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Effectiveness and Mechanisms of Mindfulness Training for School Teachers in Difficult Times: A Randomized Controlled Trial

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Abstract

Objectives Research in recent years has shown that mindfulness-based interventions can enhance teachers' mental and physical health. However, the existing studies were predominantly conducted in Western, educated, industrialized, rich, and democratic (WEIRD) societies. As a randomized controlled trial in a non-WEIRD society, the present study examined the effectiveness and mechanisms of mindfulness training for Hong Kong teachers in difficult times.

Methods Teachers from primary and secondary schools ($n = 186$) were randomly assigned to mindfulness training (eight-week .b Foundations) or waitlist control condition. They completed online self-report surveys on measures of well-being, emotion management, and mindfulness in teaching at baseline, post-intervention, and two-month follow-up.

Results The intervention group reported significantly higher levels of life satisfaction, positive affect, general health, along with significantly lower levels of insomnia, stress, and negative affect than the control group at post-test and two-month follow-up. The effect sizes were medium to large ($\eta_p^2 = 0.06$ to 0.14). More importantly, teachers' baseline well-being had a significant moderating effect on the intervention effectiveness. Those with a lower baseline in well-being benefitted more than their counterparts with a higher baseline. In addition, teachers' emotion management was found to be the mediator through which mindfulness training enhanced teachers' well-being. Such improvement in well-being also predicted higher levels of mindfulness in teaching.

Conclusions This study provides evidence on the efficacy of mindfulness training for teachers beyond WEIRD societies. It suggests the universality and practicality of mindfulness training in enhancing teachers' well-being and reducing their distress in difficult times.

Keywords Mindfulness · Teacher · Well-being · Stress · Emotion management · Mindful teaching

Teaching is widely regarded as a socially, emotionally, cognitively, and physically demanding profession (Johnson et al., 2005). Teachers need to be very versatile "on the fly" in response to different students' needs in class every day (Roeser et al., 2012). It is, therefore, not surprising to find ample studies reporting teacher stress and burnout and their adverse effects on teachers' physical and mental health, job satisfaction, turnover, quality of teaching, and student learning (e.g., Greenberg et al., 2016; Hoglund et al., 2015). Compared with the teachers in the USA and Germany, studies found that Hong Kong teachers experience more burnout symptoms (Schwarzer et al., 2000). The prevalence rate of depression symptoms among Hong Kong teachers (12.5%) is four times more than that of the general population (2.9%) (Hong Kong Professional Teachers' Union, 2018; Lam et al., 2015).

In a large-scale survey of approximately 3000 teachers from 99 schools in Hong Kong, more than half of the respondents reported working at least 61 h/week and 25% even reported working more than 71 h/week (Lai & Law,

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2010). In fact, the long working hours, the responsibility to manage students' challenging behaviors, the accountability for students' outcomes, the ever-changing education policies, and the regular external school review for quality assurance are sources of stress for teachers not only in Hong Kong but also worldwide (Chan et al., 2010; Kyriacou, 2011). Nevertheless, the stress of Hong Kong teachers may even be more intense these days because of the tightened control from the government after the social movements for democracy in recent years (Bradsher et al., 2020). Many Hong Kong teachers reported feeling worried about being complained about by parents or external parties due to their personal political viewpoints (Hong Kong Professional Teachers' Union, 2020). All these worries come together with the stress in the time of the COVID-19 pandemic when Hong Kong teachers are compelled to deal with the unprecedented changes in school routines and teaching mode. Although most of the stressors appear to be systemic constraints and external threats that are beyond the teachers' control, teachers may learn some ways to cope with the stressful conditions resiliently. As Kabat-Zinn (1994) stated, "You cannot stop the waves, but you can learn to surf (p.30)."

Since Kabat-Zinn developed the mindfulness-based stress reduction program in 1979, there has been a rapid growth of mindfulness-based intervention (MBIs) delivered in various settings, including those for teachers, such as Cultivating Awareness and Resilience in Education (CARE for Teachers; Jennings et al., 2013), stress management and relaxation techniques (SMART-in-Education; Roeser et al., 2013), and .b Foundations course (Beshai et al., 2016). A recent meta-analysis of 29 studies of MBIs in 1493 teachers revealed that MBIs have a medium treatment effect on teacher outcomes (Hedge's $g = 0.60$; Klingbeil & Renshaw, 2018), which is comparable to that for working adults in general ($g = 0.32$ to 0.77; Vonderlin et al., 2020). Specifically, MBIs were found to enhance teachers' psychological well-being (e.g., self-efficacy, job satisfaction, and positive affect; $g = 0.43$), mitigate their psychological distress (e.g., anxiety, depression, stress, burnout, and negative affect; $g = 0.55$), improve their physical health (e.g., sleep quality, insomnia, and sick leave; $g = 0.62$), and facilitate classroom climate and instructional practices ($g = 0.31$; Klingbeil & Renshaw, 2018). It is important to note that these initial meta-analytic results may be influenced by publication bias and the effect of MBIs for teachers may be overestimated (Klingbeil & Renshaw, 2018).

In addition, it is also important to note that existing studies were predominantly conducted in North America (e.g., Crain et al., 2017; Harris et al., 2016; Jennings et al., 2013, 2017, 2019; Roeser et al., 2013), Europe (e.g., Beshai et al., 2016; Mihic et al., 2020), and Australia (e.g., Hwang et al., 2019). In recent years, there are voices advocating for more scientific research beyond Western countries. As

Henrich et al. (2010) have pointed out poignantly, most of the psychological literature is built on the studies from WEIRD societies. In light of cross-cultural considerations and to extend the generalizability of the effects of MBIs for teachers, there is a need to conduct research in non-WEIRD countries.

To date, relatively few studies have investigated the mechanisms underlying the effect of MBIs on teachers' well-being. Mechanisms of change revealed thus far include self-compassion (Roeser et al., 2013), dispositional forgiveness (Taylor et al., 2016), and rumination on work at home (Crain et al., 2017). Another possible pathway by which MBIs lead to improvement in teachers' well-being is via improving emotion management. Emotion management refers to the use of adaptive strategies for regulating unpleasant moods and maintaining pleasant moods (Salovey et al., 1995). For instance, having greater self-compassion (Neff, 2003), more forgiveness (Brown, 2003), and less rumination (Nolen-Hoeksema et al., 2008) are examples of emotion management strategies evident in previous MBI studies for teachers. MBIs can help teachers become more aware of their automatic, habitual, and often maladaptive reactions to stress triggers (Skinner & Beers, 2016). For example, teachers may yell at students after being triggered by their misbehaviors. Through mindfulness practice such as the "three-step breathing space," teachers may pause momentarily to acknowledge their own thoughts (e.g., students never listen to me), feelings (e.g., anger, annoyance, and frustration), bodily sensations (e.g., racing heart and rapid breathing), and behavioral urges (e.g., to yell at students) arising at the present moment. Then they may anchor their attention to the sensations of breathing here-and-now to help them resume a sense of calmness. Through anchoring, decentering, and nonjudgmental acceptance, teachers may step out of their emotional reactivity and make a wiser choice in their response to the situation (Chiesa et al., 2013). Thus, MBIs may enable teachers to adopt more adaptive strategies to cope with stressful circumstances resiliently (Skinner & Beers, 2016). Previous studies also found that teachers who are able to effectively manage their emotions indeed experience less stress and burnout (Chang, 2009).

