Effects of a Virtual Mindful Self-Compassion Training on Mindfulness, Self-Compassion, Empathy, Well-being and Stress in Uruguayan Primary School Teachers During Covid-19 Times.

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Abstract

Objectives: This study aimed to assess the effects of a virtual Mindful Self-compassion (MSC) intervention on mindfulness, self-compassion, empathy, stress, and well-being in Uruguayan primary school teachers.

Methods: A quasi-experimental, longitudinal study was conducted with an active control intervention (Kundalini Yoga, KY). Uruguayan volunteer female teachers were randomly assigned to MSC or KY 9-weeks virtual training and completed self-reports and an empathy for pain task (EPT) at pre-, post-training, and follow-up (3 months).

Results: After MSC training, mindfulness (ES: observing= -0.836; non-reactivity= -0.476; total mindfulness= -0.655), self-compassion (ES: self-kindness= 0.745; common humanity= -0.588; mindfulness= -0.487) and self-judgment (ES= -0.463) significantly ($p<0.05$) increased. Furthermore, perspective-taking increased (ES= -0.505) and personal distress decreased (ES= -0.587), while stress decreased (ES= -0.450) and well-being increased (ES= -0.612) after this training. At follow-up, observing (ES= -0.675) and total mindfulness (ES= -0.757) remained elevated and non-judging increased (ES= -0.667); self-compassion remained elevated (ES= -0.778) and personal distress remained decreased (ES= -0.857). After MSC training, EPT intentionality comprehension accuracy significantly increased (SE= -0.588).

After training, personal distress was higher in KY than MSC (ES= -0.344), while at follow-up observing (ES= -0.454) and total mindfulness (ES =-0.415) were higher in MSC. No differences between groups were found for the EPT.

Conclusions: Virtual MSC training cultivated mindfulness and self-compassion associated with an increase in well-being and empathy, and a reduction of stress in Uruguayan primary school teachers.

Introduction

The teaching profession is worldwide one of the most demanding and exhausting, reaching higher levels of stress relative to other professions (Kyriacou, 2001; Corbin et al., 2019). Teaching professionals are required to have social and emotional skills that enable them to create the most conducive classroom climate for learning (Jennings & Greenberg, 2009) while avoiding or counteracting work-related stress that may damage their health (Seibt et al., 2013; Scheuch et al., 2015) and negatively impact on their relationship with students (Spilt et al., 2011; Corbin et al., 2019). Robalino & Körner (2005) reported mental health-related problems in Latin American teachers such as stress, depression and feelings of grief, which would result from the material and social conditions, and the challenging job demands. A study in 2015 showed that the prevalence of burnout syndrome in female teachers in Montevideo, Uruguay, was among the highest in Latin America (Silva et al., 2015). According to a report on the state of education between 2019 and 2020 (INEEd, 2021a), Uruguayan teachers perceive job demands as too challenging for their own personal resources. Especially Uruguayan preschool and public primary school

teachers, mostly females who have a higher rate of double presence -and deal with paid and domestic work simultaneously-, show higher ratings of cognitive and emotional work overload, higher levels of stress symptoms and burnout, and lower well-being, accompanied by a higher prevalence of illnesses (INEEd, 2020).

In addition to the above-mentioned situation, teaching difficulties increased and new ones emerged as a result of the Coronavirus disease pandemic (COVID-19; OECD, 2020), affecting teachers' personal, professional and emotional lives, and resulting in physical, mental and social health problems (Holguín, 2020). In fact, teachers had to cope with logistical, technological, pedagogical and socio-affective challenges and difficulties (Sánchez et al., 2020). Hence, during the COVID-19 pandemic, teachers' social skills became even more necessary, to enable them to deal with more complex and challenging contexts. Uruguayan teachers, particularly female secondary school teachers who had to reconcile paid work from home with domestic and care tasks, reported high levels of work overload (INEEd, 2021a). Uruguayan primary school teachers also highlighted the fundamental need for more competencies to enable them to work on coexistence, emotional education and relationships (INEEd, 2021b).

"The prosocial classroom" model of Jennings & Greenberg (2009) highlights the importance of teachers' well-being and social and emotional competencies for promoting a prosocial classroom atmosphere that favors learning and supportive relationships with their students. According to this model, socially and emotionally competent teachers understand the connections between their students' emotions and behaviors, and respond empathically, prone to help rather than repress or punish, hence setting limits effectively and respectfully, and are self-aware of emotions, capabilities, strengths and weaknesses, and self-regulate to promote positive outcomes even in challenging situations, without compromising their health. They have prosocial skills and therefore assess the impact of their actions on others. They build supportive relationships based on mutual understanding and cooperation, accepting others' perspectives (Jennings & Greenberg, 2009; Jennings, 2015). The authors argue that these competencies are associated with empathy, compassion, perspective-taking, and responsiveness.

The implementation of secular contemplative practices worldwide is gaining ground due to the reported beneficial effects both in clinical and non-clinical populations (Goyal et al., 2014; Hilton et al., 2017; Slemp et al., 2019). In the education field, extensive research aims at studying the impact of such practices on students (reviewed by Meiklejohn et al., 2012, Zenner et al., 2014, and Schonert-Reichl & Roeser, 2016), while historically fewer publications focused on teachers (reviewed by Meiklejohn et al., 2012, Emerson et al., 2017, Schonert-Reichl & Roeser, 2016, and Sleilaty, 2022). According to Kabat-Zinn (1994), the practice of mindfulness involves observing the experience with openness and acceptance, without judgment or resistance (Kabat-Zinn, 1994). This skill can be cultivated through a contemplative practice that implies loving-kindness, equanimity, compassion, generosity, and gratitude (Grossman, 2015). Training in mindfulness is positively associated with decreased negative psychological symptoms and emotional reactivity, as well as with increased behavioral regulation and well-being (Keng et al., 2011). According to Germer & Neff (2019), an implicit aspect of mindfulness is compassion since mindfulness can only be achieved if warmness and kindness to oneself are achieved in the first place. As

stated by Neff (2003a, 2003b), self-compassion involves treating oneself kindly, with acceptance, care and understanding (Neff et al., 2007). Three basic components interrelate in self-compassion: 1) self-kindness, which involves being kind and understanding to oneself instead of dispensing disapproving self-criticism and self-judgment, 2) common humanity, which entails considering personal experiences as part of the life experiences that humans go through instead of feeling isolated, and 3) mindfulness, which implies observing one's thoughts and feelings with awareness without over-identifying with them. The sense of shared humanity, recognizing the connection with the rest of humanity, facilitates being compassionate to others (Neff, 2003a, 2003b). Self-compassion promotes well-functioning and secure attachments through increased altruism, perspective-taking, forgiveness, generosity, and empathic concern. Highly self-compassionate people report better relationships, greater ability to resolve interpersonal conflicts and feeling less affected by adverse experiences (Neff & Beretvas, 2012; Yarnell & Neff, 2013; Neff & Pommier, 2013).

Mindfulness-based practices in teachers promote mindfulness and pro-social skills, improve emotional regulation and well-being, and reduce stress (Klingbeil & Renshaw, 2018; Berkovich-Ohana et al., 2019). Roeser et al. (2013) evidenced that training in mindfulness and self-compassion improves mindfulness, focused attention and self-compassion (related to the occupation) and reduces stress and burnout both at post-training and follow-up. Jennings (2015) found that mindfulness and self-compassion may be important contributors to creating social and emotional competencies such as self-awareness, self-management and social awareness, which may in turn impact classroom quality. Furthermore, the author raises the need for interventions that promote mindfulness and self-compassion with a randomized, controlled design. In a recent study, Tarrasch et al. (2020) showed that training in a program that employs mindfulness, compassion and social-emotional skills improves teachers' interpersonal faculties such as sense of efficacy, interpersonal mindfulness in teaching, and the interpersonal reactivity measures of perspective-taking. It also improves the intrapersonal faculties of mindfulness, perceived stress, rumination, reflection, and self-compassion (Tarrasch et al., 2020).

Mindful Self-Compassion (MSC; Neff & Germer, 2013) is a fairly recent mindfulness-based training program oriented towards promoting the capacity of self-compassion and mindfulness, the latter providing the necessary awareness of the suffering experience to bring kindness and understanding to ourselves (Germer & Neff, 2019).

To our understanding, the psychological and/or neurobiological effects of the MSC program have never been quantitatively investigated in teachers. Meditation is rarely practiced in the context of education in Uruguay, and it is not included as part of the teacher’s initial and/or permanent formation.

Considering the Uruguayan teachers' need for approaches that provide them with competencies to build supportive relations and healthy educational environments while promoting their well-being and reducing stress, we initiated a research line to study the physiological and psychological effects of interventions promoting well-being. In this study, we assessed the effects of a virtual MSC program (Neff & Germer, 2013) in a group of Uruguayan female primary school teachers on trainable skills such as mindfulness

and self-compassion, and on empathy, well-being and stress. We were also interested in elucidating if the effects last in time and would sustain 3 months after MSC training.

We hypothesized that the online MSC training would increase mindfulness and self-compassion, improve well-being while reducing stress, and that the effect of MSC on mindfulness, and particularly on self-compassion, would be higher than that of the KY as this training does not explicitly train mindfulness or self-compassion.

Since the collection of all data in this study was performed during the COVID-19 pandemic, a virtual version of the MSC program was conducted, as advised by the Center for Mindful Self-Compassion (CMSC). Following Davidson & Kaszniak (2015) considerations on mindfulness-based research, Kundalini Yoga (KY) was selected as an active control condition. KY is a contemplative practice that improves psychological outcomes and stress (Streeter et al., 2010; Wang & Szabo, 2020) although not intended specifically to promote self-compassion as the MSC program.

