Delivering mindfulness in the classroom via a technology-enabled approach

Klusmann, Birte; Sanderman, Robbert; Schroevers, Maya J.

Published in:
Teaching and Teacher Education

DOI:
10.1016/j.tate.2022.103950

Publication date:
2023

Teaching and Teacher Education 122 (2023) 103950

Contents lists available at ScienceDirect

Teaching and Teacher Education

journal homepage: www.elsevier.com/locate/tate

Research paper

Delivering mindfulness in the classroom via a technology-enabled approach: Feasibility and the potential impact on teachers' psychological well-being, self-efficacy, and mindfulness

Birte Klusmann*, Robbert Sanderman, Maya J. Schroevers

Department of Health Psychology, Health Sciences, University of Groningen and University Medical Center, Groningen, Groningen, the Netherlands

ARTICLE INFO

Article history:
Received 29 April 2022
Received in revised form
1 October 2022
Accepted 5 November 2022
Available online 6 December 2022

Keywords:
Technology-enabled
Brief
Classroom-based
Mindfulness program
Online

ABSTRACT

This longitudinal study included 64 teachers. We examined the feasibility and preliminary effects of a newly designed program, playing pre-recorded mindfulness practices to elementary school students by teachers across one school year. Self-report surveys and logbooks were used to collect data quantitative and qualitative data. During the first four months of implementation, teachers reported significant improvements in self-efficacy in classroom management and lower levels of perceived stress. Levels of mindfulness increased significantly and gradually throughout the school year. Qualitative results underlined potential changes in teachers' outcomes, suggesting a calming effect and perceived improvement in their teaching skills.

1. Introduction

Within the educational sciences, mindfulness-based interventions have gained increased interest in improving mental, cognitive, and behavioral outcomes in both students and teachers (Dunning et al., 2018; Felver et al., 2016; Meiklejohn et al., 2012; Zoogman et al., 2015). Mindfulness originated in the Buddhist philosophy and meditation practice over two and a half thousand years ago (Brown et al., 2007). Initiated by the work of Jon Kabat-Zinn, mindfulness can be defined as the capacity to direct one's attention to an experience as it unfolds, in the present moment, with open-minded curiosity and acceptance while being non-judgmental (Kabat-Zinn, 2003). Practicing mindfulness meditation has been suggested to enhance self-regulation strategies by means of better attention- and emotion regulation, greater body awareness, and changes in perspective on the self (Hölzel et al., 2011).

Most mindfulness-based approaches, whether for children, adolescents, or adults, often include an intensive program of several weeks. A review and meta-analysis of 33 RCTs on the effects of face-to-face mindfulness-based interventions (on average 8–12 weeks) by trained mindfulness instructors concluded that these interventions have a modest positive impact on reduced stress and increased mindfulness in children and adolescents (Dunning et al., 2018). Zenner et al. (2014) systematically reviewed 24 mindfulness-based interventions for schools and concluded moderate positive effects, particularly in relation to resilience to stress and improvements in cognitive performance. Yet, Zenner and colleagues, as well as other scholars, point out that there is significant heterogeneity in the format of the program (e.g., 2–28 weeks), with programs delivered during regular school hours in two-thirds of the studies (Felver et al., 2016; Maynard et al., 2017; Zenner et al., 2014; Zoogman et al., 2015).

A similar picture can be observed regarding mindfulness-based programs for teachers (Albrecht et al., 2012; Emerson et al., 2017). A systematic review of 12 studies showed a wide range in program format, content, and duration, including the standard 8-week mindfulness program and modified programs of four to nine weeks (e.g., SMART, CARE; Emerson et al., 2017). Comparable to studies among students, most mindfulness-based intervention trials in teachers demonstrated a reduction in cognitive-affective problems (e.g., stress, anxiety, depression) and an increase in teachers' self-efficacy, showing moderate positive effects. Overall, results provide evidence for the model assuming that teachers

* Corresponding author. , HPC FA12, Hanzeplein 1, POB 30 NL 9700RB, Groningen.
E-mail address: b.klusmann@umcg.nl (B. Klusmann).

https://doi.org/10.1016/j.tate.2022.103950
0742-051X/

practicing mindful awareness increase in their mindfulness skills and experience improved well-being due to better emotion regulation and more self-efficacy regarding classroom management (Jennings et al., 2013; Klingbeil & Renshaw, 2018; Roeser et al., 2013; Tsang et al., 2021). A review by Meiklejohn et al. (2012) suggests potential benefits of mindfulness training in teaching self-efficacy, managing classroom behavior, and maintaining supportive student-teacher relationships. With teaching being a highly demanding, uncertain, and emotionally draining profession, several skills need to mastered, including engagement, focused attention, mental flexibility, adequate emotion regulation, and confidence is necessary (Hargreaves, 1998; Roeser et al., 2012). Mindfulness-based training for teachers seems potentially be a suitable intervention and prevention approach.

Several factors, however, have been identified that may hinder the implementation of mindfulness-based programs at school. A significant barrier is that most of these programs are delivered by outside professional mindfulness trainers (Carsley et al., 2018). This often comes along with high costs for schools. Also, external trainers do not usually know about the needs and specifics of students, teachers, or the school environment. Therefore, having an outside facilitator come in may be less effective, as concluded by a meta-analysis (Carsley et al., 2018). Carsley et al. (2018) found that mindfulness programs delivered by trained school teachers resulted in more considerable benefits in students' mental health outcomes than programs offered by outside facilitators. However, having teachers provide a mindfulness-based program also has its costs, as teachers need to receive intensive training in mindfulness themselves. Such teacher training requires personal interest and motivation and is often time-consuming as well as costly; resources that schools or teachers often do not have (Lever et al., 2017).

Besides the concern about who can best deliver a program, a second barrier to facilitating mindfulness-based school programs during regular school hours is its format, with 30 to 50-min sessions provided for several weeks or several days a week. This means that time from the general curriculum must be taken out or students' resource time is used. With academic requirements necessary to meet, this may hold schools back from using such programs, especially non-private schools, with restrained resources, despite the known positive effects on students' and teachers' well-being as well as the school climate. Taking all the evidence and insights into possible barriers together, it can be argued that a mindfulness-based program that is easy to implement by teachers within their classrooms and does not cost too much time and financial resources may be a feasible and acceptable alternative to explore.

For these reasons, the Holistic Life Foundation (www.hlfinc.org), a non-profit organization, developed a technology-enabled program for elementary school classrooms called Bridging Academics and the Mind (BAM). The BAM program includes pre-recorded online brief mindful breathing and movement exercises as well as an extensive curriculum and workbook to tackle problems related to training teachers extensively to deliver mindfulness-based programs and changing the school curriculum to incorporate multi-week intensive programs. Teachers provide the program to students by playing the audio- and video-guided practices via an online platform. Teachers are encouraged to participate with students when doing the exercises in class. Providing BAM requires only short training for teachers. Practices are short, lasting between three to 8 min, which makes the program easy to implement within the regular curriculum of elementary schools. Teachers can adjust the moment of using a practice depending on their and the classroom's preferences and needs. To achieve a sustainable change in class and the school environment, the BAM program developers recommend that teachers and schools use BAM daily throughout the whole school year. With all practices available to every teacher of a participating school, the BAM program was designed to reach scalability. To our knowledge, this is the first empirical study examining the feasibility and benefits for teachers of doing brief, pre-recorded mindfulness exercises daily in class during regular school times throughout the school year. There is preliminary evidence for the feasibility of using such brief, pre-recorded mindfulness exercises in school classes from a study that examined these effects during an 8-week period (Bakosh et al., 2016, 2018; Ritter & Alvarez, 2020).

