



# Effects of a Mindfulness-Based Intervention for Teachers: a Study on Teacher and Student Outcomes

Joana S. de Carvalho<sup>1</sup> · Sofia Oliveira<sup>1</sup> · Magda Sofia Roberto<sup>1</sup> · Carolina Gonçalves<sup>2</sup> · José M. Bárbara<sup>2</sup> · Aline F. de Castro<sup>2</sup> · Rita Pereira<sup>2</sup> · Mariana Franco<sup>2</sup> · Joana Cadima<sup>3</sup> · Teresa Leal<sup>3</sup> · Marina S. Lemos<sup>3</sup> · Alexandra Marques-Pinto<sup>1</sup>

Accepted: 12 April 2021 / Published online: 22 April 2021

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## Abstract

**Objectives** Teachers' stress can affect their occupational health and negatively impact classroom climate and students' well-being. This study aims to evaluate the proximal and distal effects of a mindfulness-based program, specially developed to promote teachers' social-emotional competencies (SEC), across teachers, classroom climates, and students' outcomes.

**Methods** The study followed a randomized trial design with two data collection points (pretest and posttest). Participants in the experimental group (EG) included 123 elementary school teachers, their 1503 students, and these students' parents (1494), while the control group (CG) comprised 105 elementary school teachers, their 947 students, and these students' parents (913). A mixed data collection strategy was used that included teachers' and students' (self-) report, observational ratings of teachers' classroom behaviors, and parents' reports on students.

**Results** After the intervention, EG teachers, compared to CG teachers, reported a significant increase in mindfulness and emotional regulation competencies, self-efficacy, and well-being and a decrease in burnout symptoms. Similarly, a significant improvement was found in EG teachers' classroom behaviors related to students' engagement. Additionally, significant improvements were also found in EG students' perceptions of the quality of their teachers' involvement in classroom relationships, self-reported effect, and social competencies perceived by their parents.

**Conclusions** These findings further the knowledge on the role played by mindfulness-based SEC interventions in reducing teachers' burnout symptoms and cultivating their SEC and well-being, in promoting a nurturing classroom climate and also in promoting the SEC and well-being of students.

**Keywords** Mindfulness-based intervention · Social and emotional competencies · Teachers · Classroom climate · Students

Decades of research have confirmed that teaching is a demanding job, and this scenario may worsen as a result of the COVID-19 pandemic (Sokal et al., 2020). Due to the difficult demands of their work, teachers feel increasingly stressed, and their stress and burnout can affect their health, well-being, and professional performance (i.e., the quality of teaching and classroom management). Consequently,

students' learning and engagement may be negatively affected (Jennings & Greenberg, 2009; Schonert-Reichl, 2017).

Efforts have been made to develop grounded and culturally adapted interventions that may act as a buffer against teachers' stress and burnout risks, thus promoting their occupational health (Durlak et al., 2015). In this context, the development of social and emotional competencies (SEC) (i.e., self-awareness, self-regulation, social awareness, relationship management, and responsible decision making; Collaborative for Academic, Social, and Emotional Learning, <http://www.casel.org>) has been emphasized as an important protective factor for teachers' health and well-being, with positive impacts on their job performance (Jennings & Greenberg, 2009; Schonert-Reichl, 2017).

✉ Joana S. de Carvalho  
joaca73@gmail.com

<sup>1</sup> Faculdade de Psicologia, CICPSI, Universidade de Lisboa, Alameda da Universidade, 1649-013 Lisboa, Portugal

<sup>2</sup> Faculdade de Psicologia, Universidade de Lisboa, Lisboa, Portugal

<sup>3</sup> Faculdade de Psicologia e de Ciências da Educação, Universidade Do Porto, Porto, Portugal

Accordingly, Jennings and Greenberg's (2009) Prosocial Classroom model is particularly noteworthy and posits that teachers' SEC and well-being have an impact on the quality of the teacher-student relationship, classroom management, and the effective implementation of social and emotional education. These variables, in turn, stimulate a healthy classroom climate, which contributes to boosting social and emotional competencies and improving the academic achievement of students along with the quality of the teacher-student relationship and the implementation of social and emotional education. A recent systematic review with meta-analysis of 43 SEC promotion interventions for teachers has shown that the promotion of SEC contributes to lower levels of psychological and physical distress and higher levels of well-being (Oliveira et al., [under revision](#)), in line with prior research highlighting the contribution of these interventions to teachers' personal and job-related dimensions (Schonert-Reichl, 2017).

In parallel with these encouraging results, mindfulness-based contemplative practices emerged as a promising approach for enhancing SEC and well-being among teachers (Jennings, 2016). Within the scope of this study, mindfulness is understood as "... the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment (...) "mindfulness" includes an affectionate, compassionate quality within the attending, a sense of open-hearted, friendly presence and interest." (Kabat-Zinn, 2003, p. 145).

Current interventions for teachers are mostly based on the Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990) model, with some adaptations to educational settings. According to the theory of change of Roeser et al. (2012), mindfulness training contributes to teachers' occupational health, personal well-being, and positive emotional experiences by increasing their self-regulatory and coping resources and pro-social dispositions. Such outcomes are manifested in teachers' classroom behaviors, namely those geared toward building a positive classroom climate for instruction and learning, effective classroom management, and supportive relationships with students. The emotionally supportive teacher-student relationships and classroom climate contribute to students' classroom engagement and motivation to learn, and in turn, these students' outcomes contribute to better classroom and teachers' outcomes over time (Roeser, 2016; Roeser et al., 2012).