Methodology

We used a pre-test post-test quasi-experimental design with an intervention (MSC training) and an active control group (KY training) (Echevarría, 2016). Since effects beyond the training period were expected, a three-month follow-up period was established. The methodological design followed the suggestions posed by Davidson & Kaszniak (2016) regarding mindfulness-based interventions. In particular, guidelines for a control condition were rigorously followed to match the mindfulness intervention on non-specific factors such as the length of interventions and amount of practice, and the instructors' expertise, confidence in the benefits of their interventions, commitment and enthusiasm. The MSC instructors were certified by the Center for Mindful Self-Compassion, USA. The KY instructor was certified as a Kundalini Yoga professor by the Kundalini Research Institute, USA. The participants were blinded to which was the experimental intervention.

Participants and Procedures

Female primary school practicing teachers of the Uruguayan Metropolitan area interested in participating in this research project, including free training in MSC or yoga, were recruited. Several channels of communication, including social media, direct contact with school authorities, and personal communication were used. A total of 298 teachers expressed their interest through the filling of a google form. After completion of informed consent, self-reported information and psychological interviews, including the Mini International Neuropsychiatric Interview (Sheehan et al., 1998; Ferrando et al., 2000), were used to select the sample. According to the inclusion criteria, the selected participants were: i) women, ii) primary school teachers in practice, and iii) right-handed. The exclusion criteria were: i) training in yoga, mindfulness and/or self-compassion during two years previous to the registration; ii) presence of psychological disorders, and iii) consumption of prescribed drugs that may affect the variables of interest such as heart rate and/or brain activity.

The MSC and KY trainings took place simultaneously for 9 weeks, matching an identical amount of practice, of both virtual synchronous formal and asynchronous informal activities (Davidson and Kaszniak, 2016). A week prior to the beginning of the training (pre-training), a week after the end of the training (post-training) and 3 months later (follow-up), the participants completed online questionnaires (Stoet, 2010; 2017). In the months previous and posterior to the beginning and end of the training, respectively, they also accomplished in-person an abbreviated and modified version of an empathy for pain task (EPT; Decety et al., 2012; Baez et. al., 2017).

A total of 48 participants that met the selection criteria were randomly assigned to the MSC or KY groups. As shown in Table 1, 37 participants completed the trainings (MSC: n=19, mean age 38 SD= 6.9 years; KY: n=18, mean age 41.2, SD= 7,2 years), and the online psychometric tests at pre- and post-training. Twenty-three of them also completed the online psychometric tests at follow-up (MSC n=10, mean age 37.6, SD= 2.12 years; KY n=13, mean age 40.92, SD= 8.41 years). Due to the issues posed by the pandemic, some participants dropped out and did not perform the self-reports and/or the in-person EPT at post-training and follow-up. Twenty-eight teachers completed the EPT at pre- and post-training (MSC: n=13, mean age 37.08, SD= 7.93 years; KY: n=15, mean age 41.13, SD= 7.92 years), while 22 completed the EPT at follow-up (MSC: n=10, mean age 37.6, SD= 7.92 years; KY: n=12, mean age 41.5, SD=8.51 years).

Table 1

Number of Participants in the Mindful Self-Compassion and Kundalini Yoga Groups at the Pre-, Post-intervention, and Follow-up Time Points for the Psychometric Tests and the Empathy for Pain Task

	Psychometric tests		Empathy for pain task	
	PRE & POST	PRE, POST & FU	PRE & POST	PRE, POST & FU
MSC	19	10	13	10
KY	18	13	15	12
Total	37	23	28	22

Note. MSC = Mindful Self-Compassion; *KY =* Kundalini Yoga; *PRE =* pre-intervention; *POST =* post-intervention; *FU =* follow-up.

Psychometric instruments: self-reported questionnaires

The participants completed an online survey (Stoet, 2010; 2017) aimed at assessing self-reported mindfulness, self-compassion, empathy, stress and well-being using the Spanish versions of the following questionnaires and scales: i) the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al, 2006; Cebolla et al., 2012; Quintana et al., 2017), a 39-item instrument on a five-point Likert-type scale to assess mindfulness skills through five factors that represent the dimensions of mindfulness -observing, describing, acting with awareness, non-judging and non-reactivity to inner experience-; ii) the Self-Compassion Scale (SCS; Neff, 2003a; García-Campayo, 2014), a 26-item that assesses the ability to be

compassionate to oneself in difficult or challenging situations, by measuring three interrelated components of self-compassion: self-kindness, common humanity and mindfulness; iii) the Interpersonal Reactivity Index (IRI; Davis, 1980, 1983; Fernández et al., 2011), a multidimensional approach to assess cognitive and affective dispositional empathy through 28 items on a 5-point Likert-type scale, including four interrelated dimensions: perspective-taking, fantasy, empathic concern and personal distress; iv) the Perceived Stress Scale (PSS; Cohen et al., 1983; Tapia et al., 2007), a 10-item questionnaire on a five-point Likert-type scale that measures the level of perceived stress elicited by one's life situations over the previous month; and v) the World Health Organization-5 Well-Being Index (WHO-5; World Health Organization, 1998; Topp et al., 2015), a 5-item that measures mental subjective well-being during the preceding two weeks.

Empathy for pain task

To evidence the effects of the MSC and KY interventions on experimental empathic responses, empathy for pain was assessed with an in-person EPT, according to Baez et al. (2017) at pre-training, post-training and follow-up. This test was selected because of its reliability in provoking empathic responses and for allowing empathy to be assessed based on the capacity to detect intentional harm in interpersonal contexts (Decety et a., 2012; Baez et. al., 2014, 2016). Briefly, the teachers observed on a computer screen 13 sets of images, one for training and 12 for testing. Each set consisted of three images -of 500, 200 and 1000 ms duration from first to third-, presented sequentially to imply an in-motion situation. As shown in Figure 1, all the situations, but the neutrals, corresponded to the interactions between two persons -whose faces could not be seen-, involving either intentional (n=4) or accidental (n=4) harm. Neutral situations (n=4) did not imply any kind of harm.

After each set, the participants answered 5 questions assessing cognitive and affective components of empathy, as well as elements of moral evaluation. The cognitive component was evaluated by a question regarding the intentionality of the harm inflicted (yes or no), while the affective components addressed the empathic concern and personal distress (by sliding an analogic bar comprising positive and negative scores). For the purpose of this study, we centered our analysis on the accuracy of intentionality comprehension, and on the affective components of empathy.

The in-person EPT was performed following the COVID-19 safety protocol indicated by the Uruguayan Ministry of Health.

Mindfulness Self-Compassion and Kundalini Yoga interventions

Meeting the criteria posed by Davidson and Kaszniak (2015), both the experimental (MSC) and the active control (KY) trainings were equivalent and the contents addressed along the trainings are described in this section. Both the MSC and the KY trainings involved virtual weekly sessions along 8 weeks and one 3-hour virtual retreat, from March to May 2021, matching weekdays and times. The MSC program (Neff & Germer, 2013) consisted of 2-hour 45-minute virtual group sessions, and daily individual home practices of 20-30 min duration. Aiming at developing skills of mindfulness and self-compassion, the topics

covered in the program were: discovering self-compassion, practicing mindfulness; practicing loving-kindness; discovering one's own compassionate voice; living deeply; managing difficult emotions; exploring challenging relationships; and embracing life. The KY sessions matched the time and length of practice of the MSC training. Aiming at activating the Kundalini energy or *shakti*, the topics covered in KY sessions were: meditating for a calm heart; physical strength and disease resistance; immune system booster: the inner sun; foundation for infinity; body adjustment to elevate the spirit; get the energy moving; long deep breathing; warriors tense release; and kundalini yoga for physical and mental vitality.

Data analysis and statistics

Psychometric and experimental data were statistically analyzed using the SPSS 26.0 statistics software package. Since the Shapiro-Wilk test for normality showed that some of the variables' distributions departed significantly from normality, non-parametric tests were used, and the median and interquartile range were calculated.

Wilcoxon signed-rank test was used to compare the results of the psychometric tests and the EPT between pre- and post-training (from here on short-term effects).

As mentioned before, due to the participants' dropout, the size of the sample of both groups decreased from post-training to follow-up.

Friedman ANOVA and the Wilcoxon signed rank test post hoc were used to compare the results of the psychometric tests and the EPT between all times (pre-, post-training and follow-up) focusing on the follow-up (from here on long-term effects).

Comparisons of the psychometric tests and the EPT results between the MSC and KY groups were conducted using the Mann-Whitney U test for each data collection point (pre-, post-training, and follow-up).

The intentionality comprehension of the EPT situations was evaluated by the accuracy of the response to the intentionality question, i.e. the number of positive attributions -both intentional and accidental- that were correct. The affective components were analyzed by the ratings of the specific questions.

In order to address the "strength of the relationship between the investigated variables", particular interest was directed toward the effect sizes (ES), calculated using $r = Z/\sqrt{N}$ (Tomczak & Tomczak, 2014).

Figures were created with Python (comparison MSC vs Yoga at pre-post-training and follow-up: https://colab.research.google.com/drive/1Ky_9meAC6-bq94SOUIlrIHS0xeMA87LP?usp=share_link; comparison between pre-post and pre-post-follow-up of MSC and YK: https://colab.research.google.com/drive/1fVh573VxkigDHO-EOD_R0ZnPH58LGksX?usp=share_link) or Excel.

The protocol of this study was approved by the Human Research Ethics Committee of the IIBCE (#001, 2018), and participants gave their written informed consent in accordance with the Declaration of Helsinki.

Results

Thirty-seven female primary school teachers (MSC: n=19; KY: n=18) completed online self-reported questionnaires assessing mindfulness (FFMQ), self-compassion (SCS), dispositional empathy (IRI), global stress (PSS) and wellbeing (WHO-5) at pre- and post-trainings. Twenty-three teachers completed these questionnaires at follow-up (MSC: n= 10; KY: n=13).

Twenty-seven participants also performed an EPT at pre- and post-training (MSC: n=13, KY: n=15), and twenty-two at follow-up (MSC: n=10, KY: n=12).

Psychometric tests

Psychometric data of MSC and KY groups did not differ at pre-training for any of the variables studied (online resource 1).

