Journal of Happiness Studies (2026) 27:17
https://doi.org/10.1007/s10902-025-01003-1

RESEARCH PAPER

Effect of a Universal Mindfulness Program on Well-Being in Adolescents: A Cluster Randomized Controlled Trial

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Received: 3 April 2025 / Accepted: 29 December 2025 / Published online: 16 January 2026

Abstract
Mental health disorders often emerge during adolescence. Mindfulness interventions may support adolescents' well-being. However, the evidence supporting the effectiveness of universal mindfulness interventions for adolescents' well-being is limited and hampered by methodological weaknesses. The present study is the first large-scale randomized controlled trial with active and inactive control groups to examine the effectiveness of a 9-week universal mindfulness intervention on the well-being of adolescents, moderated by gender, age, and independent practice. A total of 3519 Finnish adolescents aged 12–15 were randomly assigned to intervention, active, and inactive control groups. Well-being was indicated by life satisfaction (assessed with OECD life satisfaction and SWLC-C life satisfaction) and positive and negative affect (assessed with PANAS) at baseline, 9 weeks, and 26 weeks. Analyses were conducted with linear mixed models. A significant increase in life satisfaction (SWLS-C) was observed at 9 weeks in the mindfulness intervention group ($\beta = 0.38$, 95% CI 0.08–0.68, $p = 0.009$) compared to the active control group. Independent practice was found to moderate the effects in positive affect at 26 weeks; those who practiced more had increases in positive affect. Universal mindfulness intervention shows some promise in improving the well-being of adolescents, although it did not affect all well-being outcomes.

Trial Registration: Healthy Learning Mind—a school- based mindfulness and relaxation program: a study protocol for a cluster randomized controlled trial (RCT) ISRCTN18642659 retrospectively registered on 13 October 2015. The full trial protocol can be accessed at http://rdcu.be/t57S.

Keywords Well-being · Adolescence · Mindfulness · Universal interventions · School

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1 Introduction

It is noteworthy that approximately 50% of all mental health disorders begin by the age of 14 (World Health Organization, 2020) and often continue into adulthood (Costello et al., 2005). Therefore, promoting well-being during adolescence may have long-term benefits for well-being throughout the life span (Hoyt et al., 2012). Well-being is generally defined through two overlapping traditions: the hedonic, emphasizing life satisfaction, happiness, and a good life characterized by increased positive affect and reduced negative affect (Diener, 2000), and the eudaimonic, with personal growth, meaningful relationships, and a sense of purpose in life (Ryff, 1989). This study focuses on the hedonic approach by assessing well-being with measures of life satisfaction and positive and (low) negative affects. Research has indicated that mindfulness may enhance the hedonic well-being in adolescents, including increased life satisfaction (Bluth et al., 2015; Brown et al., 2011; Ma & Xiang, 2023), positive affect (Brown et al., 2011; Ma & Xiang, 2023), and reduced negative affect (Ma & Xiang, 2023; Sibinga et al., 2016; Wimmer et al., 2023). Mindfulness may be associated with adolescents' well-being through the Mindfulness-to-Meaning Theory (MMT) in which mindfulness facilitates decentering, broadening of attention, and positive reappraisal resulting enhanced positive emotions (hedonic well-being) and meaning and purpose in life (eudaimonic well-being) (Garland et al., 2015). Nevertheless, research on the effects of mindfulness on adolescents' well-being is limited, since very few methodologically rigorous studies (Kuyken et al., 2022) exist. Therefore, further high-quality studies are required. Furthermore, more research is needed in educational settings, as mindfulness interventions in schools offer universal access to potential well-being strategies for every child and adolescent. To the best of our knowledge, this is the first large-scale randomized controlled trial (RCT) with active and inactive control groups to examine the effects of universal mindfulness-based intervention (MBI) on the well-being of adolescents in a school setting.

Mindfulness is defined as attending to the present-moment with non-judgmental awareness and open attention (Kabat-Zinn, 2003). Mindfulness-based interventions (MBIs) have been developed to improve mental health, well-being, and health in a variety of populations in different settings (Zhang et al., 2021). Implementation of MBIs has been proposed as a potential strategy to enhance the well-being of adolescents (Monsillion et al., 2023; Phan et al., 2022), with schools providing an optimal environment (Ruini et al., 2009; Weare & Nind, 2011), given that adolescents spend most of their daytime there (Paulus et al., 2016).

A few promising results have been reported on universal (i.e. general approach not directed to a specific group like a certain clinical population) MBIs for adolescents yielding improvements in well-being. RCT studies have shown increased psychological well-being (Scafuto et al., 2024) as well as grade-moderated effects on well-being at school (Terjestam et al., 2016). Additionally, RCT studies have shown improvements in emotional well-being with effects moderated by gender (Kang et al., 2018), and with reduced negative affect (Sibinga et al., 2016). However, these latter two RCTs included participants from only one or two schools, which may have affected the results. Further evidence comes from studies with less rigorous designs. A study with a non-randomized controlled trial showed mental well-being improvements at a three-month follow-up compared to inactive control (Kuyken et al., 2013). Two studies using quasi-experimental design combining mindfulness and character strengths activities improved life satisfaction (Lombas et al., 2019), and emotional,

social and psychological well-being (Kennes et al., 2023). In addition, quasi-experimental study without a control group improved emotional and psychological well-being (Bernay et al., 2016).

Most of the previous studies have not found universal MBIs improving adolescents' well-being using quasi-experimental designs (Johnson & Wade, 2019; Schonert-Reichl & Lawlor, 2010), non-randomized controlled trials (Huppert & Johnson, 2010), or randomized controlled trials (Britton et al., 2014; Burckhardt et al., 2017; Dunning et al., 2022a; García-Rubio et al., 2023; Johnson & Wade, 2021; Johnson et al., 2016, 2017; Kuyken et al., 2022; Montero-Marin et al., 2022). One possible explanation for the null findings is limited sample sizes. However, even a large cluster RCT with 83 schools and over 8000 participants found no evidence for the effectiveness of a universal MBI on mental well-being (Kuyken et al., 2022). This may be because a considerable number of participants did not engage in home practice, which affected the reliability of the findings (Kuyken et al., 2022).

Overall, previous research has many methodological weaknesses, including the absence of studies examining both active and passive control conditions. The lack of control conditions (Bernay et al., 2016), relatively small sample sizes ($n < 150$) (Bernay et al., 2016; Britton et al., 2014; Burckhardt et al., 2017; Devcich et al., 2017; Johnson & Wade, 2019; Kang et al., 2018) and limited follow-up evaluations (Britton et al., 2014; Devcich et al., 2017; García-Rubio et al., 2023; Huppert & Johnson, 2010; Lombas et al., 2019; Schonert-Reichl & Lawlor, 2010; Sibinga et al., 2016; Terjestam et al., 2016) have led to inconclusive evidence regarding the potential benefits of universal MBIs for adolescents' well-being.

Furthermore, the influence of participant-related factors on the effectiveness of MBIs requires further investigation, since there is a lack of evidence for whom MBIs are most effective (Montero-Marin et al., 2022). Given the limited evidence on the potential moderators in MBI research (Tudor et al., 2022), it is appropriate to begin with basic participant-related factors. Gender (Kang et al., 2018; Saarinen et al., 2022; Volanen et al., 2020) and age (Lassander et al., 2023; Volanen et al., 2020) have been identified as factors that may influence the effectiveness of MBIs in adolescents. It has also been proposed that the amount of independent practice is associated with improvements in well-being and mindfulness in adolescents (Huppert & Johnson, 2010; Lassander et al., 2021; Volanen et al., 2020), although further evidence is required.

Considering the limitations in previous research, the current study uses a large sample size, a RCT design, active and inactive control groups, and follow-up evaluations to examine the effects of a universal MBI on adolescents' well-being indicators in the school environment. By including an active control group (relaxation group) in addition to an inactive control group (normal school curriculum), this study addresses a key limitation of previous studies that relied primarily on inactive controls. We also aim to identify participant-related factors (gender, age, independent practice) that may influence the effectiveness of the MBI.

2 Methods

The data were collected from 2014 to 2016. The selection of schools began by listing every comprehensive school in South Finland. The eligibility criteria for schools included the location of the school in southern Finland, the school being public and having the required grade levels (6th, 7th and 8th). In Finland, almost all comprehensive schools are public with

same school curriculum. A total of 247 eligible schools in 14 municipalities were invited to participate by email with a follow-up phone call. Decisions to participate were made by the headmaster of school and the teachers of the class, with 56 schools (24%) opting in (Fig. 1). Randomization was performed at the school level to ensure balanced intervention and control groups, based on the language of teaching (Finnish, Swedish or English), number of classes participating, grade, location, and socioeconomic indicators in the school's area (e.g., average apartment prices per square meter).

