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Ph.D. THESIS SUMMARY

DEVELOPING SELF-COMPASSION AND ASSESSING ITS AFFECTIVE BENEFITS FOR UNIVERSITY STUDENTS

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TABLE OF CONTENTS

Keywords: self-compassion, positive affect, negative affect, students, intervention

I. CHAPTER I. THEORETICAL BACKGROUND

1. 1. General Framework and Introduction

The overall objective of the present thesis is to evaluate the effectiveness of self-compassion interventions for improving university students' self-compassion, with the scope to optimize their levels of positive and negative affect, reduce their distress, and improve their well-being. In this regard, the present thesis is structured into four chapters. In the first chapter, the theoretical foundations and the research limitations in the field are presented. The second chapter describes the specific objectives of the thesis and the research methodology used to achieve these objectives. The third chapter details the original research carried out and the results obtained. The fourth chapter presents the conclusions drawn from the original research, as well as the theoretical and practical implications. Finally, the limitations in the original research are detailed and possible directions for future research are suggested.

Undergraduate students experience reduced levels of 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 for them to reduce their distress and improve their well-being. 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; Ferrari et al., 2019; Linardon, 2020; Mantelou & Karakasidou, 2017). Self-compassion is important in the academic context, and can predict students' well-being over their goal regulation and experience of stress (Neely et al., 2009). Self-compassion was introduced as an antidote to harsh self-criticism and it represents a healthy attitude toward one's pain and suffering (Germer, 2009; Neff, 2003a). Self-compassion can be learned (Ferrari et al., 2019), and learning self-compassion can improve various indicators of well-being and can diminish a series of distress indicators (Ferrari et al., 2019; Han & Kim, 2023; Turk & Waller, 2020; Wakelin et al., 2021; Zessin et al., 2015).

Negative affect is one of the most important indicators of general distress (Watson & Pennebaker, 1989; Watson et al., 1988a) and positive affect is one of the most relevant constructs for measuring subjective well-being, which can also help manage distress (Diener, 1984; Fredrickson, 2001; Fredrickson & Cohn, 2008; Seligman, 2011). Positive and negative affect are very relevant in the academic context, as they can predict academic success and academic stress (Saklofske et al., 2012), influence students' creativity (Charyton et al., 2009), impact the levels of test-specific worries (e.g., social and personal consequences of failing), and test performance (Chin et al., 2017), cardiovascular recovery from academic stress (Papousek et al., 2009), and academic engagement (King et al., 2015).

1. 2. The Concept of Self-Compassion

To be self-compassionate means to treat and support ourselves like a good friend would, with kindness and a wish to help alleviate the pain, instead of harsh self-criticism (Neff, 2003a, 2023a, 2023b). Self-compassion is conceptualized as a multifaceted construct formed of six elements (self-kindness, self-judgment, common humanity, isolation, mindfulness, and overidentification), as a „dynamic system in which the various elements of self-compassion work together to alleviate suffering" (Neff, 2023b, pp. 195).

The development of self-compassion is also an integral part of compassion-focused therapy (Gilbert, 2009a, 2009b, 2009c, 2014; Gilbert et al., 2017), which can be described as an „evolutionary and biopsychosocial approach to self-compassion" (Gilbert, 2023, pp. 127). According to this framework, self-compassion means sensitivity to one's suffering and the commitment to reduce and prevent it. Compassion (including self-compassion) is conceptualized as a motivation (rather than an emotion or skill) that serves to address and prevent suffering. Furthermore, this theory (Gilbert 2009a, 2009b, 2009c, 2014) proposes that the flow of compassion can be transmitted in three directions. First, it can stem from others, who show compassion towards us. Secondly, it can arise from within us and be directed towards others. Lastly, the origin and object of compassion can be the self, one's person – that is self-compassion. All three flows of compassion are very important in terms of mental and physical health, encompassing the capacity to accept others' compassion, the capacity to offer compassion to others, and the capacity to extend compassion to oneself (Gilbert et al., 2017).

Based on Gilberts' theory (2009a, 2009, 2014) which is built on current neurophysiological research (Depue & Morrone-Strupinsky, 2005), there are three major emotion regulation systems: 1) the

system responsible for threat detection (i.e., threat–defense system), 2) the system responsible for motivation (i.e., incentive and resource-seeking system), and 3) the system responsible for reassurance (i.e., soothing, caring and contentment system). The existence of these three major emotion regulation systems is also supported by empirical data (Kelly et al., 2012).

The compassionate-self acts as an internal organizing process, regulating these systems (Gilbert, 2014). There are two types of positive affect according to these systems, which differ both on a subjective and neurophysiological level (Depue & Morrone-Strupinsky, 2005). One type is related to resource-seeking, motivation, drive, and the dopaminergic system (i.e., activating positive affect), while the other type is based on the soothing and opiate/oxytocin systems encompassing feelings of safeness, contentment, and soothing positive affect.

Ideally, the soothing system is activated when there are no threats and when needs are met. This activation, however, does not occur automatically. This distinction is important, as soothing positive affect demonstrates a stronger relationship with mental health indicators (e.g., depression, anxiety, self-criticism, and secure attachment) compared to activating positive affect (Gilbert, 2009a, 2009b; Gilbert et al., 2008). These different types of positive affect may even be characterized by qualitatively distinct autonomic activation profiles. Research shows that high-frequency heart rate variability (HF-HRV), an indicator of greater autonomic flexibility, is associated exclusively with soothing positive affect and not with activating or relaxing positive affect (Duarte & Pinto-Gouveia, 2017b; Petrocchi et al., 2017).

Soothing positive affect also exhibits a stronger relationship with mindfulness (Martins et al., 2018) and self-compassion (Kirschner et al., 2019; Steindl et al., 2018). Moreover, it proves to be a better predictor of anxiety and stress than activating positive affect (McManus et al., 2019). Researchers have developed a tool for measuring the different types of positive affect, known as the Types of Positive Affect Scale (Gilbert et al., 2008). Findings also indicate that the cultivation of self-compassion can increase the soothing positive affect more than the activating positive affect (Kirschner et al., 2019).

1. 3. Measuring Self-Compassion

The most frequently used instrument for measuring the trait of self-compassion is the Self-Compassion Scale (SCS; Neff, 2003b). It consists of 26 items, each rated on a five-point Likert scale, ranging from 1 (*almost never*) to 5 (*almost always*). This scale measures the emotions and thoughts related to compassionate and uncompassionate responses, facing difficulties, and perceived personal inadequacy. Originally conceived as a three-factor scale, further development revealed a more accurate fit to the data with a model comprised of six first-order factors: Self-Kindness, Common Humanity, Mindfulness, Self-Judgment, Isolation, and Over-Identification, along with one general second-order factor named Self-Compassion. Scores for negative items that measure uncompassionate responses are reverse coded. The scale offers individual scores for each of the six components and a global self-compassion score by calculating the mean of responses to all items.

In 2021, Tóth-Király and Neff assessed the scale's measurement invariance across various populations, encompassing 18 samples from 12 different languages, accounting for differences in gender, age, and student status. This scale has been translated and adapted into a total of 22 languages across diverse cultural contexts (Neff & Tóth-Király, 2022), including Hungarian (Ságiet al., 2013), Turkish (Deniz et al., 2008), Italian (Petrocchi et al., 2014), Chinese (Chen et al., 2011), and Japenese (Arimitsu, 2014) populations.

Results have consistently shown the scale to be a reliable assessment tool, however, its dimensionality may vary depending on the specific context in which it is employed. For example, López et al. (2015) found that the proposed six-factor structure did not fit the data, and the exploratory factor analysis suggested a two-factor solution, which is based on the negatively and positively formulated items. Additionally, results have shown that the negative dimensions of self-compassion (i.e., self-coldness) display stronger relationships with distress indicators, such as perceived stress, and negative affect. Conversely, the positive dimensions of self-compassion (i.e., self-warmth) present stronger relationships with well-being indicators like positive affect (Brenner et al., 2017; Chio et al., 2021; López et al., 2015; Muris et al., 2016; Muris & Petrocchi, 2016; Neff et al., 2018). The two-factor model aligns with Gilbert's theory (2009a, 2009b, 2014), which assumes that negative and positive dimensions of self-compassion are related to different emotion regulation systems, meaning self-coldness is linked with the threat system and self-warmth is connected with the soothing system.

Neff (2016) argues that self-compassion is the dynamic balance between self-compassionate responses and uncompassionate responses towards oneself, citing empirical evidence in favor of using the global self-compassion score. Nevertheless, acknowledging the validation of alternative models, the author argues that the scale can be used flexibly, depending on the research questions (Neff, 2016).

Several adaptations of the self-compassion scale have been developed to cater to different needs. These include versions for measuring self-compassion in youth (Neff, Bluth, et al., 2021), assessing state self-compassion (Neff, Tóth-Király, et al., 2021), and a shortened variant for gauging trait self-compassion (Raes et al., 2011). The abbreviated trait self-compassion scale has also been subjected to testing and validation across various languages. Interestingly, while some studies have found that the original factor structure aligns with their data (Garcia-Campayo et al., 2014; Uršic et al., 2019), others have proposed that a two-factor solution offers a better fit (Babenko & Guo, 2019; Bratt & Fagerström, 2020; Hayes et al., 2016; Kotera & Sheffield, 2020; Lluch-Sanz et al., 2022).

Gilbert and his colleagues (2017) developed three scales aligned with their theory to assess compassion in all three dimensions, including self-compassion, known as the Compassionate Engagement and Action Scales. These scales were also adapted for use with adolescents, maintaining the same factor structure (Cunha et al., 2021).

Additionally, Steindl et al. (2021) created the Compassion Motivation and Action Scales (CMAS), which are grounded in Gilbert's theory and incorporate elements of motivational interviewing. The CMAS Self-Compassion scale consists of 18 items and reveals a three-factor structure model, encompassing Intention, Distress Tolerance, and Action. Authors have determined that these scales, namely the Compassionate Engagement and Actions, the Compassionate Engagement and Action Scale for Adolescents, and the Compassion Motivation and Action Scales, are reliable and valid instruments for measuring different aspects of self-compassion (Cunha et al., 2021; Gilbert et al., 2017; Steindl et al., 2021). Furthermore, these instruments have undergone investigation, adaptation, and validation across various languages and cultures, including Portuguese (Matos et al., 2021), Swedish (Henje et al., 2020), Japanese (Asano et al., 2020), and Turkish (Ari et al., 2022).

1. 4. The Correlates of Self-Compassion

Numerous studies (e.g., Dundas et al., 2017; Leary et al., 2007; Shapira & Mongrain, 2010) and meta-analyses (e.g., Chio et al., 2021; Ferrari et al., 2019; Kirby et al., 2017; MacBeth & Gumley, 2012; Marsh et al., 2018; Muris & Petrocchi, 2016; Neff & Germer, 2017; Zessin et al., 2015) have investigated the role of self-compassion. Their results highlight the importance of self-compassion in reducing emotional distress and promoting well-being. The meta-analyses showed a strong relationship between self-compassion and psychological distress in both adults (r = -.54; MacBeth & Gumlay, 2012) and adolescents (r = -.55; Marsh et al., 2017; Pullmer et al., 2019). Likewise, a strong correlation was found between self-compassion and well-being (r = .47), including positive affect (r = .39) as one of its dimensions (Zessin et al., 2015). Furthermore, self-compassion shows relevance in sexual and gender minority (SGM) populations, where it is associated with minority stress (r = -.29), levels of psychological distress (r = -.59), and well-being (r = .50) (Helminen et al., 2023).

Moreover, self-compassion has demonstrated connections to a range of factors, including adaptive coping (r = .30) and maladaptive coping (r = -.50; Ewert et al., 2021), suicidal thoughts and behaviors (r = -.34), non-suicidal self-injury (r = -.29; Suh & Jeong, 2021), perceived social support (r = .31), loneliness (r = -.41), close relationship quality (r = .17; Wang & Lou, 2022), sleep problems (r = -.32; Brown et al., 2021), self-efficacy (r = .65; Liao et al., 2021), physical health (r = .18), overall health behavior (r = .26; Phillips & Hine, 2019), as well as physical activity (r = .26; Wong et al., 2020).

In the context of adult romantic relationships, individuals with higher levels of self-compassion tend to exhibit lower levels of jealousy, indicating its potential relevance even in couples therapy (Tandler & Peterson, 2020). However, it seems that the social benefits of self-compassion may be greater in more individualistic societies when compared to collective societies, highlighting the culturally embedded nature of self-compassion (Wang & Lou, 2022).

When considering the potential mechanisms linking self-compassion to both mental and physical health, Inwood and Ferrari (2018) found that emotion regulation significantly mediated the relationship between self-compassion and mental health, indicating that emotion regulation could serve as a mechanism

for change. This finding aligns with neuropsychological research indicating that self-compassion is associated with brain regions involved in both emotion regulation and self-referential processing (Berry et al., 2020; Guan et al., 2021; Liu et al., 2022). Moreover, there is evidence suggesting that the relationship between self-compassion and health behaviors is partially mediated by both negative and positive affect (Sirois et al., 2015).

However, drawing on findings from three separate studies (Sirois, 2015; Sirois et al., 2019), a recent review found that self-compassion affects physical health (specifically health behavior intentions and bedtime procrastination) exclusively through negative affect, and not positive affect. In other words, negative affect was identified as a significant mediator in the relationship between self-compassion and these health-related factors (Cha et al., 2022). It is worth noting that these studies assessed affect using the PANAS (Positive and Negative Affect Scale; Watson et al., 1988b) which primarily measures activating positive affect and does not capture soothing positive affect. Therefore, the results highlight the importance of emotion regulation and negative affect as mechanisms, but the role of positive affect remains somewhat inconclusive and may be influenced by the measurement instrument used.

1. 5. The Negative and Positive Components of Self-Compassion

As previously mentioned, other studies and meta-analyses have shown that some components of self-compassion may be more important than others in terms of emotional distress and well-being (Brown et al., 2021; Chio et al., 2021; Muris & Petrocchi, 2016; Pandey et al., 2021). For example, Muris and Petrocchi's (2016) findings indicate that the negative dimensions of self-compassion, encompassing over-identification (r = .48), isolation (r = .50), and self-judgment (r =.47), relate more closely to signs of emotional distress (e.g., negative affect, anxiety, depression, worry, stress, eating problems) when compared to the positive dimensions of self-compassion, including mindfulness (r = -.33), common humanity (r = 27), and self-kindness (r = -.34).

Chio et al. (2021) found similar results concerning psychological distress. However, when examining the association with mental well-being, they observed that self-kindness (r = .39) showed a larger effect size compared to self-judgment (r = -.29). Moreover, mindfulness (r = .39) displayed a larger effect size compared to over-identification (r = -.32). Contrary to their hypothesis, common humanity (r = .29) showed a significantly smaller effect size in relation to well-being (both eudaimonic and hedonic) when compared with isolation (r = -.36). Effect size of the relationship between self-warmth (representing the average score of the positive components of self-compassion) and well-being (r = .38) and effect size of the correlation between self-coldness (representing the average score of the negative components of self-compassion) (r = -.36) and well-being were significantly different, albeit minor. Conversely, when it came to psychological distress, more noticeable distinctions emerged. Specifically, the effect size for the relationship between self-coldness and distress (r = .52) was notably stronger than the effect size for the relationship between self-warmth and distress (r = -.29).

A debate exists between Neff et al. and other scientists working within the CFT (Compassion-Focused Therapy) framework regarding the importance of distinguishing between negative and positive components of self-compassion. Neff (2003a, 2003b, 2023a, 2023b; Neff et al., 2018) believes that self-compassion is the dynamic balance between compassionate responses (self-warmth) and non-compassionate responses (self-coldness) towards the self. She argues that both are central to self-compassion, considering them as different poles of the same continuum and therefore recommends the use of the global self-compassion score. In a recent study, Neff and Tóth-Király (2022) conclude that their results support the existence of six specific dimensions along with global self-compassion, however, they found insufficient evidence to support separate factors for self-coldness and self-warmth.

On the contrary, Muris and colleagues (Muris et al., 2019; Muris & Petrocchi, 2016) state that the uncompassionate items from the Self-Compassion Scale (Neff, 2003a) reflect psychopathological symptoms, therefore exaggerating the relationship between self-compassion as a global indicator and mental health. Considering both the scale's dimensionality and its observed associations with indicators of well-being and distress, there is substantial evidence supporting the separation of these components (Brenner et al., 2017; Brown et al., 2021; Chio et al., 2021; López et al., 2015; Muris et al., 2016; Muris & Petrocchi, 2016). Therefore, it becomes important to not only investigate the relationships between self-compassion as a global indicator and various distress and well-being indicators, but also to analyse these components separately.

1. 6. Self-Compassion Interventions and Their Effectiveness

The most well-established programs designed to cultivate self-compassion include the Mindful Self-Compassion Program (MSC), developed and tested by Neff and Germer (2012) based on Neff's (2003a, 2003b, 2023a, 2023b) conceptualization of self-compassion, and the Compassionate Mind Training (CMT; Irons & Heriot-Maitland, 2021), based on Gilbert's (2009a, 2009b, 2009, 2023) biopsychosocial and evolutionary approach to self-compassion, the Compassion Focused Therapy (CFT) model. Nonetheless, the effectiveness of individual exercises derived from these programs, such as self-compassion writing, self-compassion breaks, and compassionate imagery, has also been tested independently in empirical studies across various outcomes (Cândea & Szentágotai, 2018; Dupasquier et al., 2017; Guan et al., 2021; Leary et al., 2007; Mantelou & Karakasidou, 2017; Phillips, 2018; Shapira & Mongrain, 2010; Stern & Engeln, 2018; Ziemer et al., 2019).

Both the Mindful Self-Compassion Program (MSC; Germer & Neff, 2018, 2019; Neff & Germer, 2012) and the Compassionate Mind Training (CMT; Irons & Heriot-Maitland, 2021) are group-based resource-building training programs spanning eight weeks. The MSC program was created specifically to enhance people's self-compassion and equip them with the necessary skills for practicing self-compassion in their daily lives. In contrast, the CMT program aims to not only increase self-compassion but also also promote the other two flows of compassion: compassion for others and compassion from others. Both programs feature weekly meetings lasting approximately two and a half hours, with the Mindful Self-Compassion program also including a half-day meditation retreat (Neff & Germer, 2018). Furthermore, both incorporate a blend of written exercises, imaginative practices, meditation, and body-based activities. Additionally, participants are encouraged to engage in home-based practices as part of these interventions.

Compared with the control group, the Mindful Self-Compassion Program (MSC) has demonstrated long-lasting benefits in enhancing self-compassion, mindfulness, and various well-being indicators (Germer & Neff, 2019; Neff & Germer, 2012). Results have also supported the effectiveness of a condensed four-week version of this intervention (Smeets et al., 2014). Furthermore, the authors created a supporting workbook for the program (The Mindful Self-Compassion Workbook; Neff & Germer, 2018), which has given rise to numerous adaptations towards a wide demographic, including adolescents (Bluth et al., 2016), children and their parents (Hobbs & Balentine, 2023), and healthcare communities (Neff et al., 2020).