Short-term effects of MSC training on the psychometric tests (pre- vs post-)

To evidence the short-term effects of the MSC training, pre- and post-training self-reported data were compared (n=19). Training in MSC increased the observing (p= 0.000, ES= -0.836) and non-reactivity (p= 0.038, ES= -0.476) factors of mindfulness, as well as the total FFMQ (p= 0.004, ES -0.655) (Fig. 2a). The self-kindness (p= 0.001, ES= -0.745), common humanity (p= 0.010, ES -0.588) and mindfulness (p= 0.034, ES= -0.487) components of self-compassion also increased after the MSC training, and so did self-judgment (p= 0.044, ES= -0.463) (Fig. 2b).

Concerning dispositional empathy, the perspective-taking facet increased (p= 0.028, ES= -0.505), while the personal distress decreased (p= 0.011, ES= -0.587) (Fig. 2c). The stress perception decreased (p= 0.050, ES= -0.450) (Figs. 2d), and the subjective well-being increased after the training (p= 0.008, ES= -0.612) (Fig. 2e). All data are shown in online resource 2.

Short-term effects of KY training on the psychometric tests (pre- vs post-)

To evidence the short-term effects of KY training, the pre- and post-training self-reported psychometric data were compared (n=18). Training in KY increased the observing (p= 0.010, ES -0.610) and acting with awareness (p= 0.014, ES= -0.581) factors of the FFMQ, as well as the total FFMQ (p= 0.029, ES= -0.513) (Fig. 3a). The self-kindness component of the SCS also increased (p= 0.015, ES= -0.571), as well as self-judgment (p= 0.012, ES= -0.592) and over-identification (p= 0.002, ES= -0.715) (Fig. 3b). KY did not modify any of the IRI dimensions. The stress perception decreased (p= 0.003, ES= -0.704), and the subjective well-being increased after the KY training (p= 0.022, ES= -0.541) (Figs. 3c and 3d; all data are shown in online resource 3)

Comparison of the short-term effects of MSC and KY trainings on psychometric data at pre- and post-training

Results of the self-reported questionnaires of the MSC (n=19) and KY (n=18) groups were compared before and after trainings. As mentioned before, at pre-training no differences in any of the variables studied between MSC and KY were found (online resource 1). The comparison of post-training results showed that the personal distress component of dispositional empathy was higher in the KY than in the MSC group (p= 0.036, ES= -0.344) (Fig. 4; online resource 4).

Long-term effects of the MSC training on the psychometric tests (pre- vs post- vs follow-up)

Pre-, post- and follow-up self-reported questionnaires were compared in the MSC group (n=10; note the smaller n with respect to previous analysis due to participants' dropout at follow-up). The observing factor of the FFMQ increased at post-training (p= 0.015, ES= -0.771) and follow-up (p= 0.033, ES= -0.675) with respect to pre-training. The non-judging factor increased at follow-up with respect to both pre-training (p= 0.035, ES= -0.667) and post-training (p= 0.036, ES= -0.662). The total mindfulness of the FFMQ increased at follow-up with respect to pre-training (p= 0.017, ES= -0.757) (Fig. 5a). Regarding self-compassion, the common humanity component increased at post-training (p= 0.011, ES= -0.802) and follow-up (p= 0.014, ES= -0.778) with respect to pre-training (Fig. 5b). Concerning empathy, the personal distress decreased at post-training (p= 0.049, ES= 0.624) and follow-up (p= 0.007, ES= -0.857) with respect to pre-training (Fig. 5c). The self-reported well-being increased at post-training with respect to pre-training (p= 0.021, ES= -0.732) but did not remain by follow-up (Fig. 5d). All data are shown in online resources 5 to 7.

Long-term effects of the KY training on the psychometric tests (pre- vs post- vs follow-up)

When comparing pre-, post- and follow-up self-reported questionnaires in the KY group (n=13; note the difference in the n with previous analysis due to participants' dropout), the factor acting with awareness of the FFMQ increased at post-training (p= 0.033, ES= -0.593) and at follow-up (p= 0.016, ES= -0.670) with respect to pre-training. The non-judging factor also increased at follow-up with respect to pre-training (p= 0.027, ES= -0.613) and post-training (p= 0.028, ES= -0.610) (Fig. 6a). Concerning self-compassion, the self-kindness component increased at post-training (p= 0.037, ES= -0.579) and follow-up (p= 0.028, ES= -0.610) with respect to pre-training (Fig. 6b). The self-reported stress decreased at post-training with respect to pre-training (p= 0.001, ES= -0.884), and it increased at follow-up with respect to post-training (p= 0.015, ES= 0.674) (Fig. 6c). All data are shown in online resources 8 to 10.

Comparison of the effects of MSC and KY training on psychometric data at follow-up.

When comparing self-reports between groups at follow-up (MSC: n=10, KY: n=13), the observing factor of the FFMQ was higher in the MSC than in the KY group (p= 0.029, ES= -0.454), as well as the total FFMQ (p= 0.046, ES= -0.415) (Fig. 7). All data are shown in online resource 11.

Empathy for pain Task

Short-term effects of MSC and KY trainings on the empathy for pain task (pre- vs post-)

To evidence the short-term effects of the MSC and KY trainings on experimental empathic responses, pre- and post-training EPT results were compared.

Concerning the MSC group (n=13), no differences in affective empathy -empathic concern and personal distress- were found between pre- and post-training. Meanwhile, for cognitive empathy, the accuracy in the intentionality comprehension was higher at post-training than at pre-training only when the harm was intentional (p=0.034, ES= -0.588) (online resource 12).

Concerning the KY group (n=15), no differences in the accuracy in intentionality comprehension were found between pre- and post-training. When comparing affective empathy components, only the personal distress decreased post-training when the harm was intentional (p= 0.038, ES= -0.535) (Fig. 8; online resource 13).

Long-term effects of MSC and KY training on the empathy for pain task (pre- vs post- vx follow-up)

To evidence the long-term effects of the trainings on the EPT, pre-, post-training and follow-up data were compared (note the difference in the n with previous analysis due to participants' dropout).

The MSC group (n=10) showed no significant differences between the three time points either in cognitive or affective empathy. All data are shown in online resources 14 to 16.

Concerning the KY group (n=12), the empathic concern for intentional harm decreased post-training (p=0.050, ES=0.380), and the personal distress for intentional harm decreased both at post-training (p=0.004, ES=0.720) and at follow-up (p=0.021, TE= 0.670) when compared with pre-training (Fig. 9). No significant differences between the three time points were found regarding accuracy in intentionality comprehension. All data are shown in online resources 17 to 19.

Comparison of the effects of MSC and KY training on the empathy for pain task

When comparing the EPT between MSC and KY trainings at pre-training, post-training (MSC n=13; KY n=15) and follow-up (MSC n=10; KY n=12), no statistical differences in affective or cognitive empathy were observed (online resources 20 to 22).

Discussion

The well-being of teachers is often neglected, despite the fact that they play an essential role not only in the academic but also in the mental, social, and emotional well-being of students (Lever et al., 2017). Uruguayan female public preschool and primary school teachers exhibit high levels of stress and burnout and low levels of well-being (INEEd, 2020), and express the need for more competencies related to coexistence, emotional education and relationships (INEEd, 2021b).

The present study is the first one quantitatively investigating the psychological effects of the MSC program on female primary school teachers, focusing on the trainable skills of self-compassion and mindfulness, as well as on stress, well-being and empathy. Furthermore, to the best of our knowledge, this is the first study that investigates the effects of virtual MSC training within the context of the COVID-19 pandemic. We hypothesized that a 9-week virtual MSC training (Neff & Germer, 2013) would increase primary school teachers' mindfulness and self-compassion, improve well-being and empathy and reduce stress.

We studied short-term and long-term effects of the virtual MSC program, and compared the results with an active control group that was trained in KY.

Previous to MSC or KY trainings, the participants exhibited moderate values in the mindfulness, self-compassion and empathy dimensions studied. Interestingly, in spite of the pandemic, stress and well-being variables also showed moderate values. The MSC and KY groups did not differ in any of these variables before training.

Our results show that a virtual MSC training during the pandemic improved mindfulness and self-compassion in Uruguayan female teachers. This is in line with previous research involving in-person (Neff & Germer, 2013; Jiménez-Gómez et al., 2022) and online MSC trainings in other target populations (Campo et al., 2017; Yeung et al., 2021).

As mentioned before, due to the participants' dropout, the data of the pre- vs post-training (short-term) and pre- vs post-training vs follow-up (long-term) were analyzed separately.

The MSC training showed a positive impact on the components observing and non-reactivity of the mindfulness skills, as well as on the total mindfulness score at post-training. This was as expected, since observing is a central component of mindfulness, with attention being trained to intentionally direct towards one's own breathing and experience. MSC is a program that cultivates mindfulness and self-compassion. Thus, the increase in the non-reactivity component is consistent with the improved ability to become aware of personal thoughts and feelings without reacting or trying to change them. The MSC training also positively impacted on the three positive facets of self-compassion: self-kindness, common humanity, and mindfulness. The fact that over-identification was not affected is consistent with the observed increase in non-reactivity. Considering the intertwining of mindfulness and self-compassion, an increase in mindfulness would decrease self-judgment (Neff, 2003) but the opposite holds for the present results. Although teachers' self-kindness increased after MSC training, self-judgment -its opposite facet- also increased, and over-identification and isolation did not decrease. However, since an improvement in self-kindness would relate to a decrease in negative emotional experiences (Neff, 2003), the increase in self-kindness found in our results might be indicating a phenomenon in process that would eventually lead to a decrease in self-judgment with further training.

Concerning the long-term effects of the MSC program on mindfulness and self-compassion, the component observing of mindfulness increased post-training and remained high at follow-up, the total

mindfulness skill increased from pre-training to follow-up, and the non-judging increased from post-training to follow-up. Furthermore, the common humanity also increased post-training and remained high three months later. These results indicate that the effect lasted at least 3 months after the termination of the intervention. Importantly, the effect sizes of all of these results were large, indicating a high and long-lasting impact of the MSC intervention.

