaining the compassionate mind and reviewing the model	Compassionate Landing Contemplating the realities of life The Exploration of the Three Emotion Systems in Personal Life (Global) The Future Compassionate Self My new compassionate story	

Results

Preliminary analyses

Based on skewness and kurtosis, all investigated variables exhibited a normal distribution across every time point. The descriptive statistics for both groups during each time point are presented in Table 2.

Table 2. Descriptive Statistics

	T1 *M* (*SD*)		**T2 *M* (*SD*)**		**T3 *M* (*SD*)**		**T4 *M* (*SD*)**	
	CMT (*n* = 45)	**Control (*n* = 21)**	**CMT (*n* = 45)**	**Control (*n* = 21)**	**CMT (*n* = 45)**	**Control (*n* = 21)**	**CMT (*n* = 45)**	**Control (*n* = 21)**
Negative Affect	36.64	30.14	31.37	28.90	30.53	32.09	28.02	30.95
	(9.36)	(9.76)	(9.72)	(8.62)	(8.38)	(9.54)	(9.43)	(12.47)
Depression	15.51	9.71	11.2	10.19	7.51	11.04	7.95	12.09
	(10.43)	(9.25)	(8.79)	(6.86)	(6.70)	(8.52)	(7.77)	(8.25)
Anxiety	16.53	16.57	15.11	14.00	11.82	14.19	10.13	13.52
	(8.74)	(11.59)	(9.32)	(11.91)	(7.97)	(12.61)	(7.83)	(12.13)
Stress	24.4	16.76	20.75	19.14	18.93	20.66	15.77	19.14
	(8.41)	(7.68)	(8.99)	(10.89)	(10.05)	(11.52)	(8.23)	(10.66)
Soothing Positive Affect	13.95	14.52	14.51	14.85	14.40	14.14	15.17	14.19
	(2.13)	(3.29)	(2.62)	(2.30)	(2.60)	(2.63)	(2.48)	(3.85)
Activating Positive Affect	26.00	26.80	24.84	26.23	25.04	24.14	27.02	24.95
	(5.58)	(4.42)	(4.91)	(5.30)	(5.83)	(7.09)	(5.12)	(6.05)
Life Satisfaction	24.4	25.90	24.55	25.47	25.26	25.42	25.86	25.42
	(8.41)	(6.01)	(5.57)	(5.83)	(5.70)	(4.92)	(6.12)	(4.92)
Self-Compassion	2.82	3.07	3.19	3.05	3.50	3.13	3.43	3.11
	(.55)	(.69)	(.65)	(.60)	(.50)	(.58)	(.61)	(.77)
Self-Coldness	3.68	3.11	3.22	3.19	2.93	3.00	2.92	3.11
	(.68)	(.85)	(.72)	(.73)	(.72)	(.65)	(.74)	(.82)
Self-Warmth	3.33	3.26	3.60	3.30	3.94	3.26	3.79	3.34
	(.64)	(.76)	(.72)	(.59)	(.51)	(.63)	(.68)	(.85)
Dysfunctional Attitudes	-8.88	-3.90	-12.42	-6.61	-21.35	-6.57	-20.13	-3.95
	(13.83)	(17.70)	(15.05)	(16.26)	(14.76)	(19.74)	(14.09)	(21.06)

During the initial assessment, no differences were found between individuals who successfully responded to the questionnaires (n = 66) and those who did not (n = 58) across any of the variables measured at all time points. However, upon examining the distinctions in baseline characteristics between the CMT group and the control group, notable discrepancies emerged in four variables. Specifically, the CMT group reported higher levels of negative affect (moderate difference), depression (moderate difference), stress (large difference), and self-coldness (medium to large difference) compared to participants in the control group.

Therefore, regarding negative affect, depression, stress, and self-coldness mixed-model ANCOVA tests were performed, in order to control the baseline differences between the two groups (variables measured at baseline were introduced in our models as a covariates). Conversely, no significant differences between the two groups were observed in other measured variables such as anxiety, soothing positive affect, activating positive affect, life satisfaction, self-compassion, self-warmth, and dysfunctional attitudes (refer to Table 3), therefore in these cases, mixed ANOVA tests were performed.

Table 3. Differences in measured variables between CMT and control groups at baseline

Variable	CMT Group (n = 45)		Control Group (n = 21)		t(64)	p	Cohen's d
	M	*SD*	*M*	*SD*			
Age	20.17	1.54	20.09	.76	.23	.81	.06
Negative Affect	36.64	9.36	30.14	9.76	2.59	.01	.67
Depression	15.51	10.43	9.71	9.25	2.17	.03	.58
Anxiety	16.53	8.74	16.57	11.59	-.01	.98	.003
Stress	24.4	8.41	16.76	7.68	3.52	.001	.94
Soothing Positive Affect	13.95	2.13	14.52	3.29	-.72	.47	.20
Activating Positive Affect	26.00	5.58	26.80	4.42	-.58	.56	.15
Life Satisfaction	24.4	8.41	25.90	6.01	-.99	.32	.20
Self-Compassion	2.82	.55	3.07	.69	-1.59	.11	.40
Self-Coldness	3.68	.68	3.11	.85	2.89	.005	.74
Self-Warmth	3.33	.64	3.26	.76	.35	.72	.09
Dysfunctional Attitudes	-8.88	13.83	-3.90	17.70	-1.24	.218	.31

Effectiveness of the intervention on primary outcomes

We first tested the effects on the primary outcomes, negative and soothing positive affect. Regarding negative affect (see Figure 2), a mixed-model ANCOVA test was performed, in order to control the baseline differences between the two groups (negative affect measured at baseline was introduced in our model as a covariate). Mauchly's test of sphericity yielded a significant result, prompting the presentation of time and time-group interaction effects with Huynh-Feldt correction (Epsilon for Greenhouse-Geisser = .83; Epsilon for Huynh-Feldt = .88). The time had no effect on negative affect, $F(1,76) = .726$, $p = .47$, $\eta_p^2 = .011$, (nor when we examined independently within each group), but the interaction between time and group had significant effect on it, $F(1,76) = 3.21$, $p = .05$, $\eta_p^2 = .048$. The group effect on negative affect was also significant, $F(1) = 4.91$, $p = .03$, $\eta_p^2 = .072$.

Sidak pairwise comparisons indicated significant large difference between the CMT ($M_{estimated}$= 29.48; SE = 1.11) and the control group ($M_{estimated}$ = 34.34; SE = 1.66) at post-test (M_{diff} = 4.86, SE = 2.04, p =.02, d = .82). The differences between the CMT ($M_{estimated}$ = 26.84; SE = 1.37) and the control group ($M_{estimated}$ = 33.47; SE = 2.04) was also significant and large at 3-months follow-up (M_{diff} = 6.63, SE = 2.51, p =.01, d = .94).