A meta-analysis (Klingbeil & Renshaw, 2018) on the efficacy of teacher mindfulness-based interventions revealed important results as regards teachers' competencies, occupational health, and wellbeing. Among the most notable effects highlighted by the reviewed studies are reductions in teachers' stress levels, anxiety, depression, and burnout symptoms, and improvements in teachers'

SEC, namely adaptive emotional regulation, mindfulness, self-compassion, professional self-efficacy, and psychological well-being. More recent studies corroborate these findings (e.g., Hwang et al., 2019b). Additionally, teacher mindfulness-based interventions appear to have a positive impact on teachers' perceived skills to cope with students and to manage the classroom effectively (e.g., Rupprecht et al., 2018). Other studies have also observed significant improvements in effective teaching practices, such as instructional support, emotional support, and classroom organization (e.g., Flook et al., 2013; Hirshberg et al., 2020; Hwang et al., 2019b; Jennings et al., 2017). Furthermore, some studies have extended the scope of inquiry to the effects of mindfulness-based interventions for teachers on students' variables. Singh et al. (2013) applied an 8-week mindfulness-based intervention to preschool teachers of children with mild intellectual impairment and found significant positive social and emotional outcomes in these children (e.g., decreased challenging behaviors and negative social interactions and increased compliance with teachers' requests). Likewise, Hwang et al. (2019a) found significant effects on students' sense of connectedness to teachers.

Despite the significant increase and promising results of the research on mindfulness-based interventions for teachers, studies should use more objective outcome measures, in addition to self-report data (Rupprecht et al., 2018), such as "... direct observations of classroom variables, or informant-report measures (e.g., student perceptions of classroom climate)" (Klingbeil & Renshaw, 2018, p.22). Additionally, students' perceptions of teacher classroom behaviors (e.g., support/involvement) may be of particular relevance due to the direct effect these perceptions may have on their own interest and motivation (Jennings & Greenberg, 2009).

With a view to contributing to the knowledge in this field, the present study evaluated the proximal and distal effects of a mindfulness-based SEC program (stress reduction, SEC promotion, mindfulness/compassion practices) specifically developed for teachers. This program is grounded in Jennings and Greenberg's (2009) Prosocial Classroom model, in Roeser's (2016) model, and in the aforementioned empirical findings, across teachers, classroom climate, and students' outcomes. More specifically, this study aims to evaluate the program's effects on teachers' self-report proximal results (emotional regulation, mindfulness, self-compassion) and distal results (job burnout, personal well-being, self-efficacy); teachers' classroom behaviors (emotional support, classroom organization, instructional support); students' report of teachers' behaviors (involvement); students' self-report (positive/negative affect, emotional regulation, well-being); and parental report on children (peer relationships, self-management) results.

## Method

### Participants

Two samples of participants were considered for the analysis of the program's effects. The first sample comprised 228 primary teachers. The experimental group (EG) included 123 teachers with a mean age of 43.14 years ( $SD = 7.86$ ) of whom 97% were female, with a teaching experience mean of 18 years ( $SD = 8.17$ ), where 82% taught 2nd and 3rd grades. The waitlist control group (CG) consisted of 105 teachers with a mean age of 44.42 years ( $SD = 5.65$ ) of whom 95.1% were female, with a mean teaching experience of 20.14 years ( $SD = 6.23$ ), where 74% taught 2nd and 3rd grades. One hundred and twelve teachers from the EG and 93 teachers from the CG completed the pretest and posttest assessments. The differential attrition rate (3%) was low under the optimistic threshold.

To explore the intervention effects on teachers' classroom behaviors, a subsample of teachers ( $n = 41$ ) was considered for data collection at pre and posttest. The EG consisted of 23 teachers of whom 95% were female, with a mean age of 41.83 ( $SD = 5.88$ ) years, 100% teaching 2nd and 3rd grades, with a mean of 18.37 years of service ( $SD = 6.53$ ). The CG comprised 18 teachers of whom 83% were female, with a mean age of 47.7 ( $SD = 6.69$ ) years, 87% teaching 2nd and 3rd grades, with a mean teaching experience of 22.4 years ( $SD = 6.98$ ).

The second sample included 2450 students and their parents. The EG included 1503 students (1494 parents) with a mean age of 8.01 years ( $SD = 0.84$ ) of whom 60% were female and 88% attended 2nd and 3rd grades. The CG comprised 947 students (913 parents), with a mean age of 8.13 years ( $SD = 0.82$ ), of whom 57% were female and 88% attended 2nd and 3rd grades. One thousand, two hundred and sixty-two students (and parents) from the EG and 697 students (and parents) from the CG completed the pretest and posttest assessments. The differential attrition rate (9.5%) was low under the optimistic threshold (Fig. 1).

### Procedures

The study was approved by the Scientific and Ethical Council of the Faculty of Psychology, University of Lisbon, and by the General Directorate for Education of the Portuguese Ministry of Education and Science. Following this approval, the appropriate authorizations were requested from the principals of the schools concerned, and informed consents were obtained from the teachers and the parents of the students who were to participate in the study. Data confidentiality was ensured, and evaluation

protocols were identified with a numeric code, allowing the data to be crossed between the two collection points, while ensuring the participants' anonymity. There were no exclusion criteria, and participation was voluntary. The participants were recruited through different school training centers. Upon registration (prior to pretest), a serial number was allocated to each teacher (their students and parents). The odd numbers were assigned to the EG and the even numbers to the waitlist CG. Therefore, students (and parents) were not randomly assigned to the experimental and control groups. Their assignment to a particular group followed their own teachers' randomization. The EG and CG teachers (students and parents) were sourced from different schools and were not aware of their group assignment (or of the assignment rule) before pretest.

The *Atentamente* training program was delivered in the form of a training course and accredited by the Pedagogical Scientific Council of Continuing Education (1.2 credits for teachers' career development). The training was implemented in collaboration with three training centers of state primary schools in the Lisbon district. The participants randomly assigned to the EG were divided into seven training groups, and all the sessions were implemented in a classroom provided by the school training centers. An MBSR-trained instructor was in charge of the program and implemented the training for the seven groups. Teachers did not have to pay for the training, but in order to be certified, they were required to attend at least 2/3 of the sessions.

### Intervention

*Atentamente*, a mindfulness-based program (MBP), consisted of 30 h delivered through 10 weekly 2.5 h in-group sessions and a 5 h booster session 3 months after completion of the 10th training session. It sought to promote the well-being of teachers by developing mindfulness, SEC, and (self-) compassion skills. The program included three components: mindfulness practices to reduce stress, emotional self-regulation, and caring practices.

The mindfulness training involved enhancing teachers' awareness of the present moment with openness, acceptance, and without judgment. Within this component, the teachers developed personal mindfulness practices as well as mindfulness practices to be applied within their teaching role (e.g., mindfulness of breathing, mindfulness of body sensations, and mindful listening). Through these practices, teachers learned to be more in tune with occurrences in their daily lives and in the classroom in order to promote a better relationship with their students and to be more effective in their implementation of the curriculum.

