



Training for Mindfulness Teachers: Benefits for Mindfulness, Well-being, and Emotion Regulation

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Abstract

Objectives This study examined the effects of a 9-month mindfulness teacher training (MTT) program on mindfulness skills, emotion regulation, and psychological well-being among future mindfulness instructors, compared to a control group.

Method Eighty-seven mindfulness instructors-in-training participated in the MTT program. The control group consisted of age- and gender-matched individuals. Mindfulness skills, emotion regulation, and psychological well-being were assessed at baseline, mid-intervention, and post-intervention using validated measures.

Results In comparison with the control group, participants in the MTT group showed significant improvements in most facets of mindfulness (i.e., observe, describe, non-react, and act with awareness). They also reported decreased rumination, as well as increased personal growth and purpose in life compared to the control group. However, there were no significant differences between the groups in other dimensions of emotion regulation or psychological well-being.

Conclusions This study provides preliminary evidence that mindfulness teacher trainings positively affect mindfulness skills, as well as specific aspects of psychological well-being (personal growth and purpose in life), and emotion regulation (rumination). Future research should investigate the long-term effects of these trainings and how instructors' well-being relates to their teaching effectiveness.

Preregistration This study is not preregistered.

Keywords Mindfulness meditation · Mindfulness teachers · Emotion regulation · Psychological well-being

Mindfulness has been defined as the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment (Kabat-Zinn, 2003). The

origins of what is commonly referred to as mindfulness are rooted in Buddhism and in Buddhist meditations, such as Vipassana meditation (Gunaratana, 1991) and Zen meditation (Kapleau, 1965). Based on these meditations, the practice of mindfulness has been more recently incorporated into several secular 8-week group programs, such as Mindfulness-Based Stress Reduction (MBSR) (Kabat-Zinn, 1990) and Mindfulness-Based Cognitive Therapy (MBCT) (Segal et al., 2012). In the last two decades, the benefits of mindfulness-based interventions (MBIs), such as MBSR and MBCT, on both psychological and physical health have been increasingly supported by several systematic reviews and meta-analyses (e.g., Goldberg et al., 2018; Houry et al., 2015; Zhang et al., 2021).

The growing popularity of mindfulness and the evidence of the benefits of mindfulness practice on psychological and physical health have been accompanied by a proliferation of training programs for future mindfulness teachers (Griffith et al., 2021). Of note, past literature on MBIs emphasizes the teacher's personal embodiment of mindfulness as central to

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an effective delivery and participant outcomes (Crane et al., 2010, 2012, 2013; Griffith et al., 2021). Indeed, according to Crane and colleagues, a core principle of MBIs is that they foster a shift from a “doing” mode (focused on problem-solving) to a “being” mode (present-moment awareness and acceptance) and that this shift is modeled by teachers through their own mindfulness practice and embodiment (Crane et al., 2010, 2012, 2013; Griffith et al., 2021).

Taking into account the need for mindfulness teachers and the risks that market pressures could lead to minimally trained teachers and potential adverse effects from practice, international guidelines for high-quality teacher training programs have been developing to ensure integrity, quality, and ethical practice (e.g., Kenny et al., 2020). These guidelines focus on training pathways and teacher progression including, among others, a minimum of training hours. These training hours include at least a mandatory silent retreat being before teaching begins, a minimum number of taught courses, as well as extensive continued professional development, regular silent retreats, and ongoing supervision or mentorship (Kenny et al., 2020). Of note, preliminary evidence suggests that a higher amount of training (such as that associated with an additional year of mindfulness-based teacher training and supervision), but not teacher’s basic mindfulness-based teaching and individual meditation experience, could be associated with course participants’ increases in well-being and reductions in perceived stress (Ruijgrok-Lupton et al., 2018).

Research on mindfulness teacher training is still quite limited. Beyond the relevant theoretical reflections and guidelines on the form and content of these trainings (Crane et al., 2010, 2012, 2020; Griffith et al., 2021; Kenny et al., 2020), there are a few studies that investigated the experiences of mindfulness teacher trainees during the training itself (Fontana et al., 2024; Marx et al., 2015), and only one study that employed a validated questionnaire to measure the changes that occurred during the mindfulness teacher trainings (Crane et al., 2020). A significant gap thus remains in the understanding of how these trainings impact future mindfulness teachers.

Mindfulness teachers must embody the qualities they aim to cultivate in their students (Crane et al., 2010; Kabat-Zinn, 2003). This includes modeling and fostering key mindfulness facets — observe, describe, act with awareness, non-judge, and non-react — as measured by the Five Facet Mindfulness Questionnaire (Baer et al., 2006). Also, examining the extent to which the training affects emotion regulation skills or well-being of future mindfulness teachers, such as the ability to manage difficult emotions and cultivate positive emotional states, is essential for fostering a supportive learning environment (Crane et al., 2010; Kenny et al., 2020). There are also implications for ethical and responsible mindfulness instruction. For instance, by fostering greater

well-being in instructors, training programs could help prevent burnout and compassion fatigue, while ensuring that teachers remain able to provide safe and effective guidance to their students, a critical issue for health care professionals (e.g., Di Benedetto & Swadling, 2014; Mesmer-Magnus et al., 2017). Finally, cultivating greater emotional awareness and regulation in teachers could enhance their capacity for empathy and responsiveness to their students’ needs, ultimately contributing to a more positive and supportive learning experience.