2.1 Participants

The participants (N = 3519) were 12–15-year-olds (6th, 7th, and 8th graders) in Finnish comprehensive schools. There were 2995 participants (1334 in the intervention group, 1291 in the active control group, and 370 in the inactive control group) who filled at least one well-being measure at baseline, 9 weeks, or 26 weeks (Table 1). Among them 1512 (50.5%) were girls and 1480 (49.5%) were boys (Supplementary Table S1).

2.2 Procedure

The study was approved by the ethical review board of the University of Helsinki (Statement 1/2014). All participants and their parents were required to write consent. It was informed that participation was voluntary, and the participation could be withdrawn at any time. Prior to the collection of baseline data, the classes were randomly assigned to the intervention (N = 94), active control (N = 85), and inactive control (N = 31). The intervention and active control groups were informed of participation in a 9-week program "Skills for Wellbeing" with unaware of the group assignment.

2.3 The Intervention Group

The intervention group had a 9-week mindfulness program called *.b* (Stop and Breathe/Be) (Huppert & Johnson, 2010). The program involved 45-min weekly group lessons, with participants being encouraged to practice independently at home 5–6 times per week for 3–15 min. The practices were designed to enhance sustained attention, emotional awareness, and attentional and emotional regulation. Lessons included a psychoeducational introduction to the lesson theme, short and long practices, and group discussions. The *.b*-intervention sessions were conducted by experienced mindfulness facilitators who had completed an 8-week mindfulness-based stress reduction (MBSR) course and maintained a personal mindfulness practice. They were certified to deliver the *.b*-program. Each facilitator was evaluated in a qualification process that included delivering a *b*-lesson assessed by the research team and external MBSR-trained colleagues.

2.4 The Control Groups

The active control group had a 9-week relaxation program, "Relax", with 45-min group lessons weekly and recommendation for home practice 5–6 times per week. The lessons were structured around psychoeducational presentations on well-being themes, relaxation exercises, discussions, and group assignments, led by either a qualified schoolteacher or a

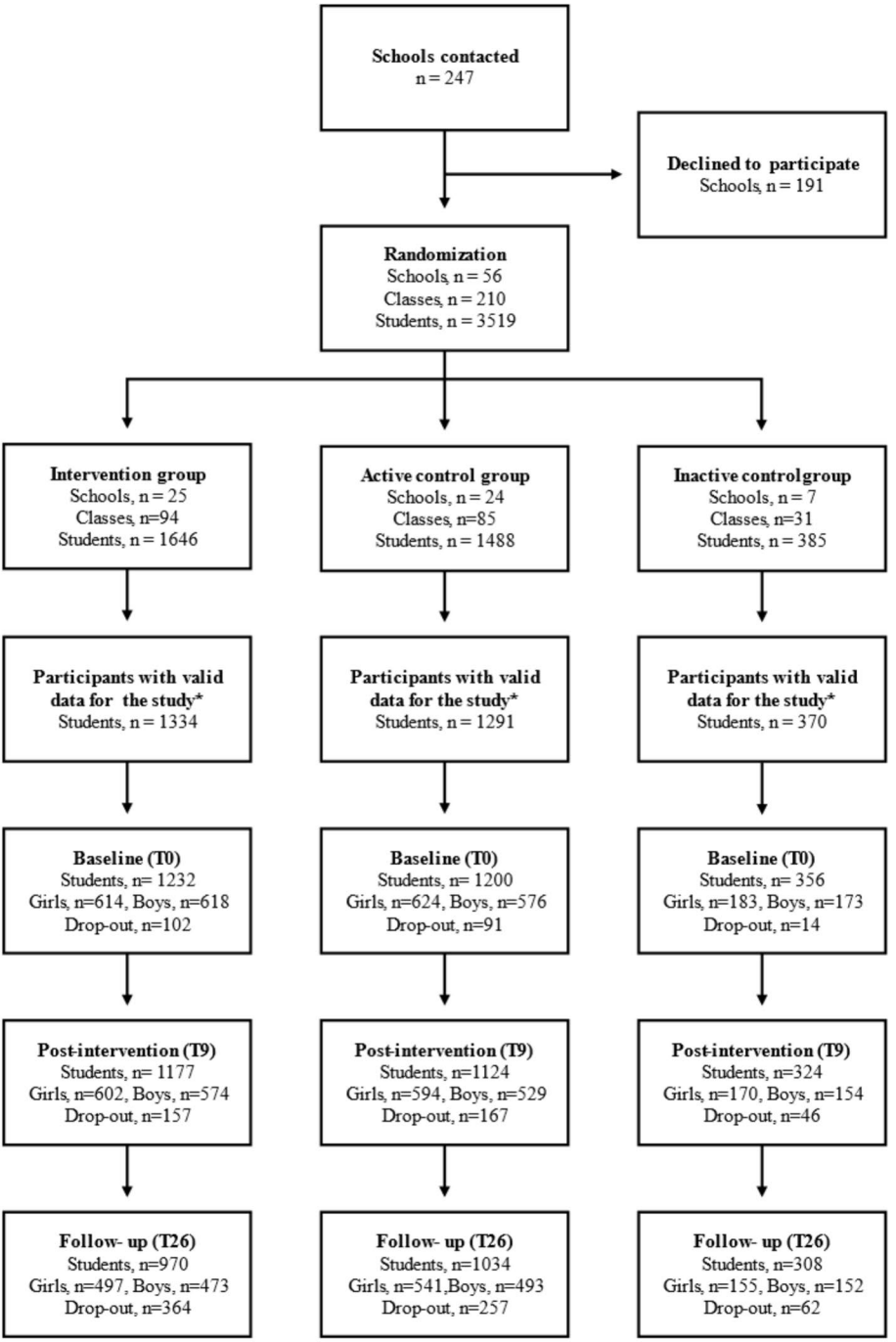

Fig. 1 Flowchart of participants

Table 1 Results of linear mixed models: Intervention effects on life satisfaction and positive and negative affect among all students

	Intervention group				Active control group				Inactive control group			
	N	Mean values (SE)	Mean change from T0 (95% CI)	*p*	N	Mean values (SE)	Mean change from T0 (95% CI)	*p*	N	Mean values (SE)	Mean change from T0 (95% CI)	*p*
Life Satisfaction question by OECD												
T0	1212	8.20 (0.06)			1175	8.22 (0.07)			348	8.21 (0.11)		
T9	1150	8.35 (0.06)	0.14 (0.05; 0.24)	**0.002**	1095	8.22 (0.07)	0.00 (−0.10; 0.10)	1.000	320	8.23 (0.11)	0.02 (−0.16; 0.20)	1.000
T26	952	8.35 (0.07)	0.15 (0.03; 0.26)	**0.010**	1020	8.34 (0.07)	0.13 (0.01; 0.24)	**0.028**	304	8.25 (0.12)	0.05 (−0.16; 0.26)	1.000
Satisfaction with life scale –child												
T0	1190	19.47 (0.15)			1171	19.56 (0.15)			352	19.33 (0.26)		
T9	1140	19.69 (0.15)	0.21 (0.00; 0.42)	**0.049**	1084	19.39 (0.15)	−0.17 (−0.39; 0.05)	0.160	316	19.71 (0.27)	0.38 (−0.01; 0.78)	0.056
T26	931	19.63 (0.16)	0.15 (−0.10; 0.41)	0.362	999	19.58 (0.16)	0.02 (−0.23; 0.27)	1.000	298	19.36 (0.27)	0.04 (−0.42; 0.49)	1.000
Positive affect												
T0	1212	34.49 (0.27)			1168	33.98 (0.29)			350	34.94 (0.48)		
T9	1161	35.47 (0.29)	0.99 (0.56;1.41)	**<0.001**	1098	34.74 (0.30)	0.76 (0.32; 1.19)	**<0.001**	322	35.65 (0.51)	0.70 (−0.08; 1.49)	0.091
T26	958	35.83 (0.30)	1.34 (0.85; 1.83)	**<0.001**	1010	34.93 (0.30)	0.94 (0.46; 1.42)	**<0.001**	306	36.08 (0.52)	1.14 (0.26; 2.01)	**0.007**
Negative affect												
T0	1211	19.03 (0.24)			1166	19.12 (0.25)			349	19.44 (0.42)		

