

## Chapter 14

# Individual-Level Interventions: Mindfulness-Based Approaches to Reducing Stress and Improving Performance Among Teachers

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**Abstract** This chapter reviews the extant literature on mindfulness-based interventions applied to reducing teachers' occupational stress and improving job performance, demonstrating the evolution of the field over the past 20 years from very small pilot studies to a recently conducted large cluster randomized controlled trial. The term "mindfulness" refers to a particular kind of attention characterized by intentionally focusing on the present moment with a non-judgmental attitude and is cultivated by engaging in mindful awareness practices. Research on the effects of mindfulness training with adults has shown numerous positive effects including reduced stress and increased self-awareness, empathy, and emotion regulation. The chapter reviews the research on mindfulness-based interventions more broadly, focusing on research involving non-clinical samples and work-related outcomes. The chapter provides an overview of early research on mindfulness-based interventions for teachers and an in-depth discussion and review of the associated research of two widely used mindfulness-based programs for teachers, Stress Management and Relaxation Techniques in Education (SMART) and Cultivating Awareness and Resilience in Education (CARE for Teachers). The chapter concludes with a discussion of the limitations of the reviewed research and recommendations for future research that will address gaps in the literature.

**Keywords** Teacher stress • Occupational stress • Burnout • Mindfulness • Emotion regulation • Intervention

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## 14.1 Stress and Burnout

There is no shortage of empirical evidence that teaching is a stressful occupation (see Guglielmi & Tatrow, 1998; Montgomery & Rupp, 2005 for reviews). Recent statistics indicate job satisfaction among teachers in the United States is at its lowest point in more than 20 years (MetLife, 2013), and reports on teacher attrition show more than 40% of U. S. K-12 teachers leave the profession within their first five years of teaching (Ingersoll, Merrill, & Stuckey, 2014). Teacher stress and the resulting teacher attrition are now recognized as critical problems that threaten the quality of education (Alliance for Excellent Education, 2014).

Researchers have related the trends of low job satisfaction and high attrition to the intense feelings of stress and burnout experienced by many teachers (e.g., Fisher, 2011; Schaefer, Long, & Clandinin, 2012). Teaching is an emotionally demanding profession, and teachers who do not regulate and cope well with their emotional experiences may suffer from considerable stress and burnout. Current pressures from standardized testing and accountability policies further exacerbate the stress experienced by teachers (Dworkin & Tobe, 2014). However, no conclusive evidence exists to identify a single source of teacher stress, which suggests the phenomenon is complex and multifaceted.

Teacher stress likely develops from a number of sources related to both a teacher's dispositional characteristics and contextual factors (Chang, 2009). Dispositional sources of occupational stress and burnout include career dedication, neuroticism, and type-A personality traits, where higher levels of these traits are related to more stress and burnout (Maslach, Schaufeli, & Leiter, 2001). The term "career dedication" is similar to the construct of "overcommitment as described in Siegrist's (1996) Effort-Reward Imbalance (ERI) Model (see Chap. 10).

There also exist environmental sources of stress that have been found to elevate teacher stress such as student misbehavior (Bibou-Nakou, Stogiannidou, & Kiosseoglou, 1999), poor administrative support (Seidman & Zager, 1986), and accountability policies (Dworkin & Tobe, 2014). However, not all teachers with type-A personality traits experience the same level of stress, nor do all teachers experience symptoms of burnout as a result of dealing with student misbehavior. Teachers deal with occupational challenges differently, and school contexts vary in the number of challenges teachers face and the degree to which teachers find them emotionally demanding.

Chang (2009) argued that teachers' experience of stress and burnout result from an interplay between individual and environmental factors. Applying Lazarus' (1993) transactional theory of appraisal and emotion, Chang explained how stress and burnout are a result of teachers' appraisals about their environment. Appraisals are judgments about events and circumstances that trigger emotional experiences. For example, a teacher might judge a student's misbehavior as a personal attack or a result of the student struggling to maintain focus through a long lesson. A personal attack appraisal will lead to an emotional response such as anger or frustration. In contrast, an appraisal that recognizes the student's limited attentional capacities is

more likely to evoke emotions such as empathy and understanding (Ekman, 2007). In Chang's (2009) model, teachers do not inevitably experience stress from student misbehavior or administrative pressures. Rather, a teacher's appraisals of specific occupational events trigger healthy or maladaptive emotional responses. The kind of appraisal a teacher makes about a situation determines the emotion and the intensity of the emotion experienced. Repeatedly experiencing more unpleasant emotions, such as frustration and anger, would lead to feelings of stress and burnout. Chang further argued that since it is not usually considered appropriate for teachers to express their emotions in the classroom, they would tend to use suppression to self-regulate. However, suppressing emotions is not a healthy coping strategy, except in very extreme cases (Bonanno & Keltner, 1997). Suppression decreases behavioral expression, but does not decrease emotion experience, which can have negative health consequences (Gross, 2002) and may lead to increased burnout (Erickson & Ritter, 2001).