The rationale of BAM that teachers initially provide the mindfulness exercises to students while also participating themselves, and with teachers encouraged to show students how to guide the exercises themselves in class, fits well with the recommendation that an integrated mindfulness-based intervention approach that focuses on both teachers and students holds a potential for a more profound and lasting effect (Meiklejohn et al., 2012). Recent research indeed hints toward the potential synergistic effects of mindfulness interventions on students and teachers. For example, Roeser et al. (2012) demonstrated that practicing mindfulness among secondary teachers may cultivate self-compassion and emotion regulation, reduce anxiety and burnout, and increase their well-being, which, in turn, supports the autonomy of their students and the emotionally supportive relations with them. Moreover, a study among preschool students by Singh et al. (2013) demonstrated improvements in children's social interactions and compliance after their teachers had followed an 8-week mindfulness training. Other studies found that mindfulness-based interventions focused on teachers led to improvements in classroom organization (Flook et al., 2013; Hwang et al., 2019), emotional support, positive climate, teacher sensitivity (Jennings et al., 2017), and enhanced atmosphere in the class (DiCarlo et al., 2020). Also, Tarrasch and Berger (2022) point toward the importance of teachers' involvement in programs designed for children and demonstrated that a combined approach, targeting both teachers and students, induced improvements in pupils' mindfulness, anxiety levels, and attention problems. As most mindfulness-based programs are still delivered to students or teachers, more research is needed about these possible synergetic effects.

The current study aimed to describe the development of the BAM program and the first results on the feasibility for teachers to use the program in their classrooms. We aim to shed light on how teachers use the BAM program in their classroom and which possible facilitators and barriers regarding the implementation they experience. Additionally, we aim to explore the potential impact on teachers by examining changes in their psychological functioning, classroom management, and mindfulness skills and teachers' perceived impact of using the program over time. Based on previous research on the effects of mindfulness-based interventions on teachers, we hypothesized that teachers would report: (1) improved psychological functioning (i.e., less perceived stress, burnout, positive and negative affect), (2) improved perceived self-efficacy in classroom management, (3) increased mindfulness. Positive results could guide future research on how to examine the synergistic, interactive effects of mindfulness interventions in both teachers and students.

2. Method

2.1. Study design

This study has a longitudinal pre-post design with a group of teachers being assessed at three time points across one school year: shortly after the start of the school year and the beginning of implementing the BAM program, four months later (February), and a third time at the end of the school year. With the focus of this pilot

study on the feasibility of elementary school practice and programs' potential benefits, we did not include a control group. This design also aligned with the natural rollout of the program as offered to schools by the non-profit organization, as described in detail below. The study was approved by the ethical committee of the University of Groningen, the Netherlands (Ethical Committee Psychology, 17450-O) as well as by the local Institutional Review Board (IRB#2018−048).

2.2. Participants

The BAM program was implemented and evaluated in four publicly funded urban elementary schools in low-income neighborhoods of a city (population greater than 600,000) on the Eastern coast of the United States of America between September 2018 and June 2019. The non-profit organization approached elementary schools and met with the school's principal to introduce the BAM program. The non-profit only charged participating schools a small amount for the use of the program. When a school agreed to implement the BAM program, the researcher on site introduced the research project. All four schools which decided to implement the BAM program voluntarily agreed to be part of the research. Teachers were introduced to the BAM program during the training after the summer holidays (see below). Since the program was offered to all teachers of the schools, teachers who attended the PD provided by the non-profit organization were eligible to participate. A total of 64 elementary school teachers voluntarily agreed to enter our study, of which 60 filled in the survey at two assessment points. A total of 43 teachers completed all three questionnaires. There were no significant differences between teachers who completed all three measurements and those who did not with regard to outcomes and demographic variables. A subgroup of 17 teachers also filled in weekly logbooks throughout the first four months of program implementation. Logbooks were collected by the independent researcher at the end of each week.

2.3. Measures

Data was collected using logbooks and existing, standardized, valid, and reliable self-report questionnaires to measure the study outcomes.

To test program feasibility, we asked all teachers in both follow-up surveys, "How often have you facilitated BAM practices on average?". Seven responses were possible, ranging "from more than once every day" to "less than once a week". In the logbooks, we asked teachers about: (1) *frequency* of practices played, (2) *current implementation phase* (use of instructional and practice materials/students as role models/use of prompt cards/students lead the practice), (3) *time/reason* a practice was played in class (answering options included: at the start/end of the day/after recess/to assist transition/before test taking or after long periods of concentration/when class was restless or stressed/other). We also asked teachers: (4) to indicate whether they had followed the BAM practices together with their students ((almost) every time/sometimes/(almost) never); (5) if using the BAM program interfered with their curriculum, i.e., Did facilitating the BAM program interfere with giving your curriculum this week?, rated on an 11-point Likert scale ranging from "Not at all" (0) to "Completely" (10), and (6) to answer an open question at the end of each logbook regarding potential *facilitators*, i.e., factors that have helped them, and *barriers*, i.e., factors that made it difficult, implementing the BAM program. The entire group of teachers was asked to fill in the multi-item questionnaires. The content of the survey at the three points of assessment is described in detail in the following paragraph.

Demographic variables. Three questions in the baseline survey assessed demographic information: Age, gender (female, male, other, rather not say), and cultural identity (African American, Latino/a, Caucasian/White, Native American, Asian, other). Furthermore, we asked participants to write down how many years they have been teaching in general (overall teaching experience) and at the current school.

Perceived Stress. Perceived stress was measured with the 4-item Perceived Stress Scale (PSS-4; Cohen et al., 1983). Teachers were asked to rate to what extent they felt as indicated by the items during the last month (e.g., "In the last month, how often have you felt that you were unable to control the important things in your life? ") on a 5-point Likert scale, from "Never" (0) to "Very often" (4). A total score was calculated for each participant by summing all item scores, with higher total scores indicating more perceived stress. Cronbach's alphas were sufficient: 0.66 at T0, 0.71 at T1, and 0.62 at T2. Following the guideline that alphas of 0.6−0.7 indicate moderate reliability (Taber, 2018), all further analyses were carried out as planned.

Professional Burnout. Burnout was assessed with two scales of the Maslach Burnout Inventory - Educators Survey (MBI-ES, Maslach et al., 1996). The extent to which participants feel drained from their work was assessed with the 9-item *Emotional Exhaustion* subscale (e.g., "I feel emotionally drained from my work"). The *Personal Accomplishment* scale comprises eight items, assessing participants' tendency to feel efficacious in their work with students (e.g., "I deal very effectively with my students' problems"). Both subscales are rated on a 7-point Likert scale ranging from "Never" (0) to "Every day" (6). Sum scores were calculated for both subscales by summing up the participants' ratings on each item, with higher scores indicating more emotional exhaustion and personal accomplishment. For the subscale *Emotional Exhaustion*, Cronbach's alpha was good: $\alpha_{T0} = 0.88$, $\alpha_{T1} = 0.93$, $\alpha_{T2} = 0.88$. Cronbach Alpha's were also good for *Personal Accomplishment*, $\alpha_{T0} = 0.76$, $\alpha_{T1} = 0.83$, $\alpha_{T2} = 0.93$.