The KY virtual intervention also impacted several of the mindfulness and self-compassion dimensions. The observing and acting with awareness components of mindfulness, as well as the total mindfulness increased post-training. Like MSC intervention, in KY attention is directed toward the body and breathing, which explains the positive effect of this practice on these components of mindfulness. Concerning self-compassion, self-kindness, self-judgment and over-identification components increased after KY training. Albeit being negative factors, one should not expect the self-compassion elements to be favored with this practice as this ability is not explicitly cultivated. Regarding the long-term effects of the KY training, acting with awareness and self-kindness increased post-training and remained high three months later, while the non-judging component of mindfulness increased from post-training to follow-up, indicating the process in progress. All the reported results of the KY intervention had a high effect size.

The comparison between MSC and KY effects with regard to mindfulness and self-compassion showed differences only for the mindfulness skill at follow-up. Observing and total mindfulness were higher in the MSC than in the control group, showing moderate effect sizes. These results could be explained by the fact that specific training in mindfulness skills takes place in the MSC program, in which mindfulness is considered one of the central aspects of self-compassion (Neff, 2003). Although the KY involves some mindfulness skills, this is not the focus of the practice. However, since MSC and KY are both mind and body practices (National Library of Medicine, 2019), based on paying attention to breathing and being aware of the present moment, the differences were not so marked. Intriguingly, no differences in self-compassion were found between MSC and KY groups.

Training in MSC was effective in reducing teachers' perceived stress and increasing their perceived well-being, consistent with previous findings (Klingbeil & Renshaw, 2018; Berkovich-Ohana et al., 2019). The perceived stress diminished post-training, with a moderate effect size, while the perceived well-being increased, with a large effect size. This is in line with previous findings, which demonstrate an inverse association between self-compassion and negative mental states, including depression, stress and anxiety (Ferrari et al., 2019; Li et al., 2019; Neff, 2023). Self-compassion fosters a more self-supportive approach to stressful situations, recognizing them as part of life and thus reducing rumination and the perception of threat (Neff et al., 2007). Training in mindfulness and self-compassion reduces stress, burnout and rumination (Shapiro et al., 2005; Roeser et al., 2013; Kirby et al., 2017; Tarrasch et al., 2020). Furthermore, the self-kindness, connectedness and presence dimensions of self-compassion allow better coping with negative emotions and lead to satisfying and meaningful feelings even when suffering, which may explain the mental positive status enhanced by self-compassion (Zessin et al., 2015; Neff, 2023). In effect, our results show that teachers trained in MSC increased self-kindness, common humanity, mindfulness and well-being.

However, contrary to our expectations and inconsistent with previous research (Neff & Germer, 2013; Tarrasch et al., 2020), the improvements in perceived stress and well-being were not sustained over time, raising the question whether the Covid-19 pandemic-related issues might have partly opposed to MSC training effects. In this regard, Pressley et al., (2021) noted that teachers became frontline workers during the pandemic, which contributed to higher levels of stress (Pressley, 2021), and primary school teachers tended to show an elevated level of burnout (Pellerone, 2021). Facing new challenges -either providing in-person, hybrid or virtual lessons- that included having to adapt their pedagogical and technological approaches o innovative classroom environments, coping with students' and parents' difficulties emerging from the current situation, and the fear of contracting the disease are among the most outstanding factors (Marshall et al., 2020; Pressley et al., 2021) that added to the teachers' pre-existing workload (Kyriacou, 2001; Corbin et al., 2019). Alves et al. (2020) showed that the perception of work-related well-being decreased during the pandemic, with special concern about the professional future. Allen et al. (2020) reported that teachers were more inclined to agree on the negative impact of the pandemic on their mental health, and that female teachers presented higher work-related anxiety than their male counterparts. Due to the COVID-19 pandemic, teachers had to cope with changing ways of teaching as time progressed, which required innovative approaches that included new pedagogies while assuming supporting functions for the students and their families (OECD, 2020). For online classes, optimal use of digital resources was required both for teachers and students and/or their families, and for in–person classes, the use of masks and respecting physical distancing was mandatory. Interestingly, a report on the opening of schools in Uruguay in 2020 (Alarcón & Mendez, 2020) noted that among a series of measures specifically created to mitigate teachers' concerns, an emotional containment plan aimed at protecting staff members was being the least concrete point at the moment. It is important to note that, during the time we collected our data, participants' teaching approaches oscillated between in-person and distance learning depending on each teacher and class' specific situation at each given moment.

Similar results regarding stress and well-being post-training were observed in the KY group, decreasing stress and increasing well-being, with large effect sizes. However, in this group, the decrease in the perceived stress post-training was transitory, since the analysis of the long-term results showed an increase from post-training to follow-up. These results showed large effect sizes. This might be suggesting that the KY group benefited from the practice but did not consolidate it as a habit or did not develop the skills necessary for continued practice. When contrasting MSC versus KY training effects on stress and well-being, no differences were found post-training or three months later.

In this work, we have paid special attention to empathy. Training in MSC positively impacted the perceived empathy, since perspective-taking increased and personal distress decreased post-training, with large effect sizes. These results are consistent with previous research using the same psychometric instrument (Davis, 1983), showing higher perspective-taking and lower personal distress in relation to increased self-compassion (Neff & Pommier, 2013; Birnie et al, 2010). Such outcomes were expected since cultivating self-compassion contributes to compassionately approaching others and connecting with their needs (Wiklund & Wagner, 2013). It also improves self-caring, thus permitting such connection without neglecting self-care (Neff, 2003; Solomon et al., 2021). Perspective-taking is a central dimension

of cognitive empathy that involves the experience of putting oneself in another person's shoes and understanding their situation (Preston & Hofelich, 2012). However, if this is accompanied by an overwhelming preoccupation due to sharing others' negative emotions, the motivation is towards relieving one's own discomfort and not that of others (Eisenberg & Eggum, 2009). Personal distress is an unpleasant response that emerges when the other's experience of suffering cannot be separated from the personal one, focused on the self rather than the other. As such, personal distress would promote putting into action self-protective avoidance behaviors to the detriment of altruistic attitudes (Preston & Hofelich, 2012; Decety, 2010). As proposed by Neff (Neff, 2023), by increasing perspective-taking and reducing personal distress, self-compassion enables reducing the separation between individuals.

With regard to the KY training, no differences in the perception of empathy were found either post-training or at follow-up.

Analyzing the long-term effects of the MSC program on perceived empathy, the personal distress diminished post-training and remained at follow-up, exhibiting large effect sizes. This may indicate an ongoing process, with long-lasting effects on self-kindness as a protective factor in promoting self-regulation when coping with negative emotions (Allen & Leary, 2010). However, no change was observed concerning perspective-taking three months later.

The impact of the MSC training on personal distress became evident also when comparing empathy components between groups, with lower levels of personal distress in the MSC group than in the KY group post-training, with moderate effect size.

Practices of the MSC training such as "Compassion with Equanimity" focus on balancing compassion for others with compassion towards oneself, as a means of sustaining empathic behaviors while self-providing kindness and support (Neff & Germer, 2013). The self-kindness cultivated by these kinds of practices may be reflected on the results hereby reported.

Although the IRI is the most widely used instrument to assess empathy, it relies on self-beliefs about one's own empathic abilities (Hall & Schwartz, 2019). Thus, it was our interest to also explore the ability to infer the content of others' feelings and thoughts by performing the EPT. We assessed empathic abilities by means of an EPT at pre-, post-training and follow-up. The performance of this experimental task allowed for assessing empathic abilities in the context of intentional or accidental harm (Baez et al., 2014, 2016, 2017). The intentionality comprehension of the inflicted harm, the empathic concern and the personal distress were evaluated. As posed by Ickes (2009) and Baez (2014), self-reports can be effective in measuring how empathic the participants regard themselves, while experimental tasks are more precise at measuring how they infer other's thoughts and feelings, which is essential for successful social interaction (Decety & Jackson, 2004).

Consistent with the effects on self-perception of empathy, the MSC training impacted cognitive empathy assessed by the EPT, since the accuracy in the intentionality comprehension increased post-training, with a large effect size. This reflects the capacity to take the other's perspective, by understanding and

recognizing other's intentions, motivations and emotional state (Decety & Jackson, 2004). Such outcomes were observed only when the harm was intentional, which is described as a common finding in previous studies employing EPT (Decety et al., 2012; Baez et al., 2014, 2016, 2017). As argued by Baez et al. (2014), accidental harm is not as conspicuous as intentional, thus leading to greater ambiguity and hindering the process of attributing intentionality. Furthermore, moral transgressions are interpreted as more serious when they are intentional than accidental (Blair & Blair, 2009), while higher arousal has been reported when harm is intentional (Decety et al., 2012).

However, no effects of the MSC program were observed post-training on the affective empathy dimensions studied with the EPT.

No changes in cognitive or affective empathy were observed when assessing the EPT outcomes at follow-up.

It is important to note that more conspicuous outcomes resulting from the MSC training were observed for the self-reported than the EPT instrument to assess empathy. In this regard, it should be taken into account that self-reported responses could be influenced by social desirability (Baez et al, 2017; Schumacker & Hoi, 2017). As discussed in Erten (2015), it would be difficult to disagree on altruistic purposes when being asked, especially when altruistic reasons prevail among teachers' motivations, so these types of instruments could be reflecting responses perceived by the participants as socially desirable. Aldrup et al. (2022) posit that a teacher's implicit caring role may lead to the assumption of possessing higher empathy levels than real. In this concern, it is argued that EPT paradigms approach empathy less explicitly than self-evaluation and may elicit more automatic responses, thus eluding the influence of social desirability (Baez et al., 2017).

Concerning the KY intervention, although the KY training did not affect perceived empathy, it impacted affective empathy when measured by the EPT. Intriguingly, while the personal distress for intentional harm diminished both short-term and long-term, a decrease was also observed in the empathic concern for intentional harm post-training. The effect size was large in all cases. This is interesting, since empathic concern and personal distress are respectively driven by altruistic and egoistic motivations (Fabi et al., 2019).