To examine Chang's (2009) model, Chang (2013) conducted a series of studies exploring teachers' appraisals of disruptive classroom behavior situations and the adaptive coping and emotion regulation strategies that prevent teacher burnout. Examining data collected from 492 teachers the study found evidence supporting a hypothesized pathway between teachers' antecedent judgments and their emotional experience. It also provided evidence for how this emotional experience may contribute to burnout. The study confirmed the hypothesized relationships between teachers' appraisals about an incident involving challenging student behavior and the intensity of the emotional response. Chang (2013) concludes that in order to manage stress and protect against burnout, teachers should first become aware of their thought or attribution patterns, helping them to proactively regulate their emotions or find ways to appropriately express them, depending on the situation. In this way teachers can develop effective coping strategies to overcome unavoidable negative emotions and to express them in ways that promote desired student behavioral and learning outcomes, rather than suppressing them (Chang, 2013). One way to build these skills is through training in mindfulness (Weinstein, Brown, & Ryan, 2009). In the following sections we review the research on mindfulness-based interventions (MBIs) in general and then focus on MBIs developed specifically to address teacher occupational stress and performance.

## 14.2 Mindfulness-Based Interventions

In recent years, MBIs have been recognized as effective approaches for reducing stress and promoting emotional awareness and self-regulation. Mindful awareness practices (MAPs) that are currently being studied in the West, were adapted from Buddhist spiritual practices (Hanh, 1976) and were popularized in the form of secular stress reduction interventions through the work of Jon Kabat-Zinn's (1982) Mindfulness Based Stress Reduction (MBSR).

Kabat-Zinn (2003) defined mindfulness as “the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” (p. 144). Others have further refined the definition as a metacognitive process of regulating attention to develop curiosity, openness, and acceptance of one’s thoughts and experiences (Bishop et al., 2004). Mindfulness can be cultivated through mindful awareness practices such as meditation, yoga, and tai chi and one can practice mindfulness informally while engaging in routine daily activities such as walking, eating, and interacting with others (Williams & Kabat-Zinn, 2011).

Before the current wave of popularity there was a history in occupational stress literature exploring the efficacy of meditation- or mindfulness-based interventions for reducing the stress response and promoting self-regulation. For example, Stress Management Training (SMT; Monroy, Jonas, Mathey, & Murphy, 1997) was developed to support employees at Corning Inc. Building upon work by Benson (1975), the program was designed to build the individual’s capacity to cope proactively by using reappraisal and self-regulation in the context of stressful situations. The intervention involved instruction in a variety of stress management skills including muscle relaxation, biofeedback, meditation, and cognitive restructuring (Murphy, Hurrell, Sauter, & Keita, 1995). Similar approaches were applied to helping teachers deal with stress as well (Bamford, Grange, & Jones, 1990; Jesus & Conboy, 2001).

Research on MBIs has grown dramatically over the past 15 years. While much of the research has focused on promoting specific psychological and physiological improvements in clinical adult populations such as reduced anxiety, depression, and symptoms of chronic pain (Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004; Khoury et al., 2013; Strauss, Cavanagh, Oliver, & Pettman, 2014), there are a growing number of studies examining applications of mindfulness for stress reduction in general adult populations. Reviews of research focused on stress management with non-clinical adult populations suggest positive effects of MBIs (Eberth & Sedlmeier, 2012; Sharma & Rush, 2014), however, authors note the paucity of rigorous studies.

More relevant to the occupational stress literature, Good et al. (2015) completed a systematic review of the mindfulness literature and found evidence suggesting that the construct of mindfulness is associated with important dimensions of optimal occupational functioning. In reviewing the research on the effects of MAPs, they presented a theoretical framework explaining how MAPs build attentional stability, control and efficiency. They propose that these improvements in attentional functioning mediate improvements in cognitive, emotional, behavioral and physiological functioning that are associated with improved work performance. This suggests support for mindfulness as a possible intervention approach to address the specific emotional stressors teachers face, as presented by Chang (2009, 2013) above.