Table 1 (continued)

	Intervention group				Active control group				Inactive control group			
	N	Mean values (SE)	Mean change from T0 (95% CI)	*p*	N	Mean values (SE)	Mean change from T0 (95% CI)	*p*	N	Mean values (SE)	Mean change from T0 (95% CI)	*p*
T9	1154	19.75 (0.25)	0.72 (0.30; 1.14)	**<0.001**	1095	20.12 (0.26)	1.00 (0.56; 1.43)	**<0.001**	322	19.78 (0.45)	0.34 (−0.45; 1.13)	0.665
T26	954	19.79 (0.27)	0.76 (0.27; 1.25)	**0.001**	1007	19.72 (0.27)	0.59 (0.11; 1.08)	**0.013**	306	19.90 (0.47)	0.47 (−0.41; 1.35)	0.469

	Intervention vs active control		Intervention vs inactive control	
	Mean difference in change (95% CI)	*p*	Mean difference in change (95% CI)	*p*
Life Satisfaction question by OECD				
T0				
T9	0.14 (−0.00; 0.28)	0.051	0.12 (−0.09; 0.33)	0.377
T26	0.02 (−0.14; 0.19)	1.000	0.10 (−0.14; 0.34)	0.710
Satisfaction with life scale –child				
T0				
T9	0.38 (0.08; 0.68)	**0.009**	−0.17 (−0.62; 0.27)	0.771
T26	0.13 (−0.23; 0.49)	0.814	0.12 (−0.41; 0.64)	1.000
Positive affect				
T0				
T9	0.23 (−0.38; 0.84)	0.788	0.28 (−0.61; 1.18)	0.961
T26	0.40 (−0.29; 1.08)	0.392	0.20 (−0.80; 1.20)	1.000

Table 1 (continued)

	Intervention vs active control		Intervention vs inactive control	
	Mean difference in change (95% CI)	*p*	Mean difference in change (95% CI)	*p*
Negative affect				
T0				
T9	−0.28 (−0.88; 0.33)	0.611	0.38 (−0.52; 1.27)	0.685
T26	0.17 (−0.52; 0.86)	1.000	0.29 (−0.72; 1.30)	1.000

Note: Bold font indicates significant effects ($p < 0.05$). Mean values are least square mean estimates from the Linear mixed model with random effects for school class and school; Bonferroni adjustment was used in between and within group comparisons. Gender and grade were controlled for in the analyses. (T0 = week 0, T9 = week 9, T26 = week 26)

proficient leader in guiding the well-being of adolescents. The facilitators in both intervention and control groups, except one, had basic education in education or health and welfare: teachers, psychologists, health professionals, a nutritionist, and a lawyer. The inactive control group had a normal school curriculum without intervention. All the groups filled in the same questionnaires at baseline, 9 weeks (after the intervention), and at 26 weeks of follow-up. Further details are provided in the study protocol (Volanen et al., 2016).

3 Measures

Well-being was assessed with life satisfaction and positive and negative affect measures. Life satisfaction was assessed with two measures: Life Satisfaction question by OECD (OECD life satisfaction) (OECD, 2020) and Satisfaction with life scale–child (SWLS-C life satisfaction) (Diener et al., 1985; Gadermann et al., 2010). The single-item (such as OECD life satisfaction) and multi-item (such as SWLS-C life satisfaction) life satisfaction measures are widely used scales in well-being research, and their length is suitable for large-scale surveys (Jovanović, 2016). In addition, using two measures of life satisfaction provides broader information of the phenomenon and gives wider comparability to other studies using these measures. Positive and negative affect were assessed with Positive and negative affect schedule (PANAS) (Watson et al., 1988).

The OECD life satisfaction includes one item, "How satisfied are you with your life at the moment?" ranging from not at all satisfied (0) to very satisfied (10). The measure is one part of the Organization for Economic Cooperation and Development's (OECD) "The Better Life Index" designed to measure the well-being of 38 OECD countries (OECD, n.d.).

The SWLS-C life satisfaction was adapted for children (Gadermann et al., 2010) from the Satisfaction with life scale (Diener et al., 1985). The SWLS-C life satisfaction includes five statements about life (e.g. 'So far I have gotten the important things I want in life') ranging from disagreeing a lot (1) to agreeing a lot (5) assessing global life satisfaction in children aged 9–14 (Gadermann et al., 2010). The total score on the test is 5–25. Higher scores indicate higher life satisfaction. One missing answer was allowed, and missing values were replaced by the individual mean of answered items. More missing answers led to exclusion of the participant. Cronbach's alpha for SWLS-C life satisfaction at the baseline was 0.85.

The PANAS assesses positive and negative affect using 20 items. Positive affect includes 10 items, and negative affect includes 10 items. "Positive Affect reflects the extent to which a person feels enthusiastic, active, and alert. High PA is a state of high energy, full concentration, and pleasurable engagement" (Watson et al., 1988, p. 1063). "Negative Affect is a general dimension of subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear, and nervousness" (Watson et al., 1988, p. 1063). Participants were asked to rate the extent to which they have experienced the following items (e.g., 'excited' or 'upset') in the past week. The PANAS uses a 5-point Likert-scale with options ranging from (1) 'very slightly or not at all' to (5) 'extremely.' Scores were summed separately for positive affect and negative affect, with total scores for both factors ranging from 10 to 50. Higher scores for positive affect indicate more positive feelings, and higher scores for negative affect indicate more negative feelings. Two missing answers were allowed, and missing values were replaced by individual mean

of answered items. More missing answers led to exclusion of the participant. Cronbach's alphas for PANAS positive and negative affects at the baseline were 0.88 and 0.87.

Participants were asked about the amount of independent home practice at the 26-week follow-up to assess whether they continued practising after the intervention. Audio recordings of the mindfulness practices were available to the participants; the practice was self-directed. Four groups were formed: Intervention 1 = students who practiced mindfulness no more than a few times (N = 733), Intervention 2 = students who practiced mindfulness once or twice a month (N = 104), Intervention 3 = students who practiced mindfulness at least once a week (N = 55), Intervention 4 = students who practiced mindfulness almost every day (N = 46).

3.1 Data Analysis

The effects of the intervention on well-being measures were analyzed with a linear mixed models to consider the clustered nature of the data. Maximum likelihood estimation was used to obtain unbiased and efficient parameter estimates for data with missing values. Models included random intercepts to account for the classroom and class level variances and time as a repeated factor using an unstructured covariance structure.

The models consisted of the main effects of group, time, age (grade), and gender. The effects of the intervention were examined by interaction between groups (intervention vs. active control group and intervention vs. inactive control group) and time (9 weeks vs. baseline and 26 weeks vs. baseline). The estimates for interaction effects (group × 9 weeks and group × 26 weeks) were required to be positive for OECD life satisfaction, SWLC-C life satisfaction and positive affect, and negative for negative affect to show beneficial intervention effects. To analyze whether gender or age moderated the intervention effect, the interaction term age × group × time or gender × group × time was entered into the model. To investigate whether the intervention effect differed according to the intensity of independent practice after the intervention, the interaction term practice intensity group × time was entered into the model. The interaction analyses were exploratory in nature. Correlations between well-being measures were calculated with Pearson correlation coefficients.

Bonferroni adjustments were used in pairwise comparisons between the intervention and control groups and within-group comparisons. Two-sided statistical tests with a significance level of 0.05 were used. Linear mixed models were done with the SAS System for Windows 9.4 (SAS Institute Inc., Cary, NC) and descriptives and correlations with the IBM SPSS Statistics 29.0 (IBM Corp., Armonk, NY, USA).

4 Results

4.1 Intervention Effects

A favorable intervention effect was found for life satisfaction (SWLS-C life satisfaction) at 9 weeks (T9) in the intervention group compared to the active control group (Table 1) (β = 0.38, 95% CI 0.08–0.68, p = 0.009). There was a significant increase in life satisfaction at 9 weeks in the intervention group (β = 0.21, 95% CI 0.00–0.42, p = 0.049), but not in the active control group (β = -0.17, 95% CI -0.39–0.05, p = 0.160). The intervention effect

waned at 26 weeks (T26) (β=0.13, 95% CI -0.23–0.49, p=0.814). There were no effects compared to the inactive control group. In addition, there were no intervention effect on OECD life satisfaction, positive affect, or negative affect.