The results of preliminary investigations show that Compassionate Mind Training (CMT; Irons & Heriot-Maitland, 2021) constitutes a feasible and effective intervention for the general population. CMT has demonstrated the ability to enhance all three flows of compassion, boost positive affect (especially soothing positive affect), and improve well-being, including physiological well-being measured by heart rate variability. Moreover, it has proven effective in reducing self-criticism, shame, distress, and fears associated with compassion (Irons & Heriot-Maitland, 2021; Matos et al., 2017).

These findings highlight the importance of nurturing self-compassion, as it plays a central role in elevating overall well-being and reducing psychological distress (Irons & Heriot-Maitland, 2021). Moreover, Matos and colleagues' (2022) study further confirms that self-compassion serves as the main mechanism of change within a two-week CMT intervention, mediating its impact on self-criticism, depression, stress, shame, safe affect, and relaxed affect. Importantly, this intervention has demonstrated benefits for students both with and without clinical problems (Beaumont et al., 2021), including those with major depressive disorder (Savari et al., 2021).

Meta-analyses examining the effectiveness of self-compassion interventions offer promising results, demonstrating the general efficacy of these interventions in fostering self-compassion (g = .75). Notably, group-based interventions appear particularly effective in nurturing self-compassion (Ferrari et al., 2019), but even smartphone applications have shown promise in this regard (Linardon, 2020).

The cultivation of self-compassion yields numerous benefits for diverse populations, including clinical, sub-clinical, and non-clinical groups (Ferrari et al., 2019; Wilson et al., 2019). These interventions have proven effective in improving overall well-being, including positive affect (g = 48), mindfulness (g = .62), life satisfaction (g = .40), eating behaviors (g = .76), and body image (g = .39), while simultaneously reducing eating pathology (g = .58), stress (g = .67), depression (g = .66), anxiety (g = .57), negative affect (g

= .33), self-criticism (g = .56), and rumination (g = 1.37) (Ferrari et al., 2019; Han & Kim, 2023; Turk & Waller, 2020; Wakelin et al., 2021; Zessin et al., 2015).

It is worth noting that while interventions aimed at cultivating self-compassion are generally effective, their impact on increasing self-compassion among students appears to be somewhat diminished (Ferrari et al., 2019). Consequently, there is a pressing need to design, develop, and implement self-compassion interventions tailored to students, ensuring the highest potential for beneficial outcomes.

As outlined, self-compassion holds significant importance for individuals' mental health (Chio et al., 2021; Ferrari et al., 2019; Kirby et al., 2017; MacBeth & Gumley, 2012; Marsh et al., 2018; Muris & Petrocchi, 2016; Zessin et al., 2015). Nonetheless, within the realm of distress and well-being, there are other important constructs to consider, such as mindfulness (Carpenter et al., 2019; Tomlinson et al., 2018) and cognitive vulnerabilities, including dysfunctional attitudes, irrational beliefs, maladaptive schemes (Abela & D'Alessandro, 2002; Hong & Cheung, 2015; Vîslă et al., 2015; Yapan et al., 2020). The question arises: which of these constructs presents more suitable targets for interventions?

A meta-analysis of self-compassion-based therapies offers insight in this regard, indicating the overall effectiveness of these interventions. However, in comparison to other active interventions, such as cognitive therapy, they do not appear to be notably more effective (Wilson et al., 2019). It is worth mentioning that in this systematic review, several therapies were categorized as self-compassion-related therapy, such as mindfulness-based cognitive therapy and acceptance and commitment therapy, potentially leading to inaccurate conclusions (Kirby & Gilbert, 2019).

Generally, studies have not revealed significant differences in the effectiveness of various interventions when comparing self-compassion with alternative approaches (e.g., Arimitsu & Hofmann, 2017). Nevertheless, some findings indicate the potential superiority of self-compassion interventions, based on their effectiveness (Javidi et al., 2021), or their acceptability and applicability for students (Cândea & Szentágotai-Tătar, 2018). Additionally, certain personal variables that can influence the effectiveness of these interventions, such as depression (Diedrich et al., 2014, 2016; Ehret et al., 2018).

1. 7. Summary and Concluding Remarks

Throughout the theoretical background, we have presented the concept of self-compassion from various theoretical perspectives, delved into its measurement, examined its correlations with other variables, explored well-established interventions aimed at fostering self-compassion, and assessed their effectiveness. Our insights from meta-analyses (e.g., Chio et al., 2021; Ferrari et al., 2019; Kirby et al., 2017; MacBeth & Gumley, 2012; Marsh et al., 2018; Muris & Petrocchi, 2016; Zessin et al., 2015) highlights that self-compassion plays an important role in addressing multiple mental problems and serves as a valuable resource for influencing various indicators of distress and well-being. Moreover, meta-analyses of the interventions demonstrate their overall efficiency in increasing self-compassion, reducing distress, and improving well-being (Ferrari et al., 2019; Han & Kim, 2023; Turk & Waller, 2020; Wakelin et al., 2021). Nevertheless, it is important to investigate not just their effectiveness, but also their specific impact on different target groups, desired outcomes, situational contexts, and the underlying mechanisms at play (i.e., identifying the active ingredients). Therefore, a more nuanced view of self-compassion interventions is recommended (Finlay-Jones, 2023). Although interventions for cultivating self-compassion prove to be generally effective, there is evidence to suggest that their effectiveness may be somewhat diminished in the case of students (Ferrari et al., 2019).

However, it remains unclear whether this lower effectiveness extends to other desired outcomes as well. To illustrate, it is well-established that self-compassion interventions successfully diminish negative affect (Ferrari et al., 2019), which is a key indicator of emotional distress (Watson & Pennebaker, 1989; Watson et al., 1988a). These interventions also show promise in enhancing positive affect (Ferrari et al., 2019), which is a primary indicator of subjective well-being (Diener, 1984; Fredrickson, 2001; Fredrickson & Cohn, 2008; Seligman, 2011). Furthermore, research indicates that affect, particularly negative affect (Cha et al., 2022; Sirois, 2015; Sirois et al., 2015, 2019; Yang et al., 2023) along with emotion regulation (Inwood & Ferrari, 2018) may serve as mechanisms of change within the realm of self-compassion. However, the extent to which various types of self-compassion interventions effectively influence the affective experiences of university students, and the magnitude of this influence, as well as any potential moderating factors, remain areas that warrant further investigation.

Previous results on the effects of self-compassion on negative and positive affect (Sirois, 2015; Sirois et al., 2015, 2019; Smeets, 2014; Stern, 2018; Yip & Tong, 2021) poses certain potential limitations, due to its reliance on the PANAS (Positive and Negative Affect Scale; Watson et al., 1988b), considered the most used instrument for measuring negative and positive affect. Notably, the PANAS cannot differentiate between activating and soothing positive affect. Furthermore, it has been observed that self-compassion interventions have a greater impact on soothing positive affect compared to activating positive affect (Kirschner et al., 2019; Matos et al., 2017). Consequently, this differentiation is crucial when evaluating the effectiveness of these self-compassion interventions. Despite the availability of a tool designed to measure distinct types of positive affect, namely the Types of Positive Affect Scale (Gilbert et al., 2008), it has not yet been investigated within the Hungarian population.

As previously discussed, various scales have been developed for measuring self-compassion. However, in the Hungarian context, only the full version of the Self-Compassion Scale (Neff, 2003a) has been adapted, while the short form (Raes et al., 2011) lacks sufficient evidence for its usage within the current population. Consequently, the adaptation of the abbreviated version of this scale for the Hungarian population holds significant importance. Given the mixed results regarding the scale's dimensionality, with some studies supporting the original higher-order factor structure (Garcia-Campayo et al., 2014; Raes et al., 2011; Uršic et al., 2019) and others favoring a two-factor solution (Babenko & Guo, 2019; Bratt & Fagerström, 2020; Hayes et al., 2016; Kotera & Sheffield, 2020; Lluch-Sanz et al., 2022), it becomes crucial to assess both models. This includes examining the original factor structure based on Neff's theory (2003a, 2003b) and the two-factor model, which distinguishes between self-coldness (comprising negative dimensions of self-compassion, representing uncompassionate responses toward the self) and self-warmth (comprising positive dimensions of self-compassion, reflecting compassionate responses toward the self).

In general, studies have not consistently shown significant differences in the effectiveness of self-compassion interventions compared to other active approaches such as mindfulness or cognitive restructuring practices (Arimitsu & Hofmann, 2017; Mak et al., 2018; Preuss et al., 2021). However, some findings suggest that self-compassion interventions may be superior in terms of their effectiveness (Javidi et al., 2021) or their acceptability and applicability, particularly for students (Cândea & Szentágotai-Tătar, 2018). While multiple forms of interventions can be effective, it is advisable to explore the relationships between self-compassion, mindfulness, and various cognitive vulnerabilities (such as dysfunctional attitudes) in predicting various indicators of distress and well-being among university students. This exploration can help identify the most opportune points for intervention from a theoretical perspective. Despite many studies having separately examined the relationship between self-compassion and mindfulness, as well as between self-compassion and dysfunctional attitudes, using different models (Ferrari et al., 2018; Makadi & Koszycki, 2020; Li et al., 2022; Liu et al., 2022; Phillips et al., 2018; Podina et al., 2015; Sedighimornani et al., 2019; Xavier et al., 2023; Wong & Mak, 2013), few studies have simultaneously explored these relationships (i.e., the relationships between cognitive vulnerabilities, mindfulness, and self-compassion) in predicting mental health.

While the body of evidence regarding the effectiveness of self-compassion interventions is growing, it's important to note that the Compassionate Mind Training (Irons & Beaumont, 2017; Irons & Heriot-Maitland, 2021) has not yet been adapted or investigated for the Hungarian population. Consequently, our understanding of whether this intervention is effective for this specific demographic remains incomplete. Despite correlation and cross-sectional mediation analyses suggesting potential benefits of Compassionate Mind Training through the improvement of self-compassion (Irons & Heriot-Maitland, 2021; Matos et al., 2022), it is worth mentioning that some researchers argue that cross-sectional mediation analyses do not respect the implied temporal sequencing suggested by mediation. As such, they recommend that mediation effects be examined using longitudinal structural equation models, taking into consideration the autoregressive nature of the variables involved (Goldsmith et al., 2018; Maxwell et al., 2011).

II. CHAPTER II. RESEARCH OBJECTIVES AND OVERALL METHODOLOGY

Through the present thesis, we aimed to address various theoretical, methodological, and practical objectives concerning self-compassion interventions.

The first primary objective was to investigate the effectiveness of self-compassion interventions on university students' positive and negative affect in comparison to control conditions. Given the varying

outcomes reported in the original studies regarding the efficacy of self-compassion interventions on reducing negative affect and enhancing positive affect within this population, we conducted a meta-analysis encompassing these studies. Additionally, we explored potential moderators influencing effect sizes, examined study quality, and addressed the issue of publication bias (**Study 1**).

The second major objective of this research revolved around adapting two well-known scales for the Hungarian university student population: one designed to measure self-compassion (Self-Compassion Scale – Short Form; Raes et al., 2011) and another intended to assess distinct types of positive affect (Types of Positive Affect Scale; Gilbert et al., 2008), namely soothing and activating positive affect. Our aims included subjecting these instruments to various analyses, such as Confirmatory Factor Analysis (CFA) to evaluate their factor structure, employing multiple group confirmatory factor analysis to assess measurement invariance, as well as examining their internal consistencies and construct validity (**Study 2a** and **Study 2b**). In Study 2a, our objective was to assess both models: the original factor structure based on Neff's theory (2003a, 2003b) and the two-factor model comprising self-coldness (representing negative dimensions of self-compassion, reflecting uncompassionate responses toward the self) and self-warmth (representing positive dimensions of self-compassion, reflecting compassionate responses toward the self).

Considering the significance of dysfunctional attitudes and mindfulness in relation to well-being and distress levels, **Study 3** aimed to investigate the relationships between self-compassion, mindfulness, and dysfunctional attitudes. Specifically, we examined the mediating role of self-compassion in the relationships between mindfulness, dysfunctional attitudes, and a series of indicators of distress and well-being using Structural Equation Modeling (SEM). We proposed two models for analysis: one in which self-compassion was treated as a global indicator, and another where we examined self-coldness and self-warmth separately. We aimed to evaluate these proposed models based on their capacity to predict various distress and well-being indicators, including negative affect and soothing positive affect, with the intention of obtaining more reliable and robust results.

Our final primary objective was to implement and tailor a comprehensive self-compassion development program to the Hungarian academic setting, specifically the Compassionate Mind Training (CMT; Irons & Beaumont, 2017; Irons & Heriot-Maitland, 2021). The effectiveness of the intervention was evaluated in a non-randomized, controlled, repeated measures clinical trial, on various indicators of distress and well-being (including negative affect and soothing positive affect). Additionally, we sought to measure self-compassion as a longitudinal mediator of effects on primary outcomes, that is, negative affect and soothing positive affect (**Study 4**).

III. CHAPTER III. ORIGINAL RESEARCH

3. 1. Study 1: A Systematic Review and Meta-Analysis on the Effectiveness of Self-Compassion Interventions for Changing University Students' Positive and Negative Affect[1]

3. 1. 1. Introduction

In the case of university students developing effective interventions for improving their negative and positive affect can be very important, because they experience lower levels of well-being (including positive affect) and elevated psychological distress (including negative affect) compared to the general community (Bore et al., 2016; Larcombe et al., 2016; Regehr et al., 2013; Tobar et al., 2022). Based on individual studies, cultivation of self-compassion is a promising type of intervention for improving students' positive affect and reducing their level of distress (i.e., negative affect) (Guan et al., 2021; Mantelou & Karakasidou, 2017), but results are not conclusive (Cândea & Szentágotai, 2018; Guan et al., 2021; Mantelou & Karakasidou, 2017; Phillips, 2018; Smeets et al., 2014; Stern & Engeln, 2018; Ziemer et al., 2019). Although these interventions for cultivating self-compassion are generally effective in increasing positive affect and reducing negative affect, in the case of students, the effectiveness of interventions is lower in increasing self-compassion (Ferrari et al., 2019).

[1]This study has been published. The current version represents an abbreviated adaptation of the published manuscript.
Póka, T., Fodor, L-A., Barta, A., & Mérő, L. (2023). A systematic review and meta-analysis on the effectiveness of self-compassion interventions for changing university students' positive and negative affect. *Current Psychology*, http://dx.doi.org/10.1007/s12144-023-04834-4

The effectiveness for positive and negative affect was not investigated in previous meta-analyses in the case of university students, therefore it is important to systematically review these studies and to synthesize said findings. There is a possibility that some personal traits and variables may moderate the effect of the interventions. In addition to personal factors, variables related to interventions can be important as well. For example, the results of the meta-analysis of Ferrari et al. (2019) showed that interventions delivered in a group format are more effective for increasing self-compassion than interventions executed on an individual scale.

The current study aims to systematically review the effect of self-compassion interventions in RCTs addressing affect (positive and negative affect) in the university student population, and to statistically synthesize these findings in a meta-analysis. The second aim is to evaluate the effectiveness of self-compassion interventions for increasing self-compassion (and separately negative dimensions and positive dimensions of self-compassion) in university students.

In addition, it would be important to investigate the possible moderators of the effectiveness: for example, the percentage of females in the samples, participants' age and provenience (i.e., the continent they come from), and other measured variables regarding the intervention (type of control, delivery format, techniques used, number of sessions, duration of sessions, instrument used for measuring the outcome, and the outcome's type: if it was measured as state or as trait). We will also investigate the role of self-compassion (and the role of negative and positive dimensions of self-compassion) in improving affect, namely whether the effect sizes for self-compassion predict the magnitude of the effects for negative and positive affect. Based on previous results, self-compassion is a main mechanism for various clinical outcomes, through which these interventions exert their effect (Matos et al., 2022).

In addition to theoretical considerations, the results would be useful for the development of more effective interventions to change the negative and positive affect for students by increasing self-compassion. Thus, by selecting studies that investigate the effectiveness of interventions or induction of self-compassion, compared to control groups (waiting list, placebo, validated intervention) in the case of the university student population we want to estimate the effect of these interventions on negative and positive affect, on self-compassion, and to perform moderator -, as well as sensitivity analysis.

3. 1. 2. Methods

This review was guided by the PRISMA guidelines, and the study protocol was pre-registered at the international prospective register of systematic reviews, PROSPERO. The registration identifier is: CRD42022309920.

3. 1. 2. 1. Identification and selection of studies

Seven electronic databases were searched throughout December 2021 for published articles in English, in peer-reviewed journals. Studies were included if they were a) RCTs comparing b) a self-compassion intervention (i.e., cultivating self-compassion had to be the direct aim of the intervention) c) to a passive control group (i.e., waitlist), or to a placebo control group, or to an active psychological intervention for d) university students, e) measuring positive and/or negative affect as outcome, f) published in peer-reviewed journals, and g) written in English.

We included all eligible studies, regardless of the number of sessions, regardless of the used technique, no matter the method of delivery or format. Studies were excluded if they had no control group or if they were not randomized. Studies were also excluded if their direct aim was not cultivating self-compassion for university students, if they didn't measure neither positive nor negative affect as outcome, and if they were not published in English peer-reviewed journals.

3. 1. 2. 2. Risk of bias assessment and data extraction

The quality of the selected studies was assessed using the Revised Cochrane risk-of-bias tool for randomized trials (RoB 2; Higgins et al., 2011), to provide an evaluation of risk of bias within the studies included in this review. The following data was extracted: authors, data for calculating effect size, year of publication, sample size, participant characteristics (i.e., mean age, percent of females, the continent where they come from), techniques used (i.e., writing, audio, video, mixed), control group used (i.e., waitlist, placebo, active), outcome's type (state, trait), outcome measurement used, way of delivery (i.e., face to face

vs. online), format (i.e., individual vs. group), number of intervention sessions, duration of the sessions, attrition rates.

3. 1. 2. 3. Statistical analysis

The data was synthesized by using Comprehensive Meta-Analysis software (CMA version 2). We estimated three effect sizes: one for negative affect, one for positive affect and one for self-compassion outcomes. We used Hedges' g for measures of effect and a random effects model was used to pool the data. The interpretation is similar to Cohen's *d* (Cohen, 2013). Positive values reflect superiority of the self-compassion intervention, while negative values indicate that the control group is superior. *Q* and I^2 statistics were used to evaluate the statistical heterogeneity between intervention effects across the trials. I^2 statistics with values of 25%, 50% and respectively 75% indicating low, moderate and high heterogeneity (Higgins et al., 2003). We also conducted sensitivity analyses excluding outliers.