Given that teachers with poor mental health are vulnerable to stress and burnout (Greenberg et al., 2016), it is crucial to examine if MBIs could benefit high-risk teachers. Existing studies showed inconsistent findings on the moderating effects of teachers' baseline well-being on intervention effectiveness. Hwang et al.'s (2019) study suggested that MBI might be more beneficial for educators with lower levels of teaching efficacy in student engagement and emotional suppression at baseline than those with higher levels. Furthermore, Jennings et al.'s (2019) study on the long-term efficacy of the CARE program found that high-risk teachers with initially elevated levels of psychological distress might

benefit more in emotion management than those with low-risk. However, Mihic et al.'s (2020) study on the effect of the CARE program in Croatia failed to replicate this result. Although both studies examined the same MBI program, they were conducted in different contexts (i.e., North America vs. Europe). Despite the cultural differences, the small sample size ($n = 54$) in Mihic et al.'s (2020) study might also account for these equivocal results.

Previous studies have documented the positive influence of MBIs on classroom climate and teachers' sensitivity (Flook et al., 2013; Harris et al., 2016; Jennings et al., 2017). Questions remain in what accounts for the teachers' increasing capacity to be aware of their students' needs and cultivate a supportive learning climate. Teachers' well-being is theorized to be the key. According to the stress-contagion theory (Wethington, 2000), stress can spill over from teachers to students, leading to a "burnout cascade" (Oberle & Schonert-Reichl, 2016). To break the vicious cycle, MBIs help buffer teachers against stress and burnout (Emerson et al., 2017). It is reasonable to speculate that when teachers have good mental health, they are more capable to embody mindfulness in their teaching, such as stepping out of auto-piloting, maintaining awareness of what is happening in the classroom, listening to students' thoughts and feelings with full attention, accepting those thoughts and feelings non-judgmentally, as well as responding to students' needs with sensitivity, empathy, and compassion (Frank et al., 2016).

The above literature review indicates the need to investigate four important research questions. First, how effective is MBI for Chinese teachers in Hong Kong, a non-WEIRD society? We hypothesize that participants who have received the MBI show better well-being (i.e., increase in general health, positive affect, life satisfaction, reduction in insomnia, negative affect, and stress), better emotion management, and higher levels of mindful teaching at post-intervention and two-month follow-up than those in the waitlist control group. Second, what is the mechanism of change underlying the effect of MBI on well-being? We hypothesize that participants' emotion management at post-intervention mediates the effect of MBI on well-being at two-month follow-up. Third, who benefits more from MBI? We hypothesize that participants with lower baseline well-being benefit more than those with higher baseline well-being. Fourth, does teachers' well-being predict their embodiment of mindful teaching? We hypothesize that participants' well-being at post-intervention mediates the effect of MBI on mindful teaching at two-month follow-up. These research questions were investigated during the unprecedented upheavals caused by the anti-extradition bill protests and the unexpected lockdown caused by the COVID-19 pandemic. This background offered a very unique opportunity to examine the effectiveness and mechanisms of mindfulness training for school teachers in difficult times.

Methods

Participants

Participants were recruited via emails sent to all local elementary and secondary schools in Hong Kong. A total of 197 school teachers and personnel initially responded to the recruitment emails and filled out the screening questionnaire. Eligible participants met the following criteria: working in local schools or education institutions, not experiencing severe or unstable mental health conditions at the time of recruitment, and no extensive prior experience with mindfulness (e.g., without attending 8-week MBI) (see Fig. 1).

Excluding those ineligible (6%), the final sample included 186 school teachers and personnel (72.6% female) from 58 different schools located in various districts in Hong Kong. The majority of participants were teachers (73.7%), while 22% were social workers/counselors/educational psychologists, and 4.3% were school supporting staff (e.g., clerical assistants). Participants' ages ranged from 22 to 59 years old (mean = 39.55, SD = 9.43), and their years of working experience in schools ranged from less than 1 year to 36 years (mean = 14.62, SD = 9.77).

Procedures

Participants were randomized to either the mindfulness training condition ($n = 94$) or waitlist control condition ($n = 92$), stratified by the gender of participants. Participants randomized to the mindfulness training condition completed the 8-week mindfulness training from October to December of 2019, while those randomized to the waitlist control condition completed the training from March to May of 2020. Participants completed online surveys comprising self-report measures at three time points: baseline (T1, September 2019), post-intervention (T2, December 2019), and 2-month follow-up (T3, February 2020). Hence, training for the waitlist control group was conducted after data collection at T3. Participants received the mindfulness training for free and a certificate of completion if their attendance rate reached 80%.

Intervention

The 8-week MBI was .b Foundations, a school-based mindfulness training program developed by the Mindfulness in Schools Project (MiSP) tailor-made for adults in a school setting. Its effectiveness was evident in a feasibility trial (Beshai et al., 2016). The curriculum of .b Foundations is based on the core elements of mindfulness-based stress reduction (MBSR; Kabat-Zinn, 2013), mindfulness-based cognitive therapy (MBCT; Segal et al., 2013), and