Emotional self-regulation themes, such as understanding, recognizing, and regulating emotions and the role of positive emotions, as a means of promoting well-being and

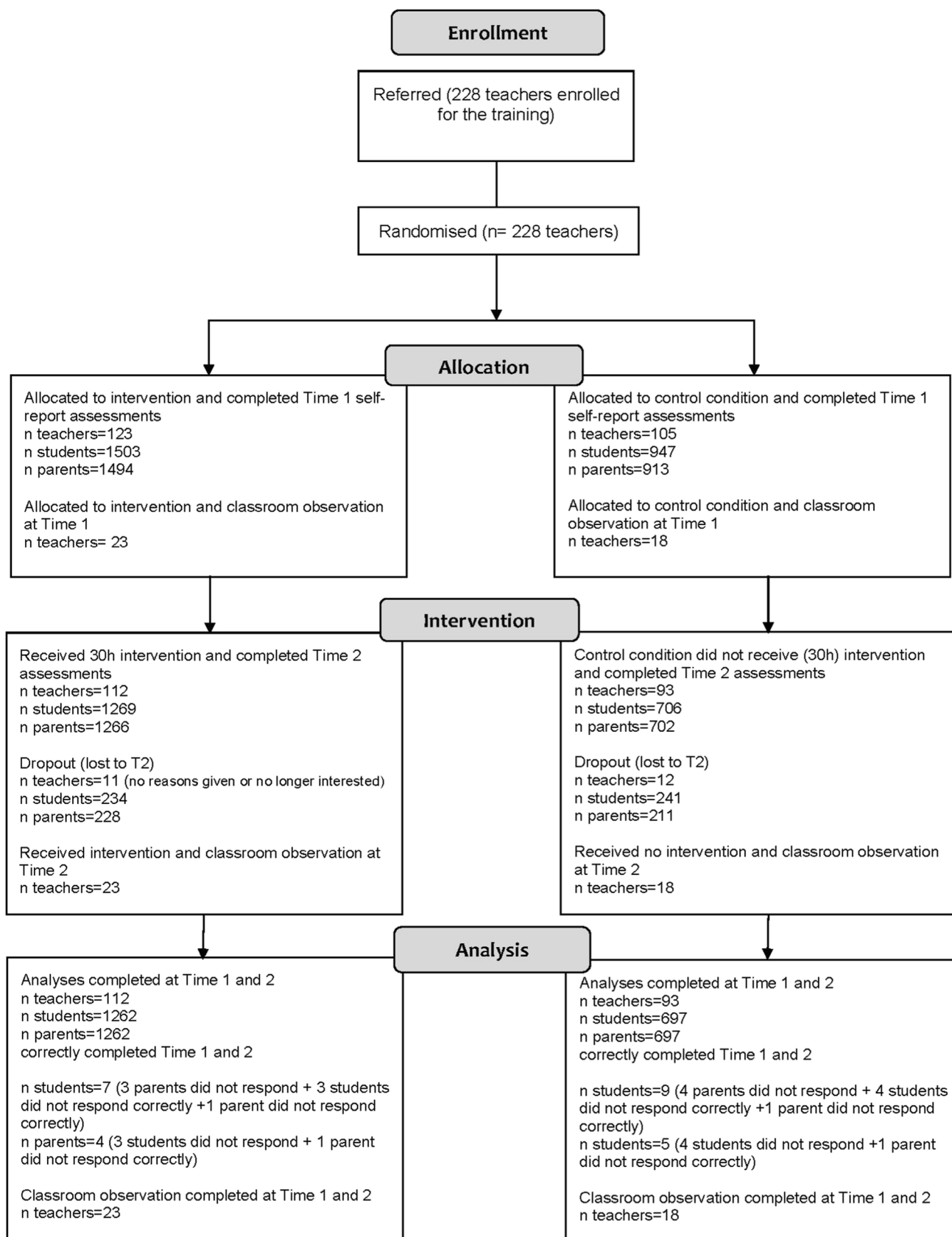


Fig. 1 CONSORT flowchart

resilience, were explored through experiential exercises, reflection, and self-induction. Hence, the emotional self-regulation component fostered the development of skills that enabled the teachers to become more sensitive to the needs of their students, more aware of the emotional climate of the classroom, and to better regulate their own emotions in challenging situations.

Within the compassion component, caring exercises were performed in relation to themselves and others (e.g., students) as well as active listening exercises, in which they noted emotional responses and did not react automatically (e.g., self-compassion practice and compassion practice). These practices are intended to promote teachers' ability to better listen to their students and to be more sensitive to their needs, thus contributing to more appropriate responses.

The program was primarily experiential in nature, and each session included the following: guided mindfulness practices, introduction to new concepts, group reflection, role-playing, reflection on poetry or readings, mindful practices, lecture, and homework assignments (formal and informal mindfulness practices). The participants were required to carry out formal practices at home for 15 to 30 min per day. The guided orientation of these practices as well as additional reading resources were sent by email.

The aim of the booster session was to reinforce the competencies acquired during the first ten sessions and to reflect on how these skills impacted the teachers' social and emotional skills and well-being. This 3-h session was conducted in silence and consisted of formal practices (learned and practiced during the first sessions) and a 2-h period of reflection on how to overcome obstacles and sustain mindfulness practices upon conclusion of the program.

### Control

Teachers randomly assigned to waitlist control groups were subject to the *Atentamente* program at a later time, after the posttest data collection.

### Data Collection

The data were collected for teachers and students at two points in time: prior to and following the program's implementation. As far as assessment is concerned, a mixed data collection strategy was used that included teachers' and students' self-report data, parents' reports on children, observational ratings of teachers' classroom behaviors, and students' reports on teachers' classroom behaviors. The teachers responded to the questionnaires individually and also administered the questionnaires to their students collectively in the classroom. The students were assured that there were no correct or incorrect answers. Parents' questionnaires on their children were sent home and collected by

the teachers at the same time as the data collection points of the teachers and students.