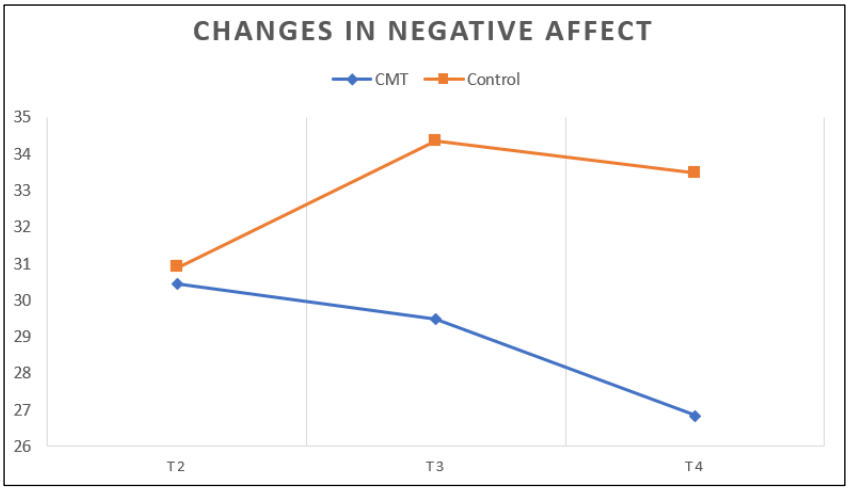

Figure 2. Results for Negative Affect with Estimated Marginal Means

Notes. Covariates appearing in the model are evaluated at the following values: T1NegativeAffect = 34.57

Concerning soothing positive affect, Mauchly's test of sphericity yielded significance as well, necessitating the application of Huynh-Feldt correction for reporting time and time- group effects (Epsilon for Greenhouse-Geisser = .89; Epsilon for Huynh-Feldt = .95). However, no significant effect emerged for soothing positive affect.

In terms of the levels of soothing positive affect, no intergroup differences were apparent across any of the time points. However, when examined independently within each group, multivariate tests revealed that the impact of time on soothing positive affect was present exclusively in the CMT group, Wilk's λ = .87, $F(3)$ = 2.84, p = .04, η_p^2 = .12, representing a medium to large effect, while the control group did not exhibit this effect, Wilk's λ = .96, $F(3)$ = .79, p = .49, η_p^2 = .03. The illustrated pattern of results is depicted in Figure 3 as well.

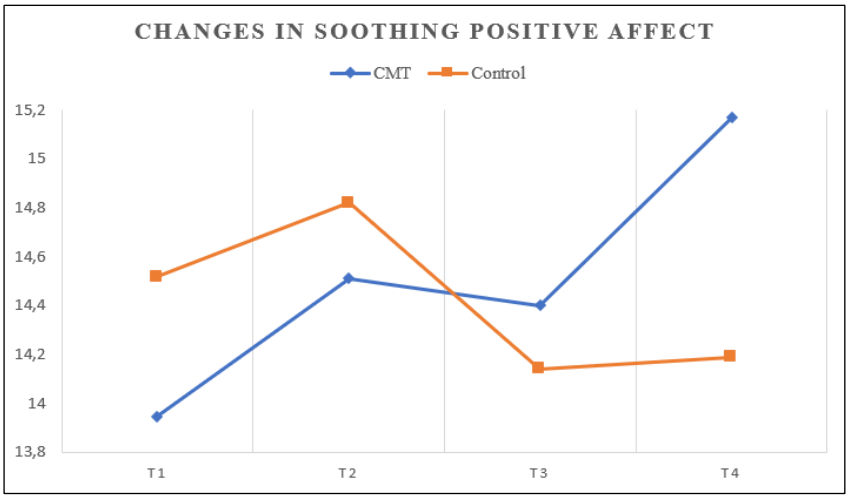

Figure 3. Results for Soothing Positive Affect

Pairwise comparations revealed notable differences with a medium effect size within the CMT group regarding levels of soothing positive affect, showcasing a significant difference between baseline (M = 13.95, SD = 2.13) and follow-up (M = 15.17, SD = 2.48; M_{diff} = 1.22, SE = .43, p = .04, d = .52) assessments.

Effectiveness of the intervention on secondary outcomes

Regarding depression, a mixed-model ANCOVA test was performed, in order to control the baseline differences between the two groups (depression measured at baseline was introduced in our model as a covariate). In terms of depression, Mauchly's test of sphericity did not yield a significant result (p = .63), implying that sphericity could be assumed.

We found significant effect of group on depression, $F(1) = 7.89$, $p < .01$, $\eta_p^2 = .11$. However, no significant effect emerged for the time, $F(2) = .358$, $p = .70$, $\eta_p^2 = .006$, nor for the time and group interaction, $F(2) = 2.18$, $p = .11$, $\eta_p^2 = .03$. When examined independently within each group, multivariate tests revealed that the impact of time on depression was present exclusively in the CMT group, where a reduction in depression was observed from mid-test ($M_{estimated}$ = 10.49, SE = 1.10) to post-test ($M_{estimated}$ = 7.18, SE = 1.08, M_{diff} = -3.30, SE = 1.29, p = .039), and maintaining stability through the follow-up period ($M_{estimated}$ = 7.32, SE = 1.08, M_{diff} = .13, SE = 1.27, p = .99). Depression levels within the control group remained consistent across all time points. Regarding depression levels, significant differences emerged between groups at the post-test with medium effect size (M_{diff} = 4.54, SE = 1.96, $p < .05$, d = .66) and at the follow-up with a large effect size (M_{diff} = 6.13,

SE = 1.96, $p < .01$, $d = .99$). The illustrated pattern of results is depicted in Figure 4 as well.