This study aimed at examining the effects of a 9-month mindfulness teacher training program on (a) specific facets of mindfulness, (b) emotion regulation skills, and (c) psychological well-being, in comparison with an age- and gender-matched control group. By identifying which specific aspects of mindfulness, emotion regulation, and well-being are most impacted by training, this research could directly inform the design and refinement of teacher training curricula. Based on available evidence on the benefits of mindfulness meditation practice, we hypothesized that participants in the training program would generally show greater improvements in mindfulness skills, emotion regulation, and psychological well-being as compared with control individuals.

Method

Participants

The study included two groups of participants. The mindfulness teacher training (MTT) group was drawn from a sample of 87 mindfulness instructors-in-training, who participated in a 9-month MTT program enabling them to become MBIs’ teachers. They were medical doctors or psychologists, some of whom were psychotherapists or psychotherapists in training as well, aged between 24 and 68, without psychiatric disorders.

The study also included a control (CTR) group of 63 participants. Participants in the MTT group were asked to identify a person they knew as a control subject of the same age, gender, and educational level and with no major health problem. Most of the MTT participants were able to identify a control subject with these characteristics. The participants’ flow chart is presented in Fig. 1.

Procedure

Participants in the MTT group were drawn from five consecutive courses organized by the School of Cognitive Psychotherapy-SPC in Italy over a 5-year period (2018–2022). The courses were held in person and were guided by one of the authors (AC), who is a medical doctor specialized in

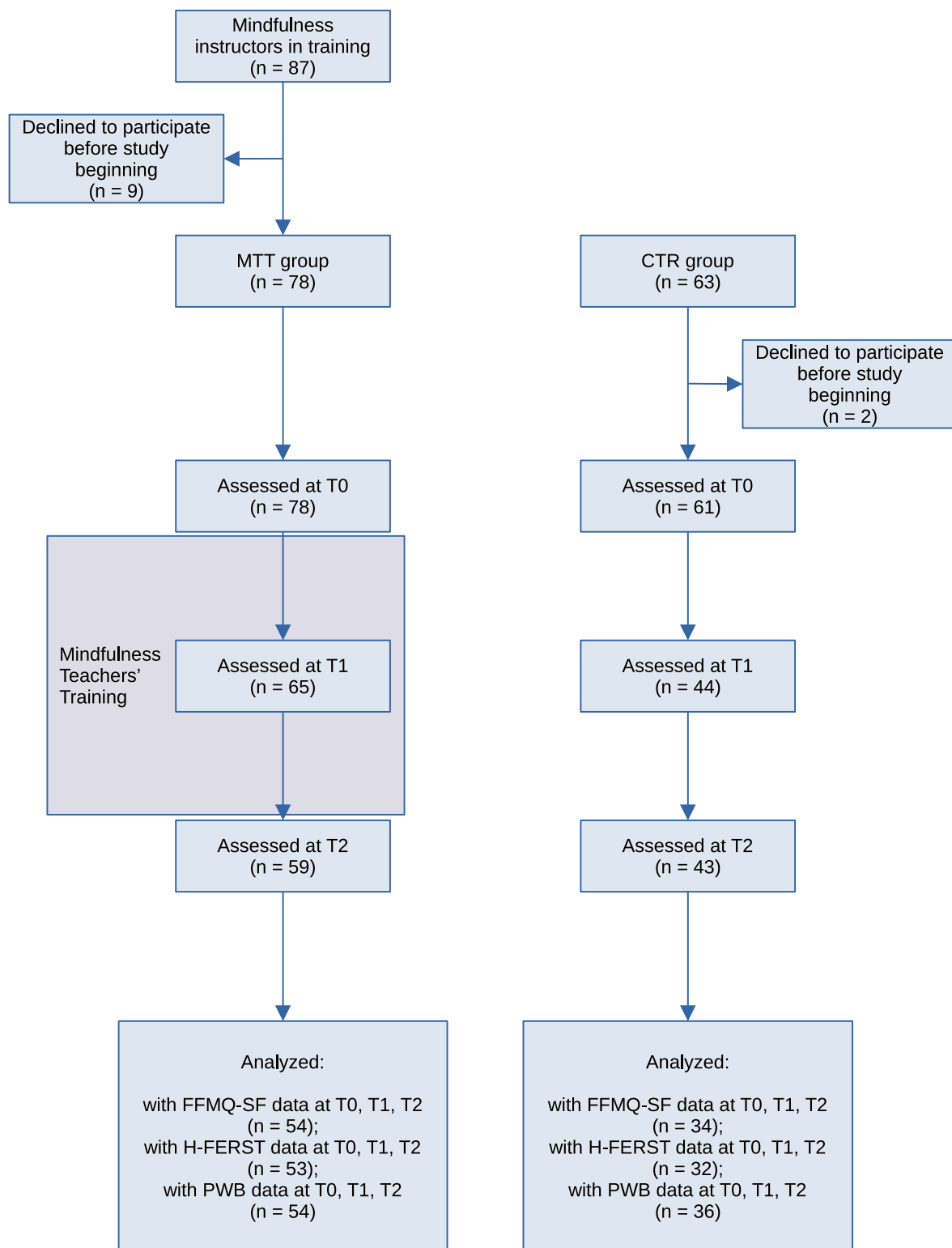


Fig. 1 The participants flow chart diagram. Abbreviations: CTR, control; FFMQ-SF, Five Facet Mindfulness Questionnaire Short-Form; H-FERST, Heidelberg Form for Emotion Regulation Strategies;

MTT, Mindfulness Teacher Training; PWB, Psychological Well-being scale. Notes: T0=before the MTT; T1=5 months after the beginning of the MTT; T2=at the conclusion of the 9-month MTT

psychiatry and psychotherapy with several years of experience as a meditation practitioner, as well as certified mindfulness teacher, and instructor of mindfulness teachers. The MTT program included four 3-day residential retreats, each of which included at least 16 h of mindfulness meditation practice, 5 h of lectures, and 4 h of supervised mindfulness practice. Retreats following the first one were held approximately 2, 5, and 9 months after the first meeting.