The outcomes above mentioned were not reflected in the comparison between groups, since no differences were found when contrasting MSC versus KY training effects on the EPT.

Summarizing, the results presented in this study show that virtual MSC training was effective in improving mindfulness and self-compassion skills in Uruguayan primary school teachers. Furthermore, this practice led to stress reduction and increased well-being, as well as improving both affective and cognitive empathy dimensions. Remarkably, all these significant findings account for moderate to large effect sizes.

By the end of the MSC intervention, training had improved the mindfulness skill, both assessed by the FFMQ and the SCS. As Neff explains, mindfulness provides the foundation for self-compassion, since it allows recognizing we are in pain while it prevents us from engaging in harsh criticism and over-identification. Being aware, we can adopt a compassionate perspective towards the challenges we are to cope with (Neff, 2023). This practice also improved compassionate elements of self-compassion, although the uncompassionate self-judgment also increased. However, it can be argued that, since self-kindness and self-judgment are two poles of a continuum (Neff, 2016), the transition from one to the other was in progress by the end of MSC training.

As expected, stress and well-being also improved by the end of the MSC training, even in the context of a pandemic that presented multiple challenges as previously described. Indeed, self-compassion could have represented a protective resource for better coping with the Covid-19 threat (Deniz, 2021). Furthermore, self-perception of empathic abilities improved with this practice, with increased perspective-taking and decreased personal distress, two fundamental elements that allow prosocial behaviors. Mounting evidence supports that the practice of meditation, in particular based on mindfulness and loving-kindness, helps improve prosocial behaviors (Luberto, 2018). Although the underlying mechanisms are not clear yet, it is argued that these practices lead to improved well-being, emotional regulation and tolerance to distress, which would permit better coping with the sufferings of others (Luberto, 2018; Neff, 2023). In this line, Gilbert poses that compassionate behaviors increase parasympathetic activity, while uncompassionate actions promote sympathetic responses (Gilbert 2005). Supporting this proposal, Poli et al. (2012) review reported that mindfulness-based interventions promote parasympathetic action and increase the vagal tone, thus counteracting the stress response (Kok et al., 2013; Poli et al, 2012). When measuring empathic abilities post-training in MSC by an EPT, results concerning cognitive empathy by testing the accuracy in intentionality comprehension were consistent with self-perceptions. However, no differences were found concerning affective empathy post-training with this task.

Interestingly, when comparing the short-term effects of the MSC versus the KY interventions on self-perceptions of mindfulness, self-compassion, stress, well-being and empathy, only the latter showed differences among groups, with lower personal distress in the MSC than the KY group. In this regard, it is important to note that the KY intervention positively impacted on mindfulness skills, stress and well-being. However, although KY increased self-kindness, it also increased two uncompassionate elements of self-compassion, and empathic self-perception did not change. Despite these findings on self-reports, personal distress diminished post-training in KY when measuring with the EPT.

The comparison of short-term effects of both interventions on the EPT paradigm showed no differences as well.

In a previous study comparing a mindfulness-based intervention, including self-compassion, hatha yoga, and a control group with no intervention, both intervention groups increased mindfulness and decreased stress in comparison to the control group at follow-up (one month later). However, self-compassion only increased in the mindfulness-based intervention (Falsafi, 2016)

Long-term effects of the MSC training -three months later- were studied in a smaller sample due to the dropout. Remarkably, MSC impacted favorably on components of mindfulness, self-compassion and affective empathy self-reports. However, the effects of MSC on stress and well-being did not sustain over time, leading us to consider these results in the context of the COVID-19 pandemic at the time. No long-term effects of the MSC training were observed on the EPT. The KY intervention also led to long-term increases in perceived mindfulness and self-compassion components, and to personal distress decrease when assessed by the EPT.

When comparing MSC with KY training long-term effects both on self-reports and the EPT, only mindfulness skills were higher in the MSC than in the KY group.

All findings emerging from the EPT were observed only for intentional harm, consistent with previous reports (Decety et al., 2012; Baez et al., 2014, 2016, 2017).

Conclusions

This is the first study reporting the effects of the MSC program (Neff & Germer, 2013) on mindfulness, self-compassion, stress, well-being and empathy in school teachers. Our results show that a virtual MSC training during pandemics improved mindfulness and self-compassion in Uruguayan teachers. MSC and KY -the active control- shared some post-training effects on mindfulness abilities, an expected finding since both practices rely on directing attention towards breathing and the body. Positive self-compassion components and empathy components increased with the MSC training, which is in line with the idea of the connection between self-compassion and compassion to others (Gilbert, 2009). Being MSC and KY contemplative practices, both interventions effectively decreased stress and increased well-being, although stress in the KY group increased again by follow-up. Comparison of the effects of MSC and KY trainings showed lower personal distress post-training and higher mindfulness abilities at follow-up in the MSC group. The favorable results elicited by MSC training on self-compassion and empathy evidence the impact of cultivating self-compassion and support the advantages of training such ability. Effect sizes here reported were high in most cases, and never small, stressing the relevance of the results.

Our results provide new evidence to support the implementation of the MSC program as a means to promote well-being and reduce stress of primary school teachers while improving their self-compassion and empathy.

Limitations

Limitations to this study should be mentioned. Concerning the number of participants,

a larger sample might have led to more conspicuous outcomes, with more differences emerging in the comparisons performed, both within groups and between groups. Dropout by follow-up reduced even more the sample, obliging to separately assess data from the pre- and post-training and data from pre-, post-training and follow-up.

Moreover, despite the great interest manifested by those interested in participating, only 10% of them met the inclusion criteria. Challenging issues related to the pandemic context should also be mentioned, such as achieving the participants' adherence despite the virtuality and the drop off mainly for medical reasons or related circumstances. Ideally, the use of profession-specific questionnaires to assess teachers' empathy would have been convenient, but such instruments are not available in Spanish yet.

Future directions

Although the characteristics of the interventions here implemented do not allow high numbers of participants, future research on this topic may benefit from larger samples to improve reliability, since small samples may be susceptible to inflated effect sizes (Button et al., 2013). Future studies should record the participant's percentage of attendance to the training sessions in order to consider such information for the interpretation of the results. Furthermore, information regarding the continuity of practice in the months following the interventions should be gathered.

When assessing the effects of a particular meditation-based intervention, a control group receiving no training would be convenient in addition to an active intervention control group. Finally, more specific questionnaires adapted to our population will become necessary.

Declarations

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Ethics approval and consent

The protocol of this study was approved by the Human Research Ethics Committee of the IIBCE (#001, 2018). Participants gave their written informed consent in accordance with the Declaration of Helsinki.

The authors declare no competing interests.

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Figures

Figure 1

Empathy for pain task. Modified version of the task developed by Baez et al. (2017). Examples of the three situations of the EPT -intentional harm, neutral, and accidental harm- are shown in the rows. Durations of the presentations of the pictures were 500, 200 and 1000 ms from left to right.

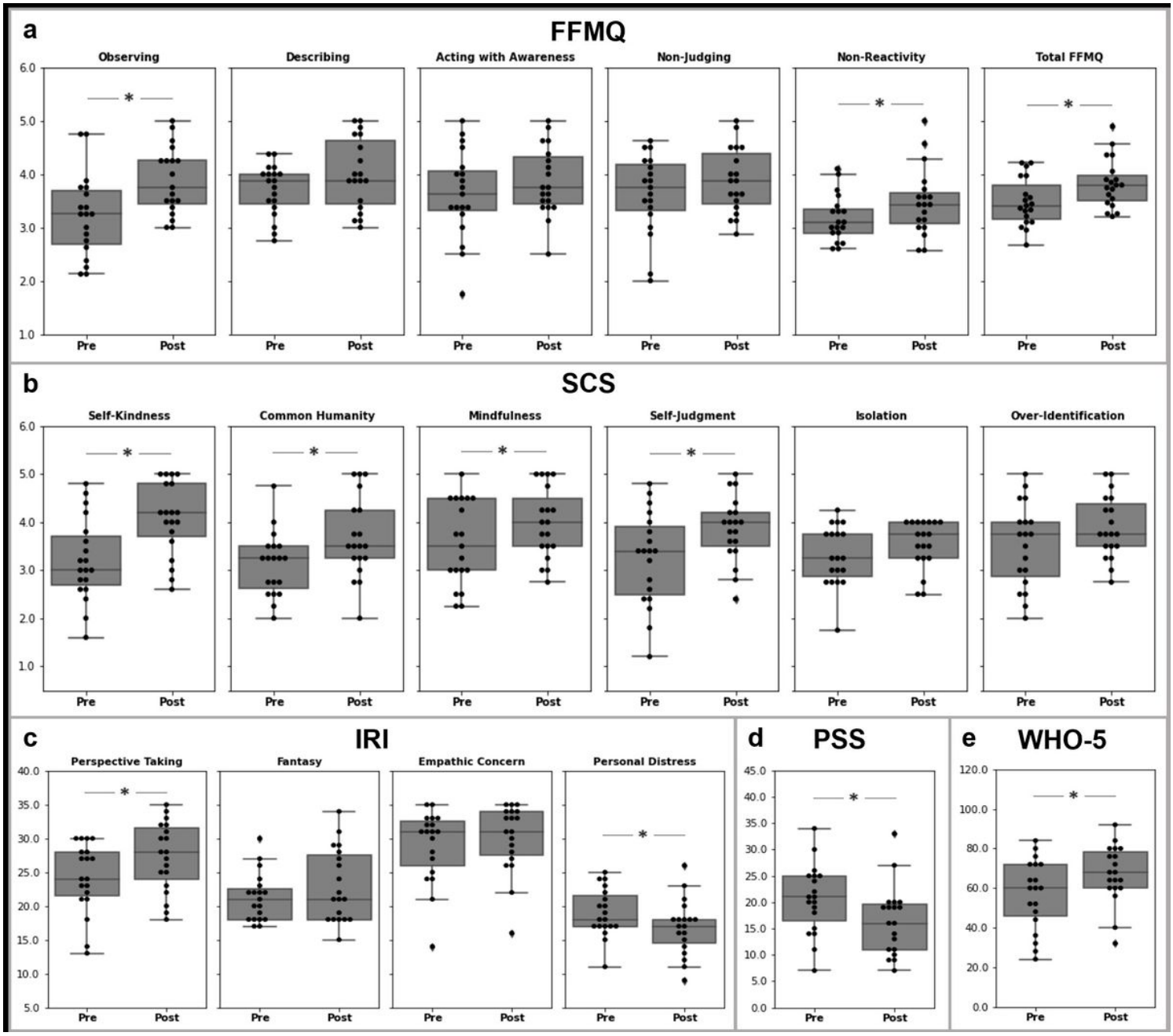

Figure 2

Psychometric tests comparing pre- vs post- Mindful Self-Compassion training (n=19). Asterisks indicate significant differences ($p<0.05$). Error bars indicate the interquartile range. a. *FFMQ =* Five Facet Mindfulness Questionnaire; b. *SCS =* Self-Compassion Scale; c. *IRI =* Interpersonal Reactivity Index; d. *PSS =* Perceived Stress Scale; e. *WHO-5 =* World Health Organization-Five Well-Being Index