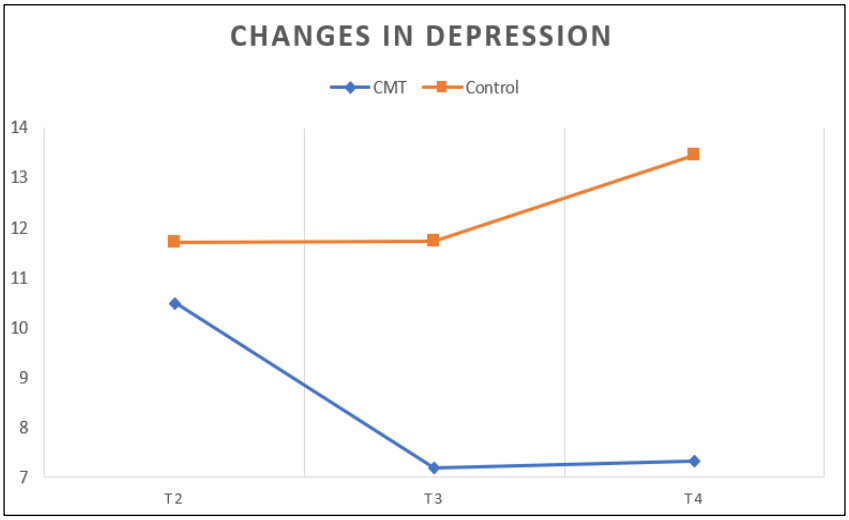

Figure 4. Results for Depression with Estimated Marginal Means

Notes. Covariates appearing in the model are evaluated at the following values: T1Depression = 13.66

Concerning anxiety, the assumption of sphericity was justified based on the non- significant outcome of Mauchly's test ($p = .49$). A significant medium effect attributed to time was identified in relation to anxiety, $F(3) = 5.75$, $p < .01$, $\eta_p^2 = .08$. However, neither the group variable, $F(1) = .30$, $p = .58$, $\eta_p^2 = .01$, nor the interaction between time and group exhibited an effect, $F(3) = 1.47$, $p = .22$, $\eta_p^2 = .02$.

No differences emerged between the two groups at any of the time points. However, upon analysing separately the change in anxiety amongst the individual groups, a significant change of large effect size was observed exclusively within the CMT group, denoted by Wilk's $\lambda = .28$, $F(3) = 8.02$, $p < .01$, $\eta_p^2 = .28$, whereas no such change was apparent in the control group, Wilk's $\lambda = .95$, $F(3) = 1.04$, $p = .38$, $\eta_p^2 = .05$. Within the CMT group, anxiety levels remained consistent from baseline ($M = 16.53$, $SD = 8.74$) to mid-test ($M = 15.11$, $SD = 9.32$, $M_{diff} = -1.42$, $SE = 1.27$, $p = .84$), but decreased from baseline to post-test ($M = 11.82$, $SD = 7.97$, $M_{diff} = -4.71$, $SE = 1.41$, $p < .01$, $d = .37$), and remained unchanged from post-test to follow-up ($M = 10.13$, $SD = 7.83$, $M_{diff} = -1.68$, $SE = 1.29$, $p = 73$). Results for anxiety are also presented in Figure 5.

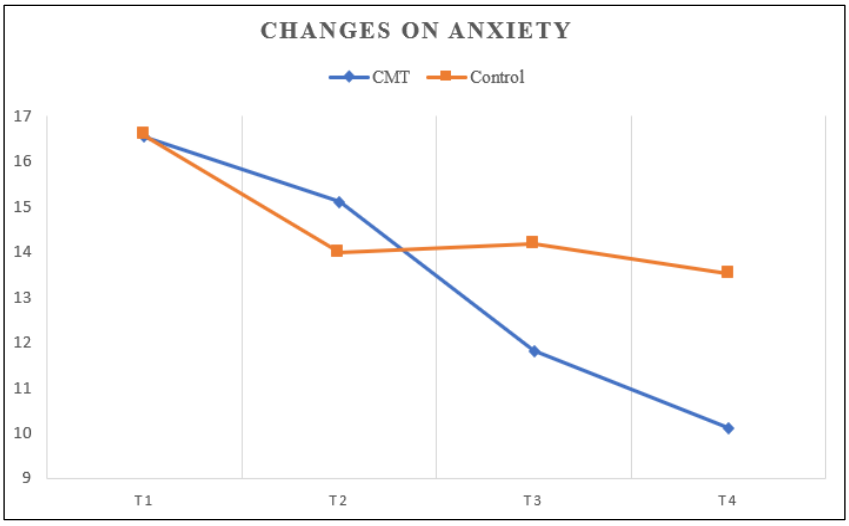

Figure 5. Results for Anxiety

Regarding stress, a mixed-model ANCOVA test was performed, in order to control the baseline differences between the two groups (stress measured at baseline was introduced in our model as a covariate). Due to the significant outcome of Mauchly's test (p = .015), it was not appropriate to assume sphericity. Consequently, we reported both time and time*group interaction effects with the Huynh-Feldt correction (Epsilon for Greenhouse-Geisser = .88; Epsilon for Huynh-Feldt = .94). No significant time, $F(1,88) = .46$, $p = .61$, $\eta_p^2 = .007$, nor time and group interaction effect, $F(1,88) = 1.79$, $p = .17$, $\eta_p^2 = .10$, were found on stress. However, the group had significant effect on stress, $F(1) = 9.27$, $p < .01$, $\eta_p^2 = .128$.

Regarding stress, controlled for the initial stress levels, significant large differences emerged between groups at the post-test ($M_{diff} = 6.92$, $SE = 2.60$, $p = .01$, $d = .94$) and also at the follow-up ($M_{diff} = 7.40$, $SE = 2.31$, $p < .01$, $d = 1.15$). Examining the effect of time on stress independently within each group, multivariate tests revealed that the impact of time on stress was present exclusively in the CMT group, Wilk's $\lambda = .86$, $F(2) = 4.75$, $p = .01$, $\eta_p^2 = .13$, representing a medium to large effect, while the control group did not exhibit this effect, Wilk's $\lambda = .85$, $F(2) = .85$, $p = .43$, $\eta_p^2 = .027$. These results mean that stress levels within the control group remained consistent across all time points. However, noteworthy changes occurred within the CMT group, where a reduction in stress was observed from mid-test ($M_{estimated} = 19.45$, $SE = 1.32$) to the follow-up period ($M_{estimated} = 14.49$, $SE = 1.23$, $M_{diff} = 4.96$, $SE = 1.64$, $p = .01$). Results are presented in Figure 6 as well.

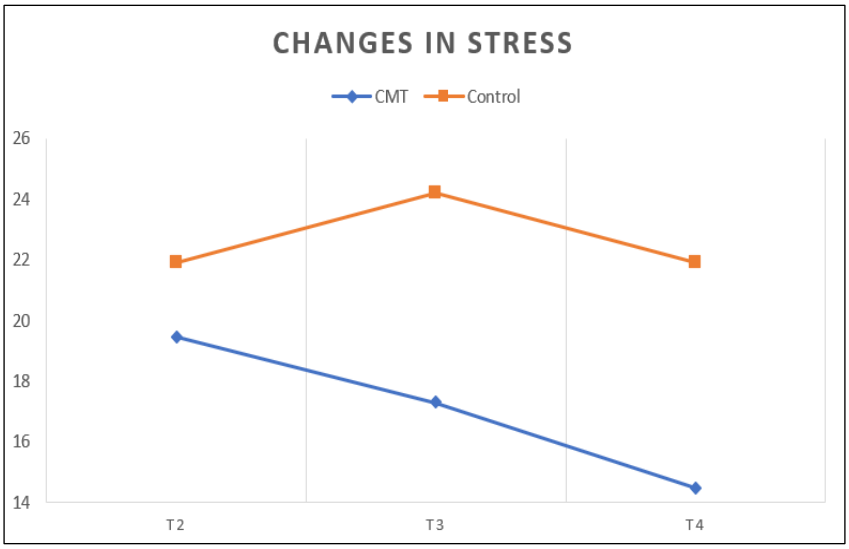

Figure 6. Results for Stress with Estimated Marginal Means

Notes. Covariates appearing in the model are evaluated at the following values: T1Stress = 21.96