Affect. Positive and negative affect was assessed with the Positive and Negative Affect Schedule (PANAS, Watson et al., 1988). The questionnaire contained 20 items, ten items for *Positive Affect* (e.g., "excited") and ten items for *Negative Affect* (e.g., "guilty"). Participants were asked to indicate to what extent they felt the respective emotions over the past week on a 5-point Likert scale, from "Very slightly/not at all" (0) to "Extremely" (4). Sum scores were computed for each subscale, with higher scores indicating more positive and negative affect, respectively. Cronbach Alpha's were good: Positive Affect: $\alpha_{T0} = 0.92$, $\alpha_{T1} = 0.93$ and $\alpha_{T2} = 0.94$; Negative Affect: $\alpha_{T0} = 0.83$, $\alpha_{T1} = 0.83$ and $\alpha_{T2} = 0.88$.

Self-efficacy of Classroom Management. The 8-item subscale for *Classroom Management* of the Teachers' Sense of Self-Efficacy Scale (TSES) (Tschannen-Moran & Hoy, 2001) was used to assess how teachers perceive their ability to maintain classroom order and help students follow the rules. Example questions include: "How much can you do to get children to follow classroom rules?", 'How much can you do to control disruptive behavior in the classroom?' and "How much can you do to calm a student who is disruptive or noisy?". Answering options were "Nothing" (1) to "A great deal" (9), with higher scores indicating greater levels of believed self-efficacy. The questionnaire generally has a high internal consistency. In the current study, the internal consistency was found to be 0.92 or higher ($\alpha_{T0} = 0.93$, $\alpha_{T1} = 0.92$, $\alpha_{T2} = 0.97$).

Mindfulness. We used the 15-item version of the Five Facet Mindfulness Questionnaire (FFMQ-15; Baer et al., 2008; Gu et al., 2016), which addresses five subscales (facets) with three items, respectively. These facets assess different components of mindfulness: *observing* (e.g., "I notice how foods and drinks affect my thoughts, bodily sensations, and emotions."), *describing* (e.g., "I am good at finding words to describe my feelings."), *acting with*

awareness (e.g., "I find myself doing things without paying attention."), *non-judging of inner experience* (e.g., "I think some of my emotions are bad or inappropriate and I shouldn't feel them."), and *non-reactivity to emotions* (e.g., "When I have distressing thoughts or images, I just notice them and let them go."). On a 5-point Likert scale, participants had to indicate to what extent these aspects of mindfulness apply to them, from "Never or very rarely true" (1) to "Very often or always true" (5). The total sum score of all 15 items was used, with higher scores indicating more mindfulness. Cronbach's alpha was good: $\alpha_{T0} = 0.79$, $\alpha_{T1} = 0.78$, $\alpha_{T2} = 0.79$.

Open question. An open-ended question was posed at the end of the questionnaire at T1 and T2 regarding teachers' perceived impact of the BAM program on themselves ("Please describe the impact the BAM program has had on you in your own words").

2.4. The BAM program

The BAM program was developed and delivered by a local well-experienced non-profit organization, namely Holistic Life Foundation, Inc. All three developers had more than 15 years of experience and led mindfulness and yoga programs for community members of inner cities. The BAM program is based on mindfulness and yoga practices evaluated in earlier studies (Dariotis et al., 2016a; Dariotis et al., 2016b; Mendelson et al., 2010). It entails a variety of breathing and movement exercises (12 exercises in total), so teachers had a choice. These exercises were accessible via an online platform, approximately three to 8 min in length. Mindful breathing exercises include Belly Breathing, Stress Breath, Balance Breath, Breath Awareness, and Breath Meditation. Five movement exercises included: Body Relaxation, Seated Frog, Push Pull Arm Exercise, Neck Rolls, and Spinal Twist. In addition, two exercises focused on Next Thought Mediation and Loving-Kindness Exercise. All practices can be performed from a seated position. Additional materials are all available via an online platform. They include the entire curriculum, background information, current research related to the benefits, scripted exercises, video and audio materials (instructional/practice), and prompt cards. Basic didactic information is included in each practice, covering how to sit, why to practice, and what to expect, including a moment of reflection piece at the end of each practice. The videos portray each of the founders of the non-profit organization in a cartoonish way, making it thereby engaging and child-friendly. The artist who designed the videos followed each voice recording step-by-step. The drawings support the content of the recordings by visualizing what is being said and guiding students through the practice. The drawings assist students in understanding and following along with each practice (e.g., how to sit, where to put the hands). The instructional version of an exercise starts with a detailed introduction to the practice and an explanation of its potential positive effects on the body and mind (Note, all video/audio practices are also available without this detailed introduction.) Afterward, the practice begins. Participating students and teachers are invited to sit up straight on their chairs and close their eyes if they want to. Step-by-step guidance through the practice is offered. At the end of the practice, students are asked to take a moment to reflect on how their bodies and mind feel. Then a short pause is initiated before everyone opens their eyes again. This marks the end of the practice.

2.5. Training and use of the BAM program

At the beginning of the school year, teachers received a 2-h training. A second training was held at each school after five months. During the first session, teachers were introduced to the BAM program. They received all the necessary information about logging in to the online platform and the recommended use of practices. Teachers were instructed to facilitate practices by using videos that included a detailed introduction and explanation of the positive effect the practice may have during the first three weeks. After this, teachers were guided to play practice videos or audios of the exercises (i.e., shortened versions excluding the detailed explanation of the practice in the beginning). After two to three months of using the practices, teachers were invited to encourage students to (1) be the role model sitting in front of the class while a practice was played; (2) lead the practice with or without using prompt cards. Teachers could independently decide at what time of the day to play an exercise (e.g., after recess, when changing subject, at the beginning or end of the school day), which exercise, and how often to play an exercise per day. They were encouraged to do at least one exercise each day and to follow along in the BAM practices with their students.

2.6. Data collection

An independent researcher on site (BK) introduced the study procedure and explained all details regarding the study during the first training session to teachers at each school. BK was not connected to the non-profit organization or the schools. Pencil-and-paper questionnaires were distributed at the end of the session in October (T0; one month into the school year). The second assessment took place four months later in February (T1) and the third after eight months (T2, at the beginning of June) which marked almost the end of the school year. Before answering the questions, all participants were asked to sign an informed consent form. Participants received a gift card ($10) for each completed returned questionnaire.

2.7. Data analyses

Quantitative data. The Software Package SPSS Version 28 (IBM Corp, 2021) was used to carry out all quantitative analyses. Values that were missing were Missing at Random (MAR). No imputation method was applied. Winsorized means were used in case of outliers and influential points. Repeated Measures Analyses of Variance (RM-ANOVA) were conducted for each outcome variable to statistically examine possible changes in teachers' answers to the questionnaires over time. As a next step, we conducted Repeated Measures Analyses of Covariance (RM-ANCOVAs), controlling for demographic factors of influence based on significant associations with outcome variables. Covariates were added to the model. The Huynh-Feldt-correction was reported in case of violation of sphericity (Haverkamp & Beauducel, 2017). We applied the Bonferroni corrections for pairwise comparisons to control for the family-wise error rate (Cramer et al., 2016). Graphs were created using R-Studio (RStudio Team, 2020).

Qualitative analyses. We applied a thematic inductive analysis approach to the survey's open-ended question. Braun and Clarke (2006, 2012; Clarke & Braun, 2017) defined this as a method for identifying, analyzing, and reporting patterns (themes) within data without a preexisting coding frame or the researcher's analytic preconceptions. In line with this method, we followed the following steps: (1) Two coders (BK, JH) read all participants' answers several times to become familiar with the data and took note of initial ideas, (2) both coders produced initial codes by labeling meaningful content from the answers, (3) together coders discussed and agreed on potential codes. These were then presented and discussed with a third coder (MS), resulting in new codes. Some codes were aggregated or deleted if agreed. Steps 2 and 3 were iterated several times until themes appeared to form a coherent pattern. Both first coders were mainly in accordance, and no significant discrepancies were reported.