Participants in the MTT group were asked to complete the questionnaires mentioned in the next section in the 7 days before the first retreat (assessment Time T0), in the 7 days following the third retreat (assessment Time T1, approximately 5 months after the beginning of the MTT), and in the 7 days following the last retreat (assessment Time T2, at the completion of the 9-month MTT).

Participants in the CTR group were included in the study to compare results observed in the sample of mindfulness instructors in training with a control sample not undergoing mindfulness training. Participants in the CTR group completed the questionnaires at the same time points as the MTT group. Participants in both groups filled in paper questionnaires in each of the three assessment sessions. Written informed consent was obtained from participants before the first assessment session. No incentives were given to participants for completing the questionnaires.

Measures

Mindfulness skills were assessed with the Five Facet Mindfulness Questionnaire Short-Form (FFMQ-SF; Bohlmeijer et al., 2011), in its Italian version (Iani et al., 2017). This 24-item instrument uses a 5-level Likert scale (ranging from 1 = *never or very rarely true* to 5 = *very often or always true*). Respondents were asked to indicate how frequently they have had each of the listed experiences in the last month (example items: “I notice the smells and aromas of things,” “I find myself doing things without paying attention”). The FFMQ-SF provides scores for five mindfulness subscales: Observe, Describe, Act with awareness, Non-judge (of inner experience), and Non-react (to inner experience). Higher scores in these scales reflect a greater level of mindfulness. In this study, FFMQ-SF showed an adequate internal consistency: overall McDonald’s omegas coefficients for the five facets were 0.83, 0.79, 0.87, 0.87, and 0.72, respectively.

Emotion regulation was assessed with the Heidelberg Form for Emotion Regulation Strategies (H-FERST; Barnow, 2015) in its 27-item Italian short version (Iani & Lombardo, 2015). In this self-report questionnaire, respondents are asked to indicate how frequently they typically experience the content of each item by using a 5-level Likert scale (ranging from 1 = *never* to 5 = *always*). Higher scores reflect higher levels of emotion regulation. The H-FERST provides scores for nine 3-item subscales, each corresponding

to a distinct dimension of emotion regulation: (s1) Rumination (example item: “When I have negative feelings, I often brood over the question, why I am feeling this way”), (s2) Reappraisal (example item: “When I want to feel better, I concentrate on the good aspects of a situation”), (s3) Acceptance (example item: “I am able to tolerate and endure uncomfortable situations”), (s4) Problem-solving (example item: “I think about possible solutions of how to change the situation”), (s5a) Suppression of emotional expression (example item “I hide physical expressions of my feelings”), (s5b) Suppression of emotional experience (example item “I rarely let my emotions run high, but keep them down”), (s6) Avoidance (example item: “I try to avoid thoughts about things that weigh me down”); (s7a) Activities and social support (example item “I often talk about my emotions with my partner or my close friends”); (s7b) Distraction (example item “Sometimes I buy something so as to feel better, even though I do not need it”). In this study, overall McDonald’s omegas for these nine subscales were all acceptable except that referring to 7a subscale (α -values 0.80, 0.79, 0.82, 0.86, 0.82, 0.74, 0.75, 0.60, and 0.67, respectively). The 7a subscale was excluded from the analysis.

Psychological well-being was assessed with the Psychological Well-being (PWB) scale (Ryff, 1989), in its 18-item Italian version (Sirigatti et al., 2009). In this self-report questionnaire, respondents are asked to indicate their agreement/disagreement with each statement by using a 6-level Likert scale (ranging from 1 = *strongly disagree* to 6 = *strongly agree*). The PWB scale provides scores for six subscales, each representing a specific domain of psychological well-being: Self-acceptance (example item: “I like most parts of my personality”), Autonomy (example item: “I tend to be influenced by people with strong opinions”), Environmental mastery (example item: “The demands of everyday life often get me down”), Personal growth (example item: “For me, life has been a continuous process of learning, changing, and growth”), Positive relations with others (example item: “I know I can trust my friends, and they know they can trust me”), and Purpose in life (example item: “Some people wander aimlessly through life but I am not one of them”). Higher scores indicate higher levels of psychological well-being in the specific subscale. In this study, overall McDonald’s omegas for the PWB subscales were 0.83, 0.69, 0.71, 0.77, 0.73, and 0.77, respectively.

Personality traits were assessed with the Big Five Inventory (BFI) questionnaire (John et al., 1991), in its 44-item Italian version (Ubbiali et al., 2013). This is a widely used self-report tool designed to measure five personality traits (John et al., 2008, p. 138): Extraversion (“implies an energetic approach toward the social and material world and includes traits such as sociability, activity, assertiveness, and positive emotionality”; 8 items; item example: “I see myself as someone who is talkative”), Agreeableness (“contrasts

a prosocial and communal orientation towards others with antagonism and includes traits such as altruism, tender-mindedness, trust, and modesty”; 9 items; item example: “I see myself as someone who has a forgiving nature”), Conscientiousness (“describes socially prescribed impulse control that facilitates task- and goal-directed behavior, such as thinking before acting, delaying gratification, following norms and rules, and planning, organizing, and prioritizing tasks”; 9 items; item example: “I see myself as someone who perseveres until the task is finished”), Neuroticism (“contrasts emotional stability and even-temperedness with negative emotionality, such as feeling anxious, nervous, sad, and tense”; 8 items; item example: “I see myself as someone who is depressed, blue”), and Openness to experience (“describes the breadth, depth, originality, and complexity of an individual’s mental and experiential life”; 10 items; item example: “I see myself as someone who values artistic, aesthetic experiences”). Participants are asked to rate the extent to which each item applies to them on a 5-point Likert scale, ranging from “disagree strongly” to “agree strongly.” In this study, the BFI showed acceptable internal consistency: overall McDonald’s omegas for the five subscales were 0.86, 0.60, 0.81, 0.82, and 0.86, respectively. The BFI was used to check for any differences between the MTT and CTR groups at baseline (assessment Time T0).