Given the non-assumption of sphericity for activating positive affect (p = .02), we proceeded to report time and time*group effects employing the Huynh-Feldt correction (Epsilon for Greenhouse-Geisser = .87; Epsilon for Huynh-Feldt = .93 However, neither of the effects exhibited significance for activating positive affect: this includes the time effect, $F(2,79) = 2.38$, $p = .07$, $\eta_p^2 = .03$, the time and group interaction, $F(2,79) = 2.49$, $p = .06$, $\eta_p^2 = .037$, as well as the group effect, $F(1) = .02$, $p = .87$, $\eta_p^2 = .00$

Analyzing the changes across time separately for the two groups, we found a significant and large time effect for the CMT group, Wilk's $\lambda = .86$, $F(3) = 3.29$, $p = .02$, $\eta_p^2 = .13$, contrasting with the control group, where no such effect emerged, Wilk's $\lambda = .90$, $F(3) = 2.06$, $p = .11$, $\eta_p^2 = .09$ (see also Figure 7). Within the CMT group, the sole significant difference occurred between the mid-test measurement (M = 24.84, SD = 4.91) and follow-up measurement (M = 27.02, SD = 5.12, M_{diff} = 2.17, SE = .71, p = .02, d = .43). No differences were found between the groups at any time point.

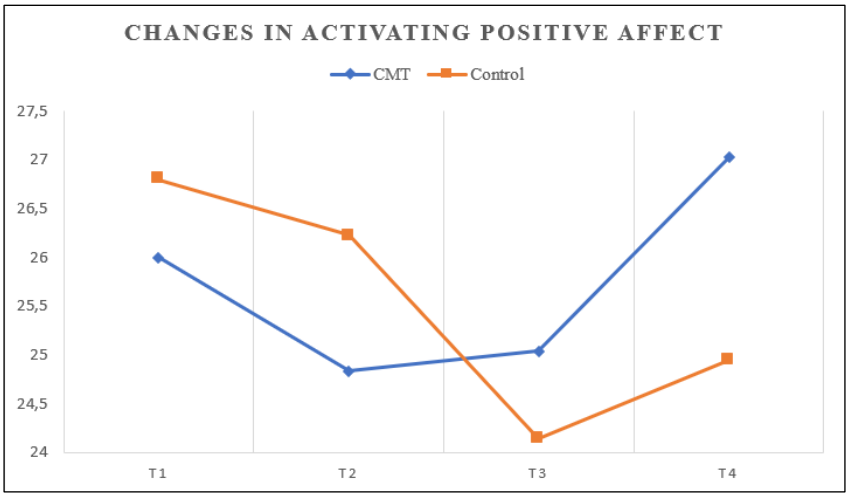

Figure 7. Results for Activating Positive Affect

Concerning life satisfaction, given the non-significant outcome of Mauchly's test (p = .08), we proceeded with the assumption of sphericity. Our analysis indicated the absence of a time effect, $F(3) = 1.52$, p = .20, η_p^2 = .02, no interaction effect between time and group was detected, $F(3)$ = .69, p = .55, η_p^2 = .01, and no group effect was identified, $F(3)$ = .29, p = .59, η_p^2 = .01.

No differences were found between groups in any of the time points, and time effects remained non-significant even when analyzed separately for each of the two groups.

Effectiveness of the intervention on investigated mechanisms

We also tested the effectiveness of the intervention on possible mechanisms (self- compassion, self-coldness, self-warmth, and dysfunctional attitudes). Regarding self- compassion, based on Mauchly's non-significant test results (p = .16), sphericity was assumed. We found a significant and large time effect, $F(3) = 11.59$, $p < .01$, η_p^2 = .15, a significant and medium time and group interaction effect, $F(3) = 8.27$, $p < .01$, η_p^2 = .11, but no significant group effect, $F(1) = 1.08$, p = .30, η_p^2 = .01.

Multivariate analyses indicated a significant time effect with a large effect size exclusively in the CMT group, Wilk's λ = .37, $F(3) = 34.69$, $p < .01$, η_p^2 = .62, whereas no such effect was observed in the control group, Wilk's λ = .98, $F(3)$ = .23, p = .87, η_p^2 = .01. In the control group, self-compassion levels remained consistent across all time points Conversely, students in the CMT group experienced an increase in self-compassion levels from baseline (M = 2.82, SD = .55) to the mid-

test (M = 3.19, SD = .65, M_{diff} = .37, SE = .08, p < .01, d = .61). This upward trend continued from the mid-test to the post-test (M = 3.5, SD = .50, M_{diff} = .31, SE = .07, p < .01, d = .53), and these levels remained stable from the post-test to the follow-up (M = 3.43, SD = .61, M_{diff} = -,07, SE = .07, p = .91). A difference in self-compassion emerged between the two groups during the post-test (M_{diff} = .375, SE = .140, p < .01, d =.68), However, these differences were no longer significant at the follow-up assessment (M_{diff} = .314, SE = .176, p = .08, d = .46). For these results, see also Figure 8.

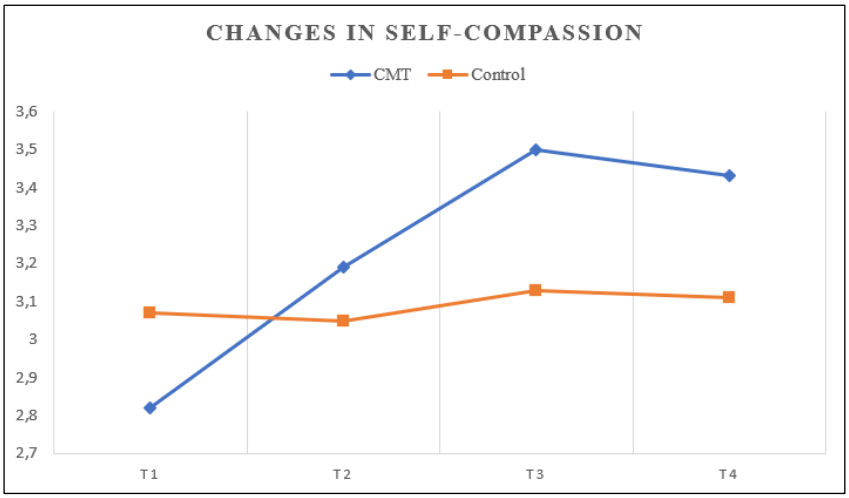

Figure 8. Results for Self-Compassion

The results for self-warmth were similar to the results for self-compassion (see Figure 9). Mauchly's sphericity test did not produce a significant result (Mauschly's W = .91, df = 5, p = .34), indicating that we could assume sphericity. Significant medium effects were observed for time, $F(3)$ = 6.43, p < .01, η_p^2 = .09, the interaction of time and group, $F(3)$ = 5.77, p < .01, η_p^2 = .08, and group, $F(1)$ = 6.18, p = .01, η_p^2 = .08.