The teachers' classroom behavior data were collected through classroom observation, with the support of an observation grid, for a 1-h period prior to and following the intervention. Observations were performed by two independent observers who had trained with practice subjects for a considerable amount of time before the subjects of the real study were rated. During the observations, the independent observers did not know the group membership (e.g., experimental group or control group). As for the design to assess inter-rater reliability, instead of a fully crossed design, one of the observers made all the pretest and posttest observations, and the second observer made ¼ of the observations at each of the two data collection points.

## Measures

### Teachers' Measures

The Five Facets of Mindfulness Questionnaire (FFMQ; Baer et al., 2006; Portuguese version by Gregório & Gouveia, 2011) was used to assess the teachers' general tendency to be mindful in daily life. This questionnaire comprises 39 items (e.g., "When I'm walking, I deliberately notice the sensations of my body moving") distributed across five subscales: Observing (8 items; T1,  $\alpha=0.91$ ; T2,  $\alpha=0.91$ ), Describing (8 items; T1,  $\alpha=0.90$ ; T2,  $\alpha=0.91$ ), Acting with Awareness (8 items; T1,  $\alpha=0.90$ ; T2,  $\alpha=0.90$ ), Non-reactivity to Inner Experience (7 items; T1,  $\alpha=0.85$ ; T2,  $\alpha=0.86$ ), and Non-judgment of Inner Experience (8 items; T1,  $\alpha=0.91$ ; T2,  $\alpha=0.92$ ). The items were rated on a 5-point scale (from 1 = *never or very rarely true* to 5 = *very often or always true*). The internal consistency for the total scale was T1,  $\alpha=0.96$  and T2,  $\alpha=0.96$ .

The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003; Portuguese version by Vaz & Martins, 2008) was used to evaluate how the teachers regulate their emotions. This questionnaire comprises 10 items (e.g., "I control my emotions by changing the way I think about the situation I'm in") organized in two subscales: Cognitive Reappraisal (6 items; T1,  $\alpha=0.76$ ; T2,  $\alpha=0.84$ ) and Expressive Suppression (4 items; T1,  $\alpha=0.77$ ; T2,  $\alpha=0.83$ ). The teachers rated their responses on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

The teachers' self-compassion was assessed by the Self-Compassion Scale (SCS; Neff, 2003; Portuguese version by Castilho & Pinto-Gouveia, 2011). This scale includes 26 items (e.g., "I'm disapproving and judgmental about my own flaws and inadequacies") and measures the extent to which participants are kind and understanding toward themselves at difficult times. The teachers rated their responses on a 5-point scale ranging from 1 (*hardly ever*) to 5 (*almost*



*always*). The negative items were reversed, and a total score was calculated and showed good reliability (T1,  $\alpha=0.96$ ; T2,  $\alpha=0.96$ ).

The teachers' self-efficacy was measured by the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001; Portuguese version by Conceição, 2008), which comprises 24 items (e.g., "How much can you do to get through to the most difficult students?") and a 9-point Likert scale (1 = *I can't ever*; 9 = *I can almost always*). The internal consistency (Cronbach's alpha) of the scale was T1,  $\alpha=0.98$  and T2,  $\alpha=0.98$ .

The Mental Health Continuum—Short Form (MHC-SF; Keyes, 2006; Portuguese version by Matos et al., 2010) comprises 14 items pertaining to symptoms of positive mental health/well-being (e.g., "How often have you felt happy?"). The respondents rated the frequency of each symptom in the previous month on a 6-point Likert-type scale (0 = *never* to 5 = *every day*). Total scores were computed and showed good reliability for T1,  $\alpha=0.95$  and T2,  $\alpha=0.95$ .

The teachers' perceived experience of burnout symptoms in relation to their work was assessed using the Maslach Burnout Inventory—Educators Survey (MBI; Maslach et al., 1996; Portuguese version by Marques Pinto et al., 2005). In this study, 14 items of the scale (e.g., "I feel emotionally drained by my work") were used to measure the two core burnout symptoms, Emotional Exhaustion (9 items; T1,  $\alpha=0.90$ ; T2,  $\alpha=0.91$ ) and Depersonalization (5 items; T1,  $\alpha=0.86$ ; T2,  $\alpha=0.87$ ). The participants rated their personal feelings and attitudes on a 7-point frequency scale, ranging from 0 (*never*) to 6 (*every day*).

To explore the intervention effects on the teachers' classroom interpersonal behaviors with their students, systematic observation was carried out by two trained independent observers, with the support of a Classroom Observation Grid (COG). The COG was specifically developed for this study, since no instrument was found that covered all the relevant classroom climate dimensions, such as teachers' flexibility and ability to adapt to classroom situations, cooperation among students, and group cohesion. Furthermore, it was considered that an observation measure tailored to the school context of Portugal, including dimensions (e.g., behavior management) that could reflect the Portuguese culture, would be a better option. The COG resorted to conceptual systemic and constructivist frameworks, such as Vygotsky's socio-constructivist and Bronfenbrenner's systemic-ecological theories, which emphasize the role of meaningful adults who interact with children on a daily basis (such as teachers) (Bronfenbrenner & Morris, 2007; Vygotsky, 1980). The definition and operationalization of the COG's dimensions were based on rich literature on early childhood education quality that has shown that warm and cognitively stimulating interactions are related to socioemotional and cognitive development