4.2 Intervention Effects by Gender

Statistically significant gender × group × time interaction was found for the life satisfaction (SWLS-C life satisfaction) (p=0.004). Gender moderated the intervention effect between intervention and active control groups at 26 weeks (p=0.019), but the intervention effects among boys (β=-0.31, 95% CI -0.82–0.21, p=0.362) or girls (β=0.53, 95% CI -0.84–1.89, p=0.762) were not significant. Gender did not moderate the effect of the intervention on OECD life satisfaction, positive affect or negative affect (Supplementary Table S2). However, regarding OECD life satisfaction, a favorable intervention effect was found among boys at 9 weeks (T9) in the intervention group compared to the active control group (β=0.25, 95% CI 0.04–0.46, p=0.016) due to a significant increase in the intervention group (β=0.18, 95% CI 0.03–0.32, p=0.011) and no change in the active control group (β=-0.07, 95% CI -0.22–0.08, p=0.614). Among girls, no significant intervention effects were found.

4.3 Intervention Effects by Age

Age did not moderate the effect of the intervention (Supplementary Table S3): No significant age × group × time interactions were observed. However, in analyses divided by age group, a favorable intervention effect was found among 12-year-olds (6th graders) for life satisfaction (OECD life satisfaction) at 9 weeks (T9) in the intervention group compared to the active control group (β=0.26, 95% CI 0.04–0.49, p=0.015) due to an increase in the intervention group (β=0.15, 95% CI -0.001–0.30, p=0.052) and a decrease in the active control group (β=-0.11, 95% CI -0.27–0.05, p=0.230). No intervention effects were found among the 13- and 14-year-olds (7th and 8th graders).

4.4 Intervention Effects by Independent Practice

Independent practice was found to moderate the effects in positive affect at 26 weeks (Table 2). Among students who practiced mindfulness at least once a week, a beneficial intervention effect was found for positive affect at 26 weeks follow-up (T26) compared to the active control group (β=3.01, 95% CI 0.55–5.47, p=0.009) and the inactive control group (β=2.81, 95% CI 0.23–5.40, p=0.026).

Among students who practiced mindfulness almost every day, a beneficial intervention effect was found for positive affect at T26 compared to active control (β=2.95, 95% CI 0.28–5.62, p=0.023). Independent practice did not moderate the effects in negative affect.

4.5 Effect Sizes

The intervention effect sizes (Cohen's d) are presented in online Supplementary Table S4. Cohen d=0.2 is considered as a small effect size, and Cohen d=0.5 as a medium effect size (Cohen, 1988). The largest intervention effect sizes were observed for positive affect in the two most

Table 2 Results of linear mixed models: Intervention effects on life satisfaction and positive and negative affect by independent practice

	Intervention1 vs active control		Intervention1 vs inactive control		Intervention2 vs active control		Intervention2 vs inactive control	
	Mean difference (95% CI)	p	Mean difference (95% CI)	p	Mean difference (95% CI)	p	Mean difference (95% CI)	p
Life Satisfaction question by OECD								
Change by T9	0.08 (−0.10; 0.26)	1.000	0.06 (−0.19; 0.30)	1.000	0.17 (−0.22; 0.56)	1.000	0.15 (−0.27; 0.57)	1.000
Change by T26	−0.04 (−0.24; 0.16)	1.000	0.04 (−0.24; 0.32)	1.000	0.08 (−0.36; 0.52)	1.000	0.15 (−0.33; 0.63)	1.000
Satisfaction with life scale –child								
Change by T9	0.35 (−0.04; 0.73)	0.097	−0.21 (−0.74; 0.32)	1.000	0.41 (−0.42; 1.25)	0.864	−0.14 (−1.05; 0.77)	1.000
Change by T26	0.07 (−0.37; 0.51)	1.000	0.05 (−0.56; 0.66)	1.000	−0.01 (−0.97; 0.96)	1.000	−0.02 (−1.08; 1.03)	1.000
Positive affect								
Change by T9	−0.33 (−1.10; 0.44)	1.000	−0.28 (−1.34; 0.77)	1.000	1.47 (−0.19; 3.13)	0.110	1.51 (−0.30; 3.32)	0.147
Change by T26	−0.12 (−0.96; 0.72)	1.000	−0.32 (−1.48; 0.84)	1.000	0.95 (−0.83; 2.74)	0.731	0.75 (−1.20; 2.71)	1.000
Negative affect								
Change by T9	−0.60 (−1.38; 0.18)	0.217	0.06 (−1.01; 1.12)	1.000	−0.19 (−1.88; 1.50)	1.000	0.47 (−1.37; 2.30)	1.000
Change by T26	−0.06 (−0.91; 0.79)	1.000	0.07 (−1.11; 1.24)	1.000	1.22 (−0.60; 3.04)	0.381	1.34 (−0.65; 3.34)	0.371
	Intervention3 vs active control		Intervention3 vs inactive control		Intervention4 vs active control		Intervention4 vs inactive control	
	Mean difference (95% CI)	p	Mean difference (95% CI)	p	Mean difference (95% CI)	p	Mean difference (95% CI)	p
Life Satisfaction question by OECD								
Change by T9	0.32 (−0.21; 0.85)	0.514	0.30 (−0.25; 0.86)	0.695	0.34 (−0.25; 0.94)	0.592	0.32 (−0.29; 0.94)	0.758
Change by T26	0.14 (−0.46; 0.73)	1.000	0.21 (−0.41; 0.84)	1.000	0.06 (−0.58; 0.71)	1.000	0.14 (−0.53; 0.82)	1.000
Satisfaction with life scale –child								
Change by T9	0.16 (−0.97; 1.29)	1.000	−0.40 (−1.58; 0.79)	1.000	0.59 (−0.71; 1.89)	1.000	0.03 (−1.32; 1.39)	1.000
Change by T26	0.59 (−0.70; 1.87)	1.000	0.57 (−0.78; 1.92)	1.000	0.43 (−0.97; 1.84)	1.000	0.42 (−1.05; 1.88)	1.000
Positive affect								

Table 2 (continued)

	Intervention3 vs active control		Intervention3 vs inactive control		Intervention4 vs active control		Intervention4 vs inactive control	
	Mean difference (95% CI)	p	Mean difference (95% CI)	p	Mean difference (95% CI)	p	Mean difference (95% CI)	p
Change by T9	2.28 (−0.02; 4.58)	0.054	2.33 (−0.09; 4.74)	0.064	1.76 (−0.78; 4.31)	0.335	1.81 (−0.83; 4.46)	0.349
Change by T26	3.01 (0.55; 5.47)	**0.009**	2.81 (0.23; 5.40)	**0.026**	2.95 (0.28; 5.62)	**0.023**	2.75 (−0.04; 5.54)	0.055
Negative affect								
Change by T9	1.60 (−0.73; 3.93)	0.344	2.26 (−0.18; 4.70)	0.083	−1.40 (−3.97; 1.18)	0.703	−0.74 (−3.42; 1.94)	1.000
Change by T26	−0.01 (−2.50,2.48)	1.000	0.11 (−2.51; 2.73)	1.000	−0.25 (−2.94; 2.45)	1.000	−0.12 (−2.93; 2.69)	1.000

Note: Bold font indicates significant effects ($p < 0.05$). Mean values are least square mean estimates from the Linear mixed model with random effects for school class and school; Bonferroni adjustment was used in between and within group comparisons. Gender and grade were controlled for in the analyses. (T9 = week 9, T26 = week 26)

Intervention 1 = students who practiced mindfulness no more than a few times, N = 733

Intervention 2 = students who practiced mindfulness once or twice a month, N = 104

Intervention 3 = students who practiced mindfulness at least once a week, N = 55

Intervention 4 = students who practiced mindfulness almost every day, N = 46

active groups of independently practicing students. Those who practiced at least once a week had increases in positive affect compared to the active control group at T9 (d = 0.33) and T26 (d = 0.43), and compared to inactive control group at T9 (d = 0.33) and T26 (d = 0.40). Those who practiced almost every day had increases in positive affect compared to the active control group at T9 (d = 0.25) and at T26 (d = 0.42), and compared to the inactive control group at T9 (d = 0.26) and at T26 (d = 0.40). Overall, these effect sizes were small.

4.6 Correlations Between Measures

The Pearson correlation coefficients between well-being measures are presented in Supplementary Table S5.