Subgroup analysis and meta-regression analysis were also conducted. We used a set of categorical and continuous variables to test possible moderators of the effect size. The categorical variables tested were: control type (i.e., active vs. placebo), used technique (i.e., self-compassion writing vs. other techniques), format (i.e., online vs. face to face), the continent where the students come from, the outcome's type (i.e., state vs. trait), and the instrument used for measuring outcomes. We also conducted meta-regression analysis based on year of publication, the mean age of participants, the number of sessions, the attrition rates, the percentage of females, the study quality. We also tested the predictive effect of self-compassion effect sizes for the positive and negative affect effect sizes with meta-regression. The publication bias was examined using Duval and Tweedie's trim and fill method, the Rosenthal's fail-safe N and the Egger's test.

3. 1. 3. Results

3. 1. 3. 1. Selection and inclusion of studies

The search generated 8649 records (7096 after duplicate removal). We excluded 6946 records based on abstract inspection and examined the full texts of 144 articles. Subsequently, 21 records met our inclusion criteria, 11 of which had insufficient data for effect size calculation. Following contact with the original authors, we obtained data for one study (Kirschner et al., 2019). We included a record (Mantelou & Karakasidou, 2017) based on references from previous meta-analyses. A total of 12 records were included in the systematic review. One of them (Yip & Tong, 2021) had four eligible studies with different samples and one (Stern & Engeln, 2018) had three, which means that there was a total of 17 studies (e.g., different samples, different trials) included in this review.

3. 1. 3. 2. Characteristics and risk of bias of included studies

The number of studies included per total was 17 ($k = 17$), of which 15 measured the positive affect and 15 measured the negative affect. The years of publication were between 2013-2021. A total sample size of the included studies was $N = 2900$ and the mean age range was between 18.63 and 34.83 years. The percent of females were between 28.42% - 100%. The number of intervention sessions were between one and six. Most interventions ($k = 12$) used self-compassion writing exercise based on Leary et al.'s (2007) method, and five studies used other techniques (e.g., audio, compassionate image, mixed techniques). For measuring positive and negative affect most studies ($k = 13$) used the PANAS (Positive and Negative Affect Scale; Watson et al., 1988b).

Overall, in this meta-analysis, we included three trials with a high risk of bias and 14 trials evaluated with some concerns. Regarding the measurement of the outcome, we rated each study at least with some concern, based on the criteria that the assessment could be influenced by knowledge of intervention (i.e., outcomes were participant-reported). We evaluated some trials with a high risk of bias too. For example, we rated Cândea and Szentágotai-Tătar's (2018) study with a high risk of bias based on the patterns of missing data (i.e., the lack of information was unequal between different groups), and Mantelou and Karakasidou's (2017) study based on the measurement of the outcome, lacking intervention control.

3. 1. 3. 3. Main results

The pooled effect size across all studies that measured negative affect ($k = 15$) was small and was not significant ($g = .28$; 95% CI = -.025 to .59), with very high heterogeneity ($Q = 110.68$, $df = 14$, $p < .001$, $I^2 = 87.35$). Exclusion of two outliers (Guan et al., 2021; Wong & Mak, 2016) led to even smaller estimations

(g = .18; 95% CI = .004 to .35) and the results became statistically significant with moderate heterogeneity (Q = 25.79, df = 12, p = .01, I^2 = 53.48). All results for negative affect (i.e., global estimation, sensitivity analyses, subgroup analyses) can be find in Table 1.

Table 1 The main analyses, the sensitivity, and the subgroup analyses for negative affect

Negative affect		*k*	*g*	95% CI	I^2	*p*
All studies		15	.28	-.03 to .29	87.35	
Outliers excluded		13	.18	.004 to .35	53.48	
Subgroup analyses						
Techniques used	Writing	12	.25	-.11 to .61	89.48	.61
	Other	3	.41	-.05 to .86	51.47	
Control type	Active	8	-.05	-.23 to .14	39.65	.08
	Placebo	8	.52	-.01 to 1.06	91.65	
	Waitlist	2	.43	-.31 to 1.17	71.95	
Delivery format	Face to face	10	.23	.01 to .45	52.98	.43
	Online	4	.63	-.33 to 1.59	96.23	
Format	Individual	13	.27	-.07 to .60	88.67	
	Group	2	.40	-.44 to 1.23	75.33	
Used scale	PANAS	13	.28	-.07 to .63	89.03	
	Other	2	.29	-.05 to .64	<.001	
Continent	America	5	.15	-.04 to .35	39.99	.82
	Asia	6	.40	-.48 to 1.28	94.58	
	Europe	4	.24	-.20 to .69	63.99	
Outcome type	State	13	.24	-.10 to .59	88.64	
	Trait	2	.52	.04 to 1.01	46.17	

The pooled effect size across fifteen studies that measured positive affect was very small, but statistically significant (g = .14; 95% CI = .024 to .25), with low, statistically non-significant heterogeneity (Q = 17.82, df = 14, p = .21, I^2 = 21.46). The exclusion of one outlier (Mantelou & Karakasidou, 2017) led to smaller estimations (g = .11; 95% CI = .01 to .20) with no heterogeneity (Q = 7.97, df = 13, p = .85, I^2 < .001). All results for positive affect can be find in Table 2.

Table 2 The main analyses, the sensitivity, and the subgroup analyses for positive affect

Positive affect		*k*	*g*	95% CI	I^2	*p*
All studies		15	.14	.02 to .25	21.46	
Outliers excluded		14	.11	.01 to .20	<.001	
Subgroup analyses						
Techniques used	Writing	10	.09	-.03 to .02	58.15	.21
	Other	5	.30	-.01 to .61	<.001	
Control type	Active	8	-.01	-.14 to .12	<.001	*.02*
	Placebo	9	.20	.08 to .33	<.001	
	Waitlist	2	.72	-.05 to 1.50	73.19	
Delivery format	Face to face	10	.21	.02 to .40	36.09	.34
	Online	4	.10	-.03 to .23	<.001	
Format	Individual	13	.10	.01 to .20	<.001	
	Group	2	.68	-.20 to 1.57	76.83	
Used scale	PANAS	12	.14	-.01 to .29	34.43	.95
	Other	3	.15	-.03 to .33	<.001	
Continent	America	4	.112	-.03 to .25	<.001	.38
	Asia	5	.015	-.21 to .24	5.94	
	Europe	5	.315	-.05 to .68	56.04	
Outcome type	State	13	.11	.01 to .21	<.001	
	Trait	2	.58	-.48 to 1.63	87.48	

The pooled effect size across all studies that measured self-compassion at post induction or post intervention (k = 11) was small/ moderate and statistically significant (g = .49; 95% CI = .27 to .71), with moderate heterogeneity (Q = 24.52, df = 10, p = .006, I^2 = 59.23). For self-compassion outcomes we have not found outliers, so we did not conduct sensitivity analysis. All results for self-compassion (i.e., global estimation and subgroup analyses) can be find in Table 3.

Table 3 The main analyses and the subgroup analyses for self-compassion

Self-compassion		*k*	*g*	95% CI	I^2	*p*
All studies		11	.49	.28 to .71	59.23	
Subgroup analyses						
Techniques used	Writing	7	.50	.20 to .80	63.87	.97
	Other	4	.51	.12 to .90	61.78	
Control type	Active	4	.38	-.03 to .78	53.89	.65
	Placebo	7	.44	.18 to .70	62.39	
	Waitlist	2	.78	.03 to 1.52	70.72	
Delivery format	Face to face	6	.80	.53 to 1.07	26.74	*.001*
	Online	4	.26	.10 to .42	<.001	
Format	Individual	9	.42	.21 to .64	55.38	
	Group	2	.88	.31 to 1.44	43.01	
Scale used	SCS, SCS-SF, SCS-state, SCS-SF-state	7	.35	.13 to .57	46.31	*.04*
	Other	4	.77	.42 to 1.13	39.26	
Continent	Asia	5	.63	.26 to 1.01	64.24	.78
	Europe	4	.56	.17 to .94	47.39	
Outcome type	State	6	.58	.28 to .88	63.17	.45
	Trait	5	.40	.03 to .76	61.52	

Despite our aim to analyze intervention effects on different dimensions of self-compassion, the provided data was insufficient for this objective.

3. 1. 3. 4. Results of analysis of subgroups and analysis of meta-regression

3. 1. 3. 4. 1. Moderator analyses for negative affect.

As specified a-priori we investigated a set of categorical and continuous moderators. All results based on subgroup analyses for negative affect can be find in Table 1. The type of control group was a significant moderator (Q = 3.89, df = 1, p = .048) for negative affect (after excluding waitlist control groups). The intervention format (individual vs. group) and outcome type (state vs. trait) also had a tendency to impact the effectiveness of interventions for decreasing negative affect.

Based on meta-regression analyses, we found that the year of publication was a significant positive predictor (B = .066; SE = .03; 95% CI = .01 to .12; p = .01), and the attrition rate (B = -.019; SE = .004; 95% CI = -.03 to -.01; p < .001) as well as the percentage of female participants (B = -.012; SE = .003; 95% CI = -.018 to -.007; p < .001), were both negative predictors for the effect size of negative affect. The mean age (B = -.06; SE = .05; 95% CI = -.15 to .03; p = .20), the number of sessions (B = -.08; SE = .04; 95% CI = -.17 to .004; p = .06) and the quality of studies (B = .14; SE = .09; 95% CI = -.04 to .31; p = .13) did not predict effect size for negative affect.

In order to analyze if the effect sizes for self-compassion predict the effect sizes for negative affect, we only included in the meta-regression analysis studies that measured both of them (k = 9). The effect size of self-compassion was a significant positive predictor for the effect size of negative affect (B = .48; SE = .22; 95% CI = .05 to .90; p = .03).

Despite our aim to analyze if different dimensions of self-compassion can predict the effect sizes for negative and positive affect, the provided data was insufficient for this objective. We were also unable to analyze the moderating effect of the sessions' duration, due to missing data.

3. 1. 3. 4. 2. Moderator analysis for positive affect.

Despite the fact that we did not find heterogeneity in effect sizes for positive affect, we investigated the same categorical and continuous moderators with the same procedure like in the case of negative affect (Table 2). In the case of positive affect like for negative affect, the type of control group is a significant moderator (Q = 7.97, df = 2, p = .019). The intervention format (individual vs. group) and the type of outcome (state vs. trait), also tends to impact the effectiveness of interventions for increasing positive affect (i.e., g = .68 for group format, g = .10 for individual format; g = .11 for the positive affect measured as state, g = .58 for the positive affect measured as trait), however we included in the meta-analysis only two studies with group format, and only two studies which measured positive affect as trait. Other variables did not moderate the effect.

3. 1. 3. 4. 3. Moderator analysis for self-compassion.

For self-compassion, the delivery format is a significant moderator (Q = 11.36, df = 1, p = .001), meaning that interventions in face-to-face (g = .80; 95% CI = .53 to 1.07) format are more effective than interventions delivered in online format (g = .58; 95% CI = .09 to .42). For all subgroup analyses conducted see Table 3. We found that the used measurement (validated scale vs. other) was also a significant moderator of effect sizes for self-compassion (Q = 3.98, df = 1, p = .046), and the format (individual vs. group) also tends to impact the effectiveness of interventions (i.e., g = .88 for group format, g = .42 for individual format).

Results of meta-regression showed, the year of publication (B = .06; SE = .04; 95% CI = -.01 to .13; p = .08), the mean age (B = -.01; SE = .01; 95% CI = -.03 to .01; p = .16), the number of sessions (B = -.03; SE = .05; 95% CI = -.12 to .06; p = .47) and the percent of females (B = -.01; SE = .003; 95% CI = -.01 to .001; p = .12) did not predict the effect size for self-compassion. The attrition rates (B = -.02; SE = .01; 95% CI = -.03 to -.01; p < .001) and the study quality ratings (B = .31; SE = .11; 95% CI = .11 to .52; p = .002) were significant predictors. We were unable to analyze the moderating effect of the duration of the sessions due to missing data, since in some studies no time frame was given.

3. 1. 3. 5. Publication bias analyses

For negative affect there were two studies trimmed, and the original small effect size (g = .28; 95% CI = -.02 to .59) was reduced even more (g = .03; 95% CI = -.29 to .45), but in both cases the effect sizes were statistically non-significant. The classic fail-safe N test indicated that 59 is the number of missing studies to reduce the effect size to zero, which signals a risk of publication bias. However, the Egger's test (B = 2.19, SE = 2.01, p (1-tailed) = .15) indicated that the findings were not significantly influenced by publication bias. For positive affect were no studies trimmed, which indicate no publication bias. The classic fail-safe N test indicated that 17 is the number of missing studies to reduce the effect size to zero, which signals a risk of publication bias. However, the Egger's test (B = .58, SE = .76, p (1-tailed) = .23) also indicated that the findings were not significantly influenced by publication bias. For self-compassion were three studies that were trimmed, and the original moderate effect size (g = .49; 95% CI = .28 to .71) was reduced to a small effect size (g = .32; 95% CI = .08 to .56), which indicates a risk of publication bias. The classic fail-safe N test indicated that 125 is the number of missing studies to reduce the effect size to zero, which, in this case, did not signal a risk of publication bias. However, the Egger's test (B = 2.66, SE = 1.09, p (1-tailed) = .02) also indicated that the findings were significantly influenced by publication bias.

3. 1. 4. Discussion

This meta-analysis investigated the effectiveness of self-compassion interventions in RCTs, addressing positive and negative affect on the university student population, and found that these interventions have small (g = .28) and statistically nonsignificant effect on negative affect compared to control (with very high heterogeneity), and statistically significant, but very small effect (g = .14) on positive affect (no heterogeneity). Sensitivity analyses lead in general to the same results, that is, the effects for both negative and positive affect are very small. Overall, self-compassion interventions and self-compassion inductions produced a small/ moderate and significant improvement in self-compassion (g = .49) compared to control interventions with moderate heterogeneity. These findings are consistent with previous meta-analytic results, which found that in the case of students, the effectiveness of these interventions may be weaker (Ferrari et al., 2019). On self-compassion they found a strong effect (g = .75) in general, but in the case of student population the result was similar to our findings (g = .47). Including all population types, they found small/moderate

effect on positive affect (g = .48) and small effect on negative affect (g = .33). For all three outcomes investigated in our study the intervention format tended to impact the effect size, thus, interventions with a group format seem to be more effective for increasing positive affect, reducing negative affect, and cultivating self-compassion too, which is consistent with previous results (Ferrari et al., 2019).

For both types of affection, for negative and positive affect, we found that the used control (active vs. placebo) moderate the effect size, thus, self-compassion interventions are more effective than placebo interventions for improving affection, but they are not more effective than other active interventions (e.g., emotional writing, happiness induction, self-esteem induction), which can boost affections too (Pennebaker, 1997; Segal et al., 2009). However, for self-compassion, the used control did not moderate the effect size, so for improving self-compassion these interventions are more effective than other active interventions. Results indicated that interventions delivered in a face-to-face format are more effective (strong effect) than interventions delivered online (moderate effect) for increasing self-compassion. We also found significant moderating effect of the instrument used for measuring self-compassion. In the case of studies which used a validated scale for measuring self-compassion (e.g., SCS, SCS-SF, SCS-state, SCS-SF-state) we found small effect (g = .35), and in the case of studies which used other instruments, methods for measuring self-compassion we found moderate/ large (g = .77) effect. For future research it is indicated to use the validated scales for measuring self-compassion as a trait: the Self-Compassion Scale (SCS; Neff, 2003b), the Self-Compassion Scale – Short Form (SCS-SF; Raes et al., 2011), and also for measuring as a state (Neff et al., 2021).

Regarding the possible mechanisms for changes in affect, we found that effect sizes for self-compassion are positive predictors (B = .48) of the effect sizes for negative affect (but for the positive affect they are not). Previous studies also revealed that self-compassion is a main mechanism of various clinical outcomes (i.e., it mediates the relationships), through which these interventions exert their effect (Matos et al., 2022).

Despite these findings, this review and meta-analysis has its limitations. First, Ferrari et al. (2019) found that in group format, self-compassion can be cultivated more effective than in individual format, however the reviewed number of studies included in this meta-analysis, which used group format (k = 2 for each outcome), prevented this moderation analysis. Based on subgroup analysis we observed this tendency for all three outcomes.

Secondly, the majority of studies used the PANAS (Watson et al., 1988b) for measuring positive and negative affect. This can be a major limit of our meta-analysis, because according to actual theories, there are different types of positive (Gilbert et al., 2008) and negative affect (David et al., 2005; Ellis, 2001, 2005; Opriș & Macavei, 2005), but the PANAS can't differentiate between them. The PANAS measures solely the activating positive affect, which reflects only the extent to which a person feels active and alert. In conclusion, we do not know if these interventions are effective or not for improving soothing positive affect for university students. From the included studies only one case measured the activating and the soothing positive affect separately. Their results also indicate that it is very important to consider this distinction (Kirschner et al., 2019).

The next limit is that the original protocol of this meta-analysis had intended to investigate the effectiveness of these interventions for different dimensions of self-compassion and to analyze their role in predicting effect sizes for negative and positive affect, but the unavailability of this data prevented this analysis. For further studies, it is required to relate not just to global self-compassion scores, but also to scores for different dimensions of self-compassion.

Another limitation of this meta-analysis was the small number of studies included, and that the majority of them were experiments with single sessions. Most of them used self-compassion writing techniques and it was impossible to compare specific different types of intervention for cultivating self-compassion. For further research, it is recommended to also directly compare different types of self-compassion improving/ inducing techniques for students. For example, more embodied and more experiential techniques may activate the soothing system more effective, like self-compassionate touch, compassionate image, or developing the compassionate self, the compassionate inner voice, which is the main target of compassion-focused therapy (Gilbert, 2009a, 2009b, 2014) and of compassionate mind training (Irons & Beaumont, 2017; Irons & Heriot-Maitland, 2021).

Another limitation of this review is that meta-analysis for self-compassion outcomes does not include all relevant studies, but only those which measured the positive or negative affect too. So, for further research it may be important to search for and include all studies which measured self-compassion outcomes without measuring students' affect (e.g., Binder et al., 2019; Toole & Craighead, 2016), in order to reach a valid conclusion and to analyze the possible moderators.

Future research would make a valuable contribution to self-compassion literature by directly comparing the effects of different approaches to identify which is more successful at improving affect and increasing self-compassion: online vs. face-to-face, and group vs. individual, which was recommended also by Ferrari et al. (2019). For improving self-compassion, this meta-analysis' results showed that the face-to-face format can be more beneficial than the online format. For all three outcomes the subgroup-analyses suggest that group format can be more beneficial than individual format in case of university students too, which is consistent with Ferrari et al. (2019) findings. In the case of developing and testing these techniques and programmes for cultivating self-compassion, for improving the positive affect and for reducing the negative affect for university students, it may be useful to consider these results.