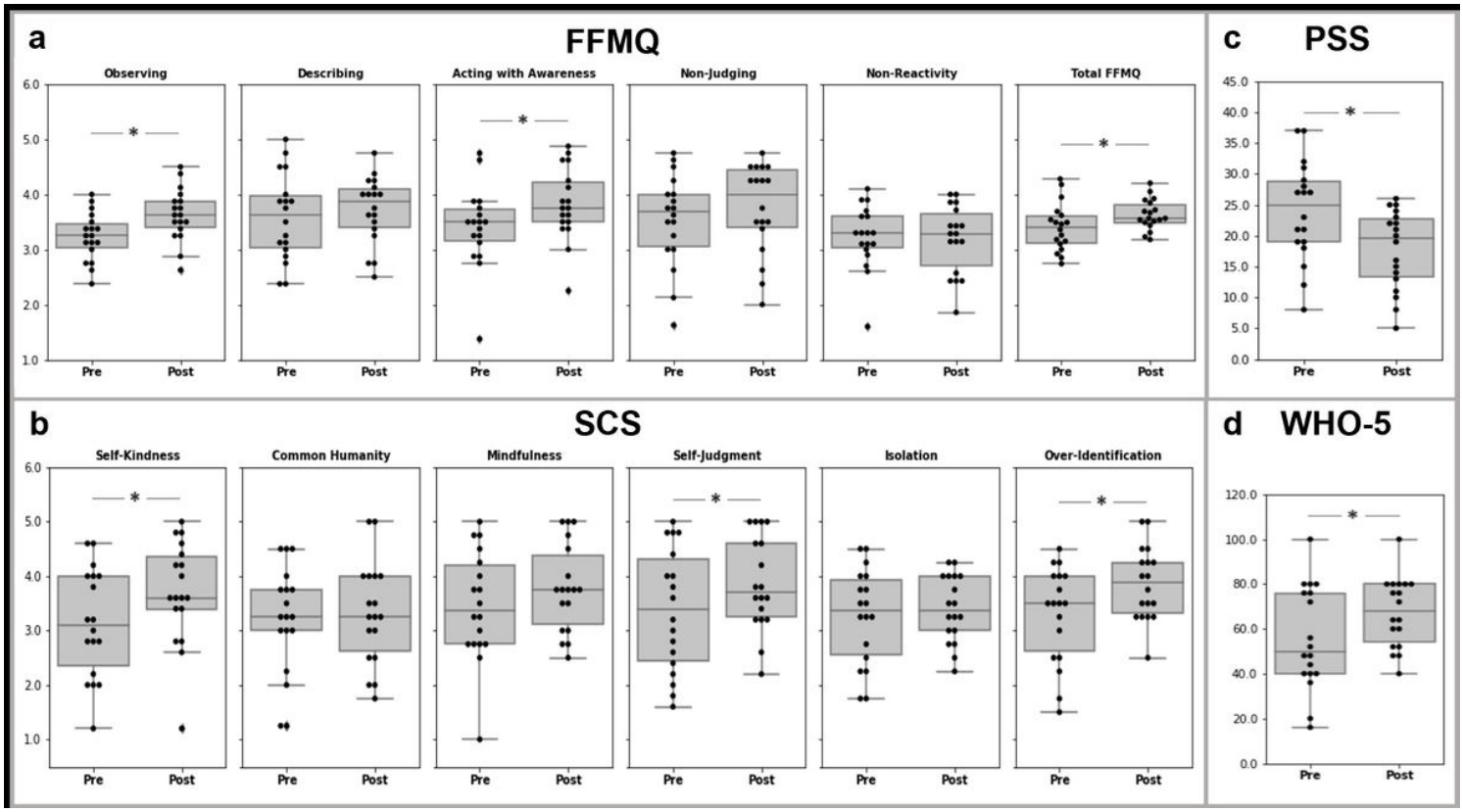

Figure 3

Psychometric tests comparing pre- vs post- Kundalini Yoga training (n=18). Asterisks indicate significant differences ($p<0.05$). Error bars indicate the interquartile range. a. *FFMQ* = Five Facet Mindfulness Questionnaire; b. *SCS*= Self-Compassion Scale; c. *PSS* = Perceived Stress Scale; d. *WHO-5 =* World Health Organization-Five Well-Being Index

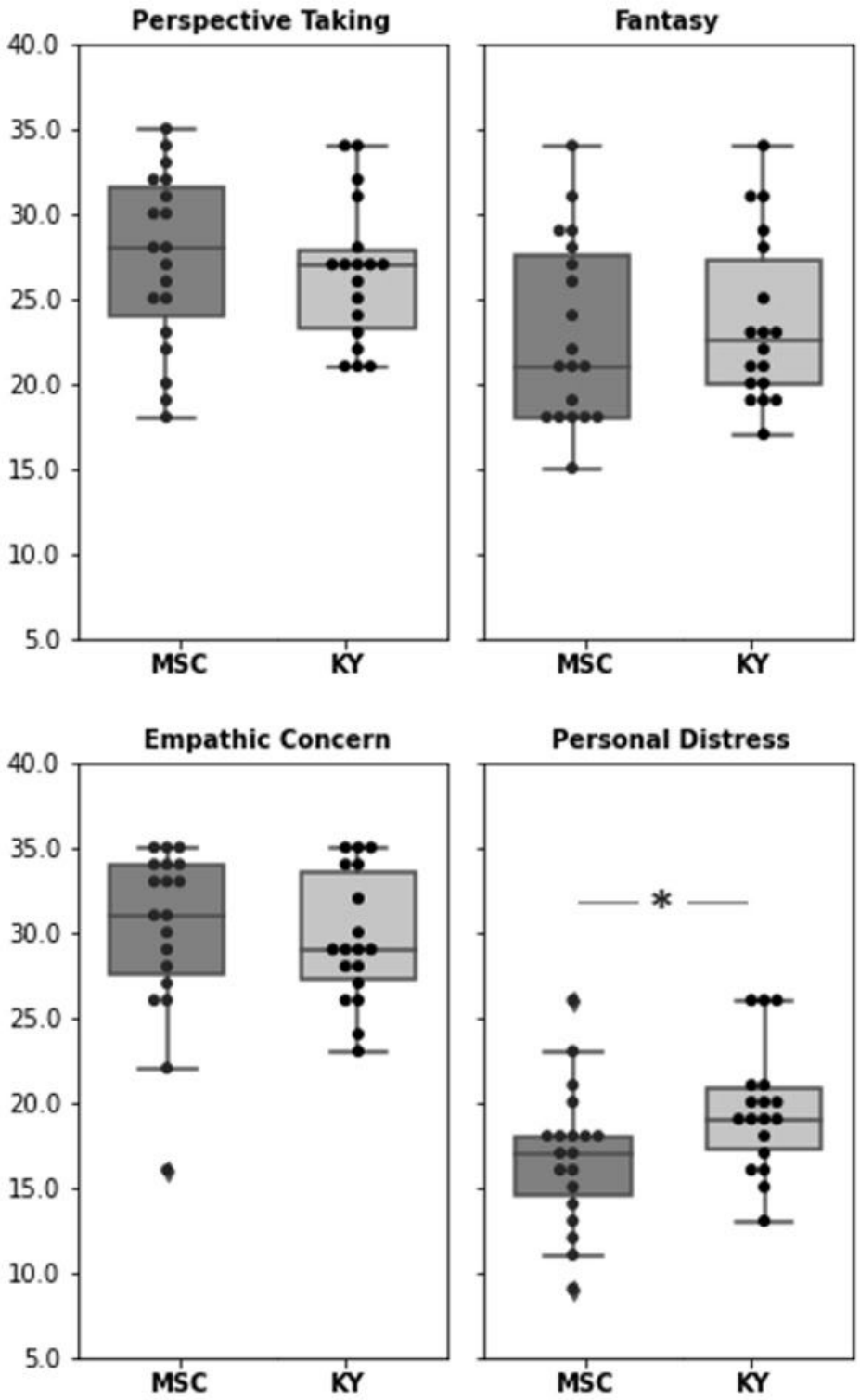

Figure 4

Interpersonal Reactivity Index comparing Mindful Self-Compassion (n=19) vs Kundalini Yoga (n=18) trainings at post-training. Asterisks indicate significant differences ($p<0.05$). Error bars indicate the interquartile range.