While the extant research shows promise, there are a number of gaps in the research literature. Davidson and Kaszniak (2015) noted that interpretation of the results of research on MBIs has been challenging due to the unique conceptual and methodological issues posed by this research such as how best to study first-person

experience, problems developing valid control conditions, lack of clear descriptions of the specific activities that compose the training, and over-reliance on self-report measures. Furthermore, Dimidjian and Segal (2015) identified the need to more carefully anchor clinical research in basic science, extend research on MBIs to include more active control conditions to address questions of specific efficacy, and develop studies to examine effectiveness and quality of implementation at scale.

Another concern is whether or not the effects of MBIs extend past the end of intervention. There is evidence that suggests that the positive effects of mindfulness-based interventions may endure, especially if individuals are provided maintenance support. A meta-analysis was conducted to examine the effectiveness of mindfulness-based interventions for reducing personal distress (Hofmann, Sawyer, Witt, & Oh, 2010). The study identified 39 studies totaling 1,140 participants engaging in a mindfulness-based intervention for a range of conditions. The effect size estimates suggest that these interventions were moderately effective for improving anxiety and mood symptoms more generally. For participants with diagnosed anxiety and mood disorders the interventions were associated with robust effect sizes for improving anxiety and mood symptoms and effects were maintained over follow-up periods averaging 27 weeks.

More relevant to the occupational stress literature, Amutio, Martinez-Taboada, Delgado, Hermosilla, and Mozaz (2015) conducted a longitudinal study to examine the effectiveness of mindfulness-based stress reduction program involving an 8-week initial program plus a 10-month maintenance program in alleviating work stress-related symptoms in a sample of 42 physicians, 21 randomly assigned to receive the program and 21 assigned to the wait-list control group. Results showed significant reductions in emotional exhaustion, heart rate (HR) and blood pressure (BP) and increases in mindfulness. Over the 10-month maintenance period effect sizes significantly increased, especially for mindfulness and systolic BP. However, the small sample size limits the reliability of these findings.

The growing body of research demonstrating the benefits of mindfulness has sparked an emergent interest in its application to the field of education (Greenberg & Harris, 2011; MLERN, 2012; Meiklejohn et al., 2012). Currently, MBIs can be found in educational settings spanning preschool to post-secondary including programs for students, teachers, and principals. However, despite its proliferation, the research on the effectiveness of MBI's in this context has been limited. There have been very few rigorous randomized controlled trials and none that examine long-term effects. Nevertheless, results from a number of empirical studies on mindfulness-based interventions are beginning to show promise for helping teachers manage occupational stress. Because the teaching profession is characterized as one of high emotional labor, stress, and burnout (Chang, 2009, 2013; Guglielmi & Tatrow, 1998), mindfulness may be especially helpful for teachers. Teachers may benefit from MAPs by improving their emotional awareness, developing techniques for regulating and responding to their own emotions, and coping with inevitable negative emotional experiences (Roeser et al., 2013).

## 14.3 Mindfulness-Based Interventions for Teachers

Over the past 15 years, the body of research on MBIs for teachers has shown steady growth in both prevalence and rigor. The following review tracks the evolution of MBIs for teachers from exploratory pilot studies to cluster randomized controlled trials. The review also discusses MBIs' growing reception in the public eye as an effective and feasible approach to reducing teacher stress and burnout.

### 14.3.1 Preliminary Research

In the late 1990s, before the term “mindfulness” became popular, a number of researchers investigated the effects of meditation practices on teachers' stress and well-being. Like many nascent fields, the reliability of these early studies was limited by small samples and less than rigorous designs. As is the case for research on mindfulness-based interventions in general, there was a lack of specificity in the descriptions of the actual practices included in the intervention. Nevertheless, these studies provided evidence that MBIs are feasible and acceptable to teachers and might be useful for reducing occupational stress (Anderson, Levinson, Barker, & Kiewra, 1999; Winzelberg & Luskin, 1999).

In the early 2000s, the term “mindfulness” began to emerge as a way of describing the enhanced awareness and stress management skills resulting from secularized meditation practices (Davidson & Kaszniak, 2015; Williams & Kabat-Zinn, 2011). The term “mindful awareness practices” or MAPs emerged as a way to describe a continuum of practices involving states and processes engaged in to promote a particular stance or orientation towards one's experience. These practices involve various forms of directed attention including mindfulness meditation, yoga, tai chi and other contemplative practices (Kabat-Zinn, 2014; Lutz, Jha, Dunne, & Saron, 2015).