3. 2a. A Validation Study of the Self-Compassion Scale – Short Form – Hungarian Version (SCS-SF-HU) with University Students[2]

3. 2a. 1. Introduction

In the year of introducing the concept of self-compassion, Neff (2003b) also developed an instrument for measuring the trait of self-compassion (Self-Compassion Scale) in a sample of university students, which, to this day, is the most commonly used scale for measuring the construct. Originally, the model was supposed to be a three-factor scale (self-kindness vs. self-judgment, mindfulness vs. over-identification with painful emotions and thoughts, and sense of common humanity vs. isolation), however, throughout its development, the authors have decided upon the final model, consisting of six first-order (self-kindness, common humanity, mindfulness, self-judgment, isolation, and over-identification) and one second-order factor (self-compassion). At the time of writing this article, this scale was translated and adapted into 22 different languages (Neff & Tóth-Király, 2022) across many cultures, including Hungarian (Sági et al., 2013), Turkish (Deniz et al., 2008), Italian (Petrocchi et al., 2014), Chinese (Chen et al., 2011) and Japenese (Arimitsu, 2014) populations. Results have shown that this instrument is a reliable tool, however, the dimensionality of it may vary according to different contexts.

For example, López et al. (2015) found that the proposed six-factor structure did not fit the data, and the exploratory factor analysis suggested a two-factor solution, which is based on the negatively (self-coldness) and positively formulated items (self-warmth). The two-factor model is in coherence with Gilbert's theory (2009a, 2009b, 2014), which assumes that the negative and positive dimensions of self-compassion are related to different emotion regulation systems (self-coldness is related to the threat system and self-warmth is related to the soothing system). The two-factor model is also coherent with empirical findings regarding their relative importance for distress and well-being (Brenner et al., 2017; Chio et al., 2021; López et al., 2015; Muris et al., 2016; Muris & Petrocchi, 2016; Neff et al., 2018). Neff (2016) recommends the use of the global self-compassion score, however, she also suggested that the scale can be employed flexibly, considering the validation of other models based on specific research questions.

The Self-Compassion Scale-Short Form (SCS-SF; Raes et al., 2011) is another commonly utilized tool for assessing self-compassion as a trait. The overall self-compassion scores from this scale had a near-perfect correlation (r = .97) with the overall scores from the original Self-Compassion Scale (SCS), supporting the same six-factor structure with a single higher-order factor (Neff, 2003b). The scale comprises 12 items, with each first-ordered factor assessed by two items. However, the authors suggest utilizing only the global score (self-compassion) due to relatively lower internal consistencies observed for the subscales (Raes et al., 2011). Furthermore, the scale underwent testing and validation in various languages, such as Spanish (Garcia-Campayo et al., 2014) and Slovenian (Uršic et al., 2019), revealing consistent factor structures across these translations.

[2]This study has been accepted for publication. The current version represents an abbreviated adaptation of the accepted manuscript.
Póka, T., Barta, A., & Mérő, L. (in press). A validation study of the Self-Compassion Scale – Short Form – Hungarian version (SCS-SF-HU) with University Students. *European Journal of Applied Positive Psychology*

On the other hand, several studies conducted with foreign translations have revealed the two-factor solution demonstrate a better fit with the data (Babenko & Guo, 2019; Bratt & Fagerström, 2020; Hayes et al., 2016; Kotera & Sheffield, 2020; Lluch-Sanz et al., 2022).

The abbreviated version of the scale has not been adapted or studied in relation to the Hungarian population. Thus, the objective of the study was the investigation of the factor structure of the Hungarian version of the Self-Compassion Scale – Short Form among university students. Using confirmatory factor analysis (CFA) we aimed to test the original model consisting of six first-order factors and one second-order factor, as well as the two-factor model (self-coldness and self-warmth). We also aimed to test the measurement invariance of the scale across gender and country, including participants from Hungary and Romania.

Self-compassion was expected to negatively correlate with negative affect and positively correlate with both types of positive affect (activating and soothing). Based on Gilbert's theory (2009a, 2009b, 2014) and neuroscientific evidence supporting the existence of two distinct systems (drive and affiliation systems) associated with different types of positive affect (Depue & Morrone-Strupinsky, 2005), a stronger positive correlation was anticipated between self-compassion and soothing positive affect, as opposed to activating positive affect. Judging by previous empirical data (Brenner et al., 2017; Chio et al., 2021; López et al., 2015; Muris et al., 2016; Muris & Petrocchi, 2016; Neff et al., 2018), we hypothesized that self-coldness has a stronger association with negative affect than self-warmth, and self-warmth has a stronger association with soothing positive affect than self-coldness.

3. 2a. 2. Methods

3. 2a. 2. 1. Instruments

3. 2a. 2. 1. 1. Socio-demographic and personal information.

Participants were asked to complete a socio-demographic form, which included items regarding age, gender, country, and student status (i.e., student year, type of study, and major type).

3. 2a. 2. 1. 2. Self-compassion.

Self-compassion was assessed with the Self-Compassion Scale – Short Form (SCS-SF; Raes et al., 2011). Respondents provide answers on a five-point scale ranging from 1 (*almost never*) to 5 (*almost always*). To account for uncompassionate responses, negative item scores (i.e., self-judgment, isolation, and over-identification) are reverse-coded. Subscale and global scores are computed by averaging item responses. Higher scores on self-compassion indicate greater levels of trait self-compassion. In the present study, the negative items were reversed prior to any calculation.

3. 2a. 2. 1. 3. Activating and soothing positive affect.

Two subscales of the Types of Positive Affect Scale (Gilbert et al., 2008) were used to measure the activating and soothing positive affect. Answers are to be given on a five-point scale ranging from 1 (*not typical for me*) to 5 (*very typical for me*). For the current sample, the activating positive affect sub-scale demonstrated good internal consistency with a Cronbach's Alpha of $\alpha = 0.87$, while the soothing positive affect sub-scale exhibited acceptable internal consistency with $\alpha = 0.72$. Additionally, the mean inter-item correlations further supported the good internal consistency of the subscales, with MIIC = .46 for activating positive affect and MIIC = .40 for soothing positive affect.

3. 2a. 2. 1. 4. Negative affect.

To measure negative affect, the abbreviated version of the Emotional Distress Profile (Profilul Distresului Emoțional - PDE; Opris & Macavei, 2005) was utilized. The present study employed a set of 12 items, which, during the translation process, showed high face validity, based on the professional judgement of two independent experts. Participants were asked to rate the extent to which these affect were characteristic of their experiences over the past two weeks using a five-point Likert scale, with higher scores indicating greater negative affect. Notably, the abbreviated version of the scale exhibited excellent internal consistency ($\alpha = 0.91$) in the current sample.

3. 2a. 2. 2. Participants

Hungarian-speaking students from Babeș-Bolyai University (Romania) and Eötvös Lóránd University (Hungary) were recruited to form the sample, of which 685 completed the study. Of these 685 we

identified six participants with multivariate outlier data based on Mahalanobis distance analyses. Nonetheless, we opted to retain them in the study. The sample's mean age was 23.09 years (*SD* = 8.06), the majority self-identifying as female (*n* = 562; 82,00%), while 122 declared themselves to be male (17,8%).

3. 2a. 2. 3. Procedures

After voluntarily agreeing to participate and providing online consent, participants completed an online structured survey using Google Forms. The study was approved by the local Ethics Committee from Eötvös Lóránd University (nr. 2022/615).

3. 2a. 2. 4. Analyzed models

Two plausible models were examined for their fit. The first model assessed was the two-factor model, with indicators loading onto two correlated latent factors (self-coldness and self-warmth). The second model represented the original factor structure, encompassing six first-order factors (self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification) loaded onto a second-order factor (self-compassion).

3. 2a. 2. 5. Data analyses and assessment of model fit

For preliminary analyses, we utilized SPSS 20 software. Confirmatory factor analysis (CFA) was performed in SPSS AMOS 20, employing Maximum Likelihood (ML) estimation. The model fit was evaluated using various criteria, including the ratio of chi-square statistic and degrees of freedom (CMIN/DF), root mean square error of approximation (RMSEA) with a 90% confidence interval, standardized root mean square residual (SRMR), general fit index (GFI), and comparative fit index (CFI).

To investigate the measurement invariance of the scale, a multi-group confirmatory factor analysis was conducted. The scale's internal consistency was assessed through Cronbach's Alpha's (α) coefficient, while the subscales' internal consistency was determined using the mean inter-item correlation (MIIC), a more appropriate measure for scales with fewer than 10 items (Mitchell & Jolley, 2012). Pearson's correlation analysis was employed to examine the relationships between self-compassion and indicators of well-being (i.e., activating positive affect, soothing positive affect, and negative affect).

Cutoff values for the ratio of the chi-square statistic to the degrees of freedom have been suggested to range from 2 to 5 (Hu & Bentler, 1999). For RMSEA, values below .08 indicate an adequate fit, while values under .05 suggest a good fit (Schermelleh-Engel et al., 2003). Additionally, the upper limit of the associated 90% confidence interval for RMSEA should rest below .10 (West et al., 2012).
CFI values below .90 are not recommended, however, for a good fit, CFI values should exceed .95 (Hu & Bentler, 1999). Additionally, a GFI value of .95 suggests a good fit, whereas values greater than .90 indicate an acceptable fit. Moreover, an SRMR value below .08 is considered acceptable, and a value below .05 is indicative of a good fit (Schermelleh-Engel et al., 2003).

Chen's (2007) cutoff criteria were used to evaluate the measurement invariance of the scale. To support invariance, the recommended thresholds were $\Delta CFI < .01$ and $\Delta RMSEA < .015$. Our decision was not based on the chi-square test due to its sensitivity to sample size, as it could yield statistically significant results in large samples even with very small absolute differences in parameter estimates.

Following George & Mallery's (2003) recommendations, we interpret Cronbach's Alpha values as follows: $\alpha > .9$ are indicative of excellent, $\alpha > .8$ of good, $\alpha > .7$ of acceptable, $\alpha > .6$ of questionable, $\alpha > .5$ of poor, and $\alpha < .5$ of unacceptable indices of internal consistency. Mean inter-item correlations (MIIC) above .3 were considered acceptable based on Mitchell & Jolley's (2012) criteria.

While Neff (2003b) and Sági et al. (2013) excluded items with loadings below .40 from their final scale, the current study, following Simms' (2008) approach, will include items with loadings above .35. Correlation coefficients were interpreted as follows: $r = .10$ indicates a small effect, $r = .30$ indicates a medium effect and $r = .50$ indicates a large effect (Cohen, 1988).

3. 2a. 3. Results

3. 2a. 3. 1. Preliminary analyses

Calculated means, standard deviations, and first-order correlations between items are presented in Table 1 (*N* = 685). The sensitivity analyses yielded consistent results across all analyses, whether including

or excluding outliers, therefore deciding to report our results including all data. The distribution of data was normally distributed, and multivariate normality was confirmed (kurtosis = 6.485).

Table 1 Correlations between scale items (N = 685)

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12
1. SCS1R	2.30	1.08												
2. SCS2	3.41	1.05	.24**											
3. SCS3	3.52	1.06	.31**	.31**										
4. SCS4R	2.71	1.34	.38**	.14**	.22**									
5. SCS5	3.71	1.05	.29**	.30**	.37**	.27**								
6. SCS6	3.07	1.18	.28**	.32**	.22**	.22**	.29**							
7. SCS7	3.32	1.11	.20**	.23**	.44**	.19**	.21**	.24**						
8. SCS8R	2.41	1.32	.48**	.17**	.16**	.45**	.22**	.16**	.03					
9. SCS9R	2.20	1.14	.46**	.23**	.32**	.38**	.25**	.26**	.17**	.47**				
10. SCS10	3.01	1.19	.19**	.26**	.21**	.17**	.33**	.24**	.15**	.13**	.16**			
11. SCS11R	3.22	1.20	.46**	.38**	.29**	.27**	.30**	.30**	.18**	.34**	.40**	.23**		
12. SCS12R	2.83	1.14	.37**	.37**	.18**	.26**	.23**	.21**	.19**	.29**	.33**	.21**	.50**	

Notes: ** Correlation is significant at the .01 level (2-tailed)

3. 2a. 3. 2. Confirmatory factor analyses

3. 2a. 3. 2. 1. Two-factor solution.

Analyzing the two-factor solution, the results of CFA indicated a poor to borderline fit (CMIN = 286,75; *DF* = 53; CMIN/DF = 5,41; GFI = .93; CFI = .88; SRMR = .054; RMSEA = .08, 90%CI = [.07; .09]). Notably, no loading below .35 was observed, and in the initial step, none below .40, indicating that no items needed to be excluded from the analyses.

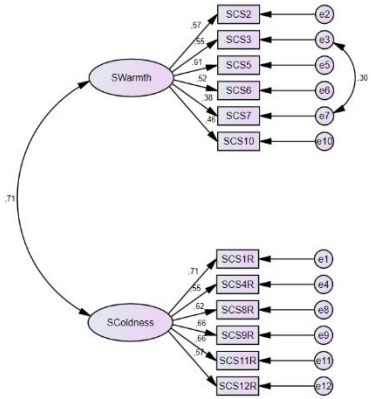

Fig. 1 *The Final Two-Factor Solution*

Following the procedure suggested by modification indices regarding the covariances between errors of the items (including a covariance between errors of items SCS3 and SCS7), we increased the fit of the model to an adequate level (CMIN = 234,78; *DF* = 52; CMIN/DF = 4,51; GFI = .94; CFI = .90; SRMR = .04; RMSEA = .07, 90%CI = [.06; .08]). The standardized factor loadings, as well as the covariances between the two factors (i.e., self-coldness and self-warmth) and between the two errors (e3 and e7), are presented in Figure 1.

3. 2a. 3. 2. 2. The original higher-order model.

Analyzing the original higher-order solution, the results of CFA showed an acceptable fit (CMIN = 239,28; *DF* = 48; CMIN/DF = 4.98; CFI = .90; SRMR = .055; RMSEA = .07, 90%CI = [.06; .08]). The higher-order model, along with all standardized factor loadings, is presented in Figure 2. No loading was observed to be below .35 or .40, hence no items were excluded from the analyses.

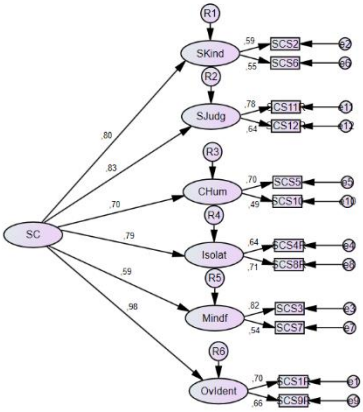

Fig. 2 *The Original Higher-Order Model*

3. 2a. 3. 3. Analyses of internal consistencies

The global indicator of self-compassion, encompassing all 12 items, demonstrated good internal consistency (α = .82). The scales formed by the six positively formulated items (self-warmth) and the six negatively formulated items (self-coldness) exhibited acceptable internal consistencies, with Cronbach's Alpha values of α = .70 and α = .79, respectively. Similarly, mean inter-item correlations supported the acceptability of internal consistency, with values of .36 for self-warmth and .47 for self-coldness. Removal of any item would lead to the reduction of internal consistency. The six subscales also displayed acceptable internal consistencies based on inter-item correlations: MIIC = .32 for self-kindness, MIIC = .50 for self-judgment, MIIC = .33 for common humanity, MIIC = .45 for isolation, MIIC = .44 for mindfulness, and MIIC = .46 for over-identification.

3. 2a. 3. 4. Assessing the measurement invariance of the scale

We also tested the measurement invariance of the scale across gender and country (Hungary, Romania) for both models, as shown in Table 2. Initially, we assessed the configural invariance and overall found acceptable model fits in the majority of cases. However, the CFI indices showed a lower fit when comparing the models between the Hungarian and Romanian samples, which indicates that across countries the configural invariance can be questionable.

When assessing the metric and structural invariances of these models, the changes of CMIN (chi-square) indexes were, in all cases, significant, indicating the non-invariance of the scale (for both models: the higher-order and the two-factor solutions) across gender and country. Nevertheless, changes in fit and error indexes (CFI and RMSEA) indicate the measurement invariance of the scale (ΔCFI < .01, ΔRMSEA < .015). A detailed breakdown of the results can be found in Table 2.

Table 2 Model Fit Across Samples

Model	CMIN	*DF*	CMIN/DF	CFI	GFI	RMSEA [90% CI]	SRMR
All sample (*N* = 685)							
Two-factor model	234.78	52	4.51	.90	.94	.07 [.06; .08]	.04
Higher-order model	239.28	48	4.98	.90		.07 [.06; .08]	.05
Configural Invariance Across Country (Hungarian sample *N* = 206; Romanian sample *N* = 466)							
Two-factor model	313.81	104	3.01	.89	.92	.05 [.04; .06]	.05
Higher-order model	312.94	96	3.26	.88	.92	.05 [.05; .06]	.06
Metric Invariance Across Country (Hungarian sample *N* = 206; Romanian sample *N* = 466)							
Two-factor model	319.13	114	2.79	.89	.92	.05 [.04; .05]	.05

Higher-order model	316.23	102	3.10	.89	.92	.05 [.04; .06]	.06
Structural Invariance Across Country (Hungarian sample N = 206; Romanian sample N = 466)							
Two-factor model	325.97	117	2.78	.89	.92	.05 [.04; .05]	.07
Higher-order model	325.06	108	3.01	.88	.92	.05 [.04; .06]	.07
Configural Invariance Across Gender (Female Sample N = 562); Male sample N = 122)							
Two-factor model	284.75	104	2.73	.90	.93	.05 [.04; .05]	.05
Higher-order model	286.44	96	2.98	.90	.93	.05 [.04; .06]	.05
Metric Invariance Across Gender (Female Sample N = 562); Male sample N = 122)							
Two-factor model	293.58	114	2.57	.90	.93	.04 [.04; .05]	.05
Higher-order model	290.56	102	2.85	.90	.93	.05 [.04; .05]	.05
Structural Invariance Across Gender (Female Sample N = 562); Male sample N = 122)							
Two-factor model	295.70	117	2.52	.90	.93	.04 [.04; .05]	.05
Higher-order model	295.76	108	2.73	.90	.93	.05[.04; .05]	.05

3. 2a. 3. 5. Construct validity

To test our hypotheses, we conducted a Pearson correlation analysis. In concordance with our hypothesis, self-compassion had a strong negative correlation with negative affect (r = -.58, p < .01), a moderate positive correlation with activating positive affect (r = 37, p < .01), and a moderate/strong positive correlation with soothing positive affect (r = .46, p < .01). Therefore, the relationship between self-compassion and soothing positive affect was indeed stronger than the relationship between self-compassion and activating positive affect (z = 2.01, p = .04). As expected, we also found that self-coldness had a stronger relationship with negative affect (r = -.60, p < .01) compared to self-warmth (r = -.39, p < .01), with significant difference between the strength of the relationships (z = 5.2, p < .01). Unexpectedly however, self-warmth had a similar (z = .22, p = .82) relationship with soothing positive affect (r = .41, p < .01) as self-coldness (r = .40, p < .01).