Regarding self-warmth levels, large significant differences emerged between groups at the post-test (M_{diff} = .68, SE = .14, p < .01, d = 1.18), and medium divergences were observed at follow-up (M_{diff} = .44, SE = .19, p = .02, d =.58). For participants in the control group, self- warmth remained constant across the four measurement time points, with time having no effect (Wilk's λ = .98, $F(3)$ = .23, p = .87, η_p^2 = .01), as opposed the CMT group, where a significant large time effect was found (Wilk's λ = .48, $F(3)$ = 22.02, p < .01, η_p^2 = .51). The pattern of change mirrored that of self-compassion, with self-warmth increasing from baseline (M = 3.33, SD = .64) to the mid-test (M = 3.60, SD = .72, M_{diff} = .27,

SE = .09, *p* = .03, *d* = .39), continuing to increase from mid-test to post-test (*M* = 3.94, *SD* = .51, M_{diff} = .33, *SE* = .08, *p* < .01, *d* = .54), and remaining stable through follow-up (*M* = 3.79, *SD* = .68, M_{diff} = -.14, *SE* = .08, *p* = .36).

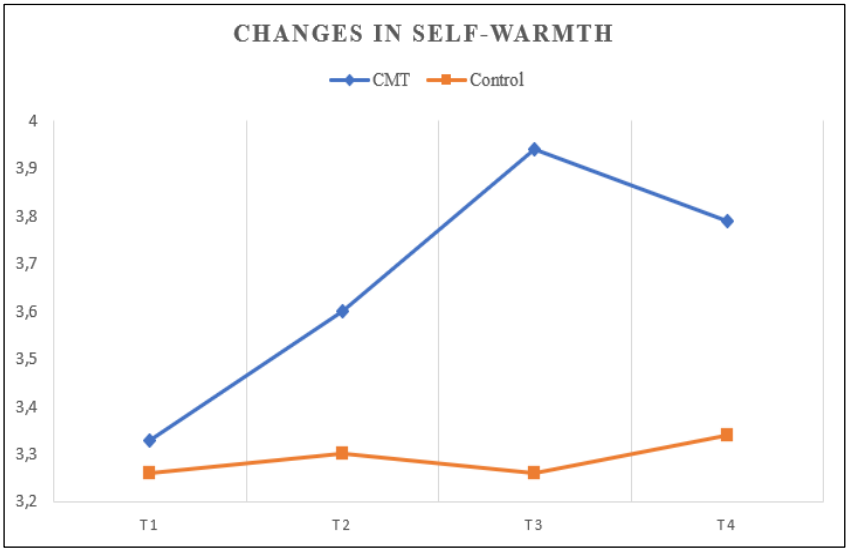

Figure 9. Results for Self-Warmth

Regarding self-coldness, a mixed-model ANCOVA test was performed, in order to control the baseline differences between the two groups (self-coldness measured at baseline was introduced in our model as a covariate). For self-coldness the sphericity was assumed (Mauschly's *W* = .92, *df* = 2, *p* = .07). We found a significant time effect, *F*(2) = 3.30, *p* = .04, η_p^2 = .05, but no time and group interaction effect was identified, *F*(2) = 1.97, *p* = .14, η_p^2 = .03. The group effect was also significant, *F*(1) = 7.93, *p* < .01, η_p^2 = .112 (see also Figure 10).

Examining the effect of time on self-coldness independently within each group, multivariate tests revealed that the impact of time on self-coldness was present exclusively in the CMT group, Wilk's λ = .79, *F*(2) = 8.01, *p* = .001, η_p^2 = .20, representing a large effect, while the control group did not exhibit this effect, Wilk's λ = .95, *F*(2) = 1.46, *p* = .24, η_p^2 = .04. These results mean that self-coldness levels within the control group remained consistent across all time points. However, noteworthy changes occurred within the CMT group, where a reduction in self-coldness was observed from mid-test ($M_{estimated}$ = 3.13, *SE* = .09) to post-test ($M_{estimated}$ = 2.84, *SE* = .09, M_{diff} = -.29, *SE* = .08, *p* = .001), and maintaining

stability through the follow-up period ($M_{estimated}$ = 2.80, SE = .08, M_{diff} = .03, SE = .09, p = .97).

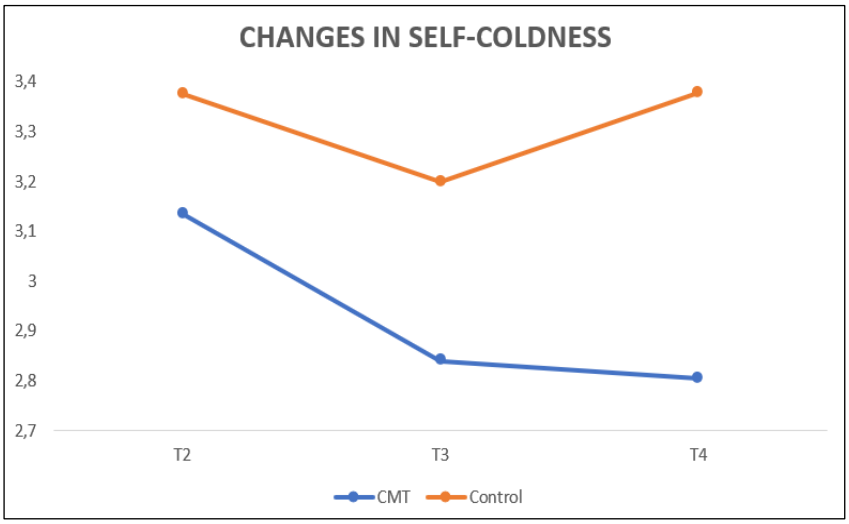

Figure 10. Results for Self-Coldness with Estimated Marginal Means

Notes. Covariates appearing in the model are evaluated at the following values: T1Self-Coldness = 3.50

Regarding self-coldness, controlled for the initial self-coldness levels, significant differences emerged between groups at the post-test with a medium effect size (M_{diff} = .359, SE = .168, p = .037, d = .59) and at the follow-up we found large differences (Mdiff = .574, SE = .163, p < .01, d = .97).