When applying such an inductive qualitative research method, it is necessary to examine the trustworthiness and assess the quality of the study by exploring if the inquiry's findings are "worth paying attention to" (Lincoln & Guba, 1985). We used Elo et al. (2014)'s checklist to examine the trustworthiness of our study. The list includes three phases: preparation, organization, and reporting phase. During the preparation phase, we reached trustworthiness by assessing the data collection method, sampling strategy, and the selected unit of analysis. Teachers freely provided answers which repeatedly occurred; we concluded data saturation. During the organization phase, we reached organization and abstraction using several discussion meetings among the three coders. During these meetings, the overlap and redundancy of different codes were addressed in detail. Here, we also discussed the degree of interpretation. With both first coders analyzing all provided answers, a complete checking of all codes was allowed. Furthermore, we focused on differences and similarities between codes; any discrepancies were resolved and presented to the third coder.

2.8. Data availability

Data will be made available on request.

3. Results

3.1. Sample characteristics

Across all 64 teachers, the majority were female (90.6%), with a mean age of 40 years (range 22–72 years). About two-thirds identified themselves as African American and slightly less than a fifth as Caucasian/White (see Table 1). On average, teachers had about 12 years of teaching experience, with a minimum of less than a year up to 37 years.

3.2. Feasibility

(1) **Frequency**. In response to the question "How often have you facilitated BAM practices on average?" in the survey, teachers reported using the BAM practices on average three times a week. This was observed at T1 and T2, with only a small decrease in frequency at T2. In line with this result, outcomes of the logbook data also showed that, on average, BAM practices were played 2.7 times per week.

(2) **Implementation phase**. At the end of the logbook collection phase, teachers reported to be in different phases of the implementation, i.e., some still using the instructional or practice videos after four months, while others had students be role models or even led the practices themselves.

Table 1
Sample descriptives at baseline (T0).

	Total
N of teachers (T0)	64
Age *M (SD)*	39.66 (12.90)
Female sex *n (%)*	58 (90.6)
Ethnicity *n (%)*	
AA	40 (62.5)
Hispanic	1 (2.3)
Caucasian	13 (20.3)
Asian	6 (9.4)
Other (e.g., African)	4 (6.3)
Years of teaching *M (SD)*	11.58 (9.15)
Years of teaching at school *M (SD)*	5.163 (5.80)

(3) **Time/reason practice**. During the first four months, teachers reported to have used practices during the following situations (based on frequencies and presented from most often to less often): Before transitions, after recess, at the start of the day (morning routine), when students got restless, at the end of the day (afternoon), before test taking or after long periods of concentration. Additionally, other times/reasons were mentioned: during test taking, when students seemed overwhelmed, after witnessing a fight, in the middle of a lesson to lower distracting behavior, playing, talking, not listening, after lunch, for PE/art teachers, at the beginning of each class.

(4) **Teacher participation**. Out of 17 teachers who participated in the logbooks, 11 teachers (almost) always participated in the practices, i.e., doing them together with their students, with additional five teachers reported having sometimes followed along. Only one teacher stated to have rarely engaged in the practices.

(5) **Interference with the general curriculum**. On a scale from 0 to 10, teachers reported an average score of 2.24 across the first four months, indicating low interference of the BAM program with providing their curriculum.

(6) **Facilitators and barriers**. Answers to two open questions about facilitators and barriers respectively were categorized into four themes: *1. Technology-related issues* (e.g., "It was easy to use", "It helped to have the video explain it" versus "slow or no internet connection", "broken projector", *2. Content/duration of the practices* (e.g., "I liked the video with breathing through the nostril" versus "Length of some videos, sleepy children fall asleep", 3. *Feasibility.* (e.g., "Knowing when to use it", "Part of routine") versus "time constraints", "noise in building", 4. *(Pro)active participation* (e.g., "Students ask for it, they remind me", "Students willing to participate, it's fun" versus "disruptive students", "getting the class quiet for instructions or meditation is difficult, but I felt students were more on tasks afterward").

3.3. Relationships among study variables

Table 2 describes the correlations between demographic characteristics and outcomes. Given the significant relationships, we controlled for teaching experience across all outcome measures except perceived stress. It should be noted that teaching experience is strongly related to age ($r = 0.75$). Therefore, they could not be both included in the model as they were considered multicollinear. Cultural identity was only included as a covariate in the model for negative affect.

3.4. Changes in psychological functioning, perceived self-efficacy in classroom management, and mindfulness over time

Results of RM-ANOVAs indicated significant changes over time in several indicators of psychological functioning (i.e., negative affect, perceived stress, exhaustion), self-efficacy in classroom management, and mindfulness. We did not find significant changes in two positive indicators of psychological functioning, namely positive affect, and personal accomplishment. When controlling for teaching experience and cultural identity, results of RM-ANCOVAs indicated that changes over time remained significant for perceived stress, self-efficacy of classroom management, and mindfulness (Table 3 and Fig. 1). Changes in exhaustion and negative affect were no longer significant. These outcomes could be highly correlated with teachers' years of teaching experience (for which the analyses were controlled).

Table 2
Correlations between demographics and outcome variables at T0 ($N = 64$).

Correlations											
Baseline (at T0) $N = 64$	Age	Cultural Identity	Years of Teaching General	Years of Teaching at School	TSES Class Management (T0)[a]	Perceived Stress Scale (T0)	Positive Affect (T0)	Negative Affect (T0)	MBI Exhaustion (T0)	MBI Accomplishment (T0)	FFMQ (T0)
Age	1										
Cultural Identity	-.291*	1									
Years of Teaching General	.747**	-.103	1								
Years of Teaching at School	.412**	-.162	.519**	1							
TSES Class Management (T0)[a]	.317*	-.058	.330**	.192	1						
Perceived Stress Scale (T0)	-.073	-.051	-.138	-.014	-.064	1					
Positive Affect (T0)	.295*	.043	.272*	.074	.405**	-.201	1				
Negative Affect (T0)	-.391**	.300*	-.394**	-.190	-.255*	.328**	-.242	1			
MBI Exhaustion (T0)	-.391**	.196	-.255*	-.074	-.205	.434**	-.440**	.555**	1		
MBI Accomplishment (T0)	.294*	.002	.234	-.084	.440**	-.191	.460**	-.270*	-.196	1	
FFMQ (T0)	.361**	-.169	.287*	.049	.387**	-.457**	.483**	-.502**	-.494**	.441**	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
[a]Winsorized mean used here.

Table 3
Outcomes of RM-ANCOVAs and post-hoc comparisons.