Fig. 1 A CONSORT flow diagram
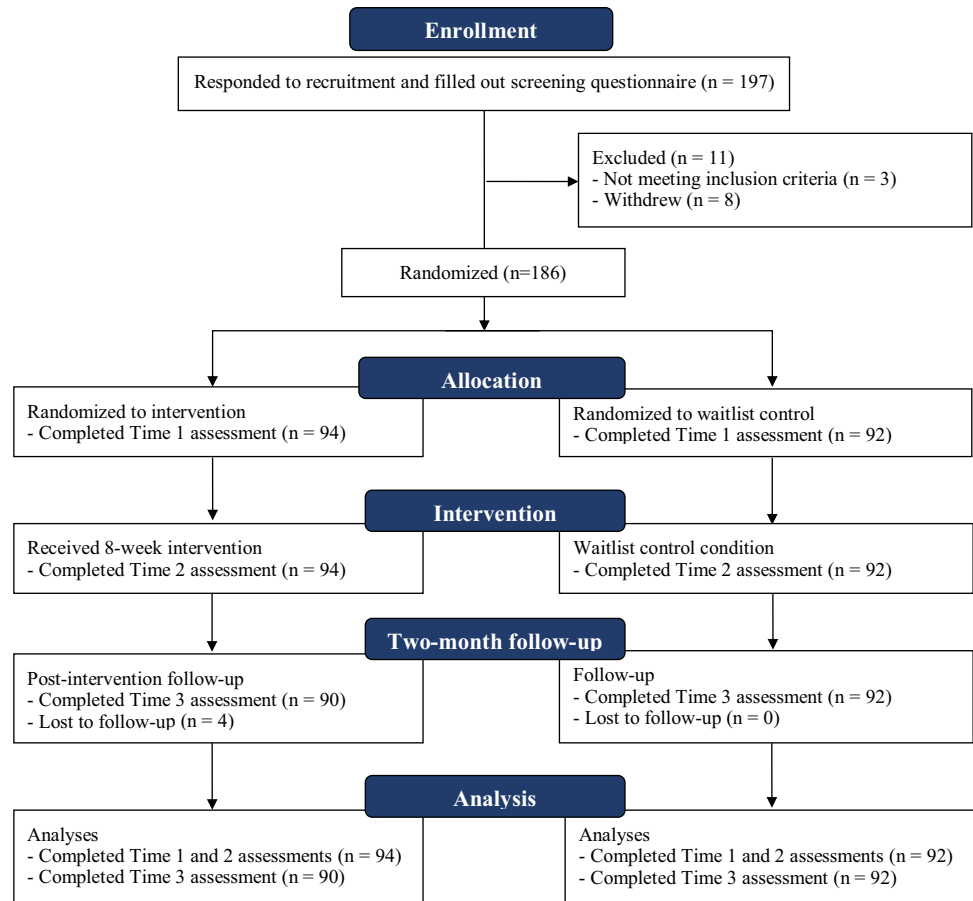
Mindfulness: Finding Peace in a Frantic World (Williams & Penman, 2011) adapted for non-clinical populations. Like MBCT or MBSR, the .b Foundations course is a group-based intervention that incorporates a blend of experiential and interactive learning activities. It consists of a taster session, followed by eight sessions that are 90 min in duration per week (12 contact hours in total). Each session involves a specific theme (e.g., waking up to the autopilot), and a structured set of formal and informal mindfulness practices

(e.g., mindful eating, body scan, and habit releaser), and cognitive exercises. Cantonese audio guides modeled after those of the book Mindfulness: Finding Peace in a Frantic World (Williams & Penman, 2011) were used in this study to support home practice (around 20 min daily). An overview of the .b Foundations course is presented in Table 1.

In the experimental condition, six groups of the 8-week .b Foundations course were implemented on weekday evenings in six different venues across Hong Kong. The time and

Table 1 An overview of the 8-weeks .b Foundations course

Session	Theme	Core concepts and practices
Taster	Orientation of the course	
1	Waking up to the autopilot	Mindful eating, sitting with body and breath, and bringing mindful awareness to routine activities
2	Bringing curiosity to our experience	Body scan, using body as anchor and radar, and tuning into enjoyable moments
3	Mindfulness in daily life	Mindful standing, stretching and walking, and .b practice
4	Tuning into thoughts and feelings	Sounds and thoughts practice, rumination, and thought bus practice
5	Exploring difficulty: building resilience	Sitting with difficulty practice, stress signature, and automatic reaction and mindful response
6	Relating to ourselves and others	Mindful communication practice and befriending practice
7	Developing balance in our lives	Rebalancing nourishing and depleting activities and .b and take action
8	Mindfulness and the rest of life	Reflecting back and looking forward

location were made convenient for teachers' participation after school. Each group had an average of 15–17 participants and the total number of participants of the six groups was 94. Participants' mother tongue—Cantonese was used as the medium of instruction and all the course materials were translated from English into Chinese. The translation was done by a team of bilingual mindfulness teachers at the University of Hong Kong, with the consent of MiSP. In the waitlist control condition, another six groups ($n = 92$) were conducted in the same six venues 3 months after the participants in the experimental condition completed the course. Ten mindfulness teachers (two males and eight females) were responsible for teaching all these 12 groups in the experimental and waitlist control conditions. They were healthcare professionals who had been trained to teach the 8-week .b Foundations according to the requirements set by the MiSP.

Measures

The self-report online survey was in Chinese. The measures originally developed in English were translated into Chinese by a bilingual postgraduate student, and back-translated by another bilingual postgraduate student. An experienced bilingual educational psychologist, herself a mindfulness teacher, verified the measures to ensure conceptual equivalence across languages (Brislin, 1970). Measures on participants' level of mindfulness, well-being (i.e., general health, insomnia, stress, positive and negative affect, life satisfaction), emotion management, and mindfulness in teaching were selected based on the review of previous research (e.g., Emerson et al., 2017; Klingbeil & Renshaw, 2018; Lomas et al., 2017).

Mindfulness Mindfulness was assessed by the 12-item Cognitive and Affective Mindfulness Scale-Revised scale (CAMS-R; Feldman et al., 2007). It measures four core aspects of mindfulness, including attention regulation, present-focus, awareness, and non-judgment. Sample items include "I try to notice my thoughts without judging them," and reversed items e.g., "I am preoccupied by the future." Participants rated the items on a 5-point Likert scale from 1 ("Never") to 5 ("Always"). After reversing negatively worded items, a higher score indicates a higher level of mindfulness. Internal consistency of the scale in this study was $\alpha = 0.79$ at baseline (T1), 0.81 at post-intervention (T2), and 0.85 at two-month follow-up (T3).

General Health The 12-item General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988) was used to measure the extent to which participants experience problems with strain, concentration, self-confidence, worry, decision making, and mood. Sample items include "capable of making

decisions about things," and reversed items e.g., "loss of confidence in self." Participants rated the items on a 5-point Likert scale from 1 ("Never") to 5 ("Always"). After reversing negatively worded items, a higher score represents better general health. Internal consistency of the scale in this study was $\alpha = 0.87$ at T1, 0.88 at T2, and 0.90 at T3.

Insomnia The 7-item Insomnia Severity Index (ISI; Morin, 1993) was used to assess participants' perceived severity of insomnia symptoms, interference with daytime functioning, and concerns caused by sleep problems (e.g., "difficulty falling asleep") over the last two weeks. Participants rated the items on a 5-point Likert scale from 1 ("Not at all") to 5 ("Very severe"). A higher score indicates more severe insomnia. Internal consistency of the scale in this study was $\alpha = 0.84$ at T1, 0.85 at T2, and 0.91 at T3.