3. 2a. 4. Discussion

The aim of this study was to evaluate the factorial structure, measurement invariance, internal consistency, and construct validity of the SCS-SF (Self-Compassion Scale-Short Form; Raes et al., 2011) in a Hungarian student sample. Two models were tested based on previous research, with some studies supporting the original higher-order model (Garcia-Campayo et al., 2014; Raes et al., 2011; Uršic et al., 2019), while others favoring the two-factor solution (Babenko & Guo, 2019; Bratt & Fagerström, 2020; Hayes et al., 2016; Kotera & Sheffield, 2020; Lluch-Sanz et al., 2022). These models consist of self-coldness (uncompassionate responses to own difficulties and perceived inadequacies) and self-warmth (compassionate responses to own difficulties and perceived inadequacies). The results of factorial confirmatory analyses (CFA) indicated that both models adequately fit the data.

Overall, the results supported the measurement invariance of the scale for both models (the original higher-order model and the two-factor model) across countries (participants from Hungary and Romania) and gender (female and male participants). However, it is essential to acknowledge that the unbalance in the sample may impact the results (Chen, 2007), and not all indexes fully supported the various tested invariances (configural, metric, and structural). As such, these findings should be interpreted with consideration for these factors. In the current study, self-compassion scores (M = 2.98; SD = 0.67) closely resembled those of another article involving a Hungarian community sample (N = 505; 52.5% females; M_{age} = 44.37, SD = 15.59), in which the mean self-compassion score was also three (M = 3.00, SD = 0.56) (Tóth-Király & Neff, 2021).

The internal consistency for global self-compassion was deemed good, and both self-warmth (averaging compassionate responses and positively formulated items) and self-coldness (averaging uncompassionate responses and negatively formulated items) showed adequate internal consistencies, as indicated by Cronbach's alpha values and mean inter-item correlations. Similarly, the six first-order factors (self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification) also demonstrated acceptable internal consistencies based on mean inter-item correlations. While Raes and colleagues (2011) did not recommend using six first-order subscales based on Cronbach's alpha values, the mean inter-item correlation is considered a better measure of internal consistency for scales with fewer than 10 items (Mitchell & Jolley, 2012). Therefore, considering the mentioned results, all subscale scores, as well

as the global score can be used in further studies. The results of correlation analyses were coherent with previous results and presented theories, sustaining the construct validity of the scale, and highlighting the importance of distinguishing between self-coldness and self-warmth and also between activating and soothing positive affect.

Summarizing, the results suggest that both models are valid for Hungarian-speaking students, supporting the use of the global self-compassion indicator, as well as the self-warmth and self-coldness indicators. Moreover, our findings justify the use of the six subscale scores. These results align with Neff's (2016) assertion that the scale can be utilized flexibly depending on the research questions.

3. 2b. Hungarian Adaptation of Types of Positive Affect Scale: Differentiation Between Activating and Soothing Positive Affect[3]

3. 2b. 1. Introduction

The emotional states of negative and positive affect play a very important role in individuals' mental health, making it crucial to have reliable and valid scales for their assessment. The Positive and Negative Affect Scale PANAS (Watson et al., 1988b) is the most commonly used instrument for measuring positive and negative affect. Comprising 20 items, it includes ten designed to measure positive affect and another ten to assess negative affect. However, the PANAS does not differentiate between different types of positive affect, it exclusively measures activating positive affect, which reflects only the extent to which a person feels energetic and alert. According to the authors, soothing positive affect, such as calmness and contentment, are essentially the absence of negative affect: „Briefly, Positive Affect (PA) reflects the extent to which a person feels enthusiastic, active, and alert. High PA is a state of high energy, full concentration, and pleasurable engagement, whereas low PA is characterized by sadness and lethargy. In contrast, Negative Affect (NA) is a general dimension of subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear, and nervousness, with low NA being a state of calmness and serenity" (Watson et al., 1988b, pp. 1063).

In contrast, Gilbert (2009a, 2009b, 2014) and colleagues (Gilbert et al., 2008) argue that soothing positive affect requires the activation of the soothing system, which does not occur automatically when the threat system (responsible for generating negative affect) is deactivated. Based on Gilberts' theory (2009a, 2009, 2014) which is built on current neurophysiological data (Depue & Morrone-Strupinsky, 2005), there are three major emotion regulation systems: the system responsible for threat detection (i.e., threat–defense system), the system responsible for motivation (i.e., incentive and resource-seeking system), and the system responsible for reassurance (i.e., soothing, caring and contentment system). In view of this framework, there are two types of positive affect, showing both subjective and neurophysiological differences (Depue & Morrone-Strupinsky, 2005). One type of positive affect is related to the search for resources, motivation, and drive. On a subjective level, these are activating positive affects related to performance, acquiring important resources, and the dopaminergic system. Another type of positive affect is based on the soothing system, characterized by feelings of safeness, and contentment). Ideally, the soothing system is activated when there are no threats and when needs are met, but as previously mentioned, this does not occur automatically. The feeling of contentment and safety doesn't simply result from deactivating the motivational and danger-signaling systems, but from activating the soothing, reassurance system, associated with the opiate/oxytocin system (Depue & Morrone-Strupinsky, 2005).

These distinct types of positive affect also have different relevance for mental health. Soothing positive affect, for example, demonstrates a stronger relationship with mental health indicators (e.g., depression, anxiety, self-criticism, and secure attachment) than activating positive affect (Gilbert, 2009a, 2009b; Gilbert et al., 2008).

[3]This study has been accepted for publication. The current version represents an abbreviated adaptation of the accepted manuscript.
Póka, T., Barta, A., Veres, A., & Mérő, L. (in press). Hungarian adaptation of Types of Positive Affect Scale: Differentiation between activating and soothing positive affect. *Studia Psychologia-Pedagogia*

These different types of positive affect may be characterized even by qualitatively distinct autonomic activation profiles. Research shows that high-frequency heart rate variability (HF-HRV), an indicator of greater autonomic flexibility, is only associated with soothing positive affect, not with activating or relaxing positive affect (Duarte & Pinto-Gouveia, 2017; Petrocchi et al., 2017). Among these types of positive affect, soothing positive affect also has strongest relationship with mindfulness (Martins et al., 2018) and self-compassion (Kirschner et al., 2019; Steindl et al., 2021). It also proves to be a better predictor of anxiety and stress (McManus et al., 2019). Moreover, self-compassion interventions have a greater impact on soothing positive affect than on activating positive affect (Kirschner et al., 2019; Matos et al., 2017).

Gilbert and his colleagues (2008) have developed an instrument for measuring these different types of positive affect known as the Types of Positive Affect Scale (Gilbert et al., 2008). Contrary to their initial expectations of two factors, they identified three: positive activating affect, positive relaxing affect, and positive soothing affect (such as feelings of safeness and contentment). The activating positive affect is measured with eight items (e.g., "Active", "Dynamic", "Excited", etc.), the soothing positive affect is measured with four items (e.g., "Secure", "Safe", etc.), and the relaxed positive affect with six items (e.g., "Relaxed", "Calm"). Answers can be given on a five-point scale ranging from 1 (*not typical for me*) to 5 (*very typical for me*). Subscale scores are calculated by summing the item responses. The internal consistency of the original subscales was found to be acceptable to good, with a Cronbach's α of .83 for activating positive affect, Cronbach's α of .73 for soothing positive affect, and Cronbach's α of .83 for relaxing positive affect. The test-retest reliability over a three-week interval was good for both activating positive affect (r = .84) and soothing positive affect (r = .77), but relatively low for relaxed positive affect (r = .34).

To date, no confirmatory factor analysis testing the factor structure of this scale and no adaptation of the scale to the Hungarian population has been performed. Therefore, the primary objective of our study aims to develop the Hungarian version of the Types of Positive Affects Scale (Gilbert et al., 2008), which can differentiate between activating and soothing positive affect. Additionally, we intend to evaluate the scale's factor structure using confirmatory factor analysis (CFA) within a large student sample**.** Given the low test-retest reliability of the relaxing positive affect subscale, we have decided to translate, adapt, and test only the remaining two subscales. Furthermore, we aim to examine the invariance of the two-factor model according to gender (males vs. females) and students' country of origin (Hungary vs. Romania). We will also evaluate the internal consistency of these subscales and examine their construct validity. Lastly, this study aims to test the relationships between different types of positive affect, negative affect, and self-compassion.

According to our first hypotheses, we expect both types of positive affect to correlate negatively with negative affect. However, we predict that the relationship between soothing positive affect and negative affect will be stronger than the relationship between activating positive affect and negative affect.

Our second hypothesis assumes that both types of positive affect have a positive relationship with self-compassion. Nevertheless, we also expect that soothing positive affect will demonstrate a more pronounced connection with self-compassion in comparison to activating positive affect.

3. 2b. 2. Methods

3. 2b. 2. 1. Instruments

3. 2b. 2. 1. 1. Socio-demographic and personal information.

Participants completed a socio-demographic form, which included items regarding age, gender, country, and student status (i.e., student year, type of study, and major type).

3. 2b. 2. 1. 2. Self-compassion.

Self-compassion was measured with the Self-Compassion Scale – Short Form (SCS-SF; Raes et al., 2011), a 12-item version of the original Self-Compassion Scale (SCS; Neff, 2003). Higher scores on this scale indicate greater levels of trait self-compassion. In our study, the scale also displayed good internal consistency (α = .82).

3. 2b. 2. 1. 3. Activating and soothing positive affect.

Two subscales of the Types of Positive Affect Scale (Gilbert et al., 2008) were used to measure the activating and soothing positive affect. The scores of the sub-scales were determined by summing up the

responses to items. Gilbert et al. (2008) found good internal consistency for activating positive affect (α = 0.83) and an acceptable level for soothing positive affect (α = 0.73).

3. 2b. 2. 1. 4. Negative affect.

To measure negative affect, we used the abbreviated version of the Emotional Distress Profile (Profilul Distresului Emoțional - PDE; Opriș & Macavei, 2005), a scale developed and validated in Romania. Following the translation process, the used 12 items demonstrated high face validity, based on the ratings of two experts. In our sample, the abbreviated version of the scale also showed excellent internal consistency (α = .91).

3. 2b. 2. 2. Participants

Hungarian-speaking students from Eötvös Lóránd University (Hungary) and Babeș-Bolyai University (Romania) were recruited to participate. Out of the 1239 individuals who completed the study, we identified 18 participants with multivariate outlier data based on Mahalanobis distance analyses. However, the sensitivity analyses showed similar results for all analyses with or without the exclusion of outliers, therefore we opted to report our results including all data.

Therefore, the final sample consisted of 1239 students (N = 1239) with a mean age of 22.59 years (SD = 6.71). Most of them self-identified as females (n = 978; 78,9%). Of these participants, 470 were from Romania (37,9%), 749 were from Hungary (60,5%), and 20 were from other countries (1,6%). The majority lived in a city (n = 902; 72,8%) and studied Psychology (n = 480; 38,7%). The sample included first-year students (n = 514; 41,5%), second-year students (n = 452; 36,5%), third-year students (n = 233; 18,8%), and 38 students with extended periods (3.1%). The majority of the participants were full-time students (n = 1051; 84,8%) pursuing Bachelor-level degrees (n = 1066; 86%).

3. 2b. 2. 3. Translation of the scale

The translation process for the two subscales (soothing and activating positive affect) of the Types of Positive Affect Scale (Gilbert et al., 2008) was done according to existing guidelines (Sousa & Rojjanasrirat, 2011). Initially, the two subscales were translated from English to Hungarian by two certified translators. Another two certified translators then performed a reverse translation from Hungarian back to English. Following this, a committee consisting of the thesis author and the translators evaluated the two sets of scales and items. Any discrepancies between the scales were resolved through discussion. The final scale was created by selecting 12 appropriate items, out of which four measure soothing positive affect and eight assess activating positive affect.

3. 2b. 2. 4. Procedures

Following their voluntary agreement to take part in the research and submission of online consent, participants filled out a structured survey via Google Forms. The study received approval from the local Ethics Committee from Eötvös Lóránd University (nr. 2022/615).

3. 2b. 2. 5. Data analyses and assessment of model fit

The SPSS 20 software was used for preliminary and correlational analyses. The model fit was examined using confirmatory factor analysis (CFA) in SPSS AMOS 20, with Maximum Likelihood (ML) estimation. Evaluation of the model fit relied on multiple indicators, including the chi-square statistic (CMIN) to the degrees of freedom (DF) ratio, the root mean square error of approximation (RMSEA) with a 90% confidence interval, the standardized root mean square residual (SRMR), the general fit index (GFI), and the comparative fit index (CFI). The measurement invariance of the scale was explored through multi-group confirmatory factor analyses.

For evaluating internal consistency, we utilized Cronbach's Alpha's (α) coefficient and the mean inter-item correlation (MIIC). MIIC is particularly suitable for scales featuring less than 10 items (Mitchell & Jolley, 2012). Pearson's correlation analysis was used to assess the relationships among two types of positive affect (activating and soothing positive affect), negative affect, and self-compassion.

For the chi-square statistic to the degrees of freedom ratio, critical values ranging from 2 to 5 have been recommended as cutoffs (Hu & Bentler, 1999). Regarding RMSEA, values less than .08 are indicative of adequate fit, and values less than .05 signify good fit (Schermelleh-Engel et al., 2003). Moreover, for RMSEA, the associated 90% confidence interval upper limit needs to be no more than .10 (West et al., 2012).

CFI values should not drop lower than .90, but values above .95 are considered a good fit (Hu & Bentler, 1999). Furthermore, a GFI of .95 demonstrates a good fit, while values over .90 suggest an acceptable fit. SRMR values less than .08 are deemed an acceptable fit, while a value less than .05 is a good fit (Schermelleh-Engel et al., 2003).

The assessment of measurement invariance relied on Chen's (2007) criteria, which suggest that for invariance to be supported, ΔCFI should be less than .01, and ΔRMSEA should be less than .015. We chose not to base our judgement on the chi-square test because it is significantly influenced by sample size. It is worth mentioning that in large samples, this test could be statistically significant, even if the absolute differences in parameter estimates are very small.

Cronbach Alpha values were interpreted according to George and Mallery's (2003) recommendations, where $\alpha > .9$ indicates excellent internal consistency, $\alpha > .8$ suggests good consistency, $\alpha > .7$ indicates acceptable consistency, $\alpha > .6$ suggests questionable consistency, $\alpha > .5$ indicates poor consistency, and α values below .5 are considered unacceptable. MIIC values above .3 are deemed acceptable (Mitchell & Jolley, 2012).

Based on Simms (2008), items with loadings above .35 were included in the final scale. Correlation coefficients were interpreted according to Cohen (1988), with $r = .10$ indicating small effects, $r = .30$ indicating medium effects, and $r = .50$ representing large effects.

3. 2b. 3. Results

3. 2b. 3. 1. Preliminary analyses

Calculated means, standard deviations, skewness, and kurtosis statistics for scale items are presented in Table 1 ($N = 1239$). The sensitivity analyses showed similar results for all analyses with and without the exclusion of outliers (we identified 18 participants with multivariate outlier data), therefore we decided to report our results including all data.

Table 1 Descriptive statistics of scale items ($N = 1239$)

Variable	*M*	*SD*	Skewness	*SE*	Kurtosis	*SE*
TPAS1	3.42	1.05	-.33	.07	-.51	.13
TPAS2	3.65	1.08	-.49	.07	-.51	.13
TPAS3	3.56	1.05	-.43	.07	-.44	.13
TPAS4	3.34	1.09	-.28	.07	-.60	.13
TPAS5	3.14	1.12	-.10	.07	-.78	.13
TPAS6	3.33	1.07	-.20	.07	-.59	.13
TPAS7	3.68	1.04	-.55	.07	-.29	.13
TPAS8	3.77	1.09	-.68	.07	-.22	.13
TPAS9	3.21	1.03	-.22	.07	-.47	.13
TPAS10	3.53	1.06	-.41	.07	-.49	.13
TPAS11	3.31	1.20	-.23	.07	-.90	.13
TPAS12	3.64	1.01	-.53	.07	-.18	.13

3. 2b. 3. 2. Confirmatory factor analyses

Analyzing the two-factor model, the results of CFA showed borderline fit (CMIN = 225,74; *DF* = 53; CMIN/DF = 11,80; GFI = .92; CFI = .90; SRMR = .054; RMSEA = .09, 90%CI = [.08; .10]. Each loading found to be statistically significant and all loadings exceeded the threshold of 0.35, which means there was no need to exclude any item from the analyses.

Following the procedure suggested by modification indices regarding the covariances between errors of the items (including covariances between errors of items TPAS3a and TPAS4a; and between TPAS10a and TPAS11a), we increased the fit of the model to an adequate level (CMIN = 438,16; *DF* = 51; CMIN/DF = 8.59; GFI = .94; CFI = .93; SRMR = .04; RMSEA = .07, 90%CI = [.07; .08]). Figure 1 present the standardized factor loadings, as well as the covariances between the two factors (activating positive affect and soothing positive affect) and between the errors.

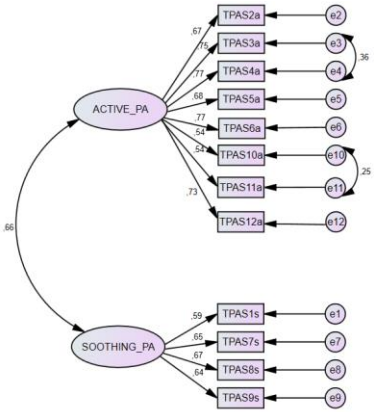

Fig. 1 *The Final Model*

3. 2b. 3. 3. Analyses of internal consistencies

Based on Cronbach's alpha indexes, we found good internal consistency for activating positive affect subscale (α = .87) and acceptable internal consistency for soothing positive affect subscale (α = .73). Additionally, the mean inter-item correlations (MIIC) reinforced these findings, indicating that both subscales showed good internal consistency (MIIC = .47 for activating- and MIIC = .40 for soothing positive affect).

3. 2b. 3. 4. Assessing the measurement invariance of the scale

We also tested the measurement invariance of the scale across gender (female and male) and country (Hungary and Romania). We assessed the configural invariance and found good model fits across all scenarios. Subsequently, when assessing metric and structural invariances, changes in fit and error indexes (CFI and RMSEA) further confirmed the scale's measurement invariance (ΔCFI < 0.01, ΔRMSEA < 0.015). Results are presented in Table 2.