Last, we examined the impact on dysfunctional attitudes, the results of which are presented in Figure 11. Sphericity was not assumed for dysfunctional attitudes (Mauschly's W = .79, df = 5, p = .01) facilitating the report of time and time*group effects utilising the Huynh- Feldt correction (Epsilon for Greenhouse-Geisser = .87, Epsilon for Huynh-Feldt = .93). Significant medium-sized effects were identified, including time effect, $F(2,79) = 6.89$, $p < .01$, $\eta_p^2 = .09$, time and group interaction effect, $F(2,79) = 5.52$, $p < .01$, $\eta_p^2 = .07$, as well as group effect, $F(1) = 8.34$, $p < .01$, $\eta_p^2 = .11$.

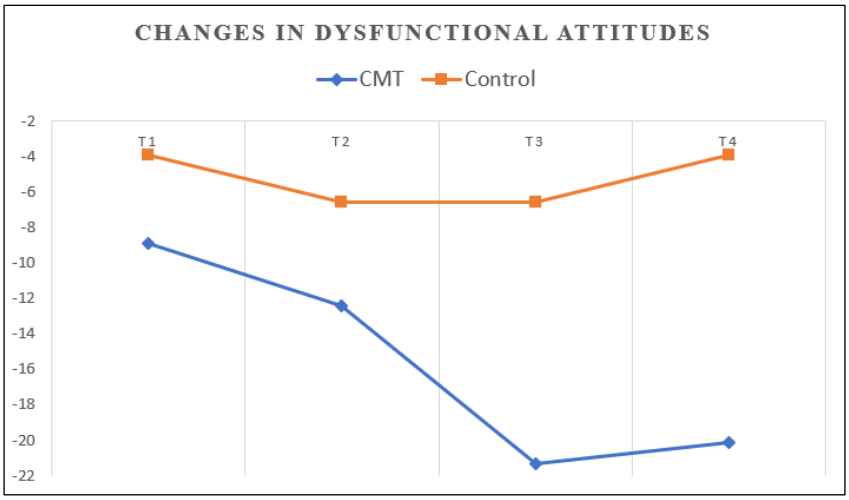

Figure 11. Results for Dysfunctional Attitudes

Pairwise comparations revealed significant and large differences in dysfunctional attitudes during the post-test (M_{diff} = 14.78, SE = 4.35, p < .01, d = .84), and follow-up (M_{diff} = 16.18, SE = 4.38, p < .01, d = .90) assessments. Large-scale time effects were also observed solely within the CMT group, Wilk's λ = .56, $F(3)$ = 16.12, p < .01, η_p^2 = .43, while no such effects were noticed in the control group, Wilk's λ = .97, $F(3)$ = .55, p = .64, η_p^2 = .02.

The levels of dysfunctional attitudes for participants belonging to the CMT group remained consistent from baseline (M = -8.88, SD = 13.83) to mid-test (M = -12.42, SD = 15.05, M_{diff} = -3.53, SE = 1.89, p = .33), decreased from mid-test to post-test (M = -21.35, SD = 14.76, M_{diff} = -8.93, SE = 1.53, p < .01, d = .59), and maintained stability from post-test to follow-up (M = -20.13, SD = 14.09, M_{diff} = 1.22, SE = 1.87, p = .98).

Testing of mechanisms of the intervention on negative affect

For testing the longitudinal mediation effects, we tested indirect effects based on the model presented in Figure 12. Given that we found baseline differences between groups, we also controlled for the effect of the group on variables at the baseline level. Based on Goldsmith and colleagues' (2018) recommendations, we additionally controlled for contemporaneous covariance between mediator and outcome.

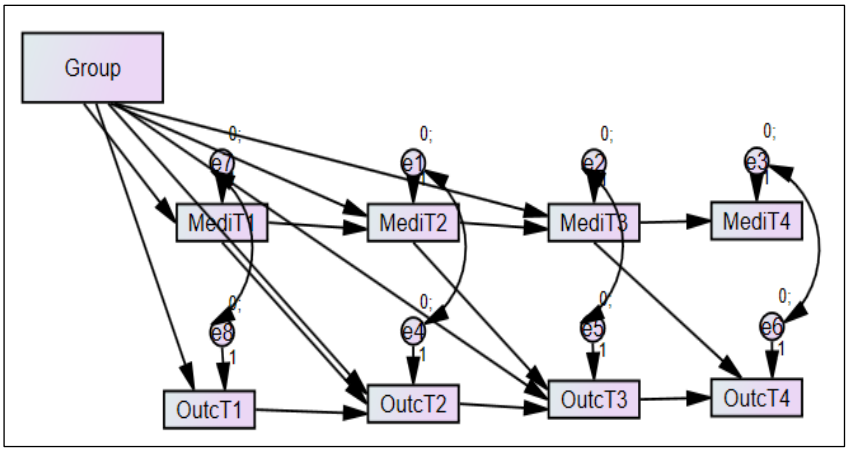

Figure 12. Tested model for longitudinal mediation analyses

The effect of the group on primary outcomes (negative affect and soothing positive affect) was examined through the hypothesized mediators: self-compassion, self-coldness, self- warmth, and dysfunctional attitudes. In Figure 13, we have displayed the specific indirect effects that were of particular interest to us.

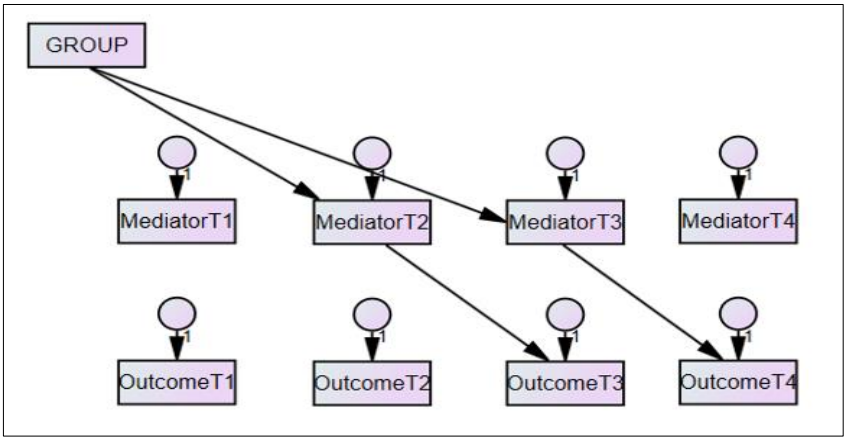

Figure 13. Tested indirect effects

Our initial analysis focused on examining the longitudinal indirect effects on negative affect. The results indicate that the standardized indirect effect of the group on negative affect, as measured through indirect paths, was not statistically significant. The detailed results can be found in Table 4.