Data Analyses

The statistical analysis was performed with R version 3.6.3. First, the missing responses from each participant’s questionnaire were analyzed, separately for the four questionnaires used. In case of missing responses, if the percentage of missing responses equaled or exceeded 30% of the total number of questionnaire items, the participant’s questionnaire was deemed incomplete and subsequently excluded from analysis; if the percentage was below 30%, the missing responses were imputed by substituting each missing value with the nearest response level to the average score of the corresponding group in the corresponding item. Among the final study data (Fig. 1), the percentage of imputed values for missing responses on the total number of responses were 0.9% for FFMQ-SF, 0.4% for H-FERST, and 0.2% for PWB.

Second, the questionnaire scores were calculated. For each of the FFMQ-SF, H-FERST, and PWB questionnaires separately, only participants who completed the study (i.e., those with scores at all three assessment time points) were included in the main analysis. To examine possible differences between participants who completed the study and participants lost after the baseline assessment, their baseline FFMQ-SF, H-FERST, and PWB scores were compared by using the Welch independent-sample *t*-test. Moreover, to examine baseline personality differences between MTT and CTR participants who completed the study, baseline BFI

scores of participants who completed this questionnaire were compared by using again the Welch independent-sample *t* test.

Third, the main analysis of the study concerned a series of 2×3 mixed-model analyses of variance (ANOVAs) on the FFMQ-SF, H-FERST, and PWB scores. In these analyses, the “Group” variable (with levels: MTT, CTR) was considered a between-subject factor, and the “Time” variable (with levels: T0, T1, T2) was considered a within-subject factor. Due to various violations of the assumption of normality in the within-group distribution of the FFMQ-SF, H-FERST, and PWB scores, as assessed with the Shapiro–Wilk normality test, robust ANOVAs on trimmed means were used. These ANOVAs provide *Q* statistics and *p* values for the main effects of Group and Time, as well as for the Group \times Time interaction. The level of trimming was set to the default value of 20%. Effect sizes for the effects found in the ANOVAs were provided in terms of partial eta squared (η_p^2). The post hoc pairwise contrasts were performed using the Holm–Bonferroni procedure.

Sample size was obtained with a-priori power analysis using G-Power 3.1 (Faul et al., 2009). Given that no previous information was available concerning the changes in FFMQ-SF, H-FERST, and PWB scores among mindfulness instructors in training, it was assumed for each outcome a small effect size of $f=0.15$ ($\eta_p^2=0.02$) for the between-within interaction in the ANOVA. The minimum sample size to obtain an expected power ($1-\beta$) of 0.80, assuming a probability of type I error of $\alpha=0.05$, was 74 participants.

All effects are reported as significant at $p < 0.05$.

Results

One hundred thirty-nine participants were assessed at the beginning of the study (Fig. 1): among these, there were 78 of the 87 mindfulness instructors in training and 61 of the 63 participants who initially agreed to participate in the study as controls. At the end of the study, after screening for missing or incomplete questionnaire entries at T0, T1, or T2, the overall study sample was composed of 92 participants (F/M: 66/26) who provided FFMQ-SF, H-FERST, or PWB data at all three assessment points. More specifically, the valid retained questionnaires filled at the three assessment points were 88 for FFMQ-SF, 85 for H-FERST, and 90 for PWB.

At baseline (Time = T0), there were no significant differences between the participants who were included in the main analysis of the study (i.e., those with scores at all three assessment time points) and those who were lost after the baseline assessment in terms of FFMQ-SF, H-FERST, and PWB scores (for all completers across the FFMQ-SF, H-FERST, and PWB measures: $|t| \leq 1.23$, $p \geq 0.23$). In terms of baseline personality, both MTT and CTR groups of study

completers were close to the reference population, as their average scores in the five BFI subscales were all within 0.56 standard deviations from the average score of the reference population (Ubbiali et al., 2013). The MTT vs. CTR group comparison of baseline BFI scores reveal a significant difference in the Conscientiousness trait (higher for the MTT group in all three sets of FFMQ-SF, H-FERST, and PWB study completers who also completed the BFI questionnaire: $t \geq 2.04$, $p \leq 0.05$), a marginal difference in the Openness trait (scores were similar in the two groups within the FFMQ-SF and H-FERST sets: $t \leq 1.76$, $p \geq 0.08$; scores were higher in the MTT group within the PWB set: $t = 2.08$, $p = 0.04$), and no differences in the other BFI traits (for all three sets: $|t| \leq 1.22$, $p \geq 0.23$).

Mindfulness Skills

In the analysis of the FFMQ-SF scores, a total of 88 participants were included, with 54 participants from the MTT group and 34 participants from the CTR group (Table 1). Group \times Time interaction effects were found in the subscales of Observe, Act with awareness, Non-react, and Describe.