								Pairwise comparisons					
	T0	T1	T2	Overall				T0 − T1		T1-T2		T0-T2	
	EMM (SE)	*EMM (SE)*	*EMM (SE)*	*F*	*df*	*p*	ηp^2	*(95%CI)*	*p*	*(95%CI)*	*p*	(95%CI)	p
Self-efficacy of Classroom management[a]	56.85 (1.48)	60.38 (1.23)	59.86 (1.51)	5.36	2	.006**	.111	6.14–-.917	.005**	-2.26–3.29	1.00	−6.29–.26	.080
Perceived stress	6.67 (.38)	5.57 (.44)	6.11 (.38)	4.13	2	.019*	.088	.055–2.16	.036*	-1.33–.26	.295	−.44–1.58	.506
Positive Affect[a]	27.16 (1.10)	27.09 (1.13)	26.69 (1.30)	.020	2	.980	>.001						
Negative Affect[b]	10.16 (.88)	8.83 (.82)	7.84 (.82)	1.59	1.73	.212	.038						
Exhaustion[a]	28.24 (1.56)	23.60 (1.81)	24.75 (1.66)	2.60	2	.080	.058						
Accomplishment[a]	38.35 (.89)	39.50 (.85)	39.67 (.94)	.13	2	.875	.003						
Mindfulness[a]	51.95 (1.21)	54.22 (1.19)	55.64 (1.20)	5.45	1.62	.01**	.129	-5.22–.503	.138	-3.29–.35	.149	−6.34–-1.03	.004 **

Significant at alpha level <.05; ** Significant at alpha level <.01.
[a]controlled for teaching experience in years.
[b]controlled for teaching experience in years and cultural identity.

To examine in which period the changes took place, we applied pairwise comparison while controlling for the abovementioned covariates. Perceived stress as well as self-efficacy in classroom management significantly changed over the course of the first four months (T0-T1). As in the second half year, perceived stress and self-efficacy of classroom management slightly increased, resulting in no significant change over time in these outcomes across the whole school year. A significant gradual change in mindfulness was observed from the beginning of the school year until the end (T0-T2).

3.5. Teachers' perceived impact of BAM

Based on the open-ended question ("Please describe the impact the BAM program has had on you in your own words") presented at both follow-up assessments, teachers reported two impacts: (1) *Impact on teacher's well-being and personal functioning* and (2) *Impact on teaching activities/skills*. Based on provided answers at T1 ($n = 38$), 41 codes (nine codes categorized as 'not to be coded') emerged. At T2, 39 codes were identified among 27 given responses, with five codes classified as 'not to be coded'. Please see Table 4 for all themes, including frequencies and illustrative quotes.

Impact on teacher's well-being and personal functioning included the following themes:

1. **Calming.** This was the most frequently reported perceived impact. About one-third of teachers reported a calming effect of the BAM, including feeling less stressed and more relaxed and restored, as well that the practices also helped them calm down during stressful situations. Five teachers stated a calming effect on T1 as well as T2.
2. **Improved emotion regulation.** An improved ability to regulate emotions occurred 15 times. Four teachers mentioned this change at both time points.
3. **Taking a breath/break.** Teachers described that the BAM program functioned as a reminder to take a break and focus on their breath, especially during stressful situations.
4. **Heightened self-awareness.** Across all answers, being more aware of their feelings and being better able to respond to and regulate them was mentioned nine times, with two teachers reporting it both at T1 and T2.
5. **Improved overall well-being/health.** Another effect brought forward was improved overall well-being and health as well as positivity. One teacher stated this at both time points.

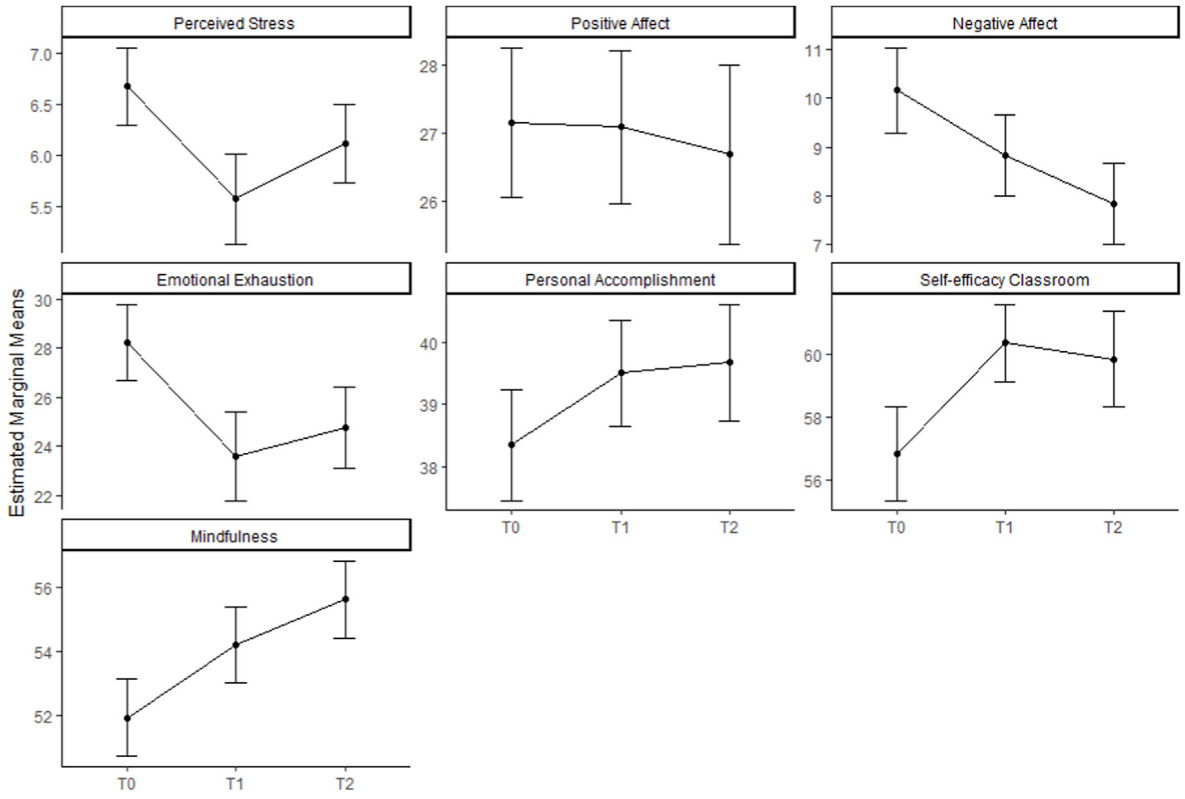

Fig. 1. Estimated Marginal Means (EMM) across time (T0-T2) per outcome measure.

Impact on teaching activities/skills included the following theme:

6. **Improved classroom management.** Teachers described that, due to the practices, they were better able to manage the classroom, including dealing with students who require specific attention about their social and emotional needs. Further, it was stated that the BAM practices helped to teach more effectively, and by that, decreasing teachers' stress levels.

4. Discussion

In the present study, we examined whether offering pre-recorded online breathing and movement practices to students within the classroom is feasible and may positively impact teachers' well-being and classroom functioning. Our preliminary results suggest that it was feasible for teachers to incorporate the brief exercises in their regular teaching hours. Teachers were able to implement practices on average three times a week. In addition, both quantitative and qualitative results suggest that providing and following the practices with their students had a stress-reducing, calming effect on teachers. The approach helped teachers take a regular break, be more mindful and aware of themselves, and better regulate their emotions. Teachers also reported that providing and doing the exercises has helped them to feel more self-efficacy regarding managing students and classroom activities. Unexpectedly, no significant changes were found in positive outcomes, including the experience of positive affect and personal accomplishment.

Table 4
Frequency and illustrative quotes regarding teachers' perceived impact of the BAM program.