Table 4 Standardized indirect effects on negative affect

Predictor	Mediator	Effect type	Outcome	Standardized Indirect Effects	95% CI LL	95% CI UL
Group	T2Self-compassion	Indirect	T3NegativeA	-.06	-.22	.09
Group	T3Self-compassion	Indirect	T4NegativeA	.10	-.06	.28
Group	T2Self-coldness	Indirect	T3NegativeA	-.07	-.22	.08
Group	T3Self-coldness	Indirect	T4NegativeA	.05	-.11	.21
Group	T2Self-warmth	Indirect	T3NegativeA	-.08	-.24	.07
Group	T3Self-warmth	Indirect	T4NegativeA	.07	-.09	.26
Group	T2Dysfunctional Attitudes	Indirect	T3NegativeA	-.06	-.23	.11
Group	T3Dysfunctional Attitudes	Indirect	T4NegativeA	.06	-.12	.24

Notes: ** The regression is significant at the .01 level; CI Confidence Interval; LL Lower Limit; UL Upper Limit; NegativeA Negative Affect

These results indicate that self-compassion levels assessed during mid-intervention did not mediate the effect of the group towards the volume of negative affect measured at post-test (ß = -.06, 95%CI = -.22 to .09). Moreover, self-compassion levels assessed during post-test did not mediate the effect of the group towards the degree of negative affect measured at the three- month follow-up (ß = .10, 95%CI = -.06 to .28).

Additionally, when examined, the separate mediating effects of self-coldness and self- warmth indicate that neither self-coldness at mid-intervention (ß = -.07, 95%CI = -.22 to .08) nor self-coldness at post-test (ß = .05, 95%CI = -.11 to .21) served as significant mediators of the effects. Likewise, self-warmth at mid-intervention (ß = -.08, 95%CI = -.24 to .07) and self- warmth at post-test (ß = .07, 95%CI = -.09 to .26) did not emerge as significant mediators. Furthermore, dysfunctional attitudes did not exhibit a significant mediating effect at either the mid-test (ß = -.06, 95%CI = -.23 to .11) or the post-test (ß = .06, 95%CI = -.11 to .24).

Testing of mechanisms of the intervention on soothing positive affect

We also analyzed the longitudinal indirect effects on soothing positive affect. The results, which can be found in Table 5, indicate that, in the majority of cases, the standardized indirect effect of the group on soothing positive affect through the indirect paths was not statistically significant.

Table 5 Standardized Indirect Effects of the Group on Soothing Positive Affect

Predictor	Mediator	Effect type	Outcome	Standardized Indirect Effects	95% CI LL	95% CI UL
Group	T2Self-compassion	Indirect	T3SoothingPA	.04	-.10	.17
Group	T3Self-compassion	Indirect	T4SoothingPA	-.11	-.25	.01
Group	T2Self-coldness	Indirect	T3SoothingPA	.04	-.11	.17

Predictor	Mediator	Effect type	Outcome	Standardized Indirect Effects	95% CI	
					LL	UL
Group	T3Self-coldness	Indirect	T4SoothingPA	-.02	-.16	.08
Group	T2Self-warmth	Indirect	T3SoothingPA	.06	-.09	.20
Group	T3Self-warmth	Indirect	T4SoothingPA	-.14	-.31	.03
Group	T2Dysfunctional Attitudes	Indirect	T3SoothingPA	.06	-.09	.21
Group	T3Dysfunctional Attitudes	Indirect	T4SoothingPA	-.14	-.29	-.004

Notes: ** The regression is significant at the .01 level; CI Confidence Interval; LL Lower Limit; UL Upper Limit; SoothingPA Soothing Positive Affect

The findings regarding soothing positive affect showed that self-compassion at mid- intervention did not mediate the group's effect on soothing positive affect at post-test (ß = .04, 95%CI = -.10 to .17). Similarly, self-compassion at post-test did not mediate the group's effect on soothing positive affect at the three-month follow-up (ß = -.11, 95%CI = -.25 to .01)

While examining the mediating effects of self-coldness and self-warmth separately, the results revealed that neither self-coldness at mid-intervention (ß = .04, 95%CI = -.11 to .17) nor self-coldness at post-test (ß = -.02, 95%CI = -.16 to .08) served as significant mediators. Likewise, self-warmth at mid-intervention (ß = .06, 95%CI = -.09 to .20) and self-warmth at post-test (ß = -.14, 95%CI = -.310 to .03) did not demonstrate significant mediation effects.

Although no significant mediating effect was found for dysfunctional attitudes at the mid-test (ß = .06, 95%CI = -.09 to .21), it was revealed that dysfunctional attitudes measured at the post-test mediated the effect of the group on soothing positive affect at the three-month follow-up (ß = -.14, 95%CI = -.29 to -.004). This suggests that the group's influence on soothing positive affect, as measured at the follow-up, may be partially explained by dysfunctional attitudes measured at the post-test within an academic setting.

Discussion

The effectiveness of the intervention on primary outcomes

The current study aimed to assess the effectiveness of the Hungarian adaptation of Compassion Mind Training in a pragmatic trial conducted within an academic setting, targeting undergraduate students' distress and well-being. We focused on assessing its impact on two key outcomes: negative affect and soothing positive affect. In line with previous findings (Beaumont et al., 2021; Irons & Heriot-Maitland, 2021; Matos et al., 2017; Matos et al., 2022), our results demonstrate the intervention's effectiveness in improving affect. Regarding negative affect, a mixed-model ANCOVA test was performed, in order to control the baseline differences

between the two groups. We found large differences between the CMT and the control group at post-test and also at 3-months follow-up. Furthermore, we identified a medium to large effect of time towards soothing positive affect for participants belonging to the CMT group. However, it's noteworthy that we did not find significant differences between the intervention and control groups at any of the assessment time points. This may be attributed, in part, to limitations in statistical power.

Taking these outcomes into account, our first hypothesis was partially confirmed. We originally anticipated that students in the intervention group would report lower levels of negative affect and higher levels of soothing positive affect compared to the control group following the intervention. However, we found significant differences between the two groups at post-test and at follow-up only for negative affect.

The effectiveness of the intervention on secondary outcomes

As expected, our results underscore the effectiveness of this intervention in addressing secondary outcomes, particularly those related to indicators of distress, such as depression, anxiety, and stress. However, the results for well-being markers, specifically activating positive affect and life satisfaction, seem less promising compared to the distress indicators.