In the Observe subscale, main effects of Group (MTT > CTR; $Q = 6.33$, $p = 0.02$, $\eta_p^2 = 0.10$) and Time (T0 < T1; $Q = 5.38$, $p < 0.01$, $\eta_p^2 = 0.03$) were observed, as well as a Group \times Time interaction effect ($Q = 4.39$, $p = 0.02$, $\eta_p^2 = 0.14$): scores were similar in the MTT and CTR groups at T0 ($p = 0.68$), and were greater in the MTT group at T1 ($p < 0.01$) and T2 ($p < 0.01$). In the Describe subscale, a main effect of Group (MTT > CTR; $Q = 14.08$, $p < 0.01$, $\eta_p^2 = 0.18$) was observed, as well as a Group \times Time interaction effect ($Q = 3.79$, $p = 0.03$, $\eta_p^2 = 0.05$): scores were greater in the MTT group at all three time points, but the between-group difference increased over time ($p_{T0} = 0.03$, $p_{T1} < 0.01$, $p_{T2} < 0.01$). In the Act with awareness subscale, a Group \times Time interaction effect ($Q = 6.19$, $p < 0.01$, $\eta_p^2 = 0.10$) was observed: scores were similar in the two groups at T0 and T1 ($p = 0.06$ and $p = 0.75$, respectively), and greater in the MTT group at T2 ($p < 0.01$). In the Non-judge subscale, main effects of Group (MTT > CTR; $Q = 24.14$, $p < 0.01$, $\eta_p^2 = 0.23$) and Time (T0 < T1 and T0 < T2; $Q = 8.42$, $p < 0.01$, $\eta_p^2 = 0.10$) were observed. In the Non-react subscale, main effects of Group (MTT > CTR; $Q = 7.66$, $p < 0.01$, $\eta_p^2 = 0.10$) and Time (T0 < T1 and T1 < T2; $Q = 9.16$, $p < 0.01$, $\eta_p^2 = 0.17$) were observed, as

Table 1 Scores and results of the ANOVAs for the Five-Facet Mindfulness Questionnaire Short-Form (FFMQ-SF). CTR control, M mean, MTT Mindfulness Teacher Training, SD standard deviation

FFMQ-SF subscale	Time	MTT group		CTR group		ANOVA		
		n	M (SD)	n	M (SD)	Group effect	Time effect	Group \times Time effect
Observe	T0	54	3.48 (0.64)	34	3.54 (0.88)			
	T1	54	3.96 (0.58)	34	3.43 (0.90)			
	T2	54	4.03 (0.62)	34	3.30 (0.93)	$Q = 6.33$, $p = 0.02^*$	$Q = 5.38$, $p < 0.01^{**}$	$Q = 4.39$, $p = 0.02^*$
Describe	T0	54	3.84 (0.43)	34	3.56 (0.74)			
	T1	54	3.96 (0.54)	34	3.54 (0.63)			
	T2	54	4.16 (0.45)	34	3.52 (0.73)	$Q = 14.08$, $p < 0.01^{***}$	$Q = 1.30$, $p = 0.28$	$Q = 3.79$, $p = 0.03^*$
Act with awareness	T0	54	3.23 (0.70)	34	3.55 (0.88)			
	T1	54	3.60 (0.61)	34	3.55 (0.90)			
	T2	54	3.69 (0.56)	34	3.27 (0.90)	$Q = 0.12$, $p = 0.74$	$Q = 1.29$, $p = 0.28$	$Q = 6.19$, $p < 0.01^{**}$
Non-judge	T0	54	3.65 (0.77)	34	2.99 (0.92)			
	T1	54	3.97 (0.76)	34	3.34 (0.85)			
	T2	54	4.10 (0.64)	34	3.21 (0.90)	$Q = 24.14$, $p < 0.01^{***}$	$Q = 8.42$, $p < 0.01^{**}$	$Q = 0.91$, $p = 0.41$
Non-react	T0	54	2.96 (0.56)	34	2.78 (0.62)			
	T1	54	3.20 (0.49)	34	2.95 (0.53)			
	T2	54	3.44 (0.52)	34	2.98 (0.52)	$Q = 7.66$, $p < 0.01^{**}$	$Q = 9.16$, $p < 0.01^{***}$	$Q = 3.26$, $p < 0.05^*$

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

well as a Group \times Time interaction effect ($Q=3.26, p<0.05, \eta_p^2=0.10$): scores were similar in the MTT and CTR groups at T0 ($p=0.16$), and were greater in the MTT group at T1 ($p=0.03$) and T2 ($p<0.01$).

Emotion Regulation

In the analysis of the H-FERST scores, a total of 85 participants were included, with 53 participants from the MTT group and 32 participants from the CTR group (Table 2). The only Group \times Time interaction effect was found in the

(s1) Rumination subscale. Here, main effects of Group (MTT < CTR; $Q=9.56, p<0.01, \eta_p^2=0.11$) and Time (T0 < T1 and T0 < T2; $Q=11.68, p<0.01, \eta_p^2=0.11$) were observed, along with the Group \times Time interaction effect ($Q=4.20, p=0.02, \eta_p^2=0.05$): post hoc tests revealed that scores were similar in the MTT and CTR groups at T0 ($p=0.26$), and were lower in the MTT group at T1 ($p<0.01$) and T2 ($p<0.01$).