Table 2 Model fit across samples

	CMIN	*DF*	CMIN/DF	CFI	GFI	RMSEA [90% CI]	SRMR
All sample (*N* = 1239)							
	438.16	51	8.59	.93	.94	.07 [.07; .08]	.04
Configural Invariance Across Country (Hungarian sample *N* = 749; Romanian sample *N* = 470)							
	525.26	102	5.15	.92	.93	.05 [.05; .06]	.05
Metric Invariance Across Country (Hungarian sample *N* = 749; Romanian sample *N* = 470)							
	529.96	112	4.73	.92	.92	.05 [.05; .06]	.04
Structural Invariance Across Country (Hungarian sample *N* = 749; Romanian sample *N* = 470)							
	538.96	115	4.68	.92	.92	.05 [.05; .06]	.06
Configural Invariance Across Gender (Female Sample *N* = 978; Male sample *N* = 255)							
	505.40	102	4.95	.93	.93	.05 [.05; .06]	.04
Metric Invariance Across Gender (Female Sample *N* = 978; Male sample *N* = 255)							
	516.03	112	4.60	.93	.93	.04 [.04; .05]	.05
Structural Invariance Across Gender (Female Sample *N* = 978; Male sample *N* = 255)							
	521.29	115	4.53	.93	.93	.04 [.04; .05]	.06

3. 2b. 3. 5. Construct validity

To test our hypotheses, we conducted a Pearson correlation analysis. According to our hypothesis, both soothing and activating positive affect showed negative correlations with emotional distress (*r* = -.44, *p*

< .01, and r = -.37, p < .01, respectively). Additionally, as predicted, the relationship between soothing positive affect and negative affect was stronger than the relationship between activating positive affect and negative affect (r compare: z = 2.08, p = .03).

Our second hypothesis was also confirmed, indicating that both soothing and activating positive affect demonstrated positive relationships with self-compassion (r = .43, p < .01 and r = .33, p < .01, respectively). Moreover, here as well, we found that soothing positive affect plays a bigger role compared to activating positive affect (r compare: z = 2.91, p < .01).

3. 2b. 4. Discussion

The purpose of this study was to evaluate the factorial structure, measurement invariance, internal consistency, and construct validity of the Types of Positive Affect Scale (TPAS; Gilbert et al., 2008) within a Hungarian student sample. To date, there are no adaptations of the TPAS for this population. Our primary objective was to develop a Hungarian scale that can differentiate between activating (related to seeking and doing) and soothing (associated with contentment and social safeness) positive affect. Given Gilbert and colleagues' (2008) previously reported low test-retest reliability for the third subscale of the original scale (relaxing positive affect), we decided to adapt only the two subscales of interest.

The proposed model, which included two covariances between errors of the items, demonstrated an adequate fit with the data. Furthermore, the measurement invariance of the scale was confirmed across genders (females and males) and countries (Hungary and Romania). We found acceptable levels of internal consistency for these two subscales, as indicated by both Cronbach's alpha and mean inter-item correlation indexes.

Both hypotheses were confirmed, showing that both types of positive affect present negative relationships with negative affect and positive relationships with self-compassion. Findings also revealed that, as expected, soothing positive affect exhibited stronger relationships with these variables compared to activating positive affect. This suggests that soothing positive affect plays a more important role in mental health than activating positive affect. Moreover, these results align with Gilberts' theory (2009a, 2009b, 2014) and with previous findings (Gilbert et al., 2008; Kirschner et al., 2019; Martins et al., 2018; Steindl et al., 2021), supporting the idea that the Hungarian version of the Types of Positive Affect Scale serves as a reliable and valid tool for distinguishing and measuring soothing and activating positive affect separately.

Further empirical research is needed to assess the stability of the scale's factorial structure. This includes studies executed on different populations, involving not just students, but also community and clinical populations, along with participants from varying cultural backgrounds. Moreover, it is also important to investigate the invariance of the models across age groups, as well as to measure test-retest reliability.

Based on the present findings, it can be concluded that the Hungarian version of the Types of Positive Affect Scale is a valid and reliable tool for distinguishing between soothing and activating positive affect. Consequently, the use of this instrument is recommended for further studies instead of the PANAS (Watson et al., 1988b), especially in self-compassion research.

3. 3. Self-Compassion Mediates the Relationships Between Mindfulness, Dysfunctional Attitudes, and Diverse Distress and Well-Being Indicators[4]

3. 3. 1. Introduction

Cognitive vulnerabilities such as dysfunctional attitudes are considered to be well-known mechanisms underlying emotional distress (e.g., negative affect, stress, anxiety, depression, guilt, etc.), and lower levels of well-being (e.g., positive affect, satisfaction with life, etc.) (Abela & D'Alessandro, 2002; Hong & Cheung, 2015; Vîslă et al., 2015; Yapan et al., 2020). On the other hand, mindfulness and self-compassion are protective factors, that may reduce distress levels and promote well-being (Carpenter et al., 2019; Chio et al., 2021; Ferrari et al., 2019; Kirby et al., 2017; MacBeth & Gumley, 2012; Marsh et al., 2018; Muris & Petrocchi, 2016; Tomlinson et al., 2018; Zessin et al., 2015).

[4]This study is submitted for publication and it is under review. The current version represents an abbreviated adaptation of the submitted manuscript.

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Several studies have examined the relationship between self-compassion and mindfulness, and between self-compassion and cognitive vulnerabilites, using different models (Ferrari et al., 2018; Makadi & Koszycki, 2020; Li et al., 2022; Liu et al., 2022; Phillips et al., 2018; Podina et al., 2015; Sedighimornani et al., 2019; Wong & Mak, 2013; Xavier et al., 2023).

In some models, self-compassion has been proposed as a moderator between cognitive vulnerabilities and distress. There is a growing body of studies on the buffering effects of self-compassion on the relationship between different cognitive vulnerabilities (e.g., dysfunctional attitudes, irrational beliefs, maladaptive schemas) and different indicators of distress and well-being (Ferrari et al., 2018; Fonseca & Canavarro, 2017; Li et al., 2022; Phillips et al., 2017; Podina et al., 2015; Wong & Mak, 2013). Other studies (Hassani et al., 2021; Liu et al., 2022; Xavier et al., 2023), however, found that self-compassion mediated rather than moderated this relationship (i.e., cognitive vulnerabilities such as dysfunctional attitudes led to lower levels of self-compassion, which resulted in higher levels of distress).

Studies examining the relationship between mindfulness and self-compassion have shown that self-compassion mediates the relationship between mindfulness and various indicators of distress and well-being, such as social anxiety (Makadi & Koszycki, 2020), shame (Sedighimornani et al., 2019), recovery from mental disorders (Mak et al., 2021), and subjective well-being (Yang et al., 2022). However, Mak and colleagues (2021) found that only self-warmth mediates the relationship between mindfulness and personal recovery (self-coldness did not). Thus, it appears that different components of self-compassion (i.e., self-warmth and self-coldness) may play different roles in these associations between dysfunctional attitudes and clinical outcomes, and between mindfulness and clinical outcomes (Liu et al., 2022; Mak et al., 2021).

To the best of the author's knowledge, few studies have examined these relationships together (i.e., the relationships between cognitive vulnerabilities, mindfulness, and self-compassion). Thimm (2017), for example, examined the relationship between early maladaptive schemas (another well-established cognitive vulnerability), self-compassion, mindfulness, and psychological distress. Their results showed that self-compassion and mindfulness mediated (but did not moderate) the relationship between early maladaptive schemas and psychological distress, thus both mindfulness and self-compassion were found to be mediators.

Based on previous results, in this study, we propose and test two models for the relationships between dysfunctional attitudes, mindfulness, and self-compassion in predicting various psychological distress (i.e., negative affect, depression, anxiety, stress) and well-being indicators (i.e., soothing positive affect, activating positive affect, satisfaction with life). In the first model self-compassion was introduced as a global indicator. We hypothesized that mindfulness and dysfunctional attitudes through self-compassion influence various psychological distress indicators (i.e., negative affect, depression, anxiety, and stress) and various well-being indicators (i.e., soothing positive affect, activating positive affect, and satisfaction with life). We hypothesized that mindfulness increases well-being and decreases distress by improving self-compassion. We also hypothesized that dysfunctional attitudes lead to higher psychological distress levels and lower well-being by reducing self-compassion.

Based on the results on different components of self-compassion (Chio et al., 2021; Liu et al., 2022; Mak et al., 2021; Muris & Petrocchi, 2016), and based on Gilbert's (2009a, 2009b, 2014) theory of compassion and emotion regulation systems, another aim was to investigate which predictor variables (i.e., mindfulness and dysfunctional attitudes) affect clinical variables through which component of self-compassion (i.e., self-warmth or self-coldness). Therefore, we also tested a second model, in which we investigated the mediating role of self-coldness and self-warmth separately. For the second model, we hypothesized that mindfulness would affect clinical outcomes, especially through self-warmth, and dysfunctional attitudes, especially through self-coldness. We also hypothesized that in predicting various indicators of distress (i.e., negative affectivity, depression, anxiety, stress), self-coldness would have greater predictive power than self-warmth, but in predicting various indicators of well-being (i.e., soothing positive affect, activating positive affect, satisfaction with life), self-warmth would have greater predictive power than self-coldness.

3. 3. 2. Methods

3. 3. 2. 1. Participants

Taking into account that the first proposed model requires estimating 10 distinct parameters and the second model requires estimating 13 distinct parameters, we needed at least 130 participants to test the

models (Collier, 2020). In the end, 181 participants (university students) completed the questionnaires and after preliminary analyses, five participants were excluded. Further analyses were based on the data of the remaining 176 participants. The majority of the participants were female (*n* = 140; 79,5%), from Romania (*n* = 130; 73,9%). Half of the participants studied psychology (*n* = 87; 49,4%), and half studied other fields of study (*n* = 89; 50,6%). The mean age of the participants was 26,06 years (*SD* = 11,17).

3. 3. 2. 2. Instruments

3. 3. 2. 2. 1. Mindfulness.

Mindfulness was assessed using the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). For this study, the global score of mindfulness was used (α = .776).

3. 3. 2. 2. 2. Self-compassion.

Self-compassion was 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, 2003a). The scale showed good internal consistency for self-compassion as a global indicator (α = .82) and for self-coldness (α = .81), but the self-warmth subscale had questionable internal consistency (α = .62).

3. 3. 2. 2. 3. 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 rated from 0 (*does not apply to me at all*) to 3 (*applies to me very much, or most of the time*) how often they usually experience each symptom. The DASS-21 showed good internal consistency in the current study for each of the subscales: depression (α = .860), anxiety (α = .83), and stress (α = .84).

3. 3. 2. 2. 4. Negative affect.

To measure the subjective dimension of distress (i.e., negative affect), we used the abbreviated (12 items) Hungarian version of the Emotional Distress Profile (Profilul Distresului Emoțional - PDE; Opris & Macavei, 2005). The scale had excellent internal consistency (α = 0.92) in measuring negative affect in the present sample.

3. 3. 2. 2. 5. Soothing and activating positive affect.

The two types of positive affect (i.e., soothing and activating positive affects) were assessed using the Types of Positive Affect Scale (Gilbert et al., 2008). The subscale measuring soothing positive affect showed acceptable (α = .75) and the subscale measuring activating positive affect showed good internal consistency (α = .88) in this study.

3. 3. 2. 2. 6. Dysfunctional attitudes.

Dysfunctional attitudes were assessed using the Hungarian version of Dysfunctional Attitude Scale (DAS; Kopp, 1985; Weissman & Beck, 1978*).* The scale had excellent internal consistency in measuring dysfunctional attitudes (α = .91).

3. 3. 2. 2. 7. Life satisfaction.

The five-item Hungarian version of the Satisfaction with Life Scale (SWLS; Diener et al., 1985; *Martos et al., 2014*) measured participants' agreement with statements (e.g., "In most ways my life is close to ideal"), ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Variable scores were calculated by summing the items. The current study confirmed good internal consistency of the scale (α = .82).

3. 3. 2. 3. Procedure and design

This study used a correlational design and measured two predictors (i.e., dysfunctional attitudes and mindfulness), three mediators (self-compassion and separately self-coldness and self-warmth), and seven outcome variables. Of the seven outcome variables, four were used to operationalize emotional distress (i.e., negative affect, depression, anxiety, and stress) and three were used to operationalize psychological well-being (i.e., soothing positive affect, activating positive affect, and satisfaction with life). The study was conducted in accordance with the Code of Ethics of the American Psychological Association. Following informed consent, participants completed the questionnaire using an online platform (Google Forms). The study was advertised in Introduction to Psychology classes. Students were not rewarded for participating in the study.

3. 3. 2. 4. Data analyses and assessment of model fit

SPSS 20 software and R Package were used for the preliminary analyses and Pearson correlations. The Benjamini-Hochberg (1995) Procedure for decreasing the false discovery rate was also used, adjusting for p-values. Results of correlation analyses are reported taking to consideration the adjusted p-values. The proposed models were tested using SEM (Structural Equation Modeling) in SPSS AMOS 20 software and Maximum Likelihood (ML) estimation was chosen. We used the bootstrap method to test for direct and indirect effects, generating 5000 samples (95% confidence interval). Effects were considered significant if the confidence intervals of the bootstrap analysis did not include zero (Hayes, 2018; Preacher & Hayes, 2004). Model fit was assessed using the ratio of the chi-square statistic (CMIN) to the degrees of freedom (DF), standardized root mean square residual (SRMR), comparative fit index (CFI), and general fit index (GFI).

For the chi-square statistic and the degrees of freedom ratio, critical values between 2 and 5 have been recommended as cut-off values (Hu & Bentler, 1999). CFI values should not be lower than .90, but for a good fit, CFI values should be above .95 (Hu & Bentler, 1999). For the GFI, .95 indicates a good fit, while values higher than .90 indicate an acceptable fit. For the SRMR, a value less than .08 is considered acceptable and less than .05 is considered a good fit (Schermelleh- Engel et al., 2003).

3. 3. 3. Results

3. 3. 3. 1. Preliminary analyses

Data were normally distributed and multivariate normality was tested and confirmed in all cases. The first-order correlations between variables are presented in Table 1.

Table 1 Bivariate correlations among predictor and criterion variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Self-Compassion	-											
2. Self-Warmth	.83**											
3. Self-Coldness	-.91**	-.54**										
4. Mindfulness	.53**	.41**	-.50**	-								
5. Dysfunctional Attitudes	-.47**	-.17*	.59**	-.24**	-							
6. Negative Affect	-.54**	-.33**	.58**	-.35**	.40**	-						
7. Depression	-.56**	-.33**	.61**	-.47**	.53**	.59**	-					
8. Anxiety	-.39**	-.22**	.44**	-.31**	.36**	.56**	.59**	-				
9. Stress	-.56**	-.38**	.58**	-.31**	.47**	.68**	.63**	.66**	-			
10. Soothing PA	.44**	.34**	-.42**	.38**	-.21**	-.47**	-.54**	-.29**	-.41**	-		
11. Activating PA	.33**	.28**	-.29**	.33**	-.14*	-.44**	-.39**	-.16*	-.26**	.60**	-	
12. Life Satisfaction	.38**	.30**	-.36**	.33**	-.13	-.36**	-.44**	-.24**	-.29**	.47**	.37**	-

Notes: The adjusted significance levels are reported; ** Correlation is significant at the .01 level (2-tailed); * Correlation is significant at the .05 level (2-tailed)

3. 3. 3. 2. Structural equation modeling

3. 3. 3. 2. 1. The first model: Self-compassion mediates the effects.

To analyze the fit of the first model to the data, in which self-compassion was proposed as a mediator of the relationships between mindfulness and clinical outcomes, and between dysfunctional attitudes and clinical outcomes, a series of (seven) structural equation modeling tests were conducted for different clinical outcomes (four for emotional distress and three for well-being). In all cases, we found that self-compassion was a significant mediator (i.e., the indirect effects of mindfulness and dysfunctional attitudes were significant in all cases).

Table 2 Standardized direct and indirect effects for the first model

Predictor	Effect type	Outcome	Standardized Effects	95% CI	
				LL	UL
Mindfulness	Direct	Self-compassion	.442**	.296	.574
Dysfunctional Attitudes	Direct	Self-compassion	-.370**	-.485	-.248
Self-compassion	Direct	Negative affect	-.546**	-.649	-.427
Self-compassion	Direct	Depression	-.562**	-.655	-.460
Self-compassion	Direct	Anxiety	-.399**	-.526	-.259
Self-compassion	Direct	Stress	-.566**	-.664	-.453
Self-compassion	Direct	Soothing Positive Affect	.446**	.321	.562
Self-compassion	Direct	Activating Positive Affect	.332**	.206	.455
Self-compassion	Direct	Satisfaction With Life	.384**	.243	.514
Mindfulness	Indirect	Negative affect	-.241**	-.331	-.153
Mindfulness	Indirect	Depression	-.248**	-.339	-.159
Mindfulness	Indirect	Anxiety	-.176**	-.263	-.097
Mindfulness	Indirect	Stress	-.250**	-.341	-.163
Mindfulness	Indirect	Soothing Positive Affect	.197**	.114	.289
Mindfulness	Indirect	Activating Positive Affect	.147**	.074	.235
Mindfulness	Indirect	Satisfaction With Life	.169**	.086	.262
Dysfunctional Attitudes	Indirect	Negative affect	.202**	.122	.291
Dysfunctional Attitudes	Indirect	Depression	.208**	.126	.294
Dysfunctional Attitudes	Indirect	Anxiety	.147**	.080	.229
Dysfunctional Attitudes	Indirect	Stress	.209**	.127	.298
Dysfunctional Attitudes	Indirect	Soothing Positive Affect	-.165**	-.237	-.100
Dysfunctional Attitudes	Indirect	Activating Positive Affect	-.123**	-.179	-.071
Dysfunctional Attitudes	Indirect	Satisfaction With Life	-.142**	-.209	-.080

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

Consistent with our hypotheses, mindfulness, and dysfunctional attitudes affected all psychological distress indicators (i.e., negative affect, depression, anxiety, and stress) and all well-being indicators (i.e., soothing positive affect, activating positive affect, and satisfaction with life) through self-compassion. In other words, higher levels of mindfulness led to improved well-being and reduced distress through improvements in self-compassion, and higher levels of dysfunctional attitudes led to higher levels of psychological distress and lower levels of well-being through reductions in self-compassion. For all direct and indirect effects see Table 2. Figure 1 shows the first model for negative affect with standardized regression weights.

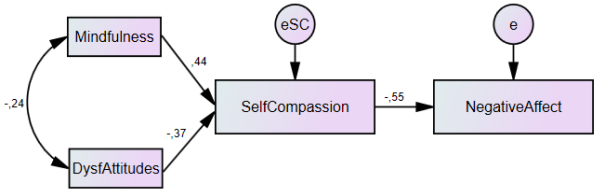

Fig. 1 *Predicting negative affect mediated by self-compassion*

We also examined the model fit of the first model for all clinical outcomes (Table 3). The fit indices (GFI and CFI) indicated a good model fit for most outcomes, and the standardized root mean square residual (SRMR) also indicated a low error rate. However, for depression, CFI and SRMR were outside the acceptable range.