Stress The 10-item Perceived Stress Scale (PSS; Cohen et al., 1983) was used to measure the extent to which participants perceive their lives as stressful, uncontrollable, and overloaded (e.g., "Difficulties are piling up so high that I could not overcome them," and reversed item e.g., "Things are going my way"). Participants rated the items on a 5-point Likert scale from 1 ("Never") to 5 ("Always"). After reversing positively worded items, a higher score indicates a greater level of stress. Internal consistency of the scale in this study was $\alpha = 0.89$ at T1, 0.88 at T2, and 0.90 at T3.

Negative Affect Negative affect was measured on four items assessing the following emotional states—"nervous," "angry," "upset," and "guilty," selected from the expanded version of the Positive and Negative Affect Schedule (PANAS-X; Watson & Clark, 1994). Participants rated on a 5-point Likert scale from 1 ("Never") to 5 ("Always"). A higher score indicates more negative affect. Internal consistency of the scale in this study was $\alpha = 0.71$ at T1, 0.73 at T2, and 0.76 at T3.

Positive Affect Positive affect was measured on four items assessing the following emotional states—"happy," "attentive," "calm," and "determined," selected from the PANAS-X (Watson & Clark, 1994). Participants rated on a 5-point Likert scale from 1 ("Never") to 5 ("Always"). A higher score indicates more positive affect. Internal consistency of the scale in this study was $\alpha = 0.77$ at T1, 0.79 at T2, and 0.82 at T3.

Life Satisfaction The 5-item Satisfaction with Life Scale (SWLS; Diener et al., 1985) was used to assess participants' subjective quality of life (e.g., "I am satisfied with my life"). Participants rated on a 5-point Likert scale from 1 ("Never") to 5 ("Always"). A higher score indicates a higher level of

life satisfaction. Internal consistency of the scale in this study was $\alpha = 0.90$ at T1, 0.92 at T2, and 0.93 at T3.

Emotion Management Emotion management was assessed by the 6-item Mood Repair subscale of the Trait Meta-Mood Scale (TMMS; Salovey et al., 1995). Sample items include "When I become upset, I remind myself of all the pleasures in life," and reversed items e.g., "Although I am sometimes happy, I have a mostly pessimistic outlook." Participants rated on a 5-point Likert scale from 1 ("Never") to 5 ("Always"). After reversing negatively worded items, a higher score represents better emotion management skills. Internal consistency of the scale in this study was $\alpha = 0.82$ at T1, 0.74 at T2, and 0.75 at T3.

Mindfulness in Teaching The 14-item Mindfulness in Teaching Scale (MTS; Frank et al., 2016) was used to measure participants' capacity to maintain present-centered awareness of what is happening in the classroom and being open, accepting, and sensitive to students' needs. Sample items include "I am aware of how my moods affect the way I treat my students," and reversed items e.g., "When I am teaching, it seems I am running on automatic without much awareness of what I am doing." Participants rated on a 5-point Likert scale from 1 ("Never") to 5 ("Always"). After reversing negatively worded items, a higher score represents a higher level of mindfulness in teaching. Internal consistency of the scale in this study was $\alpha = 0.81$ at T1, 0.79 at T2, and 0.86 at T3.

Intervention Fidelity Measures To ensure the quality of the implementation of the 8-week mindfulness training by different mindfulness teachers, one participant in each group was randomly invited to fill out the intervention fidelity form after each training session. He/she checked either "yes" or "no" to indicate if the core concepts and practices were covered during the session, and rated whether the mindfulness teacher's instructions were clear on a 4-point Likert scale from 1 ("Strongly disagree") to 4 ("Strongly agree").

Program Acceptability Measures To examine how much the participants accepted the 8-week mindfulness training and whether they did mindfulness practice regularly, participants rated their agreement to the following statements at post-intervention, including "know more about mindfulness," "would recommend this 8-week mindfulness course to others," "practice mindfulness daily during the 8-week course," "gain better self-understanding," "improve health," and "have positive life influence" on a 5-point Likert scale from 1 ("Strongly disagree") to 5 ("Strongly agree").

Data Analyses

Preliminary analyses were conducted to examine whether the intervention and control conditions were equivalent in terms of the demographic characteristics and baseline measures. Intervention fidelity and program acceptability were examined to establish the social credibility of the 8-week mindfulness training. The main analyzes addressed four research questions: (1) to examine the effects of mindfulness training at post-intervention (T2) and two-month follow-up (T3), analysis of covariance (ANCOVA) was conducted separately on the outcome measures with condition (intervention vs. control) as the independent variable and baseline (T1) score as the covariate; (2) to explore the mechanisms underlying the effect of mindfulness training on participants' well-being, mediation analysis (Preacher & Hayes, 2004) was conducted to test the mediation effect of emotion management; (3) to determine whether the effect of mindfulness training differed by participants' baseline well-being, moderation analysis was conducted to examine the interaction between condition and baseline well-being; and (4) to investigate whether participants' well-being predicted their embodiment of mindfulness in teaching, mediation analysis (Preacher & Hayes, 2004) was conducted with teachers' well-being as the mediator between training condition and mindfulness in teaching.

Results

Baseline Comparisons of Two Conditions

Table 2 summarizes the demographic characteristics (including gender, age, years of working experience in school, and school type) of the intervention and waitlist control conditions. Results of the chi-square test and independent sample t-tests indicated no significant differences in demographic characteristics between conditions. Table 3 presents the descriptive statistics of the baseline measures of the intervention and control conditions. Results of the independent sample t-tests found no significant differences between conditions on any baseline measures. Thus, randomization was effective in ensuring that the intervention and control groups were equivalent at baseline.

Intervention Fidelity

Across all training sessions, almost all participants (99.5%) reported "yes" to the question asking whether core concepts and practices were covered in the lesson. All participants (100%) agreed or strongly agreed that the mindfulness

Table 2 Participants' demographics split by intervention and control conditions

Demographics	Mindfulness training ($n=94$)			Waitlist control ($n=92$)			
	N	%	Mean (SD)	N	%	Mean (SD)	
Gender							$\chi^2(1)=.16$, $p=0.69$
Male	27	28.7%		24	26.1%		
Female	67	71.3%		68	73.9%		
Age in years			39.74 (9.41)			39.34 (9.51)	$t(182)=.29$, $p=0.77$
Years of working experience in school			15.00 (9.73)			14.22 (9.86)	$t(180)=.54$, $p=0.59$
School type							$\chi^2(3)=.19$, $p=0.98$
Primary	40	42.6%		37	40.2%		
Secondary	24	25.6%		25	27.1%		
Special	20	21.3%		19	20.7%		
All-through	10	10.5%		11	12%		

All-through schools are schools with students from grade 1 to grade 12

teachers' instructions were clear, and no significant differences were found across different mindfulness teachers.