5 Discussion

This is the first large-scale RCT to examine the effects of universal mindfulness-based intervention (MBI) on the well-being of adolescents compared to an active (relaxation) and inactive control (normal school curriculum) groups. The results demonstrated that the MBI increased well-being (SWLS-C life satisfaction) in comparison to the active control group at the immediate post-intervention assessment. Furthermore, of the participant-related factors, gender and age did not moderate the effectiveness of the intervention, whereas independent practice was found to moderate some intervention effects at follow-up.

The results of the comparison between the intervention group and the active control group demonstrated an intervention effect on life satisfaction (SWLS-C life satisfaction) at 9 weeks. Similar results have been found with universal MBI for 9–10-year-old children (Amundsen et

al., 2020), although null findings also exist (García-Rubio et al., 2023). Several mechanisms might explain the connection between mindfulness and life satisfaction. Mindfulness cultivates emotion regulation through cognitive reappraisal (Hölzel et al., 2011) and facilitates self-evaluation (Li et al., 2022). Moreover, mindfulness boosts self-esteem (Randal et al., 2015). In turn, all of these promote life satisfaction (Amundsen et al., 2020; Judge et al., 2003; Moksnes & Espnes, 2013). However, in the comparison between the intervention group and the smaller inactive control group, no intervention effect was observed on any well-being indicators at any time point. Similarly, a cluster-RCT study with a 9-week universal MBI for 7–12-year-olds found no difference in life satisfaction compared to waiting list controls (García-Rubio et al., 2023). The small sample size of the inactive control group in our study, approximately four times smaller than the intervention group (Fig. 1), may have contributed to this outcome, as statistical power may have been insufficient to detect differences between the intervention and inactive control groups.

We assessed life satisfaction using the OECD life satisfaction and the SWLS-C life satisfaction, which yielded inconsistent results, despite a strong baseline correlation among all students (Supplementary Table S4, r=0.75). The SWLS-C life satisfaction increased significantly at 9 weeks in the intervention group compared to the active control group. Conversely, the OECD life satisfaction did not demonstrate a significant increase in the intervention group, although it approached significance at 9 weeks compared to the active control group (p=0.051). The SWLS-C life satisfaction assesses life satisfaction in children aged 9–14 with five statements (Gadermann et al., 2010), providing a more precise and sensitive measure to changes (Bowling, 2005). The 10-level single-item OECD life satisfaction is designed to measure well-being across 38 OECD countries (OECD, n.d.), emphasizing general summary of the measured phenomenon (Bowling, 2005). The OECD life satisfaction may not capture adolescents' life satisfaction as effectively as the SWLS-C life satisfaction. Additionally, multi-item life satisfaction measures (such as SWLS-C life satisfaction) have been indicated to be more stable than single-item measures (such as OECD life satisfaction), which are found to be potentially more vulnerable to measurement inaccuracies (Jovanović & Lazić, 2020).

We found no effects of MBI at the 26-week follow-up on life satisfaction (SWLS-C life satisfaction and OECD life satisfaction), which is consistent with earlier research on universal MBI with a RCT design (García-Rubio et al., 2023). This is likely due to the limited number of participants who continue regular, independent practice, as evidenced by the present study (5.9% practiced weekly and 4,9% daily), similar to rates seen in a study by Kuyken et al. (2013) (15% practiced weekly, 5% several times a week, 1% practiced daily) and in a study by Kuyken et al. (2022) where practice frequency was a mildly above 'never' at post-intervention and 1-year follow-up. Prior studies support the finding, that the amount of independent mindfulness practice during (Huppert & Johnson, 2010; Kuyken et al., 2013) and after an intervention (Kuyken et al., 2013) is associated with improvements in adolescents' well-being.

The present study found no effects of a 9-week MBI on positive or negative affect when compared to active and inactive control groups. Similarly, a previous 12-week MBI study for children aged 9–13-year-olds showed no effects on positive or negative affect compared to a control group (Schonert-Reichl & Lawlor, 2010). The brief intervention duration may explain the lack of impact on affects. Similar interpretations have been made previously (Garber et al., 2025; Mettler et al., 2024; Vickery & Dorjee, 2016). Metacognitive skills, cultivated through mindfulness practice are suggested to influence affects (Garland et al., 2015; Vickery & Dorjee, 2016) but require time to develop (Garland et al., 2015). A longer mindfulness practice may be needed, as the independent practitioners in our study showed increased positive affect at the 26-week

follow-up. In addition, the PANAS has been criticized for overrepresenting high-arousal affects (e.g., excited, alert) (Diener et al., 2010). Some studies have indicated that mindfulness practice is more strongly related with changes in low-arousal affects (e.g., calm, quiet, sad) than high-arousal affects (Jones et al., 2018; McManus et al., 2024). Consequently, the PANAS may be less sensitive in detecting mindfulness-related changes.

The present study found that gender did not moderate the effectiveness of MBI. However, in separate gender analyses, boys demonstrated a favorable intervention effect on life satisfaction (OECD life satisfaction) compared to the active control group post-intervention. No intervention effect was found among girls. In contrast to our study, Kang et al. (2018) found that girls in the MBI group demonstrated greater benefits from mindfulness practice than boys, with increased well-being. In Bluth et al. (2017) and Carsley et al. (2018) there was no clear evidence of gender differences, and Johnson et al. (2017) found no differences. Mindfulness may impact genders through different mechanisms; females may benefit from reduced rumination and internal distress, while males may require mindfulness practice that aligns with externalizing and distractive coping mechanisms (Rojiani et al., 2017). However, there is limited evidence on the gender differences in the effectiveness of MBIs on well-being and more research is needed.

Our study found no moderating effect of age on MBI. However, when age groups were analyzed separately, a favorable intervention effect was found among 12-year-olds (6th graders) on life satisfaction (OECD life satisfaction) post-intervention, but not among 13- and 14-year-olds (7th and 8th graders). Similarly, another MBI showed improvement in well-being only among 11-year-olds and not among 13- and 14-year-olds (Terjestam et al., 2016). Younger students had a more stable learning environment, such as a single teacher and classroom, unlike older students who had changes in both teachers and classrooms, which potentially influenced the effectiveness of the intervention (Terjestam et al., 2016). The school environments in our study were similar. However, it has been suggested that younger adolescents may struggle with mindfulness practices due to limitations in self-regulatory and metacognitive capabilities (Montero-Marin et al., 2022). Overall, evidence is inconclusive regarding the age group that benefits the most from MBIs. Some studies have indicated that older adolescents benefit the most (Carsley et al., 2018; Dunning et al., 2019), whereas others suggest children benefit the most from MBIs (Odgers et al., 2020) or found no age-related differences (Johnson et al., 2017).

The role of independent home practice was also examined. The practice was self-directed with available audio records of the practices. While the quality of the practice is very challenging to evaluate, the amount of independent home practice was asked at the 26-week follow-up questionnaire from the participants in the mindfulness intervention. The participants in the intervention group who practiced weekly demonstrated improvements in positive affect at the 26-week follow-up compared to both control groups. Daily practitioners improved compared to the active control group and nearly significantly compared to the inactive control group (Table 2). No prior study has examined the impact of independent mindfulness practice on positive affect in adolescents. However, increases in key elements of mindfulness; the awareness of challenging experiences, and approaching these with nonreactivity have been connected to improved positive affect among adolescents (Galla et al., 2020). Mindfulness practice has also been proposed to foster metacognitive abilities, enabling a more flexible perspective on experiences, and thus promoting positive affect (Garland et al., 2015). These abilities take time to accrue (Garland et al., 2015; Weil et al., 2013), which may explain why an increase in positive affect was observed at the 26-week follow-up rather than immediately post-intervention in the intervention group or among independent practitioners. The independence of positive and negative affect was also evi-

dent. While independent practitioners showed increased positive affect at the follow-up, negative affect remained unchanged. Although the mechanisms behind this phenomenon are unclear, some studies have conversely found that mindfulness practice decreases negative affect in adolescents and children, without increasing positive affect or other well-being indicators (Sibinga et al., 2016; Vickery & Dorjee, 2016; Wimmer et al., 2023). Therefore, tailored approaches may be needed to ascertain the effect of MBIs on diverse indicators of well-being.