Table 3 The model fit of the proposed model for different clinical outcomes

Clinical Outcome	CMIN	DF	CMIN/DF	GFI	CFI	SRMR
Negative Affect	8.33	2	4.16	.977	.962	.049
Depression	38.44	2	19.22	.910	.820	.100
Anxiety	11.71	2	5.85	.969	.930	.063
Stress	14.13	2	7.06	.963	.932	.063
Soothing Positive Affect	6.87	2	3.43	.981	.966	.047
Active Positive Affect	7.12	2	3.56	.980	.959	.050
Life Satisfaction	5.707	2	2.85	.984	.972	.044

3. 3. 3. 2. 2. The second model: Self-coldness mediates the effects.

To analyze the fit of the second model to the data, in which self-coldness and self-warmth were separately proposed as mediators of the relationships between mindfulness and clinical outcomes, and between dysfunctional attitudes and clinical outcomes, we also performed a series of structural equation modeling for different clinical outcomes. The indirect effects of mindfulness and dysfunctional attitudes were significant in all cases (Table 4).

Table 4 Standardized indirect effects for the second model

Predictor	Effect type	Outcome	Standardized Effects	95% CI	
				LL	UL
Mindfulness	Indirect	Negative affect	-.229**	-.318	-.141
Mindfulness	Indirect	Depression	-.235**	-.328	-.147
Mindfulness	Indirect	Anxiety	-.166**	-.251	-.086
Mindfulness	Indirect	Stress	-.241**	-.331	-.153
Mindfulness	Indirect	Soothing Positive Affect	.195**	.113	.287
Mindfulness	Indirect	Activating Positive Affect	.148**	.074	.237
Mindfulness	Indirect	Satisfaction With Life	.168**	.086	.263
Dysfunctional Attitudes	Indirect	Negative affect	.293**	.209	.382
Dysfunctional Attitudes	Indirect	Depression	.309**	.232	.390
Dysfunctional Attitudes	Indirect	Anxiety	.227**	.146	.314
Dysfunctional Attitudes	Indirect	Stress	.278**	.190	.374
Dysfunctional Attitudes	Indirect	Soothing Positive Affect	-.185**	-.267	-.098
Dysfunctional Attitudes	Indirect	Activating Positive Affect	-.116**	-.193	-.036
Dysfunctional Attitudes	Indirect	Satisfaction With Life	-.153**	-.233	-.071

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

Consistent with our hypothesis, dysfunctional attitudes had a direct effect only on self-coldness (ß = .504, $p < .01$), but not on self-warmth (ß = -.082, $p > .05$). However, contrary to our hypothesis, mindfulness was a significant predictor for both, a positive predictor of self-warmth (ß = .399, $p < .01$), and a negative predictor of self-coldness (ß = -.383, $p < .01$). The direct effects of mindfulness and dysfunctional attitudes on self-warmth and on self-coldness are shown in Figure 2 and Table 5.

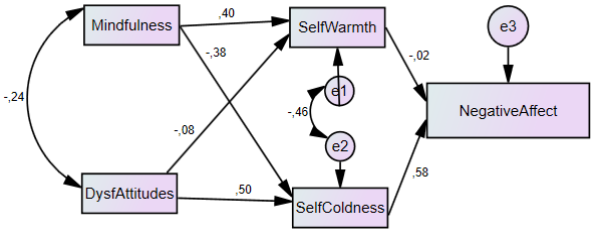

Fig. 2 *Predicting negative affect through self-warmth and self-coldness*

The covariance and the correlation between errors for self-warmth and self-coldness were also significant (r = -.460; 95%CI = -.565 to -.343; p < .01). The model is presented in Figure 2 for negative affect.

Table 5 Standardized direct effects for the second model

Predictor	Effect type	Outcome	Standardized Effects	95% CI	
				LL	UL
Mindfulness	Direct	Self-Warmth	.399**	.232	.546
Mindfulness	Direct	Self-Coldness	-.383**	-.497	-.257
Dysfunctional Attitudes	Direct	Self-Warmth	-.082	-.233	.066
Dysfunctional Attitudes	Direct	Self-Coldness	.504**	.397	.600
Self-warmth	Direct	Negative affect	-.018	-.179	.139
Self-warmth	Direct	Depression	.000	-.146	.148
Self-warmth	Direct	Anxiety	.020	-.127	.173
Self-warmth	Direct	Stress	-.089	-.232	.060
Self-warmth	Direct	Soothing Positive Affect	.161*	-.017	.340
Self-warmth	Direct	Activating Positive Affect	.176*	.001	.350
Self-warmth	Direct	Satisfaction With Life	.152	-.015	.319
Self-coldness	Direct	Negative affect	.579**	.449	.699
Self-coldness	Direct	Depression	.612**	.508	.718
Self-coldness	Direct	Anxiety	.452**	.312	.583
Self-coldness	Direct	Stress	.537**	.410	.661
Self-coldness	Direct	Soothing Positive Affect	-.340**	-.487	-.176
Self-coldness	Direct	Activating Positive Affect	-.202**	-.367	-.032
Self-coldness	Direct	Satisfaction With Life	-.280**	-.434	-.114

Notes: ** The regression is significant at the .01 level; * The regression is significant at the .05 level; CI Confidence Interval; LL Lower Limit; UL Upper Limit

Testing separately the effects of self-warmth and self-coldness on the different outcomes, the results showed that self-coldness was more relevant in all cases (not only for indicators of emotional distress). The direct effects of self-warmth and self-coldness on the different well-being and distress indicators are presented in Table 5.

Assessing the model fit of the second model for all clinical outcomes (Table 6), we found that the fit indicators (GFI and CFI) indicated a good fit to the model for all outcomes (including depression), and the standardized root mean square residual (SRMR) also indicated a low level of error.

Table 6 The model fit of the second model with different components of self-compassion for different clinical outcomes

Clinical Outcome	CMIN	*DF*	CMIN/*DF*	GFI	CFI	SRMR
Negative Affect	2.51	2	1.256	.994	.998	.019
Depression	26.10	2	13.05	.947	.921	.060
Anxiety	6.44	2	3.22	.986	.982	.035
Stress	8.20	2	4.10	.982	.978	.034
Soothing Positive Affect	6.79	2	3.39	.985	.980	.038
Active Positive Affect	7.21	2	3.60	.984	.977	.041
Life Satisfaction	6.07	2	3.03	.987	.982	.037

3. 3. 4. Discussion

The present study aimed to test the fit of two proposed models of the relationship between dysfunctional attitudes, mindfulness, self-compassion (and two components of self-compassion), and various indicators of distress and well-being. In the first model, the mediation role of self-compassion was tested for the relationship between mindfulness and various clinical outcomes, and for the relationship between dysfunctional attitudes and these clinical outcomes. In the second model, we separately examined the mediation role of self-warmth and self-coldness in these relationships.

Reinforcing previous results (Hassani et al., 2021; Mak et al., 2021; Makadi & Koszycki, 2020; Liu et al., 2022; Sedighimornani et al., 2019; Xavier et al., 2023; Yang et al., 2022), our hypotheses for the first model were confirmed, which means that mindfulness led to an increase in well-being and a decrease in emotional distress through self-compassion, and dysfunctional attitudes led to a decrease in well-being and

an increase in emotional distress through self-compassion. In most cases, the first model provided an excellent fit to the data, with depression being an exception. When we investigated which of the relationships not represented in the model might increase the model fit, we found that dysfunctional attitudes not only lead to depression through self-compassion but also directly affect it. This is not surprising given that the Dysfunctional Attitudes Scale (Weissman & Beck, 1978) was developed specifically to measure dysfunctional attitudes in depression.

Based on the theory of Gilbert (2009a, 2009b, 2014) and findings on the relative importance of self-coldness and self-warmth in predicting indicators of distress and well-being (Chio et al., 2021; Liu et al., 2022; Mak et al., 2021; Muris & Petrocchi, 2016), in the second model we tested the mediating role of these two components of self-compassion (i.e., self-coldness and self-warmth) separately. This model showed a good fit for the data for all clinical outcomes (including depression).

Our hypothesis that dysfunctional attitudes would influence clinical outcomes, especially through self-coldness, based on the results of Liu and colleagues (2022), was confirmed. We found a direct effect of dysfunctional attitudes only on self-coldness (not on self-warmth)- and significant indirect effects on all outcomes. This implies that dysfunctional attitudes lead to a decrease in well-being and an increase in emotional distress through self-coldness. Our unexpected findings that mindfulness had an indirect effect on clinical outcomes (including well-being indicators), in many cases only through self-coldness, can be explained by the fact that self-warmth has no direct effect on these clinical indicators (mindfulness had a similar direct effect on both self-warmth and self-coldness).

Based on the results of meta-analyses (Chio et al., 2021; Muris & Petrocchi, 2016), we expected that self-coldness would have greater predictive power than self-warmth in predicting various indicators of distress (i.e., negative affectivity, depression, anxiety, stress), but that self-warmth would have greater predictive power than self-coldness in predicting various indicators of well-being (i.e., soothing positive affect, activating positive affect, satisfaction with life). However, our results showed that when we control for covariance between the two components, when testing the relations in a single model, self-coldness also has greater significance in indicators of well-being. If we were to base our conclusions only on the correlation test (Table 1), we would draw completely different conclusions. Although in our model, self-warmth did not affect any of the distress indicators (i.e., negative affect, depression, anxiety, stress), the correlations between them were significant in all cases. Furthermore, based on correlation analyses alone, the relationships between self-warmth and well-being indicators were similar to the relationships between self-coldness and well-being indicators. These results indicate the need for testing these relationships using SEM.

3. 4. The Effectiveness of Compassionate Mind Training (CMT) for Improving Undergraduate Students' Well-Being and Reducing Their Distress[5]

3. 4. 1. Introduction

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). One promising option to help students manage their distress is cultivating self-compassion (Dundas et al., 2017; Mantelou & Karakasidou, 2017). 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 on self-compassion (Ferrari et al., 2019). 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 (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).

[5]This study is submitted for publication and it is under review. The current version represents an abbreviated adaptation of the submitted manuscript.

Póka, T., & Barta, A. (2023). The effectiveness of Compassionate Mind Training (CMT) for Undergraduate Students. [Manuscript submitted for publication]

The results of the preliminary investigations show that CMT is a feasible and effective intervention for improving well-being and reducing distress in the general population (Irons & Heriot-Maitland, 2021; Matos et al., 2017). Findings also 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; Matos et al., 2022).

Beaumont and Martin (2016) emphasized the importance of developing self-compassion and compassion for others in therapy students using Compassionate Mind Training. 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 on various outcomes 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.).

3. 4. 1. 1. Objectives

The main objective of the current study was to investigate the effectiveness of Compassion Mind Training for undergraduate students delivered in an academic context, for improving their 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. Scientists (Goldsmith et al., 2018; Maxwell et al., 2011) have argued and have mathematically proven that cross-sectional mediation analyses do not respect the implied temporal ordering suggested by mediation, therefore recommending that mediation should be examined through longitudinal structural equation models, controlling their autoregressive nature. Maxwell and his colleagues (2011) have further demonstrated 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.

Along with these arguments, 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. Meta-analyses have also highlighted 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). This differentiation aligns with the tenets of the Compassion-Focused Therapy model (Gilbert, 2009a, 2009b, 2014). Consequently, we also aim to investigate the individual longitudinal mediation roles of self-warmth and self-coldness.

3. 4. 1. 2. 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.

3. 4. 2. Methods

3. 4. 2. 1. Participants

The research participants consisted of second-year undergraduate students. 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. From them, 66 students completed all measurements (n = 45 from CMT group and n = 21 from control group), therefore, results are presented based on their data. 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%.

3. 4. 2. 2. Instruments

3. 4. 2. 2. 1. 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 scale exhibited acceptable internal consistency for the global self-compassion indicator (α = .76) and self-coldness (α = .75), while the internal consistency of the self-warmth subscale was considered questionable (α = .64).

3. 4. 2. 2. 2. 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). In the current study, the DASS-21 demonstrated good internal consistency for depression (α = .875), along with acceptable consistency for both anxiety (α = .770) and stress (α = .771).

3. 4. 2. 2. 3. 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 exhibited very good internal consistency (α = 0.89) in measuring negative affect in the present sample.

3. 4. 2. 2. 4. 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). Based on Cronbach's alpha indicators, the subscale assessing soothing positive affect exhibited questionable internal consistency (α = .60), while the subscale evaluating activating positive affect demonstrated acceptable internal consistency (α = .75).

3. 4. 2. 2. 5. Dysfunctional attitudes.

The Hungarian version of Dysfunctional Attitude Scale (DAS; Kopp, 1985; *Weissman & Beck, 1978)* was used for measuring dysfunctional attitudes. The scale exhibited good internal consistency (α = .83).

3. 4. 2. 2. 6. Life satisfaction.

The 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. The scale's good internal consistency was confirmed in the current study (α = .80).

3. 4. 2. 3. Procedure and design

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).

3. 4. 2. 4. 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).

3. 4. 3. Results

3. 4. 3. 1. 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 1.

Table 1 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 (9.36)	30.14 (9.76)	31.37 (9.72)	28.90 (8.62)	30.53 (8.38)	32.09 (9.54)	28.02 (9.43)	30.95 (12.47)
Depression	15.51 (10.43)	9.71 (9.25)	11.2 (8.79)	10.19 (6.86)	7.51 (6.70)	11.04 (8.52)	7.95 (7.77)	12.09 (8.25)
Anxiety	16.53 (8.74)	16.57 (11.59)	15.11 (9.32)	14.00 (11.91)	11.82 (7.97)	14.19 (12.61)	10.13 (7.83)	13.52 (12.13)
Stress	24.4 (8.41)	16.76 (7.68)	20.75 (8.99)	19.14 (10.89)	18.93 (10.05)	20.66 (11.52)	15.77 (8.23)	19.14 (10.66)
Soothing Positive Affect	13.95 (2.13)	14.52 (3.29)	14.51 (2.62)	14.85 (2.30)	14.40 (2.60)	14.14 (2.63)	15.17 (2.48)	14.19 (3.85)
Activating Positive Affect	26.00 (5.58)	26.80 (4.42)	24.84 (4.91)	26.23 (5.30)	25.04 (5.83)	24.14 (7.09)	27.02 (5.12)	24.95 (6.05)
Life Satisfaction	24.4 (8.41)	25.90 (6.01)	24.55 (5.57)	25.47 (5.83)	25.26 (5.70)	25.42 (4.92)	25.86 (6.12)	25.42 (4.92)
Self-Compassion	2.82 (.55)	3.07 (.69)	3.19 (.65)	3.05 (.60)	3.50 (.50)	3.13 (.58)	3.43 (.61)	3.11 (.77)
Self-Coldness	3.68 (.68)	3.11 (.85)	3.22 (.72)	3.19 (.73)	2.93 (.72)	3.00 (.65)	2.92 (.74)	3.11 (.82)
Self-Warmth	3.33 (.64)	3.26 (.76)	3.60 (.72)	3.30 (.59)	3.94 (.51)	3.26 (.63)	3.79 (.68)	3.34 (.85)
Dysfunctional Attitudes	-8.88 (13.83)	-3.90 (17.70)	-12.42 (15.05)	-6.61 (16.26)	-21.35 (14.76)	-6.57 (19.74)	-20.13 (14.09)	-3.95 (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 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 2), therefore in these cases, mixed ANOVA tests were performed.

Table 2 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	.21	.31

3. 4. 3. 2. The effectiveness of the intervention on primary outcomes

We first tested the effects on the primary outcomes, negative and soothing positive affect.

3.4.3.2.1. Negative affect.

Regarding negative affect (see Figure 1), 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).

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 ($M_{\text{estimated}}$= 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).

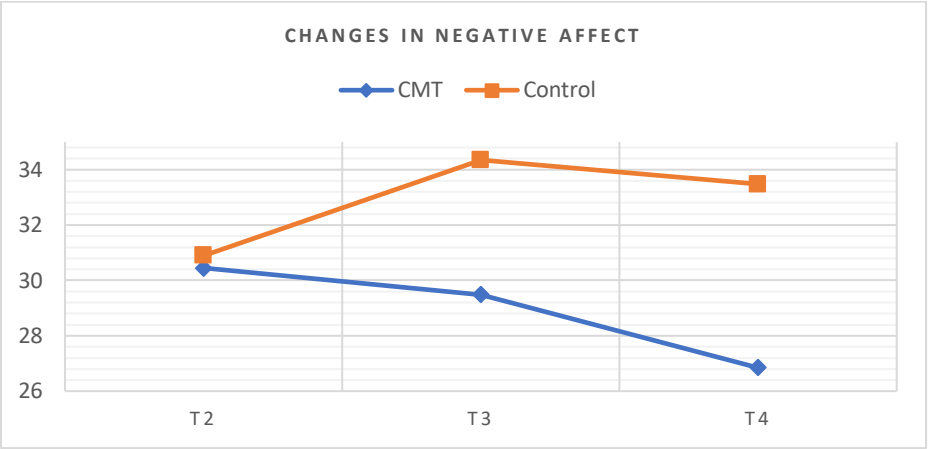

Fig. 1 *Results for Negative Affect with Estimated Marginal Means*

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

3.4.3.2.2. Soothing positive affect.

Concerning 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 $\lambda = .87$, $F(3) = 2.84$, $p = .04$, $\eta_p^2 = .12$, representing a medium to large effect, while the control group did not exhibit this effect, Wilk's $\lambda = .96$, $F(3) = .79$, $p = .49$, $\eta_p^2 = .03$. The illustrated pattern of results is depicted in Figure 2 as well.

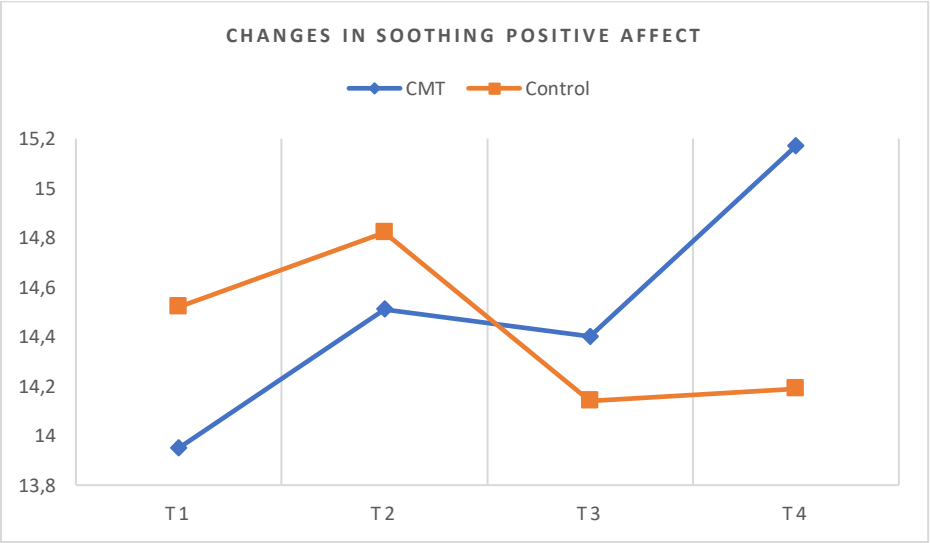

Fig. 2 *Results for Soothing Positive Affect*

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.