Program Acceptability

Most of the participants (97.9%) were able to attend 80% of the 8-week mindfulness training (i.e., at least six sessions). Participants agreed or strongly agreed that as a result of the 8-week mindfulness training, they were able to "know more about mindfulness" (96.8%), "would recommend the 8-week mindfulness course to others" (96.8%), "gain better self-understanding" (95.7%), "improve health" (89.4%), and "have positive life influence" (96.8%). Yet, less than half of the participants (46.8%) agreed or strongly agreed that they "practiced mindfulness daily during the 8-week course."

Intervention Effects

ANCOVA results revealed that participants in the 8-week mindfulness training reported significantly higher levels of mindfulness and mindfulness in teaching at post-intervention (T2) and two-month follow-up (T3) than their counterparts in the control condition, after controlling for the baseline (T1) score. The effect sizes were small to medium (η_p^2 ranging from 0.02 to 0.07; see Table 3). Similarly, ANCOVA results revealed significantly better general health, more positive affect, and higher life satisfaction, as well as significantly lower levels of insomnia, stress, and negative affect at T2 and T3 in the training group than in the control group, suggesting the benefits of mindfulness training on the participants' well-being. The effect sizes were medium to large (η_p^2 ranging from 0.06 to 0.14; see Table 3). Regarding the effect of mindfulness training on participants' emotion management,

ANCOVA results indicated that participants in the mindfulness training reported significantly better emotion management than those in the control condition at T2, but not T3. The effect sizes were small (see Table 3).

Mechanisms of Mindfulness Training

To explore the mechanisms that account for the effects of mindfulness training on participants' well-being, mediation analysis using a bootstrapping model (Preacher & Hayes, 2004) was conducted. For parsimony, six measures (including general health, positive affect, life satisfaction, insomnia, stress, and negative affect) were grouped into a well-being composite score. To calculate the composite score, raw scores of each scale were first converted into standard scores. The standard scores of insomnia, stress, and negative affect were reversely coded and averaged with the standard scores of general health, positive affect, and life satisfaction to form a well-being composite score. As illustrated in Fig. 2, mediation analysis revealed that participants' emotion management at post-intervention (T2) was a significant mediator of the effect of mindfulness training on participants' well-being at two-month follow-up (T3).

Moderating Effects of Baseline Well-being

To examine whether the effect of mindfulness training differed by participants' well-being at baseline (T1), moderation analyses were conducted by adding an interaction term between condition (mindfulness training vs. control) and baseline (T1) well-being composite score. Results indicated significant moderating effects of T1 well-being on the improvement of well-being at both T2 ($F[1, 181]=7.83$, $p=0.006$) and T3 ($F[1, 177]=7.38$, $p=0.007$). As

Table 3 Descriptive statistics and ANCOVA results for outcome measures across 3 time points of data collection

Outcome measure	Time[a]	Mean (SD)		F[b]	df[c]	η_p^2[d]
		Mindfulness training	Waitlist control			
Mindfulness	T1	3.29 (0.43)	3.25 (0.37)			
	T2	3.42 (0.37)	3.23 (0.40)	12.94***	1182	0.07
	T3	3.46 (0.41)	3.25 (0.43)	14.56***	1179	0.08
General health	T1	3.53 (0.51)	3.50 (0.46)			
	T2	3.68 (0.47)	3.43 (0.44)	23.84***	1183	0.12
	T3	3.71 (0.46)	3.48 (0.51)	17.93***	1179	0.09
Insomnia	T1	2.22 (0.68)	2.14 (0.60)			
	T2	1.91 (0.52)	2.21 (0.66)	22.82***	1179	0.11
	T3	1.87 (0.64)	2.12 (0.76)	12.76***	1175	0.07
Stress	T1	2.70 (0.52)	2.71 (0.52)			
	T2	2.55 (0.44)	2.79 (0.51)	20.31***	1183	0.10
	T3	2.48 (0.47)	2.75 (0.54)	20.64***	1179	0.10
Negative affect	T1	2.82 (0.66)	2.80 (0.56)			
	T2	2.59 (0.51)	2.81 (0.63)	11.90**	1182	0.06
	T3	2.42 (0.57)	2.77 (0.60)	28.90***	1179	0.14
Positive affect	T1	3.35 (0.55)	3.38 (0.58)			
	T2	3.58 (0.51)	3.32 (0.63)	14.84***	1182	0.08
	T3	3.58 (0.54)	3.30 (0.60)	21.05***	1179	0.11
Life satisfaction	T1	3.44 (0.72)	3.40 (0.70)			
	T2	3.65 (0.67)	3.38 (0.71)	10.81**	1182	0.06
	T3	3.67 (0.70)	3.38 (0.72)	13.95***	1178	0.07
Emotion management	T1	3.54 (0.60)	3.37 (0.58)			
	T2	3.59 (0.52)	3.35 (0.53)	6.01*	1182	0.03
	T3	3.58 (0.49)	3.40 (0.58)	1.82	1178	0.01
Mindfulness in teaching	T1	3.52 (0.44)	3.52 (0.39)			
	T2	3.58 (0.37)	3.48 (0.39)	4.02*	1182	0.02
	T3	3.62 (0.46)	3.49 (0.40)	6.50*	1177	0.04

Participants responded on a 5-point Likert scale from 1 ("Never") to 5 ("Always")

[a]*T1* = baseline; *T2* = post-intervention; *T3* = two-month follow-up. No significant baseline differences between the mindfulness training and waitlist control conditions for any outcome measures

[b]*F*-statistic is based on analysis of covariance (ANCOVA) with condition (mindfulness training vs. control) as the between-subject factor and baseline measure as the covariate. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

[c]*df* = degrees of freedom, between groups ($N_{GROUPS} - 1$), total ($N_{INDIVIDUALS} - 1$)
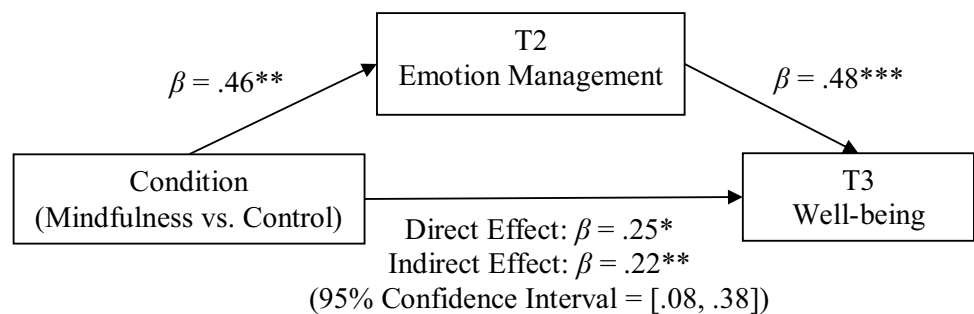
[d]Effect size (η_p^2): small effect ≥ 0.01 to < 0.06; medium effect ≥ 0.06 to < 0.14; large effect ≥ 0.14