(e.g., Pianta, et al., 2008). With the support of two experts with extensive experience in observation grids (e.g., CLASS, Classroom Assessment Scoring System, Pianta et al., 2006; ECERS, Early Childhood Environment Rating Scale, revised edition, Harms et al., 1998; SACERS, School-Age Care Environment Rating Scale, Harms et al., 1996), and following a consultation of various empirical studies and a compendium of observational systems (e.g., Halle et al., 2010; Van de Grift, 2007), several key dimensions were defined and operationalized. A piloting process was undertaken to refine the COG categories until a final version was reached. This version comprised the following four main dimensions of teachers' classroom interpersonal behaviors: Socio-Emotional Support (7 items; e.g., "Shows positive affect"; T1,  $\alpha=0.92$ ; T2,  $\alpha=0.91$ ); Student-Focused Attention and Responsiveness to Student Needs (6 items; e.g., "Shows responsiveness"; T1,  $\alpha=0.83$ ; T2,  $\alpha=0.86$ ); Classroom Management (8 items; e.g., "Defines clear expectations related to behavioral rules and classroom procedures"; T1,  $\alpha=0.86$ ; T2,  $\alpha=0.80$ ); and Instructional Practices (5 items; e.g., "Assures clarity in learning objectives"; T1,  $\alpha=0.91$ ; T2,  $\alpha=0.92$ ). The observers rated the frequency of teachers' behaviors on a 5-point scale, ranging from 1 (*low evidence*) to 5 (*high evidence*). As the teachers were assessed by a different set of raters, the intraclass correlation coefficient (ICC) estimates and their 95% confident intervals were calculated on the basis of a one-way random effects model, absolute agreement, and average score ( $k=5$ ). The ICC for inter-rater reliability was good (0.64, 95% CI [0.60, 0.68], ranging from 0.60 to 0.92; Cicchetti, 1994).

### Students' measures

The Involvement subscale of the Teacher as Social Context questionnaire (TASC; Belmont et al., 1992; Portuguese version by Roque & Lemos, 2004) was used to assess the students' perceptions of teachers' classroom behavior, specifically regarding their degree of involvement with students. This subscale encompassed 8 items (e.g., "My teacher likes me"; T1,  $\alpha=0.71$ ; T2,  $\alpha=0.71$ ) rated on a 4-point Likert scale (from 1 = *not true* to 4 = *totally true*).

Positive and negative affects were measured using a Portuguese short version (de Carvalho et al., 2017) of the PANAS-C (Laurent et al., 1999). This measure comprises 10 items (e.g., "Indicate to what extent you have felt happy over the past 2 weeks") structured in two subscales: Positive Affect (5 items; T1,  $\alpha=0.76$ ; T2,  $\alpha=0.94$ ) and Negative Affect (5 items; T1,  $\alpha=0.70$ ; T2,  $\alpha=0.89$ ). Children rated how often they had felt each emotion (e.g., sad and interested) over the past 2 weeks on a 5-point scale (from 1 = *very slightly or not at all* to 5 = *extremely*).

The Portuguese Version for children (de Carvalho et al., 2016) of the aforementioned Mental Health Continuum—Short Form (adolescents) (MHC-SF; Keyes, 2006) was used to evaluate the children’s well-being and revealed good reliability: T1,  $\alpha=0.83$  and T2,  $\alpha=0.96$ .

The Portuguese version (de Carvalho et al., 2017) of the aforementioned Emotional Regulation Questionnaire—Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012) was used to assess the children’s emotional control strategies. Cronbach’s alphas at pretest and posttest for the Cognitive Reappraisal subscale were 0.73 and 0.87, respectively, and for the Expressive Suppression subscale 0.72, and 0.68 respectively.

### Parents’ measures

The Portuguese version (Raimundo et al., 2009) of Home & Community Social Behavior Scales—Scale A: Social competence (Merrell & Caldarella, 2002) was used to assess the students’ social behavior evaluated by their parents. This scale comprises 32 items (e.g., “Offers help to peers when needed”) organized in two subscales: Peer Relations (15 items; T1,  $\alpha=0.97$ ; T2,  $\alpha=0.97$ ) and Self-Management/Compliance (17 items; T1,  $\alpha=0.97$ ; T2,  $\alpha=0.97$ ). Behaviors were rated on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*frequently*).

### Data analysis

For non-nested data (group differences for teachers’ measures), multivariate analyses of covariance (MANCOVA) were conducted, with significant MANCOVAs being followed by analyses of covariance (ANCOVA) to further examine the effects. For clustered data, multilevel modeling was employed (group differences for students’ report on teachers’ classroom behaviors, for students’ self-report and for parents’ report on children measures nested within teachers) using lme4 package (Bates et al., 2015) designed for R environment (R Core Team, 2019). The analyses controlled for baseline scoring, age, gender, years of teaching, and school grade. Due to multiple comparisons, the family-wise error rate was controlled with adjustment of  $p$ -values with Bonferroni correction.

The multivariate normality assumption was tested using the Shapiro–Wilk test ( $p \geq 0.05$  for the two groups), and the homogeneity of the covariance matrices for each group was analyzed with the Box’s M test. Second, to understand the direction of change from pretest to posttest, difference scores (Posttest minus Pretest) were computed. These were used in MANCOVAs and multilevel models as dependent variables, and type of group (experimental vs. control) as the independent variable, controlling for the variables proving to be significant at baseline. To evaluate the magnitude

of the program’s outcomes, effect sizes were calculated for MANCOVAs using the Partial Eta Squared ( $\eta^2$ ) and for the comparison of the two groups (control vs. experimental), Cohen’s  $d$  ( $d$ ) was computed. For Cohen’s  $d$ , values between 0.20 and 0.40 were considered small effect sizes, between 0.50 and 0.70 moderate effect sizes, and values higher than 0.80 were regarded as large effect sizes (Cohen, 1992). For multilevel models, the recommendations of Lorah (2018) were followed with the ICC being used to represent the magnitude of teacher-level random effects. ICC was computed for unconditional (null model) and conditional models (model with covariates).

Given the small size of the observation subsample and the absence of normal data distribution, a more conservative option was taken to use non-parametric tests (Field, 2013). To analyze the baseline differences between the EG and CG teachers of the observation subsample, the Mann–Whitney test was used. To explore the impact of the intervention on the variables studied through observation (T1 and T2), the non-parametric Wilcoxon test was used, and the effect size was determined by calculating the  $r$  coefficient (Field, 2013). The ICC was calculated and interpreted according to Cicchetti’s (1994) cutoffs, indicating that values below 0.40 are poor, between 0.40 and 0.59 fair, between 0.60 and 0.74 good, and between 0.75 and 1.0 excellent.

## Results

### Teachers

For the pretest and posttest data, the analysis of baseline differences between the groups showed (see Table S1, Supplementary Materials) that there were significant differences for the group effect across all the outcome variables. However, age, years of teaching, school grade, and gender showed no significant differences. Follow-up ANCOVAs (see Table S2, Supplementary Materials) indicated that group had significant effects on non-judgmental, non-reactive, total mindfulness, well-being, and depersonalization; age had significant effects on self-compassion; gender, school grade, and years of teaching showed no significant effects.