In the subscales of (s2) Reappraisal (all $Q \leq 1.75, p \geq 0.19, \eta_p^2 \leq 0.01$), (s5b) Suppression of emotional experience (all $Q \leq 0.86, p \geq 0.36, \eta_p^2 \leq 0.03$), and (s7b)

Table 2 Scores and results of the ANOVAs for the Heidelberg Form for Emotion Regulation Strategies (H-FERST). CTR control, M mean, MTT Mindfulness Teacher Training, SD standard deviation

H-FERST subscale	Time	MTT group		CTR group		ANOVA		
		<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	Group effect	Time effect	Group X Time effect
(s1) Rumination								
	T0	53	9.43 (2.45)	32	10.09 (2.79)			
	T1	53	7.76 (2.46)	32	9.59 (2.73)			
	T2	53	7.53 (2.24)	32	9.78 (3.16)	$Q=9.56, p<0.01^{**}$	$Q=11.68, p<0.01^{***}$	$Q=4.20, p=0.02^*$
(s2) Reappraisal								
	T0	53	9.94 (2.16)	32	9.37 (2.60)			
	T1	53	9.96 (2.02)	32	9.56 (2.64)			
	T2	53	10.00 (2.35)	32	9.66 (2.77)	$Q=1.75, p=0.19$	$Q=0.78, p=0.46$	$Q=0.41, p=0.67$
(s3) Acceptance								
	T0	53	10.43 (1.67)	32	10.13 (2.39)			
	T1	53	11.04 (1.79)	32	10.47 (2.55)			
	T2	53	11.40 (1.60)	32	10.34 (2.80)	$Q=1.14, p=0.29$	$Q=4.44, p=0.02^*$	$Q=2.24, p=0.12$
(s4) Problem-solving								
	T0	53	12.68 (1.68)	32	12.38 (1.81)			
	T1	53	12.23 (1.95)	32	11.84 (2.17)			
	T2	53	12.26 (1.68)	32	11.44 (2.24)	$Q=1.50, p=0.23$	$Q=5.13, p<0.01^{**}$	$Q=0.06, p=0.94$
(s5a) Suppression of emotional expression								
	T0	53	7.57 (2.66)	32	7.88 (3.00)			
	T1	53	7.08 (2.23)	32	7.78 (2.24)			
	T2	53	6.75 (2.31)	32	7.13 (2.43)	$Q=0.58, p=0.45$	$Q=5.65, p<0.01^{**}$	$Q=0.73, p=0.49$
(s5b) Suppression of emotional experience								
	T0	53	6.26 (2.02)	32	6.97 (2.72)			
	T1	53	6.02 (1.66)	32	6.34 (2.16)			
	T2	53	6.28 (1.86)	32	6.91 (2.29)	$Q=0.86, p=0.36$	$Q=0.40, p=0.67$	$Q=0.03, p=0.97$
(s6) Avoidance								
	T0	53	6.66 (2.45)	32	8.34 (2.29)			
	T1	53	6.58 (2.32)	32	7.53 (2.51)			
	T2	53	6.17 (2.05)	32	7.50 (2.53)	$Q=12.75, p<0.01^{***}$	$Q=3.58, p=0.04^*$	$Q=1.36, p=0.27$
(s7a) Activities and social support								
Excluded from the analysis for low McDonald's omega								
(s7b) Distraction								
	T0	53	5.17 (1.72)	32	5.22 (1.60)			
	T1	53	5.23 (2.11)	32	5.69 (2.21)			
	T2	53	5.08 (1.83)	32	5.81 (2.61)	$Q=1.61, p=0.21$	$Q=0.03, p=0.97$	$Q=1.05, p=0.36$

* $p<0.05$; ** $p<0.01$; *** $p<0.001$

Distraction (all $Q \leq 1.61$, $p \geq 0.21$, $\eta_p^2 \leq 0.02$), no effects were observed. In three H-FERST subscales, main effects of Time were observed, namely in the subscales of (s3) Acceptance (T0 < T1 and T0 < T2; $Q = 4.44$, $p = 0.02$, $\eta_p^2 = 0.05$), (s4) Problem-solving (T0 < T2; $Q = 5.13$, $p < 0.01$, $\eta_p^2 = 0.06$), and (s5a) Suppression of emotional expression (T0 < T2; $Q = 5.65$, $p < 0.01$, $\eta_p^2 = 0.05$). In the subscale of (s6) Avoidance, main effects of Group (MTT < CTR; $Q = 12.75$, $p < 0.01$, $\eta_p^2 = 0.10$) and Time ($Q = 3.58$, $p = 0.04$, $\eta_p^2 = 0.04$) were observed. The subscale of (s7a) Activities and social support was excluded from the analysis for low McDonald's omega.

Psychological Well-being

In the analysis of the PWB scores, a total of 90 participants were included, with 54 participants from the MTT group and 36 participants from the CTR group (Table 3). Group \times Time interaction effects were found in the subscales of Personal growth and Purpose in life.

In the subscale of Personal growth, a main effect of Group (MTT > CTR; $Q = 13.79$, $p < 0.01$, $\eta_p^2 = 0.13$) was observed, along with the Group \times Time interaction effect ($Q = 3.74$, $p = 0.03$, $\eta_p^2 = 0.09$): post hoc tests revealed that scores were similar in the MTT and CTR groups at T0 ($p = 0.09$), and were greater in the MTT group at T1 ($p = 0.01$) and T2 ($p < 0.01$). Similarly, in the subscale of Purpose in life, a main effect of Group (MTT > CTR; $Q = 4.86$, $p = 0.03$, $\eta_p^2 = 0.09$) and a Group \times Time interaction effect ($Q = 4.06$, $p = 0.02$, $\eta_p^2 = 0.05$) were observed: scores were similar in the MTT and CTR groups at T0 ($p = 0.19$), and were greater in the MTT group at T1 ($p < 0.01$) and T2 ($p < 0.01$).

In the subscales of Self-acceptance (all $Q \leq 2.86$, $p \geq 0.08$, $\eta_p^2 \leq 0.08$) and Positive relations with others (all $Q \leq 2.89$, $p \geq 0.06$, $\eta_p^2 \leq 0.03$), no effects were observed. In the subscales of Autonomy (T0 < T1 and T0 < T2; $Q = 4.03$, $p = 0.02$, $\eta_p^2 = 0.05$) and Environmental mastery (T0 < T2; $Q = 3.80$, $p = 0.03$, $\eta_p^2 = 0.06$), main effects of Time were observed.