illustrated in Fig. 3, the effect of mindfulness training was stronger for participants starting with poorer well-being. The moderation effect was sustained for at least 2 months after the intervention.
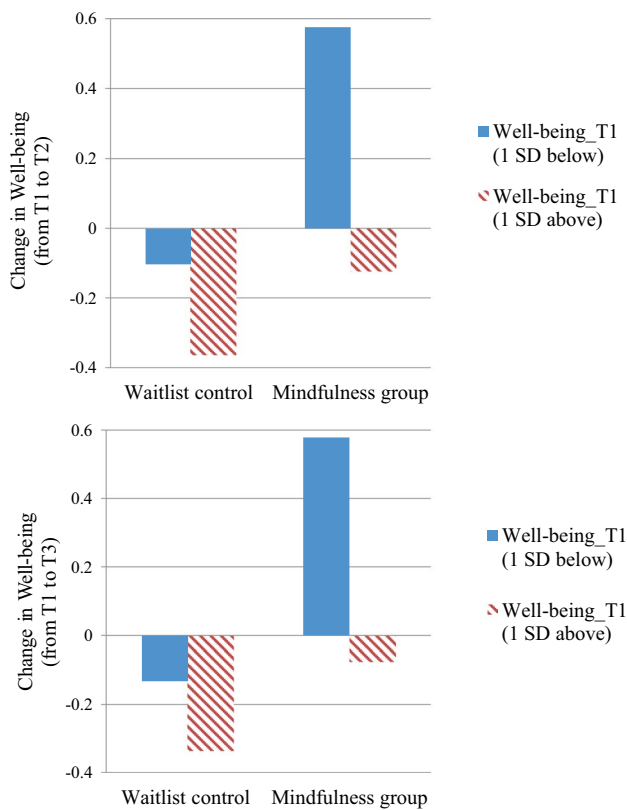
Mediating Role of Teachers' Well-being

To investigate whether participants' well-being predicted their embodiment of mindfulness in teaching, mediation

Fig. 2 Mediation analysis: The mediated effect of mindfulness training on participants' wellbeing at 2-month follow-up (T3) through their emotion management at post-intervention (T2). *$p < .05$, **$p < .01$, ***$p < .001$

T2 Emotion Management

$\beta = .46**$ $\beta = .48***$

Condition (Mindfulness vs. Control)

T3 Well-being

Direct Effect: $\beta = .25*$
Indirect Effect: $\beta = .22**$
(95% Confidence Interval = [.08, .38])

Fig. 3 Moderating role of baseline (T1) well-being in the effect of mindfulness training on participants' well-being at post-intervention (T2; upper panel) and at 2-month follow-up (T3; lower panel). Note. Well-being was operationally defined by the increase in general health, positive affect, and life satisfaction, and the reduction in insomnia, negative affect, and stress

analysis using a bootstrapping model (Preacher & Hayes, 2004) was conducted. Results found that participants' well-being at post-intervention (T2) was a significant mediator of the effect of mindfulness training on participants' mindfulness in teaching at two-month follow-up (T3) (see Fig. 4).

Discussion

This study was a randomized controlled trial of the effectiveness of MBI on a relatively large sample of teachers in a non-WEIRD society. The robustness and generalizability

of the effects of MBIs typically observed among teachers in the Western countries were found to be extended to an Asian sample. Specifically, we found that Chinese teachers in Hong Kong who attended the 8-week mindfulness training based on .b Foundations showed significantly higher life satisfaction, more positive affect, and better general health, along with lower levels of insomnia, stress, and negative affect than the control group both at immediate post-test and two-month follow-up, with medium to large effect sizes. Our findings aligned with those of prior studies conducted in Western populations (e.g., Beshai et al., 2016; Crain et al., 2017; Harris et al., 2016; Hwang et al., 2019; Jennings et al., 2013, 2017, 2019; Mihic et al., 2020; Roeser et al., 2013) and indicated that MBI is effective in enhancing teachers' psychological well-being, reducing their psychological distress, and improving their physical health in WEIRD and non-WEIRD cultures alike (Klingbeil & Renshaw, 2018).

Importantly, teachers' initial well-being was found to be a significant moderator of the effects of mindfulness training on the participants' well-being at immediate post-test and at least up to 2 months after the intervention. We observed that the improvement in well-being was more pronounced for teachers who reported significantly lower well-being at baseline in contrast to those who were better off in well-being prior to the training. In other words, those who were poorer in well-being benefitted more from the MBI than their counterparts.

Prior studies have examined the moderating effects of teachers' baseline well-being on the intervention effectiveness of MBI (Jennings et al., 2019; Mihic et al., 2020). Despite investigating the effects of the same MBI program (i.e., CARE), Jennings et al. (2019) found a significant moderating effect of teachers' baseline psychological distress on their improvement in emotion regulation in a sample of elementary school teachers in New York, USA, whereas Mihic et al. (2020) did not observe such moderation effect of participants' well-being among elementary school teachers in Zagreb, Croatia. Our findings among Chinese teachers in Hong Kong corroborate the results obtained by Jennings et al. (2019). Apart from cultural differences, we postulated that the discrepancies in results on the moderating effect might be attributed to the different operational definitions of

Fig. 4 Mediation analysis: The mediated effect of mindfulness training on participants' mindfulness in teaching at 2-month follow-up (T3) through their well-being at post-intervention (T2). *$p < .05$, **$p < .01$, ***$p < .001$
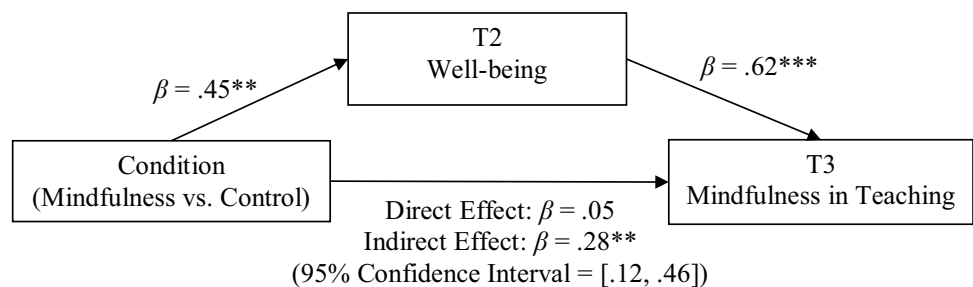
well-being in the two prior studies, as well as in the current study. In Jennings et al.'s study (2019), teachers' psychological distress was a composite score derived from measures of depression, anxiety, negative affect, sleep disturbance, emotional exhaustion, and perceived stress. This operational definition was very similar to how we operationalized well-being in our study (i.e., in terms of general health, life satisfaction, positive affect, negative affect, insomnia, and stress), but rather different from the construct of well-being examined by Mihic et al. (2020), who assessed burnout, self-compassion, and compassion in their study. In sum, the findings here along with those of Jennings et al. (2019) suggest that MBIs may be particularly helpful for teachers who are at a high risk for psychological problems.