Table 1 presents pretest and posttest means and standard deviations computed (for all dependent variables) for the EG and CG in order to determine the direction of change. After controlling for significant baseline variables, the results showed group main effects on teachers’ well-being, self-compassion, cognitive reappraisal, suppression, exhaustion, and depersonalization (see Table S3, Supplementary Materials). Follow-up ANCOVAs (Table 2) indicated that, contrary to the CG teachers, the teachers who had participated in the *Atentamente* program showed a significant increase in observing,

**Table 1** Teacher self-report of mindfulness, emotional control, self-efficacy, self-compassion, well-being, and burnout — pretest and posttest

Variable	Experimental (n = 112)				Control (n = 93)			
	Pretest		Posttest		Pretest		Posttest	
	M	SD	M	SD	M	SD	M	SD
<b>Mindfulness</b>								
Observing	26.70	5.54	28.56	4.57	26.52	5.22	21.71	6.51
Describing	26.77	5.69	27.63	4.88	28.47	5.38	23.65	5.97
Acting with awareness	26.06	5.47	27.00	4.78	26.62	5.46	23.26	6.79
Non-judgmental	22.65	5.49	26.19	5.32	25.86	5.91	23.02	6.52
Non-reactive	16.06	7.68	21.97	3.78	18.73	6.96	17.75	4.54
Total	23.65	3.72	26.27	3.15	25.24	3.56	21.88	4.93
<b>Emotional control</b>								
Cognitive reappraisal	4.57	1.27	5.14	1.05	4.48	1.32	4.16	1.19
Suppression	4.23	1.87	3.08	1.30	3.88	1.77	4.26	1.37
Self-efficacy total	6.66	0.87	6.80	0.83	6.63	0.76	5.60	1.27
Self-compassion total	3.16	0.69	3.31	0.65	3.34	0.56	2.79	0.63
Well-being total	3.08	0.94	3.79	0.78	3.69	0.82	3.42	0.84
<b>Burnout</b>								
Emotional exhaustion	2.36	1.58	2.17	1.45	2.26	1.28	2.97	1.48
Depersonalization	1.25	1.08	1.09	0.88	2.29	1.57	1.31	1.06

describing, acting with awareness, non-judgmental, non-reactive, total mindfulness, cognitive reappraisal, self-efficacy, self-compassion, and well-being and a significant decrease in suppression, emotional exhaustion, and depersonalization. Additionally, the analysis of the mean values by group (Table 1) showed that the majority of the interaction effects on mindfulness were a result of control group reductions besides intervention group gains.

**Table 2** Teacher self-report (pretest and posttest) — follow-up analysis of (co)variance for all variables

Variable	df	Error df	F	p	d
<b>Mindfulness</b>					
Observing	1	203	62.34	<.001	1.113
Describing	1	203	43.82	<.001	0.930
Acting with awareness		203	25.88	<.001	0.717
Non-judgmental	1	203	45.66	<.001	0.953
Non-reactive	1	203	34.41	<.001	0.970
Mindfulness total		203	82.15	<.001	1.278
<b>Emotion control</b>					
Cognitive reappraisal	1	203	18.26	<.001	0.602
Suppression	1	203	31.37	<.001	0.790
Self-compassion <sup>1</sup>	1	200	46.40	<.001	0.960
Self-efficacy	1	203	75.59	<.001	1.226
Well-being	1	203	71.28	<.001	1.199
<b>Burnout</b>					
Exhaustion	1	203	33.54	<.001	0.816
Depersonalization	1	203	28.49	<.001	0.698

<sup>1</sup>Controlling for age

### Classroom Observation

To explore the intervention impacts on the teachers’ classroom interactive behaviors, the non-parametric Mann–Whitney test was first used to test for mean rank differences (in T1) and indicated that there were no differences between the two groups (see Table S4, Supplementary Materials). The non-parametric Wilcoxon test for the median differences (in pretest and posttest) of both groups showed significant results in the teachers’ classroom behaviors, namely an increase in EG teachers’ engagement with the students (Classroom Management dimension: EG,  $MdnT1 = 3.00$ ,  $MdnT2 = 3.67$ ,  $Z = -2.148$ ,  $p = 0.032$ ,  $r = 0.33$ ; CG,  $MdnT1 = 3.00$ ,  $MdnT2 = 3.33$ ,  $Z = -1.460$ ,  $p = 0.144$ ,  $r = 0.22$ ). For the CG, a decrease in instruction adaptation (Student-Focused Attention and Responsiveness to Student Need dimension: EG,  $MdnT1 = 2.67$ ,  $MdnT2 = 2.50$ ,  $Z = -0.713$ ,  $p = 0.476$ ,  $r = 0.001$ ; CG,  $MdnT1 = 3.00$ ,  $MdnT2 = 2.17$ ,  $Z = -2.253$ ,  $p = 0.024$ ,  $r = 0.35$ ) and task adaptation (Student-Focused Attention and Responsiveness to Student Need dimension: EG,  $MdnT1 = 2.34$ ,  $MdnT2 = 2.00$ ,  $Z = -1.776$ ,  $p = 0.065$ ,  $r = 0.28$ ; CG,  $MdnT1 = 2.34$ ,  $MdnT2 = 1.84$ ,  $Z = -1.998$ ,  $p = 0.046$ ,  $r = 0.31$ ) and an increase in clarity of the learning objectives (Instructional Practices dimension: EG,  $MdnT1 = 2.67$ ,  $MdnT2 = 3.33$ ,  $Z = -0.786$ ,  $p = 0.432$ ,  $r = 0.12$ ; CG,  $MdnT1 = 2.34$ ,  $MdnT2 = 3.00$ ,  $Z = -2.340$ ,  $p = 0.025$ ,  $r = 0.36$ ) were observed.