	Frequency		Illustrative quotes
	T1	T2	
(1) Impact on teachers' own well-being and personal functioning			
Calming	12	11	"It calms me. BAM also puts me in a good head space".
Improved emotion regulation	7	6	"It keeps me from totally losing my cool"
Taking a breath/break.	4	4	"[The BAM program] reminds me to stop and breathe
Heightened self-awareness	2	7	"[…] BAM helps me to identify how I'm feeling and determine what will be effective in dealing with those emotions."
Overall well-being/health	3	3	"Using this program has helped me maintain my overall wellness as well by taking breaks when needed to re-center myself and use my breathing strategies to stay calm, neutral and as positive as possible."
(2) Impact on teaching activities/skills			
Improved classroom management	4	3	"[…] the BAM program does have a positive impact on me to reduce student conflict"

A key finding includes the feasibility of the program. Teachers who did not receive extensive mindfulness-based training could incorporate pre-recorded breathing and movement exercises within their classrooms during regular school hours for several times a week. Results demonstrate that the majority of teachers actively participated along with their students and that the BAM program did not crucially interfere with the common curriculum they had to provide. Instead, teachers reported that it was easily incorporated into their routine and that students even reminded them to play a practice. Time constraints and other interfering responsibilities were also mentioned, especially during weeks of early dismissal, testing, or holidays.

Another interesting outcome is the reduction in teachers' stress levels in the initial months of using the pre-recorded breathing and movement exercises in class. Teachers perceived more self-efficacy and confidence regarding their classroom management skills. Although the current results are preliminary, without a control group to compare, we cannot directly relate to changes to using the BAM program. Yet, outcomes do suggest that offering pre-recorded brief breathing and movement exercises in class to students may have helped teachers to feel less stressed and more confident in how much they can do to control disruptive behavior in the classroom, to get students to follow classroom rules, and to calm students who are disruptive or noisy. Our qualitative data underlined that teachers felt more relaxed and better able to deal with disruptive student behavior and that the BAM program enabled them to "take back" valuable academic time. Such stress management skills are a key focus and beneficial element of mindfulness programs directed at teachers (Roeser et al., 2012, 2013). Also, these findings align with results from studies examining the efficacy of intensive, multiple-week, mindfulness-based programs offered to teachers (Flook et al., 2013; Hwang et al., 2019; Jennings et al., 2013; Schussler et al., 2016).

Based on the logbook data, we observed that teachers played the pre-recorded exercises specifically before transitions, after recess, or when they observed students being restless. This may have allowed teachers to be able to structure their lessons and regain focus of their students. Having useful tools for managing the classroom and handling highly stressful situations adequately seems to enhance teachers' levels of experienced competence to a certain level. Especially within the hectic and highly demanding school environment, it is essential to keep fostering and supporting teachers' psychological functioning and self-efficacy and although preliminary, offering programs such as BAM might be a suitable approach for this. It has been demonstrated that repeated mindfulness practice, even brief, is crucial for developing mindfulness skills. Our results add to the small amount of evidence (Bakosh et al., 2016, 2018; Ritter & Alvarez, 2020) that it is feasible and beneficial to incorporate brief pre-recorded online mindfulness exercises in class.

Unexpectedly, we did not observe significant changes in two positive outcomes, i.e., positive affect and a sense of personal accomplishment. Also, others failed to find significant changes in teachers' positive affect due to participating in a mindfulness-based course (Jennings et al., 2017). A possible explanation may be that doing mindfulness exercises has a more significant impact of reducing stress than increased feelings of joy. Personal accomplishment refers to feeling effective, competent, and successful in understanding and positively influencing how students feel and creating a good atmosphere. As such, personal accomplishment, although related, differs from perceiving self-efficacy in classroom management, with the latter referring to managing class order and dealing with disruptive behaviors. In our sample, and in line with other studies (e.g., Brouwers & Tomic, 2000), we found that personal accomplishment and self-efficacy in classroom management were only moderately related. In line with our findings, some studies on the efficacy of mindfulness programs targeting teachers also did not find a significant change in personal accomplishment (Frank et al., 2015; Harris et al., 2016), while others did (Flook et al., 2013; Frank et al., 2015; Harris et al., 2016; Jennings et al., 2013). More research is needed to understand better the benefits of mindfulness-based interventions for teachers, including how it affects their sense of confidence, self-efficacy, and personal accomplishment, and which teachers are more or less likely to benefit from doing exercises included in the BAM program.

Further evidence of the possible impact of using the BAM program comes from the finding that teachers' mindfulness levels increased steadily over the course of the school year when offering the program. Such outcomes suggest that besides experiencing stress reductions and more self-efficacy teachers also develop mindfulness skills, including being more aware of their actions and thoughts in a nonjudgmental, accepting way and less reactive to stressful events and emotions. Our qualitative outcomes underline this as teachers experienced a heightened self-awareness of their feelings and therefore felt more able to respond and regulate them. Also, teachers reported that the BAM program had helped them to remind them to take a (breathing) break, especially in stressful classroom situations. In other qualitative studies of mindfulness programs for teachers, similar experiences have been described (Grant, 2017; Schussler et al., 2016).

From previous studies, we know that a higher frequency of engagement in mindfulness practices is related to greater improvement in outcomes (e.g., Carmody & Baer, 2008; Carson et al., 2004). In our study, the majority of the subsample of teachers who filled in logbooks indicated to have regularly participated in the practices themselves together with their students. This aligns with reports at T1 and T2 across the whole sample. Interestingly, we observed an initial increase during the first months after implementation, effects leveled off during the second half of the school year. This could be due to different reasons. First, teachers might use the practices less frequently in their classrooms than during the first months. Toward the end of the school year, exams and other responsibilities seem to take up a considerable amount of time. However, this is not supported by our data as teachers reported to have used the practices on average three times a week, both at T1 and T2. Since we asked teachers to retrospectively report on this, there might be a bias about the actual frequency. Second, it could be that program buy-in and engagement decreased throughout the year. The challenge, however, remains to continue using a program, such as BAM, within the classroom sustainably over a more extended period of time. Additionally, some teachers mentioned in the second survey that they wished for more variety of exercises, that students got less engaged, or that other alternative mindfulness programs were considered; all factors we did not control for in our analyses. Third, during the first four months, 17 teachers turned in logbooks every school week. Having the independent researcher present at the school at least once a week during the initial implementation phase, could have reminded teachers and impacted the use of the BAM program.

Even though we can only draw conclusions very carefully, the results mentioned above hint toward the feasibility and potential impact on teachers using the BAM program with their students. Overall, by learning about mindfulness via playing pre-recorded video and audio materials to students, participating themselves, and following the training sessions, teachers are introduced to the background and potential effects of regular breathing and movement practices for their students. Using the BAM program within their classroom may encourage teachers' self-care behavior and apply principles of present moment focus, non-judgmental awareness, and compassion towards themselves. This seems to be

especially useful during stressful situations. It could be that by being exposed to the concept of mindfulness and the different practices and being reminded to take (breathing) breaks, teachers' perceived stress levels, self-awareness, and emotion regulation are positively impacted. Yet, it is also possible that, as students practice the exercises regularly, classes become quieter and more focused, indirectly influencing teachers positively. Previous studies have shown that classroom climate improves when students follow a mindfulness-based program (e.g., Black & Fernando, 2014; DiCarlo et al., 2020).

4.1. Limitations and future directions

Using quantitative and qualitative data helped us to explore the possible changes in teachers' outcomes when offering the BAM program to their students. The current study was based on natural program implementation at four elementary schools. At this moment, we were able to observe how teachers take on the practices in their classrooms and the changes they experience. However, several limitations must be considered when evaluating the current study. First, the BAM program was delivered at a school-wide level throughout an entire school year, including a control condition was not possible. This means that alternative explanations for the significant detected changes must be considered. Although teachers reported having done the practices on average three times a week and that most teachers also participated themselves in these practices, it can be reasoned that some teachers may have benefitted from simply having a break from their schoolwork during the day while students participated in the exercises, or that, other programs and circumstances may have impacted our results. We did not control for this. A time-effect might also be possible, i.e., it could be that teachers felt more stressed at the beginning of the year compared to the end, independent of the effect of the BAM program. Second, we only used self-reported measures to assess change over time. With our specific study interest in the possible changes due to this program, teachers may have felt the need to report more positively.