We further examined the mechanism of change underlying the effects of MBI on teachers' well-being and found that participants' emotion management at post-intervention significantly mediated the effect of MBI on well-being at a subsequent time point 3 months later. We hypothesized that the practice of anchoring, decentering, and non-judgemental acceptance in the mindfulness training might have helped to enhance the teachers' awareness of their own internal states—including thoughts, feelings, bodily sensations, and behavioral urges—in stressful circumstances, and allow them to step out of their emotional reactivity and adopt more adaptive strategies to cope with the situation (Chiesa et al., 2013; Skinner & Beers, 2016). The better coping arising from enhanced emotion management might have perhaps led to the improved well-being of teachers subsequently down the road. It may also be worthy to point out that mechanisms other than improving emotion management are likely involved in the process, as indicated by the significant direct effect of training conditions on teachers' well-being at follow-up, not accounted for by emotion management in the mediation model. The possible mechanisms underlying the effects of MBIs await further exploration in future studies.

Lastly, we observed that improvement in teachers' well-being was translated into higher levels of mindfulness in their teaching. Teachers' well-being at post-intervention completely mediated the effect of training on teachers' level of mindfulness in teaching at the two-month follow-up. In other words, teachers displayed enhanced well-being after attending the mindfulness training, and this was in turn associated with a stronger capacity of the teachers to maintain present-centered awareness of the happenings in the classroom and to be open, accepting, and sensitive to their students' needs. Our findings suggest that teachers' well-being is indeed crucial to their embodiment of mindfulness in their teaching. Hence, mindfulness intervention apparently does not only influence the teachers who have attended the training but also benefits the students indirectly via higher teachers' sensitivity and acceptance toward students.

This was a timely study conducted during the period when teachers in Hong Kong were facing unprecedented pressure due to the social and political situations in the territory and the COVID-19 pandemic. Never in the history of education in Hong Kong did teachers need to shoulder such heavy burdens—in addition to their already overwhelming workload—that arose from the social unrest due to the anti-extradition bill protests in which the younger generations were heavily involved, the disharmony in both the society and within schools due to divergent political views, and the pressure from various stakeholders (e.g., government authorities and parents) to maintain school environments that were politically-abstained. Hong Kong teachers' unprecedented stress was further aggravated by the suspension of school due to the COVID-19 pandemic. They needed to master alternative modes of teaching and interaction with students in a very short period of time. This study showed that school-based mindfulness training was effective in enhancing the well-being of teachers in such difficult times. The environmental situations that circumscribed this study have indeed underscored the practicality of MBI and its ecological value.

Limitations and Future Research

The major limitation of this study remained in the fact that only self-reported measures were used to assess teachers' well-being, emotion management, and mindfulness. As such, there might be the possibility of response bias that could have affected the results. To circumvent this problem, future studies should consider incorporating objective behavioral measures (e.g., naturalistic observation of behaviors) and physiological measures (e.g., measurement of blood pressure and heart rates as a correlate of stress; Mihic et al., 2020), as well as third-person reports to strengthen the validity of the results. Moreover, instead of waitlist control, we suggest that active control based on interventions other than MBI can be included as a comparison group in order to delineate the specific effects of mindfulness training from more general intervention effects. Besides, the intervention fidelity of this study relied on participants' self-reports. Future studies are encouraged to utilize independent observers to strengthen the fidelity measure. Future research may further explore the strategies and processes involved in emotion management (e.g., via top-down or bottom-up approaches) facilitated by MBI. Further investigation on other potential mechanisms of change, apart from emotion management, that underlies the intervention effects of MBI is also warranted.

Declarations

Ethics Approval This study was approved by the University of Hong Kong's Human Research Ethics Committee (reference number: EA1908007).

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The authors declare no competing interests.

References

Beshai, S., McAlpine, L., Weare, K., & Kuyken, W. (2016). A non-randomised feasibility trial assessing the efficacy of a mindfulness-based intervention for teachers to reduce stress and improve well-being. *Mindfulness, 7*(1), 198–208. https://doi.org/10.1007/s12671-015-0436-1

Bradsher, K., Ramzy, A., & May, T. (2020, May 21). China moves to tighten its control of Hong Kong. *The New York Times.* Retrieved December 1, 2020, from https://www.nytimes.com/2020/05/21/world/asia/hong-kong-china.html

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross Cultural Psychology, 1*(3), 185–216. https://doi.org/10.1177/135910457000100301

Brown, R. P. (2003). Measuring individual differences in the tendency to forgive: Construct validity and links with depression. *Personality and Social Psychology Bulletin, 29*(6), 759–771. https://doi.org/10.1177/0146167203029006008

Chan, A. H. S., Chen, K., & Chong, E. Y. L. (2010, March 17–19). *Work stress of teachers from primary and secondary schools in Hong Kong.* Proceedings of the International MultiConference of Engineers and Computer Scientists. http://www.iaeng.org/publication/IMECS2010/IMECS2010_pp1903-1906.pdf

Chang, M. L. (2009). An appraisal perspective of teacher burnout: Examining the emotional work of teachers. *Educational Psychology Review, 21*(3), 193–218. https://doi.org/10.1007/s10648-009-9106-y

Chiesa, A., Serretti, A., & Jakobsen, J. C. (2013). Mindfulness: Top-down or bottom-up emotion regulation strategy? *Clinical Psychology Review, 33*(1), 82–96. https://doi.org/10.1016/j.cpr.2012.10.006

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

Crain, T. L., Schonert-Reichl, K. A., & Roeser, R. W. (2017). Cultivating teacher mindfulness: Effects of a randomized controlled trial on work, home, and sleep outcomes. *Journal of Occupational Health Psychology, 22*(2), 138–152. https://doi.org/10.1037/ocp0000043

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13

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

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathological Behavioral Assessment, 29*(3), 177–190. https://doi.org/10.1007/s10862-006-9035-8

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. *Mind, Brain, and Education, 7*(3), 182–195. https://doi.org/10.1111/mbe.12026

Frank, J. L., Jennings, P. A., & Greenberg, M. T. (2016). Validation of the mindfulness in teaching scale. *Mindfulness, 7*(1), 155–163. https://doi.org/10.1007/s12671-015-0461-0

Goldberg, D., & Williams, P. (1988). *A user's guide to the General Health Questionnaire.* NFER-Nelson.