## Students

Multilevel analyses revealed the importance of teacher-level effects, with general high ICC values. The highest value was found for well-being and the lowest ICC occurred for suppression. Table 3 presents pretest and posttest means and standard deviations computed (for students' report on teachers' classroom behaviors, students' self-report, and parents' report on children dependent variables) for the EG and CG in order to determine the direction of change. After controlling for age, school grade, and gender, significant group main effects were found for all outcomes (Table 4). A significant increase in EG students' perception of teachers' involvement, in positive affect, cognitive reappraisal, and well-being, and a significant decrease in negative affect and suppression were observed between pretest and posttest results. Only school grade revealed a significant impact on well-being, with well-being decreasing as school grade levels increased (Table 4). For parents' report on children variables, multilevel analyses suggested that students whose teachers had participated in the *Atentamente* program, but not those in the CG, showed a significant increase in their relationships with peers and self-management/compliance (Table 4). For both outcomes, ICC values were high, illustrating the importance of teacher-level effects.

## Discussion

This study aimed to examine the effects of the *Atentamente* program, specially designed for teachers on teachers', classroom climate, and students' results at posttest. Overall, the findings revealed that the *Atentamente* program, a MBP designed for teachers, had short-term benefits for teachers, classroom climate, and students.

As regards teachers, the results of this study on the program's short-term effects are in line with findings from prior research (e.g., Hwang et al., 2019b; Jennings et al., 2017), insofar as they point to a decrease in exhaustion and depersonalization and to an increase in mindfulness (observing, describing, acting with awareness, non-judgmental, non-reactive and total mindfulness), self-compassion and emotional regulation competencies (enhancing cognitive appraisal and diminishing the use of suppression), and also to an uplift in well-being and self-efficacy. Likewise, previous studies, namely those analyzed by Klingbeil and Renshaw (2018), have shown that mindfulness practices are associated with reduced distress, improved well-being, emotional control, mindfulness, self-compassion, and self-efficacy.

The majority of the interaction effects on mindfulness were the result of control group reductions besides intervention group gains. Considering that teachers' distress increases throughout the school year (e.g., von der Embse & Mankin, 2020) and negative relationships have been found between distress and mindfulness (e.g., Nezlek et al., 2016), this result suggests that the *Atentamente* program may have contributed to a greater stability of mindfulness competencies over time in the teachers that benefitted from the intervention.

Findings regarding the effects of the program on a small subsample of teachers' classroom behaviors are also promising as they indicate an increase, from pretest to posttest, in the behavioral interactions of the teachers and students, which facilitated their engagement in the classroom (a classroom management dimension). This result is in keeping with Jennings and Greenberg's (2009) model, and also with the findings of several previous studies (e.g., Flook et al., 2013; Hirshberg et al., 2020; Hwang et al., 2019b; Jennings et al., 2017). Additionally, the observation results

**Table 3** Students-report on teachers' classroom behaviors (involvement), students' self-report of emotional control, positive and negative affect, well-being and parents' report on children for relationship with peers and self-management/compliance — pretest and posttest

Variable	Experimental ( $n = 1262$ )				Control ( $n = 697$ )			
	Pretest		Posttest		Pretest		Posttest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Involvement <sup>1</sup>	3.50	0.428	3.58	0.390	3.50	0.383	3.01	0.896
Emotion Control <sup>2</sup>								
Cognitive reappraisal	4.04	0.752	4.13	0.735	3.93	0.979	3.31	1.353
Suppression	3.11	1.001	2.99	1.059	2.62	1.095	3.12	0.979
Positive affect <sup>2</sup>	3.62	1.350	4.16	0.696	3.85	1.002	3.42	1.352
Negative affect <sup>2</sup>	2.40	1.384	1.59	0.738	1.87	1.029	2.17	1.034
Total well-being <sup>2</sup>	3.37	1.210	4.02	0.811	3.63	0.879	3.11	1.402
Relationship with peers <sup>3</sup>	2.47	1.144	3.67	0.759	3.77	0.484	2.77	1.255
Self-regulation/compliance <sup>3</sup>	2.42	1.059	3.57	0.733	3.66	0.465	2.67	1.179

<sup>1</sup>Students' report on teachers' classroom behaviors

<sup>2</sup>Self-report by students

<sup>3</sup>Parents' report on children

**Table 4** Students' report on teachers' classroom behaviors (involvement), students' self-report of emotional control, positive and negative affect, well-being, and parents' report on children for relationship with peers and self-management/compliance (pretest and posttest) — multilevel modeling nonstandardized estimates and intraclass correlation coefficients

	Estimates		ICC	
	<i>B</i> ( <i>SE</i> )	<i>p</i>	Unconditional	Conditional
Students' report on teachers' classroom behaviors				
Involvement predictors			0.57	0.42
Group: experimental	0.53(0.08)	< .001		
Gender: male	0.01(0.02)	.590		
School grade	−0.04(0.04)	.195		
Age	−0.03(0.02)	.186		
Students' (self-)report				
Positive reappraisal predictors			0.39	0.29
Group: experimental	0.69(0.11)	< .001		
Gender: male	0.05(0.04)	.232		
School grade	−0.01(0.07)	.849		
Age	−0.01(0.04)	.877		
Well-being predictors			0.74	0.66
Group: experimental	0.89(0.23)	< .001		
Gender: male	0.05(0.05)	.262		
School grade	−0.25(0.10)	.010		
Age	0.00(0.04)	.969		
Negative affect predictors			0.75	0.69
Group: experimental	−0.83(0.23)	< .001		
Gender: male	−0.03(0.05)	.497		
School grade	0.15(0.10)	.114		
Age	−0.00(0.04)	.913		
Positive affect predictors			0.66	0.59
Group: experimental	0.69(0.19)	< .001		
Gender: male	0.05(0.04)	.260		
School grade	−0.11(0.09)	.211		
Age	0.00(0.04)	.847		
Suppression predictors			0.25	0.20
Group: experimental	−0.66(0.13)	< .001		
Gender: male	−0.02(0.06)	.687		
School grade	0.02(0.09)	.785		
Age	−0.05(0.05)	.325		
Parents' report				
Relationship with peers predictor			0.62	0.37
Group: experimental	2.36(0.18)	< .001		
Gender: male	−0.08(0.06)	.169		
School years	−0.09(0.10)	.370		
Self-management/compliance predictor			0.62	0.26
Group: experimental	2.28(0.17)	< .001		
Gender: male	−0.10(0.06)	.080		
School years	−0.06(0.09)	.0555		