Note. KY= Kundalini Yoga; *MSC* =Mindful Self-Compassion

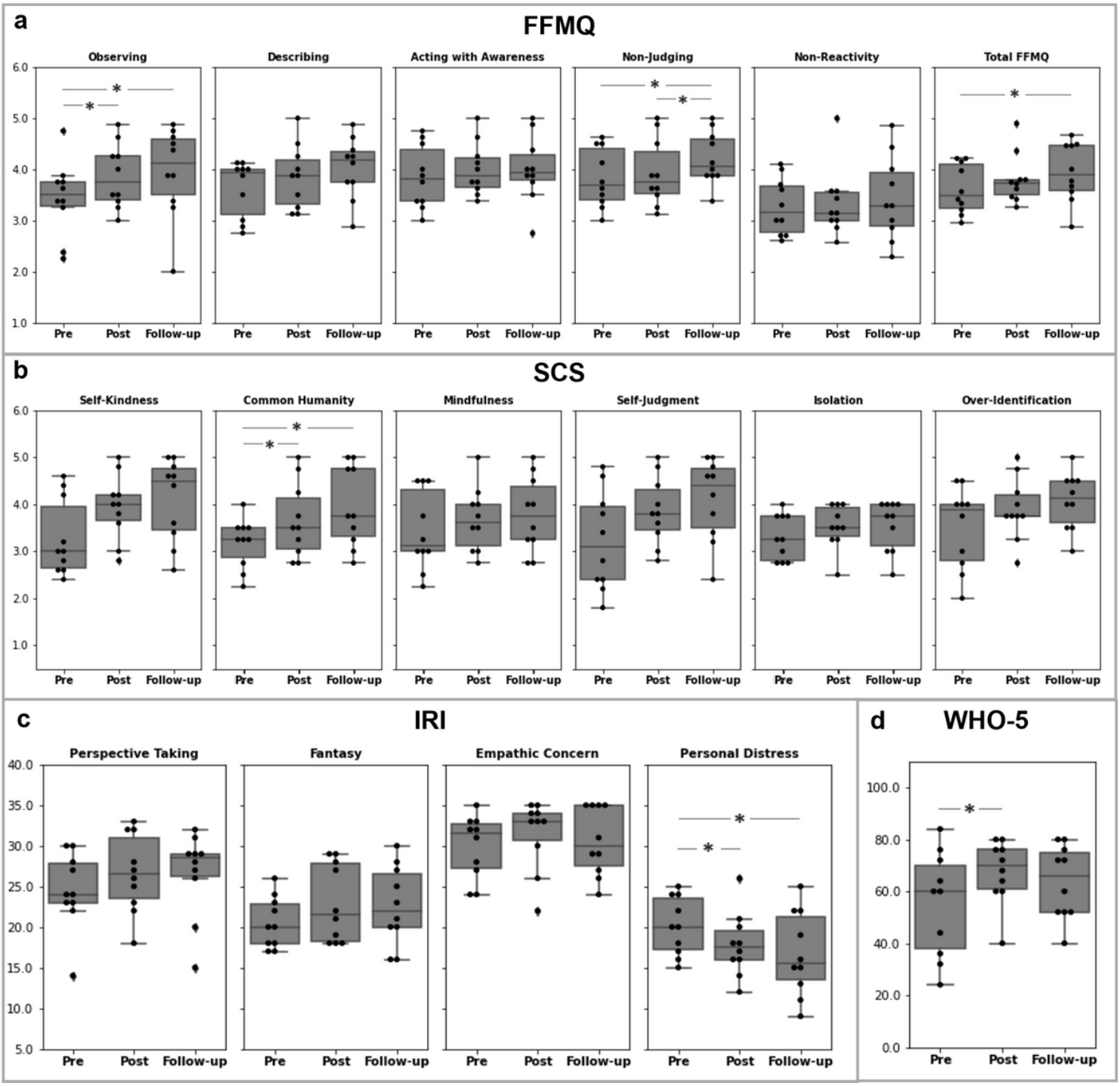

Figure 5

Psychometric tests comparing Mindful Self-Compassion training at pre-, post-training and follow-up (n=10). Asterisks indicate significant differences ($p<0.05$). Error bars indicate the interquartile range. a. *FFMQ*= Five Facet Mindfulness Questionnaire; b. *SCS*= Self-Compassion Scale; c. *IRI* = Interpersonal Reactivity Index; d. *WHO-5* = World Health Organization-Five Well-Being Index

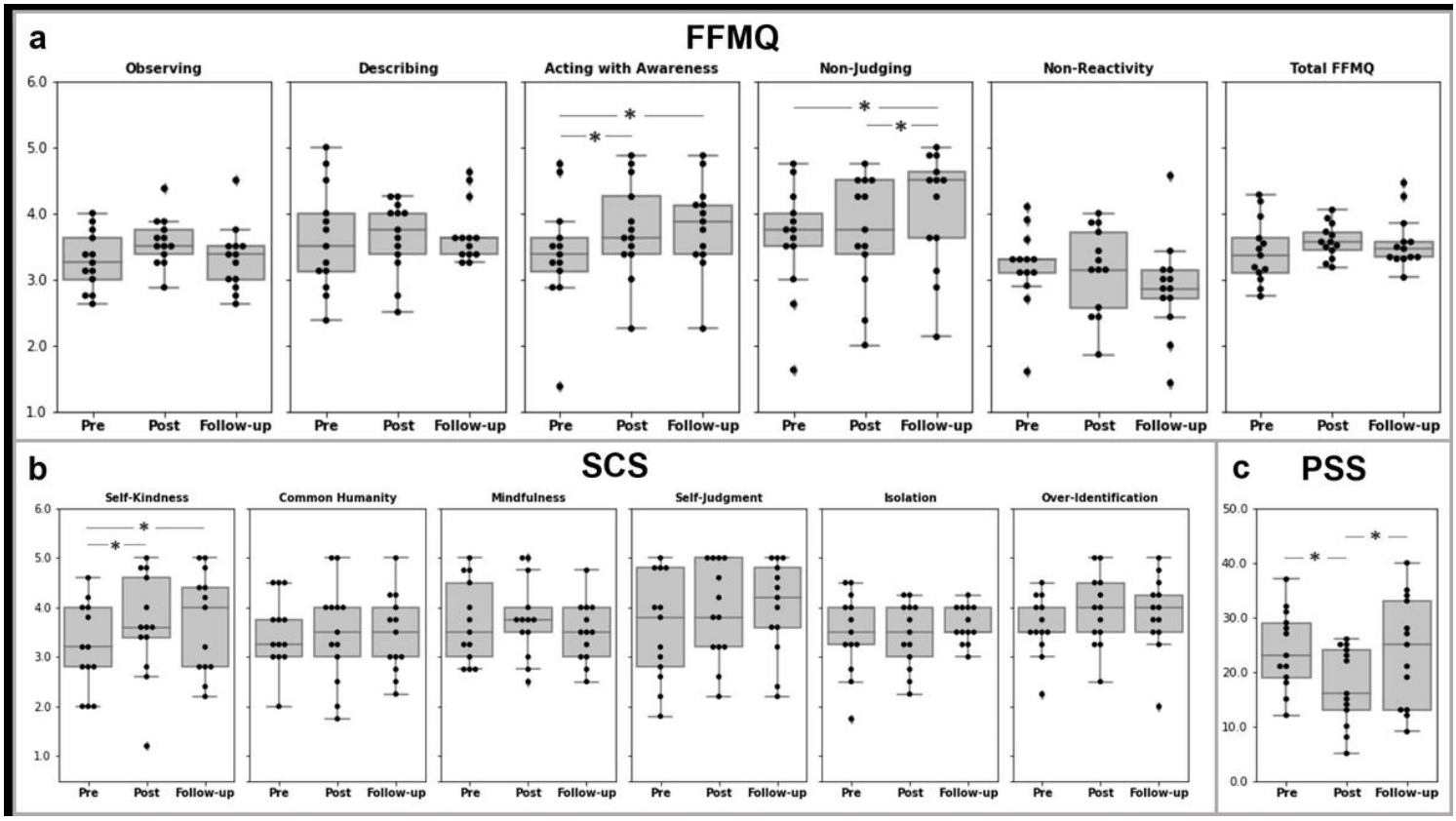

Figure 6

Psychometric tests comparing Mindful Self-Compassion training at pre-, post-training and follow-up (n=10). Asterisks indicate significant differences ($p<0.05$). Error bars indicate the interquartile range. a. *FFMQ*= Five Facet Mindfulness Questionnaire; b. *SCS*= Self-Compassion Scale; c. *IRI =* Interpersonal Reactivity Index; d. *WHO-5 =* World Health Organization-Five Well-Being Index