5.1 Methodological Considerations

The research project, which includes the present study, is one of the most methodologically rigorous in the field of universal MBIs (Volanen et al., 2016), as noted by Dunning et al. (2022b). Despite this, some limitations should be acknowledged. These include inviting a smaller group as an inactive control, which reduces the power. Additionally, as anticipated in studies of this nature, several participants withdrew from the study (Fig. 1). In terms of analyses on independent practice, those who practiced more frequently may represent a specific subgroup, as those who observe effectiveness may practice more because of noticing the impact. A randomized controlled trial assigning participants to groups of varying practice amounts could provide insights into whether the effectiveness is due to the practice itself or the participants' differences. However, ensuring that the participants engage in a specified amount of practice would be challenging. Finally, since eudaimonic well-being was not evaluated in this study, future studies should consider eudaimonic well-being when evaluating the effectiveness of MBIs for adolescents. It is possible that measures of eudaimonic well-being could have produced differing results.

The strengths of this study include the RCT design with active and inactive control groups, extensive sample size, and a follow-up evaluation. Wait-list control was not included. Wait-list control has been criticized since it may overestimate the effect sizes and induce 'nocebo' responses among participants (Gold et al., 2017). Inclusion of an active control group provided robust evidence for mindfulness-specific benefits over comparable program (relaxation). In addition, including an inactive control group enabled comparisons with prior studies primarily using inactive control conditions. Furthermore, experienced mindfulness facilitators conducted the intervention, and the randomization process was executed at the school level, which reduced the potential for contamination. Given the randomized design and comparable baseline characteristics between groups, confounding is unlikely and further adjustment for background characteristics would not have changed the intervention effects. However, possible confounding by unmeasured characteristics cannot be excluded. The analyses of classroom and school effects were statistically accounted for.

6 Conclusions

The findings indicate that a 9-week universal MBI has some potential to improve the well-being of adolescents. Independent mindfulness practice moderated the effects of MBI, indicating that committing to regular practice may enhance the effects of MBI. However, only a few students commit to practice (Kuyken et al., 2013, 2022). It would therefore be beneficial to implement mindfulness practices into the school curriculum to enable students to engage in practices during the school day with mindfulness-trained schoolteachers and to investigate the impact of this approach. There were no clear and robust moderating effects of gender and age on MBI. Further

investigation of potential moderators and the underlying mechanisms of mindfulness in promoting well-being is recommended.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10902-025-01003-1.

Acknowledgements The research team would like to express their gratitude to the participating schools, principals and teachers, children and adolescents, parents, and all who contributed to the data collection process.

Authors Contributions All authors contributed to the study conception and design. Material preparation and data collection were performed by Salla-Maarit Volanen. Analysis was performed by Jemina Qvick and Tero Vahlberg. All authors took part in interpreting the findings. The first draft of the manuscript was written by Jemina Qvick. All authors reviewed and edited the manuscript. All authors read and approved the final manuscript.

Funding Open Access funding provided by University of Oulu (including Oulu University Hospital). This project is sponsored by Folkhälsan Research Center and University of Oulu, and funded by Signe and Ane Gyllenberg Foundation, Juho Vainio Foundation, Mats Brommels Foundation, Yrjö Jahnsson Foundation, Niilo Helander Foundation, Ministry of Social Affairs and Health and Swedish Cultural Foundation. The study protocol has undergone peer-review by all the funding bodies.

Data Availability The data that support the findings of this study are available from the authors upon reasonable request.

Declarations

Competing Interest The authors declare no conflicts of interest.

Informed Consent All participating students and their parents voluntarily offered written informed consent.

Ethics Approval The study was approved by the ethical review board of the University of Helsinki (Statement 1/2014).

References

Amundsen, R., Riby, L. M., Hamilton, C., Hope, M., & McGann, D. (2020). Mindfulness in primary school children as a route to enhanced life satisfaction, positive outlook and effective emotion regulation. *BMC Psychology, 8*(1), 1–15. https://doi.org/10.1186/S40359-020-00428-Y/TABLES/4

Bernay, R., Graham, E., Devcich, D. A., Rix, G., & Rubie-Davies, C. M. (2016). Pause, breathe, smile: A mixed-methods study of student well-being following participation in an eight-week, locally developed mindfulness program in three New Zealand schools. *Advances in School Mental Health Promotion, 9*(2), 90–106. https://doi.org/10.1080/1754730X.2016.1154474

Bluth, K., Roberson, P. N. E., & Gaylord, S. A. (2015). A pilot study of a mindfulness intervention for adolescents and the potential role of self-compassion in reducing stress. *Explore, 11*(4), 292–295. https://doi.org/10.1016/J.EXPLORE.2015.04.005

Bluth, K., Roberson, P. N. E., & Girdler, S. S. (2017). Adolescent sex differences in response to a mindfulness intervention: A call for research. *Journal of Child & Family Studies, 26*(7), 1900–1914. https://doi.org/10.1007/S10826-017-0696-6

Bowling, A. (2005). Just one question: If one question works, why ask several? *Journal of Epidemiology & Community Health, 59*(5), 342–345. https://doi.org/10.1136/JECH.2004.021204

Britton, W. B., Lepp, N. E., Niles, H. F., Rocha, T., Fisher, N. E., & Gold, J. S. (2014). A randomized controlled pilot trial of classroom-based mindfulness meditation compared to an active control condition in sixth-grade children. *Journal of School Psychology, 52*(3), 263–278. https://doi.org/10.1016/j.jsp.2014.03.002

Brown, K. W., West, A. M., Loverich, T. M., & Biegel, G. M. (2011). Assessing adolescent mindfulness: Validation of an adapted mindful attention awareness scale in adolescent normative and psychiatric populations. *Psychological Assessment, 23*(4), 1023–1033. https://doi.org/10.1037/A0021338

Burckhardt, R., Manicavasagar, V., Batterham, P. J., Hadzi-Pavlovic, D., & Shand, F. (2017). Acceptance and commitment therapy universal prevention program for adolescents: A feasibility study. *Child and Adolescent Psychiatry and Mental Health*. https://doi.org/10.1186/s13034-017-0164-5

Carsley, D., Khoury, B., & Heath, N. L. (2018). Effectiveness of mindfulness interventions for mental health in schools: A comprehensive meta-analysis. *Mindfulness, 9*(3), 693–707. https://doi.org/10.1007/s12671-017-0839-2

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Routledge.

Costello, E. J., Egger, H., & Angold, A. (2005). 10-year research update review: The epidemiology of child and adolescent psychiatric disorders: I. Methods and public health burden. *Journal of the American Academy of Child and Adolescent Psychiatry, 44*(10), 972–986. https://doi.org/10.1097/01.CHI.0000172552.41596.6F

Devcich, D. A., Rix, G., Bernay, R., & Graham, E. (2017). Effectiveness of a mindfulness-based program on school children's self-reported well-being: A pilot study comparing effects with an emotional literacy program. *Journal of Applied School Psychology, 33*(4), 309–330. https://doi.org/10.1080/15377903.2017.1316333

Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist*. https://doi.org/10.1037/0003-066X.55.1.34

Diener, E., Emmons, R. A., Larsem, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71–75. https://doi.org/10.1207/S15327752JPA4901_13

Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research, 97*(2), 143–156. https://doi.org/10.1007/S11205-009-9493-Y/TABLES/8

Dunning, D., Ahmed, S., Foulkes, L., Griffin, C., Griffiths, K., Leung, J. T., Parker, J., Piera Pi-Sunyer, B., Sakhardande, A., Bennett, M., Haag, C., Montero-Marin, J., Packman, D., Vainre, M., Watson, P., Kuyken, W., Williams, J. M. G., Ukoumunne, O. C., Blakemore, S. J., & Dalgleish, T. (2022a). The impact of mindfulness training in early adolescence on affective executive control, and on later mental health during the COVID-19 pandemic: A randomised controlled trial. *Evidence-Based Mental Health, 25*(3), 110–116. https://doi.org/10.1136/EBMENTAL-2022-300460

Dunning, D., Griffiths, K., Kuyken, W., Crane, C., Foulkes, L., Parker, J., & Dalgleish, T. (2019). Research review: The effects of mindfulness-based interventions on cognition and mental health in children and adolescents – a meta-analysis of randomized controlled trials. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 60*(3), 244. https://doi.org/10.1111/JCPP.12980

Dunning, D., Tudor, K., Radley, L., Dalrymple, N., Funk, J., Vainre, M., Ford, T., Montero-Marin, J., Kuyken, W., & Dalgleish, T. (2022b). Do mindfulness-based programmes improve the cognitive skills, behaviour and mental health of children and adolescents? An updated meta-analysis of randomised controlled trials. *BMJ Mental Health, 25*(3), 135–142. https://doi.org/10.1136/EBMENTAL-2022-300464