As the current research represents preliminary results, the robustness of the findings and the magnitude of the effects need to be evaluated using more extensive and controlled trials. In our study, we could not include a control group, but comparing the BAM program with, for example, a program targeting teachers directly, might give more insight into the program's potential effects, cost-effectiveness, and feasibility. Here, concurrently investigating both teachers as well as students will be necessary. The BAM program may overcome specific barriers to implementation (e.g., time issues). Yet, a closer look at factors including the availability of technology resources in classrooms, program fidelity, student engagement, or how to implement the BAM program more sustainably within a school culture needs to be considered in future studies.

4.2. Conclusion

This study presents the first insights into the feasibility and potential impact on teachers who provided a mindfulness-based program within their classrooms through pre-recorded audio and video-guided online materials. Program facilitation and possible benefits from the program do not seem to require extensive training for teachers. Our qualitative data suggest that the program can serve as a tool to promote psychological functioning, teachers' perception of classroom management, and mindfulness skills. In the future, if the BAM program shows consistent beneficial effects on both teaching staff and students during more extensive trials, it could be a powerful tool to upscale and improve education and well-being at elementary schools.

Ethical standards

This study has been approved by the appropriate ethics committee(s). It has been performed according to ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

We thank the founders of the Holistic Life Foundation, Inc., Ali Smith, Atman Smith, and Andres Gonzalez, for their collaboration as well as all staff members who have been involved in the implementation and research. A big thank you goes to all principals, teachers, and students who were willing to participate and share their experiences and insights with us. We also thank Jana Heinen for helping analyze the qualitative data.

References

Albrecht, N. J., Albrecht, P., & Cohen, M. (2012). Mindfully teaching in the classroom: A literature review. *Australian Journal of Teacher Education, 37*(12). https://doi.org/10.14221/ajte.2012v37n12.2

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D., & Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329–342. https://doi.org/10.1177/1073191107313003

Bakosh, L. S., Snow, R. M., Tobias, J. M., Houlihan, J. L., & Barbosa-Leiker, C. (2016). *Maximizing mindful learning: Mindful awareness intervention improves elementary school students' quarterly grades*. https://doi.org/10.1007/s12671-015-0387-6. Mindfulness.

Bakosh, L. S., Tobias Mortlock, J. M., Querstret, D., & Morison, L. (2018). Audio-guided mindfulness training in schools and its effect on academic attainment: Contributing to theory and practice. *Learning and Instruction, 58*, 34–41. https://doi.org/10.1016/j.learninstruc.2018.04.012

Black, D., & Fernando, R. (2014). Mindfulness training and classroom behavior among lower- income and ethnic minority elementary school children. *Journal of Child and Family Studies, 23*(7), 1242–1246. https://doi.org/10.1007/s10826-013-9784-4.Mindfulness

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2012). Thematic analysis. In *APA handbook of research methods in psychology* (Vol. 2, pp. 57–71). American Psychological Association. https://doi.org/10.1037/13620-004. Research designs: Quantitative, qualitative, neuropsychological, and biological.

Brouwers, A., & Tomic, W. (2000). A longitudinal study of teacher burnout and perceived self-efficacy in classroom management. *Teaching and Teacher Education, 16*(2), 239–253. https://doi.org/10.1016/S0742-051X(99)00057-8

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*(4), 211–237. https://doi.org/10.1080/10478400701598298

Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31*, 23–33.

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

Carson, J. W., Carson, K. M, Gil, K. M., & Baucom, D. H. (2004). Mindfulness-based relationship enhancement. *Behavior Therapy, 35*(3), 471–494. https://doi.org/10.1016/S0005-7894(04)80028-5

Clarke, V., & Braun, V. (2017). Thematic analysis. *The Journal of Positive Psychology, 12*(3), 297–298. https://doi.org/10.1080/17439760.2016.1262613

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385–396. https://doi.org/10.2307/2136404. JSTOR.

Cramer, A. O. J., van Ravenzwaaij, D., Matzke, D., Steingroever, H., Wetzels, R., Grasman, R. P. P. P., Waldorp, L. J., & Wagenmakers, E. J. (2016). Hidden multiplicity in exploratory multiway ANOVA: Prevalence and remedies. *Psychonomic Bulletin & Review, 23*(2), 640–647. https://doi.org/10.3758/s13423-015-0913-5

Dariotis, J. K., Cluxton-Keller, F., Mirabal-Beltran, R., Gould, L. F., Greenberg, M. T., & Mendelson, T. (2016a). The program affects me "cause it gives away stress":