Table 3 Scores and results of the ANOVAs for the Psychological Well-being (PWB) scale. Abbreviations and symbols as in Table 1. CTR control, *M* mean, MTT Mindfulness Teacher Training, *SD* standard deviation

PWB subscale	Time	MTT group		CTR group		ANOVA		
		<i>n</i>	<i>M</i> (<i>SD</i>)	<i>n</i>	<i>M</i> (<i>SD</i>)	Group effect	Time effect	Group \times Time effect
Self-acceptance								
	T0	54	13.52 (2.31)	36	12.83 (3.38)			
	T1	54	14.50 (1.92)	36	13.19 (3.40)			
	T2	54	14.63 (2.09)	36	12.42 (3.68)	$Q = 2.86$, $p = 0.10$	$Q = 2.70$, $p = 0.08$	$Q = 1.52$, $p = 0.23$
Autonomy								
	T0	54	14.24 (3.19)	36	14.64 (3.52)			
	T1	54	15.02 (2.71)	36	15.25 (3.03)			
	T2	54	15.20 (2.86)	36	15.06 (3.24)	$Q = 0.05$, $p = 0.83$	$Q = 4.03$, $p = 0.02^*$	$Q = 0.26$, $p = 0.77$
Environmental mastery								
	T0	54	15.33 (2.62)	36	14.25 (3.66)			
	T1	54	15.63 (2.67)	36	14.97 (3.58)			
	T2	54	16.26 (2.71)	36	15.06 (3.35)	$Q = 1.22$, $p = 0.27$	$Q = 3.80$, $p = 0.03^*$	$Q = 0.67$, $p = 0.51$
Personal growth								
	T0	54	16.52 (1.80)	36	15.89 (1.63)			
	T1	54	16.59 (1.71)	36	15.47 (2.48)			
	T2	54	16.91 (1.53)	36	14.78 (2.52)	$Q = 13.79$, $p < 0.01^{***}$	$Q = 0.67$, $p = 0.52$	$Q = 3.74$, $p = 0.03^*$
Positive relations with others								
	T0	54	14.72 (3.12)	36	15.39 (3.13)			
	T1	54	14.65 (2.86)	36	15.44 (3.29)			
	T2	54	14.72 (2.70)	36	14.28 (3.24)	$Q = 1.38$, $p = 0.24$	$Q = 2.00$, $p = 0.15$	$Q = 2.89$, $p = 0.06$
Purpose in life								
	T0	54	15.52 (2.46)	36	14.58 (4.22)			
	T1	54	16.56 (2.26)	36	14.25 (3.92)			
	T2	54	16.44 (2.27)	36	14.33 (3.60)	$Q = 4.86$, $p = 0.03^*$	$Q = 0.73$, $p = 0.49$	$Q = 4.06$, $p = 0.02^*$

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Discussion

To the best of our knowledge, the present study is the first to explore changes in mindfulness levels, emotion regulation skills, and psychological well-being among mindfulness instructors in training during a 9-month training program. Furthermore, we compared these changes to those experienced by a control group of individuals matched for age, gender, and education who did not undergo mindfulness training.

Consistent with our hypotheses, participants in the mindfulness training program showed significantly higher improvements in several core facets of mindfulness over time as compared with the control group. Specifically, participants in the MTT group exhibited increased abilities to observe and describe their experiences, as well as to act with awareness and respond to inner experiences with less reactivity. This study's findings align with several previous studies demonstrating increased mindfulness levels following MBIs (e.g., Chiesa et al., 2014; Visted et al., 2015). According to current evidence, these increases are at least moderately specific to mindfulness practice itself (Goldberg et al., 2019). On the other hand, no specific Group \times Time interactions were observed on non-judge, although increases in this mindfulness facet were observed in both groups. A possible explanation for this finding could be related to the notion that non-judgment levels were already higher in the mindfulness group at baseline. Consequently, the potential for further improvement in the mindfulness group, as compared with the control group, may have been limited. Overall, our results confirm previous studies suggesting that mindfulness training may help cultivate increased and less reactive awareness and acceptance of present-moment inner experiences (Kabat-Zinn, 2003).

Pertaining to emotion regulation, participants in the MTT group reported significant decreases in rumination as compared with the control group. This finding is in line with current literature on this topic (e.g., Leyland et al., 2019) and suggests that mindfulness training may help reduce tendencies toward brooding and negative self-focus. Furthermore, it aligns with research suggesting that mindfulness practice can lessen rumination to a higher extent than several control groups and to the same extent as other active psychological approaches such as cognitive behavioral therapy (Chiesa et al., 2014; Feruglio et al., 2021; Leyland et al., 2019; Mao et al., 2023). Conversely, no improvements were observed in other measures of emotion regulation, and there were no significant differences between the experimental and control groups on these measures. These findings suggest two possibilities: either improvements in some aspects of emotion regulation could not be exclusive to mindfulness training, or

these improvements could require more extensive practice to fully emerge (Hoge et al., 2021; Leyland et al., 2019).