At the outset of our study, we identified baseline differences in depression and stress levels, with psychology students reporting higher scores than their peers in other fields of study. Therefore, regarding depression and stress, mixed-model ANCOVA tests were performed, in order to control the baseline differences between the two groups (depression and stress measured at baseline were introduced in our models as covariates). As expected, regarding both, depression and stress levels, significant differences emerged between groups at the post- test and at the follow-up. Examining the effect of time on depression and stress independently within each group, multivariate tests revealed that the impact of time on depression and stress was present exclusively in the CMT group. Also, concerning anxiety, a significant time effect emerged solely within the CMT group, indicating a reduction in anxiety levels from baseline to post-test, which persisted through the follow-up assessment.

In terms of activating positive affect and life satisfaction, our analysis did not reveal any noteworthy effects related to time, group, or their interaction. Furthermore, group disparities and temporal variations were absent in these measures as well.

In light of these outcomes, it seems that the intervention's primary benefits lie in reducing distress levels, encompassing negative affect, depression, anxiety, and stress. Its impact on cultivating overall well-being, including soothing positive affect, activating positive affect, and life satisfaction, appears to be less pronounced. Furthermore, these results reinforce the significance of distinguishing between soothing and activating positive affect, based on Gilbert's theory (2009a, 2009b,

2014, Gilbert et al., 2008). Additionally, our findings align with prior research indicating that compassionate mind training mainly enhances soothing positive affect, with non-significant effects on activating positive affect (Matos et al., 2017).

The effectiveness of the intervention on investigated mechanisms

Anticipations included the intervention's effectiveness in fostering self-compassion and self-warmth, alongside a reduction in self-coldness and dysfunctional attitudes. Our findings support these expectations, as we identified significant differences between the two groups in self-compassion, self-warmth, self-coldness (after controlling for the baseline differences), and dysfunctional attitudes at the post-test, with the differences in self-warmth, self-coldness, and dysfunctional attitudes persisting through the follow-up.

Additionally, significant time effects solely within the CMT group, with no such effects seen in the control group. Within the control group, measures of self-compassion, self-warmth, self-coldness, and dysfunctional attitudes remained constant across all assessment time points. For participants within the CMT group, both self-compassion and self-warmth levels increased from baseline to post-test and remained stable through the follow-up assessment. The impact of time on self-coldness was also present exclusively in the CMT group. Comparatively, the CMT group exhibited a decline in dysfunctional attitudes from baseline to post-test, and these improvements remained steady during the follow-up period.

Taken together, these outcomes underscore the intervention's effectiveness in altering the mechanisms under investigation, successfully nurturing self-compassion and self-warmth, while concurrently mitigating self-coldness and dysfunctional attitudes.

The longitudinal mediation role of the supposed mechanisms

Prior research (Irons & Heriot-Maitland, 2021; Matos et al., 2022) has suggested that self-compassion serves as the primary mechanism of change within the CMT intervention. However, these studies have mainly relied on cross-sectional analyses, which may introduce bias due to an inability to account for the autoregressive nature of the data. Therefore, based on recommendations (Goldsmith et al., 2018; Maxwell et al., 2011) this study conducted longitudinal mediation analyses, examining the role of self-compassion on the clinical benefits of the intervention concerning primary outcomes, namely, negative and soothing positive affect.

Intriguingly, our findings diverge from prior expectations, revealing no longitudinal mediating effect for self-compassion. Building on Compassion-Focused Therapy's theoretical framework (Gilbert, 2009a, 2009b, 2014) and corroborative insights from meta-analyses (Chio et al., 2021; Muris and Petrocchi, 2016), which highlight the important distinction between self-warmth (positive dimensions of self-

compassion, compassionate behaviors) and self- coldness (negative dimensions of self-compassion, uncompassionate behaviors), we tested the individual mediation roles of self-warmth and self-coldness but found no significant longitudinal mediating effects. The longitudinal mediation analyses conducted in our study did not support self-compassion as a mechanism of change. However, it is worth noting that the small sample size may constrain our ability to detect such effects, potentially leading to false negative errors.

Furthermore, we undertook an exploratory assessment regarding the longitudinal mediating impact of dysfunctional attitudes on negative affect and soothing positive affect. The findings revealed no significant indirect effect on negative affect, yet a notable mediation effect emerged for post-test dysfunctional attitudes influencing follow-up soothing positive affect. These results imply that the intervention's elevation of soothing positive affect during follow- up is driven by the attenuation of dysfunctional attitudes measured at the post-test. This reinforces the crucial role dysfunctional attitudes play in students' overall well-being. In light of these findings, it appears that students may experience an enhanced sense of safety and contentment when their levels of typical dysfunctional beliefs (Weissman & Beck, 1978) are diminished.

Limits and future directions

Despite our encouraging results on the effectiveness of the CMT intervention in promoting students' well-being and reducing their distress, we must also consider a number of limitations of our study. A primary limitation revolves around the non-randomized allocation of participants to groups, resulting in significant disparities in baseline values across various measured variables. Consequently, it is imperative to advocate for further research, particularly randomized controlled trials, which represent the gold standard for effect assessment (David, 2012)

Another substantial limitation pertains to our study's modest sample size and the subsequent lack of statistical power, particularly when making inter-group comparisons at individual time points. The reliability of our results may also be influenced by the high attrition rate, primarily within the control group. To mitigate dropout rates and for other methodological reasons, future investigations should consider implementing active control groups to assess the effectiveness of Compassionate Mind Training on students' distress and well-being. An intriguing avenue for exploration could involve measuring and comparing the relative effectiveness of Compassionate Mind Training (Irons & Heriot-Maitland, 2021), based on Gilbert's (2009a, 2009b, 2014) theoretical framework and practices, against the Mindful-Self Compassion (MSC) program (Neff & Germer, 2012), which hinges on Neff's (2003a) conceptualization of self-compassion and its associated interventions.

Our study solely relied on self-reported measures to investigate the intervention's effectiveness. Nevertheless, future explorations should consider incorporating objective outcomes, such as Heart Rate Variability (HRV), as an indicator of intervention impact, in order to enhance robustness. Prior findings (Matos et al., 2017) have suggested that CMT can positively influence HRV, a physiological marker of well-being. Although it is also a subjective instrument, the validity of our research would be greatly enhanced if we used an Ecological Momentary Assessment (EMA) app such as the MoodWheel to measure emotional well-being and distress, which according to current results is an excellent tool for assessing students' emotions (Tomoioagă et al., 2024). Finally, our intervention group comprised solely Psychology students, warranting further assessments encompassing students from diverse majors to ensure more comprehensive and generalizable conclusions.

Authors' Notes

Acknowledgement. This manuscript is original, has not been published before, and is not currently considered for publication elsewhere.

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Publication Ethics. The study was undertaken in accordance with the Code of Ethics of the American Psychological Association.

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