Urban students" qualitative perspectives on stress and a school-based mindful yoga intervention. *Explore: The Journal of Science and Healing, 12*(6), 443–450. https://doi.org/10.1016/j.explore.2016.08.002
Dariotis, J. K., Mirabal-Beltran, R., Cluxton-Keller, F., Gould, L. F., Greenberg, M. T., & Mendelson, T. (2016b). A qualitative evaluation of student learning and skills use in a school-based mindfulness and yoga program. *Mindfulness, 7*(1), 76–89. https://doi.org/10.1007/s12671-015-0463-y
DiCarlo, C. F., Meaux, A. B., & LaBiche, E. H. (2020). Exploring mindfulness for perceived teacher stress and classroom climate. *Early Childhood Education Journal, 48*(4), 485–496. https://doi.org/10.1007/s10643-019-01015-6
Dunning, D. L., Griffiths, K., Kuyken, W., Crane, C., Foulkes, L., Parker, J., & Dalgleish, T. (2018). Research Review: The effects of mindfulness. In *Based interventions on cognition and mental health in children and adolescents – a meta-aanalysis of randomized controlled trials*, Article 12980. https://doi.org/10.1111/jcpp.12980. Journal of Child Psychology and Psychiatry, jcpp.
Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *Sage Open, 4*(1), Article 2158244014522633. https://doi.org/10.1177/2158244014522633
Emerson, L.-M., Leyland, A., Hudson, K., Rowse, G., Hanley, P., & Hugh-Jones, S. (2017). Teaching mindfulness to teachers: A systematic review and narrative synthesis. *Mindfulness, 8*(5), 1136–1149. https://doi.org/10.1007/s12671-017-0691-4
Felver, J. C., Celis-de Hoyos, C. E., Tezanos, K., & Singh, N. N. (2016). A systematic review of mindfulness-based interventions for youth in school settings. *Mindfulness, 7*(1), 34–45. https://doi.org/10.1007/s12671-015-0389-4
Flook, L., Goldberg, S. B., Pinger, L., Bonus, K., & Davidson, R. J. (2013). Mindfulness for teachers: A pilot study to assess effects on stress, burnout, and teaching efficacy: Mindfulness for teachers. *Mind, Brain, and Education, 7*(3), 182–195. https://doi.org/10.1111/mbe.12026
Frank, J. L., Reibel, D., Broderick, P., Cantrell, T., & Metz, S. (2015). The effectiveness of mindfulness-based stress reduction on educator stress and well-being: Results from a pilot study. *Mindfulness, 6*(2), 208–216. https://doi.org/10.1007/s12671-013-0246-2
Grant, K. C. (2017). From teaching to being: The qualities of a mindful teacher. *Childhood Education, 93*(2), 147–152. https://doi.org/10.1080/00094056.2017.1300493
Gu, J., Strauss, C., Crane, C., Barnhofer, T., Karl, A., Cavanagh, K., & Kuyken, W. (2016). Examining the factor structure of the 39-item and 15-item versions of the Five Facet Mindfulness Questionnaire before and after mindfulness-based cognitive therapy for people with recurrent depression. *Psychological Assessment, 28*(7), 791–802. https://doi.org/10.1037/pas0000263
Hargreaves, A. (1998). The emotional practice of teaching. *Teaching and Teacher Education, 14*(8), 835–854. https://doi.org/10.1016/S0742-051X(98)00025-0
Harris, A. R., Jennings, P. A., Katz, D. A., Abenavoli, R. M., & Greenberg, M. T. (2016). Promoting stress management and wellbeing in Educators: Feasibility and efficacy of a school-based yoga and mindfulness intervention. *Mindfulness, 7*(1), 143–154. https://doi.org/10.1007/s12671-015-0451-2
Haverkamp, N., & Beauducel, A. (2017). Violation of the sphericity assumption and its effect on type-I error rates in repeated measures ANOVA and multi-level linear models (MLM). *Frontiers in Psychology, 8*. https://doi.org/10.3389/fpsyg.2017.01841
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
Hwang, Y.-S., Noh, J.-E., Medvedev, O. N., & Singh, N. N. (2019). Effects of a Mindfulness-Based Program for Teachers on Teacher Wellbeing and Person-Centered Teaching Practices. *Mindfulness, 10*(11), 2385–2402. https://doi.org/10.1007/s12671-019-01236-1
IBM Corp. (2021). *IBM SPSS statistics for windows (released 2021)*. IBM Corp.
Jennings, P. A., Brown, J. L., Frank, J. L., Doyle, S., Oh, Y., Davis, R., Rasheed, D., DeWeese, A., DeMauro, A. A., Cham, H., & Greenberg, M. T. (2017). Impacts of the CARE for Teachers program on teachers' social and emotional competence and classroom interactions. *Journal of Educational Psychology, 109*(7), 1010–1028. https://doi.org/10.1037/edu0000187
Jennings, P. A., Frank, J. L., Snowberg, K. E., Coccia, M. A., & Greenberg, M. T. (2013). Improving classroom learning environments by Cultivating Awareness and Resilience in Education (CARE): Results of a randomized controlled trial. *School Psychology Quarterly, 28*(4), 374–390. https://doi.org/10.1037/spq0000035
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
Klingbeil, D. A., & Renshaw, T. L. (2018). Mindfulness-based interventions for teachers: A meta-analysis of the emerging evidence base. *School Psychology Quarterly: The Official Journal of the Division of School Psychology, American Psychological Association, 33*(4), 501–511. https://doi.org/10.1037/spq0000291
Lever, N., Mathis, E., & Mayworm, A. (2017). School mental health is not just for students: Why teacher and school staff wellness matters. *Report on Emotional & Behavioral Disorders in Youth, 17*(1), 6–12.
Lincoln, & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE Publications Inc. SAGE Publications. https://us.sagepub.com/en-us/nam/naturalistic-inquiry/book842.
Maslach, C., Jackson, S. E., & Leiter, M. P. (1996). *Maslach burnout inventory manual* (4th ed.).
Maynard, B. R., Solis, M. R., Miller, V. L., & Brendel, K. E. (2017). Mindfulness-based interventions for improving cognition, academic achievement, behavior, and socioemotional functioning of primary and secondary school students. *Campbell Systematic Reviews, 13*(1), 1–144. https://doi.org/10.4073/CSR.2017.5
Meiklejohn, J., Phillips, C., Freedman, M. L., Griffin, M. L., Biegel, G., Roach, A., Frank, J., Burke, C., Pinger, L., Soloway, G., Isberg, R., Sibinga, E., Grossman, L., & Saltzman, A. (2012). Integrating mindfulness training into K-12 education: Fostering the resilience of teachers and students. *Mindfulness, 3*(4), 291–307. https://doi.org/10.1007/s12671-012-0094-5
Mendelson, T., Greenberg, M. T., Dariotis, J. K., Gould, L. F., Rhoades, B. L., & Leaf, P. J. (2010). Feasibility and preliminary outcomes of a school-based mindfulness intervention for urban youth. *Journal of Abnormal Child Psychology, 38*(7), 985–994. https://doi.org/10.1007/s10802-010-9418-x
Ritter, A., & Alvarez, I. (2020). Mindfulness and executive functions: Making the case for elementary school practice. *European Journal of Investigation in Health, Psychology and Education, 10*(1), 544–553. https://doi.org/10.3390/ejihpe10010039
Roeser, R. W., Schonert-Reichl, K. A., Jha, A., Cullen, M., Wallace, L., Wilensky, R., Oberle, E., Thomson, K., Taylor, C., & Harrison, J. (2013). Mindfulness training and reductions in teacher stress and burnout: Results from two randomized, waitlist-control field trials. *Journal of Educational Psychology, 105*(3), 787–804. https://doi.org/10.1037/a0032093
Roeser, R. W., Skinner, E., Beers, J., & Jennings, P. A. (2012). Mindfulness training and teachers' professional development: An emerging area of research and practice. *Child Development Perspectives, 6*(2), 167–173. https://doi.org/10.1111/j.1750-8606.2012.00238.x
RStudio Team. (2020). *RStudio: Integrated development for R. PBC*. http://www.rstudio.com/.
Schussler, D. L., Jennings, P. A., Sharp, J. E., & Frank, J. L. (2016). Improving teacher awareness and well-being through CARE: A qualitative analysis of the underlying mechanisms. *Mindfulness, 7*(1), 130–142. https://doi.org/10.1007/s12671-015-0422-7
Singh, N. N., Lancioni, G. E., Winton, A. S. W., Karazsia, B. T., & Singh, J. (2013). Mindfulness training for teachers changes the behavior of their preschool students. *Research in Human Development, 10*(3), 211–233. https://doi.org/10.1080/15427609.2013.818484
Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education, 48*(6), 1273–1296. https://doi.org/10.1007/s11165-016-9602-2
Tarrasch, R., & Berger, R. (2022). Comparing indirect and combined effects of mindfulness and compassion practice among schoolchildren on inter- and intra-personal abilities. *Mindfulness, 13*(9), 2282–2298. https://doi.org/10.1007/s12671-022-01955-y
Tsang, K. K. Y., Shum, K. K., Chan, W. W. L., Li, S. X., Kwan, H. W., Su, M. R., Wong, B. P. H., & Lam, S. (2021). Effectiveness and mechanisms of mindfulness training for school teachers in difficult times: A randomized controlled trial. *Mindfulness, 12*(11), 2820–2831. https://doi.org/10.1007/s12671-021-01750-1
Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. In *Teaching and teacher education*. https://doi.org/10.1016/S0742-051X(01)00036-1
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
Zenner, C., Herrnleben-Kurz, S., & Walach, H. (2014). Mindfulness-based interventions in schools-A systematic review and meta-analysis. *Frontiers in Psychology, 5*. https://doi.org/10.3389/fpsyg.2014.00603
Zoogman, S., Goldberg, S. B., Hoyt, W. T., & Miller, L. (2015). Mindfulness interventions with youth: A meta-analysis. *Mindfulness, 6*(2), 290–302. https://doi.org/10.1007/s12671-013-0260-4