3. 4. 3. 3. The effectiveness of the intervention on secondary outcomes

3.4.3.3.1. Depression.

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). 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 depression levels within the control group remained consistent across all time points. However, noteworthy changes occurred within 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). 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).

3.4.3.3.2. Anxiety.

Concerning anxiety, 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).

3.4.3.3.3. Stress.

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). 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).

3.4.3.3.4. Activating positive affect.

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 $\lambda = .90$, $F(3) = 2.06$, $p = .11$, $\eta_p^2 = .09$. No differences were found between the groups at any time point.

3.4.3.3.5. Life satisfaction.

Concerning life satisfaction, our analysis indicated the absence of a time effect, $F(3) = 1.52$, $p = .20$, $\eta_p^2 = .02$, no interaction effect between time and group was detected, $F(3) = .69$, $p = .55$, $\eta_p^2 = .01$, and no group effect was identified, $F(3) = .29$, $p = .59$, $\eta_p^2 = .01$. 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.

3. 4. 3. 4. The 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).

3.4.3.4.1. Self-compassion.

Regarding self-compassion, based on Mauchly's non-significant test results (p = .16), sphericity was assumed. We found a significant and large time effect, $F(3) = 11.59$, $p < .01$, $\eta_p^2 = .15$, a significant and medium time and group interaction effect, $F(3) = 8.27$, $p < .01$, $\eta_p^2 = .11$, but no significant group effect, $F(1) = 1.08$, $p = .30$, $\eta_p^2 = .01$. The results are also displayed in Figure 3. Multivariate analyses indicated a significant time effect with a large effect size exclusively in the CMT group, Wilk's $\lambda = .37$, $F(3) = 34.69$, $p < .01$, $\eta_p^2 = .62$, whereas no such effect was observed in the control group, Wilk's $\lambda = .98$, $F(3) = .23$, $p = .87$, $\eta_p^2 = .01$. 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 ($M = 3.43$, $SD = .61$, $M_{diff} = -.07$, $SE = .07$, $p = .91$).

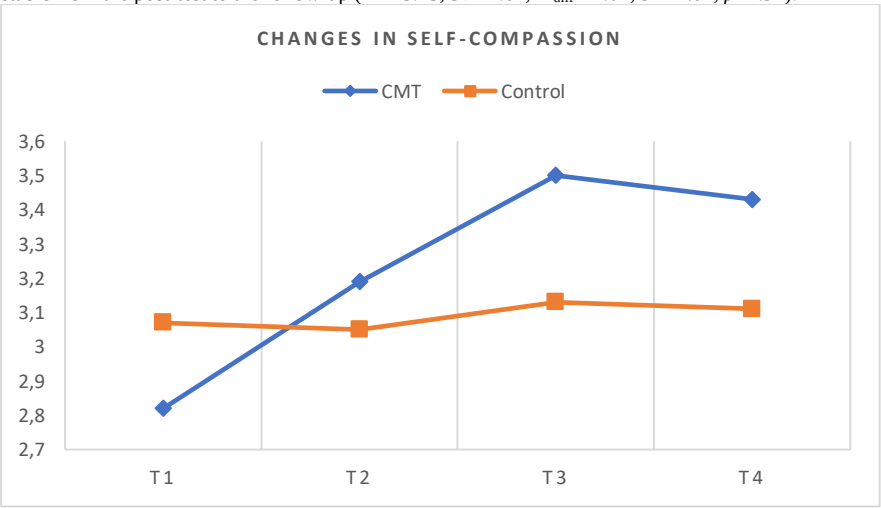

Fig. 3 *Results for Self-Compassion*

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 ($M_{diff} = .314$, $SE = .176$, $p = .08$, $d = .46$).

3.4.3.4.2. Self-warmth.

The results for self-warmth were similar to the results for self-compassion. Significant medium effects were observed for time, $F(3) = 6.43$, $p < .01$, $\eta_p^2 = .09$, the interaction of time and group, $F(3) = 5.77$, $p < .01$, $\eta_p^2 = .08$, and group, $F(1) = 6.18$, $p = .01$, $\eta_p^2 = .08$. 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 $\lambda = .98$, $F(3) = .23$, $p = .87$, $\eta_p^2 = .01$), as opposed the CMT group, where a significant large time effect was found (Wilk's $\lambda = .48$, $F(3) = 22.02$, $p < .01$, $\eta_p^2 = .51$). 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).

3.4.3.4.3. Self-coldness.

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). 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. 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 (M_{diff} = .574, SE = .163, p < .01, d = .97).

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).

3.4.3.4.4. Dysfunctional attitudes.

Last, we examined the impact on dysfunctional attitudes. Significant medium-sized effects were identified, including time effect, $F(2,79)$ = 6.89, p < .01, η_p^2 = .09, time and group interaction effect, $F(2,79)$ = 5.52, p < .01, η_p^2 = .07, as well as group effect, $F(1)$ = 8.34, p < .01, η_p^2 = .11. 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).

3. 4. 3. 5. Testing of mechanisms of the intervention

For testing the longitudinal mediation effects, we tested indirect effects based on the model presented in Figure 4. 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.

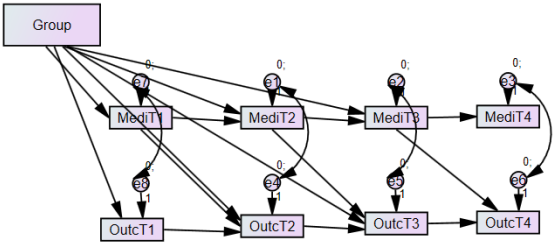

Fig. 4 *The tested model for longitudinal mediation analyses*

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. 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 3.

Table 3 Standardized indirect effects on negative affect

Predictor	Mediator	Effect type	Outcome	Standardized Indirect Effects	95% CI	
					LL	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

We also analyzed the longitudinal indirect effects on soothing positive affect. The results, which can be found in Table 4, 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 4 Standardized Indirect Effects of Group on Soothing Positive Affect

Predictor	Mediator	Effect type	Outcome	Standardized Indirect Effects	95% CI	
					LL	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
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 one exception indicated 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.

3. 4. 4. Discussion

3. 4. 4. 1. The effectiveness of the intervention

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.

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. 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.

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).

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 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.

3. 4. 4. 2. 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.

3. 4. 4. 3. 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 efficacy 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. Finally, our intervention group comprised solely Psychology students, warranting further assessments encompassing students from diverse majors to ensure more comprehensive and generalizable conclusions.

IV. CHAPTER IV. GENERAL CONCLUSIONS AND IMPLICATIONS

4. 1. General Conclusions

This thesis encompassed a wide array of theoretical, methodological, and practical objectives concerning the effectiveness of self-compassion interventions on the affect of university students. Our overarching objectives included pinpointing the most promising self-compassion intervention for students, tailoring it to an academic environment, evaluating its effectiveness on negative and positive affect, and delving into the mechanisms underlying its impact. Achieving these goals required several intermediary tasks, each of which was explored in our original studies.

To begin, we undertook a comprehensive systematic review and meta-analysis of self-compassion interventions geared toward university students. Our focus was assessing their impact on self-compassion, as well as the outcomes related to negative and positive affect. Our criteria included randomized controlled trials comparing these interventions with various control conditions, encompassing both active and passive controls.

Our primary findings underscored the effectiveness of self-compassion interventions, revealing a medium-sized positive impact on self-compassion levels and relatively smaller effects on positive and negative affect outcomes during the post-test period. Notably, we discovered that interventions conducted face-to-face within a group setting exhibited larger effect sizes on investigated outcomes, highlighting their efficacy and, consequently, our recommendation for this approach. The results indicate that the type of instrument (validated or non-validated) also moderates the effect size for self-compassion, and therefore indicates the importance of using validated scales for measuring self-compassion. Another interesting finding was that the effect size for self-compassion predicted the effect size for negative affect, suggesting that self-compassion is the possible mechanism of these interventions on negative affect.

Second, two scales were adapted to the Hungarian student population. One to measure self-compassion (Self-Compassion Scale – Short Form; Raes et al., 2011) and the other to differentiate between soothing and activating positive affect (Types of Positive Affect Scale; Gilbert et al., 2008). The main findings highlight both scales as valid and reliable instruments for measuring their respective target variables. Moreover, measurement invariance across countries (Hungary and Romania) and gender (males and females) is confirmed. The results of Study 2a affirm the presence of a reliable and valid instrument capable of measuring self-compassion as a global indicator, as a two-factor structure composed of self-coldness (reflecting the average of negative components of self-compassion, the uncompassionate responses toward the self) and self-warmth (reflecting the average of positive components of self-compassion, the self-compassionate responses), and as a model comprised of six specific components (mindfulness, overidentification, common humanity, isolation, self-kindness, and self-judgment). Additionally, results stemming from Study 2b underscored the successful development of a reliable instrument to distinguish between soothing and activating positive affect.

Third, a cross-sectional correlational study was conducted to test the mediating role of self-compassion in the relationships between mindfulness, dysfunctional attitudes, and a series of indicators of distress and well-being. We proposed two models for these connections: the first regards self-compassion as a global indicator, while the second distinguishes two separate factors, these being self-coldness and self-warmth, respectively. Our findings were consistent with the initial hypotheses, with higher levels of mindfulness resulting in both an elevated state of well-being (encompassing soothing positive affect, activating positive affect, and life satisfaction) and lower levels of emotional distress (including negative affect, depression, anxiety, and stress), this relationship mediated by increased self-compassion. Conversely, higher levels of dysfunctional attitudes predicted lower levels of well-being and increased emotional distress, with the mediation effect of reduced self-compassion. However, the results also highlighted that self-coldness played a more important role than self-warmth in all of these relationships, implying that only self-coldness served as a significant mediator and mechanism of change. The consistency of these results across various clinical indicators, encompassing four distress indicators (negative affect, depression, anxiety, and stress) and three well-being indicators (soothing positive affect, activating positive affect, and life satisfaction) provide high reliability to the tested models. These findings support the use of self-compassion interventions, particularly those targeting self-coldness reduction, to improve well-being and reduce stress among university students.

Fourth, we piloted a controlled, non-randomized clinical trial to assess the efficacy of a face-to-face Compassionate Mind Training (CMT) group intervention compared to a passive control group on various indicators of distress and well-being (including negative affect and soothing positive affect). Additionally, we examined the longitudinal mediating role of self-compassion and dysfunctional attitudes regarding the intervention's effects on primary outcomes (i.e., negative and soothing positive affect). The results indicate that, in contrast to the control group, participants in the CMT group reported lower levels of negative affect, depression, stress, self-coldness and dysfunctional attitudes, and increased levels of self-warmth during the post-test and follow-up. A difference in self-compassion also emerged between the two groups during the post-test, however, this difference was no longer significant at the follow-up assessment.

In terms of soothing positive affect, activating positive affect, life satisfaction and anxiety no group differences emerged, however, upon analysing separately the changes amongst the individual groups, a significant increase in soothing positive affect, a significant increase in activating positive affect, and a significant decrease in anxiety were observed exclusively within the CMT group.

Additionaly, mediation analyses revealed that in longitudinal models, neither self-compassion, self-coldness, nor self-warmth were significant mediators of the effect of CMT on negative affect and soothing positive affect.

In summary, our study revealed several key findings: 1) Self-compassion interventions outperformed control conditions in increasing students' levels of self-compassion and positive affect while reducing negative affect. 2) The Hungarian adaptations of the Self-Compassion Scale – Short Form and of the Types of Positive Affect Scale proved to be reliable and valid assessment tools. 3) Self-compassion, particularly the aspect of self-coldness, was identified as a mediator for the effects of mindfulness and dysfunctional attitudes on various indicators of distress and well-being. 4) Compassionate Mind Training demonstrated effectiveness in reducing the levels of distress (e.g., negative affect) and dysfunctional attitudes experienced by students while managing to cultivate self-compassion and soothing positive affect. Nevertheless, the longitudinal mediating role of self-compassion for intervention effects on primary outcomes, namely negative affect and soothing positive affect, was not supported.

4. 2. Implications of the Present Thesis

4. 2. 1. Theoretical Implications

From a theoretical perspective, the present research brings major contributions to the existing literature on self-compassion interventions. Notably, our initial investigation represents the first meta-analysis investigating the effects of self-compassion interventions on both positive and negative affect in university students. We thoroughly examined various potential moderators, including personal and intervention-related factors, revealing that face-to-face group interventions are more effective compared to online or individual interventions. Furthermore, our results emphasize the importance of caution when interpreting findings from studies employing non-validated scales to measure self-compassion, as we observed higher effect sizes in such cases.

Study 2a confirms the compatibility of both self-compassion theories (Gilbert, 2009a, 2009b, 2014; Neff, 2003a, 2003b, 2023) with the existing data, and underscores the flexibility of the Hungarian version of the Self-Compassion Scale – Short Form depending on the research question, as mentioned by Neff (2016). In study 2b, our findings supported the importance of measuring soothing positive affect and activating positive affect separately, aligning with Gilbert's (2009a, 2009b, 2014) theory. Therefore, our results highlight the importance of distinguishing between these two types of positive affect when evaluating the effectiveness of self-compassion interventions on increasing positive affect.

The third study introduced and examined two models that unravel the relationship between self-compassion, mindfulness, and dysfunctional attitudes in predicting students' distress and well-being. The initial model uncovered that self-compassion mediated the effects of both mindfulness and dysfunctional attitudes on various indicators of distress and well-being. In the second model, contrary to previous correlational analyses, we found self-coldness to be more important than self-warmth not only in predicting emotional distress (including negative affect, depression, anxiety, and stress), but also in predicting well-being (encompassing soothing positive affect, activating positive affect, and life satisfaction). These findings were consistently replicated across seven distinct clinical outcomes, reinforcing the reliability of these models.

Our fourth study represents the first trial to investigate the effectiveness of Compassionate Mind Training among Hungarian students on various distress and well-being indicators (including negative affect and soothing positive affect), indicating its potential in the academic setting. Nevertheless, the longitudinal mediation analyses conducted in our study did not support self-compassion as a mechanism of change.

4. 2. 2. Methodological and Practical Implications

Beyond the theoretical implications, several methodological and practical implications can be derived from this thesis. The results of the first study suggest that, when it comes to format, face-to-face group interventions are recommended for cultivating self-compassion. Furthermore, the same study highlights the importance of using validated tools for the measurement of self-compassion.

Based on the outcomes of Study 2a and Study 2b, we have developed the Hungarian versions of the Self-Compassion Scale – Short Form (Raes et al., 2011) and the Types of Positive Affect Scale (Gilbert et al., 2008). These tools enable the measurement of self-compassion in various aspects, including as a global indicator, as self-warmth and self-coldness, as specific components of self-compassion (such as mindfulness, overidentification, common humanity, isolation, self-kindness, and self-judgment), as well as the two distinct forms of positive affect (soothing and activating positive affect).

The findings from Study 3 emphasize the importance of employing Structural Equation Modeling (SEM) to explore the distinct contributions of self-coldness and self-warmth to distress and well-being indicators. Moreover, the results underscore the value of self-compassion interventions, particularly in reducing self-coldness, in the context of student distress and well-being. These interventions demonstrate their importance even when considering other influential predictors such as trait mindfulness and dysfunctional attitudes.

The fourth study signifies a notable methodological progression within the field of self-compassion research. It pioneers the examination of self-compassion's longitudinal mediating role in the context of intervention outcomes. During this study, valuable resources, such as handouts and audio recordings, were developed to enhance the intervention process, offering potential utility for future investigations and applications.

In summary, this thesis holds significance for undergraduate education policies, specifically proposing the implementation of face-to-face self-compassion group interventions. The introduction of programs such as Compassionate Mind Training stands as a major step towards supporting students' mental health, reducing distress (including negative affect), and enhancing well-being (encompassing soothing positive affect).

4. 3. Limitations and Further Directions of Research

As in any research endeavor, it's important to acknowledge the limitations of this thesis. First and foremost, many of the subgroup analyses conducted in Study 1 were underpowered, and a major portion of the included studies relied on the PANAS (Watson et al., 1988b) for measuring positive and negative affect. Consequently, this leads to uncertainty about whether these interventions are more effective for enhancing soothing positive affect compared to activating positive affect in university students. Another limitation of the first study was the original intent to investigate the effectiveness of self-compassion interventions for different components of self-compassion and their role in predicting effect sizes for both negative and positive affect, an analysis that couldn't be conducted due to data unavailability. Furthermore, the extensive use of self-compassion writing techniques in most of the included studies, paired with the limited number of the studies themselves, made it impossible to draw a more specific comparison among the various intervention types' effectiveness in cultivating self-compassion. These limitations emphasize the need for caution when concluding the effectiveness of self-compassion interventions on the positive and negative affect on students.

Studies 2a and 2b come with their own set of limitations, notably the unequal sample sizes among countries and genders, emphasizing the need for analyzing the psychometric properties of the scales in a more evenly distributed sample. Additionally, exploring invariances across different age groups and investigating the test-retest reliability of the scales should represent crucial aspects for future studies. These constraints underscore the necessity of exercising caution when drawing conclusions about the measurement invariance of the scales.

Study 3 presents several limitations, with a significant one being the potential overestimation of the model fit due to low degrees of freedom (Collier, 2020). Additionally, the model could be enhanced by

incorporating the six specific components of self-compassion, rather than solely focusing on the negative (self-coldness) and positive (self-warmth) components. Another important aspect for further studies involves investigating model invariance across diverse samples, such as students, community samples, and various clinical populations. The correlation design also limits our capacity to understand these relationships, as it lacks a longitudinal perspective to explore potential reversal pathways or alternative explanations. Therefore, it is highly recommended to incorporate self-compassion as a mediator in these relationships through a longitudinal design. This consideration is particularly relevant based on the findings of Maxwell and colleagues (2011), which suggest that cross-sectional analyses may identify a significant indirect effect, even when the true longitudinal indirect effect is zero.

Regarding Study 4, the main limitation lies in the non-randomized group allocation, which resulted in significant differences in baseline values for many measured variables. It is advisable for future research to address this limitation by conducting randomized controlled trials, incorporating both passive and active control groups. Another noteworthy limitation is the relatively small sample size, leading to reduced statistical power, especially when comparing the two groups at a single time point. Notably, the intervention group in our study comprised solely of Psychology students; however, it is advisable to assess the efficacy of the intervention on affect and other indicators of distress and well-being with students from various disciplines, to ensure more reliable and generalizable results. Collectively, these limitations underscore the potential for further enhancements in future research.

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