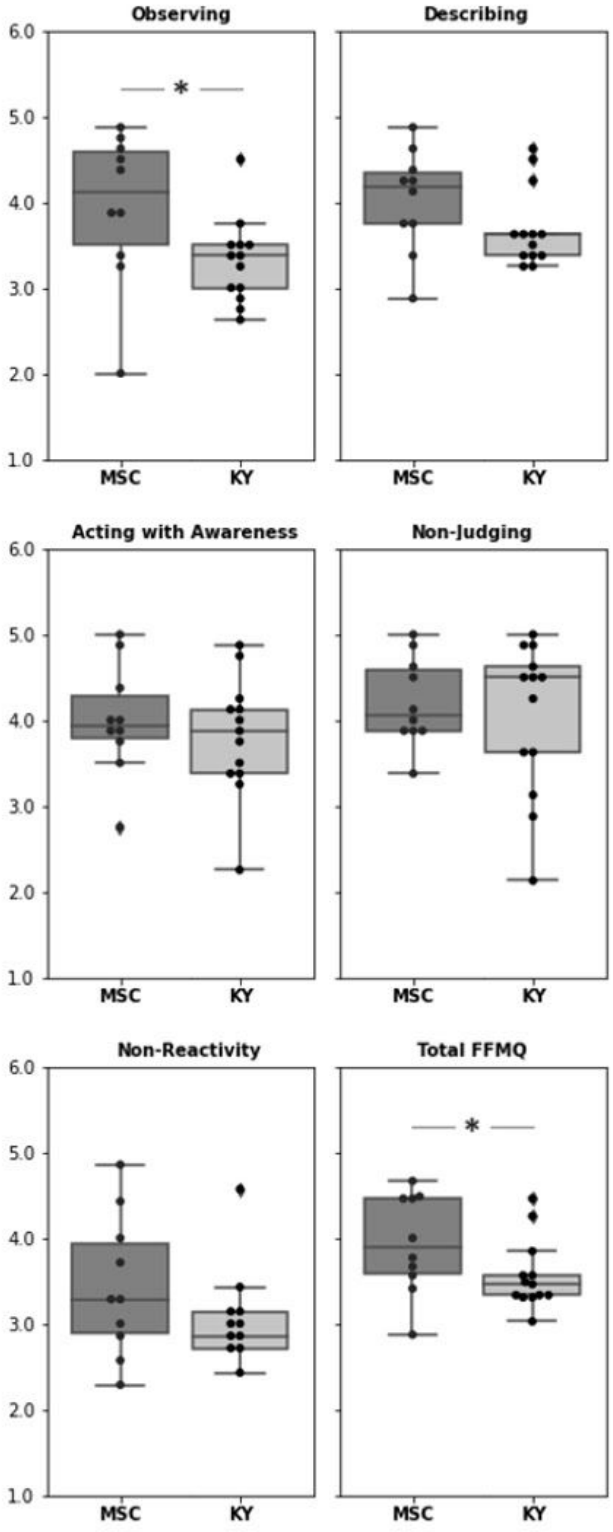

Figure 7

Five Facet Mindfulness Questionnaire comparing Mindful Self-Compassion (n=10) vs Kundalini Yoga (n=13) trainings at follow-up. Asterisks indicate significant differences ($p<0.05$). Error bars indicate the interquartile range

Note. FFMQ = Five Facet Mindfulness Questionnaire; *KY*= Kundalini Yoga; *MSC* = Mindful Self-Compassion

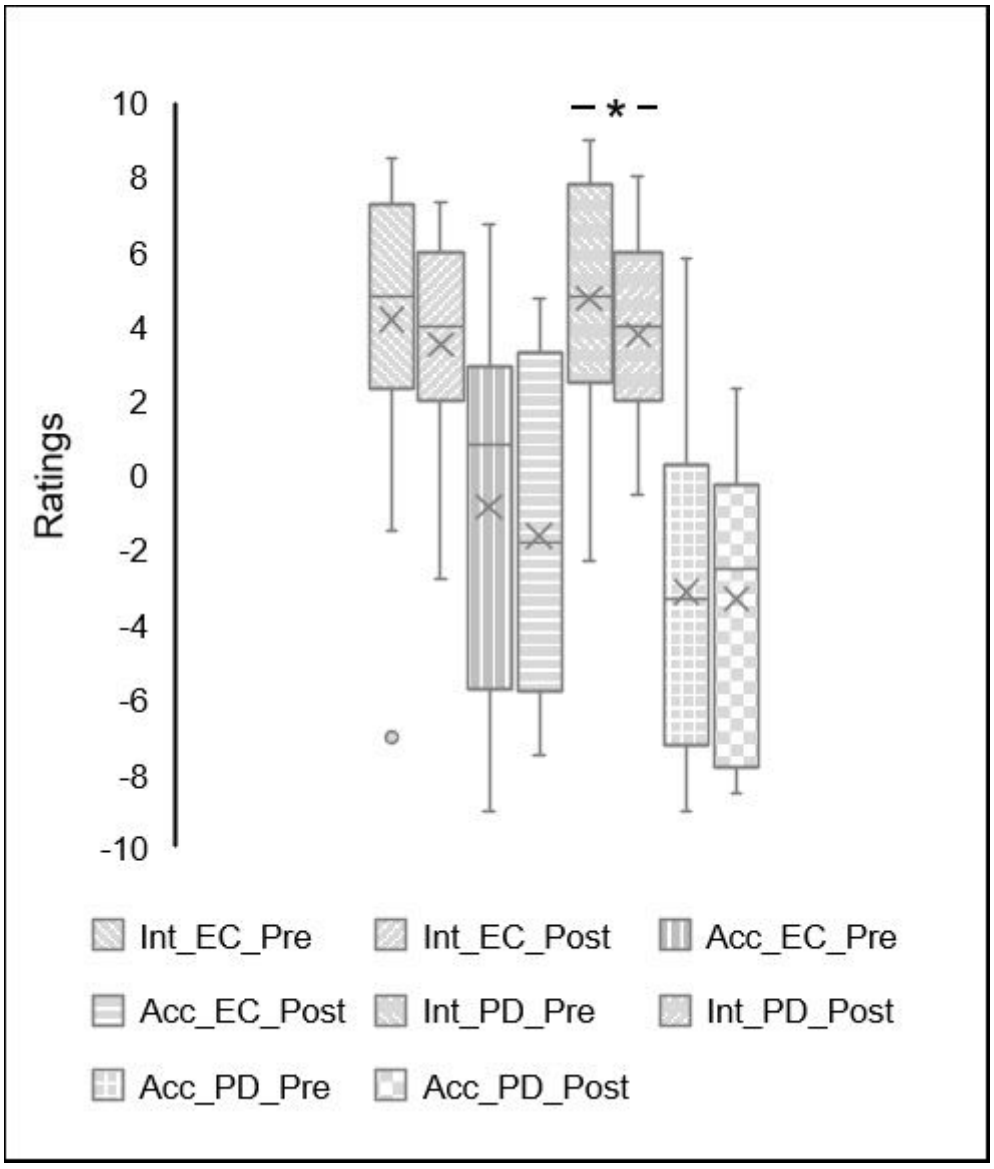

Figure 8

Empathy for pain task comparing pre- vs post- Kundalini Yoga training (n=15). Asterisks indicate significant differences ($p<0.05$). Error bars indicate the interquartile range.
Note. Int = intentional; *Acc* = Accidental; *EC* = Empathic Concern; *PD* = Personal Distress

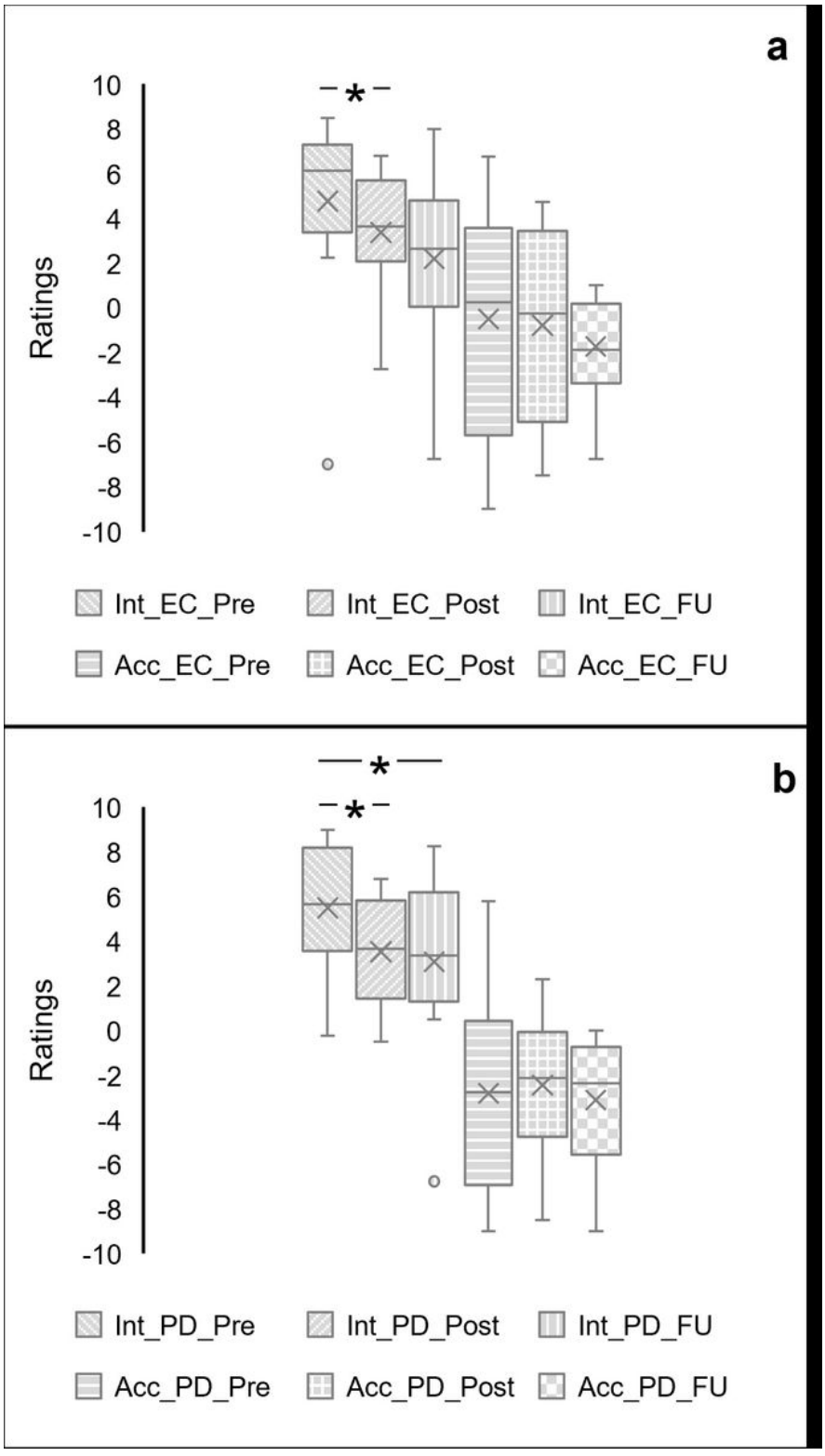

Figure 9

Empathy for pain task comparing Kundalini Yoga training at pre-, post-training and follow-up (n=12). Asterisks indicate significant differences ($p<0.05$). Error bars indicate the interquartile range.

Note. Int = intentional; *Acc* = Accidental; *EC* = Empathic Concern; *PD* = Personal Distress; *FU* = follow-up

Supplementary Files

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