*Note.* For the group, the results are for the experimental group in comparison with the control group, and for gender, the results are for males in comparison with females

showed a reduction from pretest to posttest in the CG teachers' interactive behaviors focused on students' needs, namely a reduction in instructions and task adaptation. These results suggest that the *Atentamente* program may have contributed to the maintenance of this type of behavior across time in

the teachers who benefited from the intervention. They also corroborate previous studies, suggesting that teachers with better social and emotional competencies are also better equipped to respond adequately to their students' needs (e.g., Jennings et al., 2017). The results also revealed a higher

frequency of learning objectives clarification among the teachers from the CG, while this was not observed in the EG teachers. This result may, on the one hand, be related to greater autonomy of the EG students, who therefore do not need to be reminded so frequently of the learning objectives by their teachers; on the other hand, it may be associated with a greater ability of these teachers to engage their students in the learning process and who consequently do not need to clarify the learning objectives as often. However, bearing in mind the exploratory nature of the analysis and in view of the small subsample of teachers included in the observation, which did not allow for an analysis of the impacts of the teachers' classroom behavior on students' outcomes over time, these results should be interpreted with caution.

Taken together, the teachers' self-report and classroom observation findings point to a reduction in distress and to improvements in the well-being of the teachers who benefited from the *Atentamente* program. Indeed, the latter may have enabled positive changes in the teachers' classroom management and instructional practices (Jennings & Greenberg, 2009; Roeser, 2016). In addition, these (albeit exploratory) results contribute to furthering the knowledge on classroom climate as a potential effect of a mindfulness-based program for teachers (Flook et al., 2013; Hirshberg et al., 2020; Hwang et al., 2019b; Jennings et al., 2017).

As far as students' perceptions of their teacher classroom interactive behaviors are concerned, the results of this study revealed that the students from the EG, compared to those from the CG, perceived higher involvement of their teachers in this relationship, i.e., they expressed more affection attunement, dedication of resources, and dependability. These results are in line with those found in a recent study by Hwang et al. (2019a) and reinforce the possibility that mindfulness-based interventions for teachers may increase students' perceptions of the quality of the teacher-student relationship. According to Skinner and Belmont's (1993) studies, these effects of the program are particularly encouraging as students' perceptions of teacher involvement play an important role in their motivation and commitment in the classroom. These results reinforce the observation findings regarding teacher-student interactive behavior in the classroom, also found in this study, and add to the body of knowledge on the effects that a mindfulness-based program for teachers may have on students' perceptions of their teachers. Given that only Hwang et al. (2019a) included student-reported assessment of teachers' classroom behaviors, these results call for the inclusion of similar measures in future impact assessment studies of mindfulness-based programs.

Finally, considering the effects of the *Atentamente* program on the students' outcomes, a spillover effect was observed, as found in previous studies (e.g., Singh et al., 2013). Indeed, the EG students presented more appropriate

emotional regulation skills (greater use of cognitive reappraisal and reduction of suppression) and higher levels of well-being (increased positive affect, reduced negative affect, and increased overall well-being) in the posttest, without undergoing any intervention themselves. In addition, these students also showed improvements in peer relationship and self-management/compliance competencies, as assessed by their parents. Thus, the findings of this study contribute to the knowledge on the potential of MBP interventions specifically designed for teachers, showing that they go beyond improving teacher and classroom climate outcomes to include student outcomes.

## Limitations and Future Research

Although this study presents some promising results on the beneficial effects of a mindfulness-based intervention designed for teachers on teachers, classroom climate, and students, it has limitations that warrant mention. First, despite the strategies used to develop the study questionnaire with clear items based on validated instruments, common method bias cannot be ruled out. Furthermore, as far as classroom observation is concerned, the small sample size should be noted. Additionally, the non-parametric tests used to analyze the observation data make rejecting the null hypothesis more difficult than if a parametric alternative had been used. However, this more conservative option was taken due to the small size of the observation sub-sample and the non-normal distribution of the data (Field, 2013). Moreover, although the EG and CG teachers were sourced from different schools, contamination across the experimental and control groups cannot be excluded. Also, the use of a waitlist control group instead of an active control group leads to a critical and weighted reading of the results, as suggested in the literature (Klingbeil & Renshaw, 2018). Although the results of this study are promising, future studies should collect data at follow-up to evaluate the temporal stability and " sleeper effects " of MBP for teachers on teachers' self-report, classroom, and students' outcomes (Klingbeil & Renshaw, 2018) and test the mediation effects of teachers' mindfulness proximal results on their distal results (Jennings & Greenberg's, 2009).

Given the positive changes revealed in this study of the teachers' classroom management and instructional behaviors, and the associations described in the literature between teaching practices and student learning (e.g., Jennings & Greenberg, 2009), future studies may also explore the impacts of such changes on student learning outcomes (Singh et al., 2021). Finally, taking into account the spillover effects observed on the students, future research may also examine the impacts of a student-targeted mindfulness-based intervention on their teachers' occupational health and classroom behaviors (Singh et al., 2021).

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s12671-021-01635-3>.

**Author Contribution** JSC and AMP designed and executed the study, analyzed the data, wrote the paper, and collaborated in the editing of the final manuscript; SO collaborated in the data collection, in writing the manuscript, and in the editing of the final manuscript; MSR analyzed the data and collaborated in writing the manuscript; CG, JMB, AFC, and MF collaborated in the data collection and in writing the manuscript; JC, TL, and MSL collaborated in the construction of the data collection measures. All the authors approved the final version of the manuscript for submission.

**Funding** This research was funded by a Grant (114/16) from the BIAL Foundation. This work has the financial support of FCT – Fundação para a Ciência e a Tecnologia, I.P, through the Research Center for Psychological Science of the Faculty of Psychology of the University of Lisbon (UIDB/04527/2020 & UIDP/04527/2020).

## Declarations

**Ethical Standard** All procedures performed involving human participants were conducted in accordance with the ethical standards of the Scientific and Ethical Council of the Faculty of Psychology, University of Lisbon, and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

**Consent to Participate** Informed consent was obtained for all child participants (children > 7 years) through written parental consent and by all the teachers involved in the study.

**Competing Interest** The authors declare no competing interests.

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