Gadermann, A. M., Schonert-Reichl, K. A., & Zumbo, B. D. (2010). Investigating validity evidence of the satisfaction with life scale adapted for children. *Social Indicators Research, 96*(2), 229–247. https://doi.org/10.1007/S11205-009-9474-1

Galla, B. M., Tsukayama, E., Park, D., Yu, A., & Duckworth, A. L. (2020). The mindful adolescent: Developmental changes in nonreactivity to inner experiences and its association with emotional well-being. *Developmental Psychology, 56*(2), 350–363. https://doi.org/10.1037/DEV0000877

Garber, J., Chavira, D. A., Adam, E. K., Craske, M. G., McMahon, T., Williams, A., Abitante, G., Lanser, I., Pashtunyar, D. S., Chen, S., & Zinbarg, R. (2025). A randomized controlled trial of an online mindfulness program for adolescents at risk for internalizing problems. *Journal of Consulting and Clinical Psychology, 93*(4), 226–237. https://doi.org/10.1037/CCP0000921

García-Rubio, C., Herrero, M., Luna-Jarillo, T., Albert, J., & Rodríguez-Carvajal, R. (2023). Effectiveness and mechanisms of change of a mindfulness-based intervention on elementary school children: A cluster-randomized control trial. *Journal of School Psychology, 99*, Article 101211. https://doi.org/10.1016/J.JSP.2023.04.001

Garland, E. L., Farb, N. A., R. Goldin, P., & Fredrickson, B. L. (2015). Mindfulness broadens awareness and builds eudaimonic meaning: A process model of mindful positive emotion regulation. *Psychological Inquiry, 26*(4), 293–314. https://doi.org/10.1080/1047840X.2015.1064294

Gold, S. M., Enck, P., Hasselmann, H., Friede, T., Hegerl, U., Mohr, D. C., & Otte, C. (2017). Control conditions for randomised trials of behavioural interventions in psychiatry: A decision framework. *The Lancet Psychiatry, 4*(9), 725–732. https://doi.org/10.1016/S2215-0366(17)30153-0

Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science, 6*(6), 537–559. https://doi.org/10.1177/1745691611419671

Hoyt, L. T., Chase-Lansdale, P. L., McDade, T. W., & Adam, E. K. (2012). Positive youth, healthy adults: Does positive well-being in adolescence predict better perceived health and fewer risky health behaviors in young adulthood? *Journal of Adolescent Health, 50*(1), 66–73. https://doi.org/10.1016/J.JADOHEALTH.2011.05.002

Huppert, F. A., & Johnson, D. M. (2010). A controlled trial of mindfulness training in schools: The importance of practice for an impact on well-being. *Journal of Positive Psychology, 5*(4), 264–274. https://doi.org/10.1080/17439761003794148

Johnson, C., Burke, C., Brinkman, S., & Wade, T. (2016). Effectiveness of a school-based mindfulness program for transdiagnostic prevention in young adolescents. *Behaviour Research and Therapy, 81*, 1–11. https://doi.org/10.1016/j.brat.2016.03.002

Johnson, C., Burke, C., Brinkman, S., & Wade, T. (2017). A randomized controlled evaluation of a secondary school mindfulness program for early adolescents: Do we have the recipe right yet? *Behaviour Research and Therapy, 99*, 37–46. https://doi.org/10.1016/j.brat.2017.09.001

Johnson, C., & Wade, T. (2019). Piloting a more intensive 8-week mindfulness programme in early- and mid-adolescent school students. *Early Intervention in Psychiatry, 13*(6), 1495–1502. https://doi.org/10.1111/EIP.12801

Johnson, C., & Wade, T. (2021). Acceptability and effectiveness of an 8-week mindfulness program in early- and mid-adolescent school students: A randomised controlled trial. *Mindfulness, 12*(10), 2473–2486. https://doi.org/10.1007/S12671-021-01716-3/TABLES/5

Jones, D. R., Graham-Engeland, J. E., Smyth, J. M., & Lehman, B. J. (2018). Clarifying the associations between mindfulness meditation and emotion: Daily high- and low-arousal emotions and emotional variability. *Applied Psychology: Health & Well-Being, 10*(3), 504–523. https://doi.org/10.1111/APHW.12135

Jovanović, V. (2016). The validity of the satisfaction with life scale in adolescents and a comparison with single-item life satisfaction measures: A preliminary study. *Quality of Life Research, 25*(12), 3173–3180. https://doi.org/10.1007/S11136-016-1331-5/TABLES/4

Jovanović, V., & Lazić, M. (2020). Is longer always better? A comparison of the validity of single-item versus multiple-item measures of life satisfaction. *Applied Research in Quality of Life, 15*(3), 675–692. https://doi.org/10.1007/S11482-018-9680-6/TABLES/6

Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2003). The CORE self-evaluations scale: Development of a measure. *Personnel Psychology, 56*(2), 303–331. https://doi.org/10.1111/J.1744-6570.2003.TB00152.X

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice, 10*(2), 144–156. https://doi.org/10.1093/CLIPSY.BPG016

Kang, Y., Rahrig, H., Eichel, K., Niles, H. F., Rocha, T., Lepp, N. E., Gold, J., & Britton, W. B. (2018). Gender differences in response to a school-based mindfulness training intervention for early adolescents. *Journal of School Psychology, 68*, 163–176. https://doi.org/10.1016/J.JSP.2018.03.004

Kennes, A., Lataster, J., Janssens, M., Simons, M., Reijnders, J., Jacobs, N., & Peeters, S. (2023). Efficacy of a school-based mental health intervention based on mindfulness and character strengths use among adolescents: A pilot study of think happy-be happy intervention. *Journal of Happiness Studies, 24*(2), 677–697. https://doi.org/10.1007/S10902-022-00611-5/TABLES/5

Kuyken, W., Ball, S., Crane, C., Ganguli, P., Jones, B., Montero-Marin, J., Nuthall, E., Raja, A., Taylor, L., Tudor, K., Viner, R. M., Allwood, M., Aukland, L., Dunning, D., Casey, T., Dalrymple, N., De Wilde, K., Farley, E. R., Harper, J., … Williams, J. M. G. (2022). Effectiveness and cost-effectiveness of universal school-based mindfulness training compared with normal school provision in reducing risk of mental health problems and promoting well-being in adolescence: The MYRIAD cluster randomised controlled trial. *Evidence-Based Mental Health, 25*(3), 99. https://doi.org/10.1136/EBMENTAL-2021-300396

Kuyken, W., Weare, K., Ukoumunne, O. C., Vicary, R., Motton, N., Burnett, R., Cullen, C., Hennelly, S., & Huppert, F. (2013). Effectiveness of the Mindfulness in Schools Programme: Non-randomised controlled feasibility study. *British Journal of Psychiatry, 203*(2), 126–131. https://doi.org/10.1192/BJP.BP.113.126649

Lassander, M., Hintsanen, M., Suominen, S., Mullola, S., Vahlberg, T., & Volanen, S. M. (2021). Effects of school-based mindfulness intervention on health-related quality of life: Moderating effect of gender, grade, and independent practice in cluster randomized controlled trial. *Quality of Life Research, 30*(12), 3407–3419. https://doi.org/10.1007/S11136-021-02868-4/TABLES/5

Lassander, M., Saarinen, T., Simonsen-Rehn, N., Suominen, S., Vahlberg, T., & Volanen, S. M. (2023). Healthy learning mind (HLM): Cluster randomized controlled trial on a mindfulness intervention, moderators and association with perceived socioeconomic status, and comparison to other national data. *Child & Youth Care Forum, 52*(1), 157–176. https://doi.org/10.1007/S10566-022-09683-Z/TABLES/5

Li, X., Ma, L., & Li, Q. (2022). How mindfulness affects life satisfaction: Based on the mindfulness-to-meaning theory. *Frontiers in Psychology, 13*, Article 887940. https://doi.org/10.3389/FPSYG.2022.887940/BIBTEX

Lombas, A. S., Jiménez, T. I., Arguís-Rey, R., Hernández-Paniello, S., Valdivia-Salas, S., & Martín-Albo, J. (2019). Impact of the happy classrooms programme on psychological well-being, school aggression, and classroom climate. *Mindfulness, 10*(8), 1642–1660. https://doi.org/10.1007/S12671-019-01132-8/TABLES/5

Ma, L., & Xiang, Y. (2023). Mindfulness and subjective well-being among Chinese adolescents: A longitudinal study and a weekly diary investigation. *Journal of Happiness Studies, 24*(6), 1861–1881. https://doi.org/10.1007/S10902-023-00662-2/TABLES/6