Interestingly, the mindfulness training program also led to higher improvements in two facets of psychological well-being in comparison with the control group: personal growth and purpose in life (Ryff, 1989). More in detail, participants in the MTT group experienced increased feelings of continued development and self-improvement, alongside a stronger sense of direction and meaning in life. This finding aligns with existing literature that links mindfulness practice with improved psychological well-being and increases in personal growth and purpose in life (e.g., Khoury et al., 2015; Medina et al., 2017; Wai Chu & Mak, 2019; Querstret et al., 2020). On the other hand, it is less clear why there were no other between-group differences in the other facets of psychological well-being. Further studies on mindfulness teacher training programs could continue to explore how these programs address the reduction of suffering and the increase of hedonic and eudaimonic aspects of future trainers' well-being (Allen et al., 2021; Garland et al., 2015; Hanley et al., 2015).

The findings of this study could have significant implications for mindfulness instructors' training. First, the significant increases in observing, describing, non-reacting, and acting with awareness capacities in the MTT group confirm the importance that training programs emphasize the cultivation of these specific facets of mindfulness. Incorporating instructions that foster present-moment attention, the ability to describe inner experiences, and non-reactive responding to stimuli could enhance training efficacy. This aligns with the emphasis by Crane et al. (2010, 2012, 2013) on the importance of instructors embodying mindfulness for effective transmission. Furthermore, the observed reduction in rumination within the MTT group underscores the role of mindfulness practice in mitigating repetitive negative thoughts and self-criticism. This finding suggests the importance of ensuring that instructors, through personal engagement with mindfulness practice during MTT programs, fully experience and embody its benefits before transmitting these practices to their students.

Furthermore, improvements in psychological well-being, particularly in personal growth and purpose in life, observed in the MTT group, support the notion that MTT programs should consider not only technical skills but also the holistic well-being of individuals. Promoting personal growth and a sense of purpose in instructors could positively impact their capacity to create a supportive learning environment and effectively convey mindfulness practices. As suggested by Kenny et al. (2020), integrating activities that foster self-reflection, goal setting, and the cultivation of values could contribute to training more mindful, resilient, and inspiring instructors.

Beyond the specific recommendations for training curricula, this study could have broader implications for the field of mindfulness instruction and the ongoing efforts to establish standards and quality assurance (Griffith et al., 2021; Kenny et al., 2020). As an example, our findings underscore the importance of MTT programs not only in imparting technical skills but also in fostering the personal development and well-being of instructors. This could be a significant issue in ensuring that teachers embody the principles of mindfulness they are teaching, promoting their resilience and capacity for empathy, and ultimately contributing to a safe and effective learning environment for students. To this end, future research should investigate the long-term effects of MTT on instructors' well-being, teaching effectiveness, and ability to adhere to ethical guidelines.

Furthermore, implementing and optimizing existing standardized assessment tools for mindfulness teachers could be valuable in ensuring quality and accountability across training programs (Crane et al., 2013; Griffith et al., 2021). This could involve assessing not only knowledge and competency but also embodying mindfulness qualities, such as those highlighted in this study. By focusing on both the personal and professional development of mindfulness instructors, the field can move towards establishing robust standards and ensuring the delivery of high-quality, ethical mindfulness instruction. Overall, these results lend support to the idea that mindfulness training programs may benefit those aiming to teach mindfulness in several ways. The observed improvements in various aspects of mindfulness, psychological well-being, and emotion regulation suggest that these programs can enhance many personal qualities crucial to effectively delivering mindfulness-based programs (Crane et al., 2010, 2012, 2013; Griffith et al., 2021).

Limitations and Future Directions

This study has several strengths. Foremost is its novelty; prior to this work, no research has examined the impact of mindfulness training programs on these outcomes among those involved in the process of becoming instructors. Another key strength is the inclusion of a control group, allowing for comparison with a non-mindfulness practicing sample. Furthermore, the use of well-validated measures for assessing mindfulness, psychological well-being, and emotion regulation lends credibility to the findings.

Limitations must also be acknowledged. First, the sample size was relatively small, which may limit the generalizability of our findings. Second, potential self-selection bias might be present, as individuals who chose to enroll in the training program may be intrinsically more inclined towards mindfulness and personal development (Rosenkranz et al., 2019). Furthermore, the control group was a convenience sample that was not randomly assigned, increasing the

possibility of confounding variables. Additionally, our control group, consisting of individuals who did not engage in any type of training, does not allow us to distinguish between the specific and non-specific effects of training. Moreover, daily mindfulness practice diaries were not collected for participants in the training program group. Finally, we did not include follow-up measures. Therefore, it is unclear the extent to which observed findings are maintained or could change over time following the end of the training program.

Further research with larger samples, randomized control trials, and follow-up assessment is needed to establish more robust evidence and address the limitations of the present study. It will be important to collect data on trainees' amount of mindfulness practice, both before and during the training, in order to establish whether observed changes are influenced by previous experience in meditation or by proficiency in practice during the training. It is also important to further investigate whether the intensity and duration of training programs are related to the magnitude of changes observed in trainees (Ruijgrok-Lupton et al., 2018). Finally, future research could more deeply explore the relationship between mindfulness instructors' gains in mindfulness and psychological well-being and the effectiveness of the mindfulness programs they subsequently deliver.

This study provides initial evidence that participation in a mindfulness training program can enhance mindfulness levels, psychological well-being, and emotion regulation among those training to become mindfulness instructors. These findings highlight the potential benefits of such training programs and lay the groundwork for further exploration in this crucial area of research.

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Data Availability The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of Interest The authors declare no competing interests.

Ethics approval The study was approved by the Institutional Review Board of the Department of Languages and Literatures, Communication, Education and Society (DILL) of the University of Udine. All

procedures performed in the study were in accordance with the ethical standards of the 1964 Helsinki declaration and its later amendments.

Consent Informed consent was obtained from all individual participants included in the study prior to their inclusion in the study.

Use of Artificial Intelligence AI was not used.

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