Greenberg, M. T., Brown, J. L., & Abenavoli, R. M. (2016). *Teacher stress and health: Effects on teachers, students, and schools.* Edna Bennett Pierce Prevention Research Center, The Pennsylvania State University 1–12. http://www.rwjf.org/en/library/research/2016/07/teacher-stress-and-health.html

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

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature, 466,* Article 29. https://www.nature.com/articles/466029a

Hoglund, W. L. G., Klingle, K. E., & Hosan, N. E. (2015). Classroom risks and resources: Teacher burnout, classroom quality and children's adjustment in high needs elementary schools. *Journal of School Psychology, 53*(5), 337–357. https://doi.org/10.1016/j.jsp.2015.06.002

Hong Kong Professional Teachers' Union (2018, September 2). *Survey on Hong Kong teachers' work stress in 2018 [original in Chinese].* Retrieved December 1, 2020, from https://www.hkptu.org/wp-content/uploads/2018/09/20180902-work-pressure.pdf

Hong Kong Professional Teachers' Union. (2020, June 16). *Survey results on the political stress encountered by teachers in the current social circumstance [original in Chinese].* Retrieved December 1, 2020, from https://www.hkptu.org/71805

Hwang, Y., Goldstein, H., Medvedev, O. N., Singh, N. N., Noh, J., & Hand, K. (2019). Mindfulness-based intervention for educators: Effects of a school-based cluster randomized controlled study. *Mindfulness, 10*(7), 1417–1436. https://doi.org/10.1007/s12671-019-01147-1

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), 1–19. https://doi.org/10.1037/edu0000187

Jennings, P. A., Doyle, S., Oh, Y., Rasheed, D., Frank, J. L., & Brown, J. L. (2019). Long-term impacts of the CARE program on teachers' self-reported social and emotional competence and well-being. *Journal of School Psychology, 76*, 186–202. https://doi.org/10.1016/j.jsp.2019.07.009

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

Johnson, S., Cooper, C., Cartwright, S., Donald, I., Taylor, P., & Millet, C. (2005). The experience of work-related stress across occupations. *Journal of Managerial Psychology, 20*(2), 178–187. https://doi.org/10.1108/02683940510579803

Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life (1st ed.)*. Hyperion.

Kabat-Zinn, J. (2013). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness (2nd ed.)*. Bantam.

Klingbeil, D. A., & Renshaw, T. L. (2018). Mindfulness-based interventions for teachers: A meta-analysis of the emerging evidence base. *School Psychology Quarterly, 33*(4), 501–511. https://doi.org/10.1037/spq0000291

Kyriacou, C. (2011). Teacher stress: From prevalence to resilience. In J. Langan-Fox & C. L. Cooper (Eds.), *Handbook of stress in the occupations* (pp. 161–173). Edward Elgar.

Lam, L. C., Wong, C. S., Wang, M., Chan, W., Chen, E. Y., Ng, R. M., Hung, S., Cheung, E. F., Sham, P., Chiu, H. F., Lam, M., Chang, W., Lee, E. H., Chiang, T., Lau, J. T., van Os, J., Lewis, G., & Bebbington, P. (2015). Prevalence, psychosocial correlates and service utilization of depressive and anxiety disorders in Hong Kong: The Hong Kong Mental Morbidity Survey (HKMMS). *Social Psychiatry and Psychiatric Epidemiology, 50*(9), 1379–1388. https://doi.org/10.1007/s00127-015-1014-5

Lai, K. C., & Law, K. Y. (2010). *Report on the workload of teachers in Hong Kong primary and secondary schools [original in Chinese]*. Hong Kong: Office of Planning and Academic Implementation, The Hong Kong Institute of Education.

Lomas, T., Medina, J. C., Ivtzan, I., Rupprecht, S., & Eiroa-Orosa, F. J. (2017). The impact of mindfulness on the wellbeing and performance of educators: A systematic review of the empirical literature. *Teaching and Teacher Education, 61*, 132–141. https://doi.org/10.1016/j.tate.2016.10.008

Mihić, J., Oh, Y., Greenberg, M., & Kranželić, V. (2020). Effectiveness of mindfulness-based social-emotional learning program CARE for teachers within Croatian context. *Mindfulness, 11*(9), 2206–2218. https://doi.org/10.1007/s12671-020-01446-y

Morin, C. M. (1993). *Insomnia: Psychological assessment and management*. Guilford Press.

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223–250. https://doi.org/10.1080/15298860309027

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science, 3*(5), 400–424. https://doi.org/10.1111/j.1745-6924.2008.00088.x

Oberle, E., & Schonert-Reichl, K. A. (2016). Stress contagion in the classroom? The link between classroom teacher burnout and morning cortisol in elementary school students. *Social Science & Medicine, 159*, 30–37. https://doi.org/10.1016/j.socscimed.2016.04.031

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments & Computers, 36*(4), 717–731. https://doi.org/10.3758/BF03206553

Roeser, R. W., Schonert-Reichl, K. A., Jha, A., Cullen, M., Wallace, L., Wilensky, R., & 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

Salovey, P., Mayer, J. D., Goldman, S. L., Turvey, C., & Palfai, T. P. (1995). Emotional attention, clarity, and repair: Exploring emotional intelligence using the trait meta-mood scale. In J. W. Pennebaker (Ed.), *Emotion, disclosure, and health (pp. 125–154)*. APA.

Schwarzer, R., Schmitz, G., & Tang, C. (2000). Teacher burnout in Hong Kong and Germany: A cross-cultural validation of the Maslach Burnout Inventory. *Anxiety, Stress, and Coping, 13*(3), 309–326. https://doi.org/10.1080/10615800008549268

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2013). *Mindfulness-based cognitive therapy for depression (2nd ed.)*. The Guilford Press.

Skinner, E., & Beers, J. (2016). Mindfulness and teachers' coping in the classroom: A developmental model of teacher stress, coping, and everyday resilience. In K. A. Schonert-Reichel & R. W. Roeser (Eds.), *Handbook of mindfulness in education* (pp. 99–118). Springer.

Taylor, C., Harrison, J., Haimovitz, K., Oberle, E., Thomson, K., Schonert-Reichl, K., & Roeser, R. W. (2016). Examining ways that a mindfulness-based intervention reduces stress in public school teachers: A mixed-methods study. *Mindfulness, 7*(1), 115–129. https://doi.org/10.1007/s12671-015-0425-4

Vonderlin, R., Biermann, M., Bohus, M., & Lyssenko, L. (2020). Mindfulness-based programs in the workplace: A meta-analysis of randomized controlled trials. *Mindfulness, 11*(7), 1579–1598. https://doi.org/10.1007/s12671-020-01328-3

Watson, D., & Clark, L. A. (1994). *The PANAS-X: Manual for the positive and negative affect schedule-expanded form*. The University of Iowa.

Wethington, E. (2000). Contagion of stress. *Advances in Group Processes, 17*, 229–253. https://doi.org/10.1016/S0882-6145(00)17010-9

Williams, M., & Penman, D. (2011). *Mindfulness: A practical guide to finding peace in a frantic world*. Piatakus.