McManus, M. D., Nakamura, J., & Siegel, J. T. (2024). Hiding in plain sight: The distinct importance of low-arousal positive affect. *Motivation and Emotion, 48*(3), 336–422. https://doi.org/10.1007/S11031-024-10062-5

Mettler, J., Zito, S., Bastien, L., Bloom, E., & Heath, N. L. (2024). How we teach mindfulness matters: Adolescent development and the importance of informal mindfulness. *Journal of School Psychology, 105*, Article 101323. https://doi.org/10.1016/J.JSP.2024.101323

Moksnes, U. K., & Espnes, G. A. (2013). Self-esteem and life satisfaction in adolescents-gender and age as potential moderators. *Quality of Life Research, 22*(10), 2921–2928. https://doi.org/10.1007/S11136-013-0427-4/TABLES/4

Monsillion, J., Zebdi, R., & Romo-Desprez, L. (2023). School mindfulness-based interventions for youth, and considerations for anxiety, depression, and a positive school climate—a systematic literature review. *Children, 10*(5), Article 861. https://doi.org/10.3390/CHILDREN10050861

Montero-Marin, J., Allwood, M., Ball, S., Crane, C., De Wilde, K., Hinze, V., Jones, B., Lord, L., Nuthall, E., Raja, A., Taylor, L., Tudor, K., Blakemore, S. J., Byford, S., Dalgleish, T., Ford, T., Greenberg, M. T., Ukoumunne, O. C., Williams, J. M. G., & Kuyken, W. (2022). School-based mindfulness training in early adolescence: What works, for whom and how in the MYRIAD trial? *Evidence-Based Mental Health, 25*(3), 117–124. https://doi.org/10.1136/EBMENTAL-2022-300439

Odgers, K., Dargue, N., Creswell, C., Jones, M. P., & Hudson, J. L. (2020). The limited effect of mindfulness-based interventions on anxiety in children and adolescents: A meta-analysis. *Clinical Child and Family Psychology Review, 23*(3), 407–426. https://doi.org/10.1007/S10567-020-00319-Z/FIGURES/2

OECD. (2020). How's Life? 2020. *OECD*. https://doi.org/10.1787/9870c393-en

OECD. (n.d.). *OECD Better Life Index*. Retrieved April 24, 2024, from https://www.oecdbetterlifeindex.org/about/better-life-initiative/

Paulus, F. W., Ohmann, S., & Popow, C. (2016). Practitioner review: School-based interventions in child mental health. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 57*(12), 1337–1359. https://doi.org/10.1111/JCPP.12584

Phan, M. L., Renshaw, T. L., Caramanico, J., Greeson, J. M., MacKenzie, E., Atkinson-Diaz, Z., Doppelt, N., Tai, H., Mandell, D. S., & Nuske, H. J. (2022). Mindfulness-based school interventions: A systematic review of outcome evidence quality by study design. *Mindfulness, 13*(7), Article 1591. https://doi.org/10.1007/S12671-022-01885-9

Randal, C., Pratt, D., & Bucci, S. (2015). Mindfulness and self-esteem: A systematic review. *Mindfulness, 6*(6), 1366–1378. https://doi.org/10.1007/s12671-015-0407-6

Rojiani, R., Santoyo, J. F., Rahrig, H., Roth, H. D., & Britton, W. B. (2017). Women benefit more than men in response to college-based meditation training. *Frontiers in Psychology, 8*, 551. https://doi.org/10.3389/FPSYG.2017.00551

Ruini, C., Ottolini, F., Tomba, E., Belaise, C., Albieri, E., Visani, D., Offidani, E., Caffo, E., & Fava, G. A. (2009). School intervention for promoting psychological well-being in adolescence. *Journal of Behavior Therapy and Experimental Psychiatry, 40*(4), 522–532. https://doi.org/10.1016/J.JBTEP.2009.07.002

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069

Saarinen, A., Hintsanen, M., Vahlberg, T., Hankonen, N., & Volanen, S. M. (2022). School-based mindfulness intervention for depressive symptoms in adolescence: For whom is it most effective? *Journal of Adolescence, 94*(2), 118–132. https://doi.org/10.1002/JAD.12011

Scafuto, F., Ghiroldi, S., Montecucco, N. F., De Vincenzo, F., Quinto, R. M., Presaghi, F., & Iani, L. (2024). Promoting well-being in early adolescents through mindfulness: A cluster randomized controlled trial. *Journal of Adolescence, 96*(1), 57–69. https://doi.org/10.1002/JAD.12252

Schonert-Reichl, K. A., & Lawlor, M. S. (2010). The effects of a mindfulness-based education program on pre- and early adolescents' well-being and social and emotional competence. *Mindfulness, 1*(3), 137–151. https://doi.org/10.1007/S12671-010-0011-8

Sibinga, E. M. S., Webb, L., Ghazarian, S. R., & Ellen, J. M. (2016). School-based mindfulness instruction: An RCT. *Pediatrics*. https://doi.org/10.1542/PEDS.2015-2532/52797

Terjestam, Y., Bengtsson, H., & Jansson, A. (2016). Cultivating awareness at school. Effects on effortful control, peer relations and well-being at school in grades 5, 7, and 8. *School Psychology International, 37*(5), 456–469. https://doi.org/10.1177/0143034316658321

Tudor, K., Maloney, S., Raja, A., Baer, R., Blakemore, S. J., Byford, S., Crane, C., Dalgleish, T., De Wilde, K., Ford, T., Greenberg, M., Hinze, V., Lord, L., Radley, L., Opaleye, E. S., Taylor, L., Ukoumunne, O. C., Viner, R., Kuyken, W., & Montero-Marin, J. (2022). Universal mindfulness training in schools for adolescents: A scoping review and conceptual model of moderators, mediators, and implementation factors. *Prevention Science, 23*(6), 934–953. https://doi.org/10.1007/S11121-022-01361-9

Vickery, C. E., & Dorjee, D. (2016). Mindfulness training in primary schools decreases negative affect and increases meta-cognition in children. *Frontiers in Psychology, 6*(JAN), Article 154489. https://doi.org/10.3389/FPSYG.2015.02025/BIBTEX

Volanen, S. M., Lassander, M., Hankonen, N., Santalahti, P., Hintsanen, M., Simonsen, N., Raevuori, A., Mullola, S., Vahlberg, T., But, A., & Suominen, S. (2016). Healthy learning mind - a school-based mindfulness and relaxation program: A study protocol for cluster randomized controlled trial. *BMC Psychology, 4*(1), 1–10. https://doi.org/10.1186/S40359-016-0142-3

Volanen, S. M., Lassander, M., Hankonen, N., Santalahti, P., Hintsanen, M., Simonsen, N., Raevuori, A., Mullola, S., Vahlberg, T., But, A., & Suominen, S. (2020). Healthy learning mind—Effectiveness of a mindfulness program on mental health compared to a relaxation program and teaching as usual in schools: A cluster-randomised controlled trial. *Journal of Affective Disorders, 260*, 660–669. https://doi.org/10.1016/J.JAD.2019.08.087

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Weare, K., & Nind, M. (2011). Mental health promotion and problem prevention in schools: What does the evidence say? *Health Promotion International*. https://doi.org/10.1093/HEAPRO/DAR075

Weil, L. G., Fleming, S. M., Dumontheil, I., Kilford, E. J., Weil, R. S., Rees, G., Dolan, R. J., & Blakemore, S. J. (2013). The development of metacognitive ability in adolescence. *Consciousness and Cognition, 22*(1), 264–271. https://doi.org/10.1016/J.CONCOG.2013.01.004

Wimmer, L., Isherwood, K. R., Parkinson, J., & Dorjee, D. (2023). Relating dispositional mindfulness and long-term mindfulness training with executive functioning, emotion regulation, and well-being in pre-adolescents. *Psychological Studies, 1*, 1–20. https://doi.org/10.1007/S12646-023-00746-2

World Health Organization. (2020). *Guidelines on mental health promotive and preventive interventions for adolescents: helping adolescents thrive.* https://www.who.int/publications/i/item/9789240011854

Zhang, D., Lee, E. K. P., Mak, E. C. W., Ho, C. Y., & Wong, S. Y. S. (2021). Mindfulness-based interventions: An overall review. *British Medical Bulletin, 138*(1), 41–57. https://doi.org/10.1093/BMB/LDAB005