Research on the impact of meditation techniques on teachers' occupational stress continued, but the programs began to be identified with the “mindfulness” label (Franco, 2007, 2009; Franco, Mañas, Cangas, Moreno, & Gallego, 2010; Napoli, 2004). While these studies lacked rigor they provided insight into how to adapt ancient Eastern spiritual practices to fit the secular demands of the U.S. educational landscape. Leaders in education and teacher training also began to recognize that meditation and other mindfulness practices might be particularly useful for the unique challenges of teaching (Roeser et al., 2013). The preliminary studies served as a foundation for the proliferation of future programs and investigations of MBIs for teachers. The following sections describe the more widely used MBIs with standardized curriculums and reviews the empirical studies of their effectiveness.

## ***14.3.2 Standardized MBIs for Teachers***

### **14.3.2.1 Mindfulness-based Stress Reduction (MBSR)**

One of the best known and frequently studied MBI is Mindfulness-Based Stress Reduction (MBSR). Developed by Jon Kabat-Zinn, the program uses meditation and yoga practices to cultivate greater well-being and mind-body awareness. MBSR programs are typically 8-weeks long, meeting for 2 ½-hr sessions once weekly and one day of complete silence. MBSR courses involve training in formal mindful awareness techniques such as meditation, bodily relaxation, and basic yoga postures, as well as instruction in understanding physiological, behavioral, and emotional responses to stress (Center for Mindfulness, 2014). MBSR also helps individuals develop an understanding of the mind-body connection in order to take a more holistic approach to health and healing (Kabat-Zinn & Hanh, 2009).

While research was demonstrating that MBSR is effective for stress reduction and the promotion of well being more generally, it was unclear whether it would be useful for supporting teachers' occupational health and well-being. Several preliminary studies examined the efficacy of MBSR for reducing teacher occupational stress (Flook, Goldberg, Pinger, Bonus, & Davidson, 2013; Gold et al., 2010). While these studies lacked rigor, they demonstrated that MBSR is a feasible and acceptable program for teachers and may reduce stress and promote well-being.

### **14.3.2.2 Cultivating Emotional Balance in Challenging Times**

In 2000, the Mind and Life Institute (2015) gathered many of the world's leading emotion researchers to meet with prominent figures from meditation traditions, including the Dalai Lama, to discuss the topic of human emotion (for a report on these meetings see: Goleman, 2008). Following the meeting, a team of experts led by emotion researcher Paul Ekman and Buddhist scholar B. Alan Wallace developed "Cultivating Emotional Balance in Challenging Times" (CEB), an intervention which combines meditation practices with emotion skills training (Cultivating Emotional Balance, 2015). The 8-week program introduces MAPs such as mindful movement, listening practices and compassion practices such as lovingkindness, or *metta* practice, to help individuals better understand and regulate their emotional experiences. The training aims to reduce individuals' maladaptive emotional responses to difficult situations while fostering experiences of more positive emotions such as compassion and empathy.

Although CEB was not specifically designed to address teachers' occupational stress per se, the first evaluation of the program was conducted on a sample of 82 female school teachers. Females were chosen because the physiological measures the study employed to examine the stress response have gender-related differences and it was not feasible to recruit an equal number of men and women due to the large gender disproportions among teachers. The teachers were randomly assigned



to a CEB group or a wait-list control group, and assessed at three time points (pre-intervention, immediately post-intervention and 5 months after training completion (Kemeny et al., 2012).

Using a battery of self-report measures and a series of experimental tasks, the researchers examined CEB's effect on emotional experience and behavior. Self-report measures included the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), the Trait Anxiety Inventory (TAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1977), the Negative Affect and Positive Affect Scales (PANAS; Watson, Clark, & Tellegen, 1988), Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), the *ruminat*ion subscale from the Rumination and Reflection Questionnaire (RRQ; Trapnell & Campbell, 1999), and the short version of the Marlowe Crowne (Reynolds, 1982) Social Desirability scale (baseline only).

Four tasks were administered during a 3-h laboratory assessment session. These included the Micro-Expression Training Tool (METT; Ekman, 2004), a computerized task that assesses emotion recognition, the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993), a protocol designed to induce psychological stress and to evaluate its effects on physiological responses, the Marital Interaction Task (MIT; Gottman, 1995), used to assess compassionate and hostile behavior (pre- and post-intervention) and a computerized lexical decision procedure (e.g., Mikulincer, Gillath, & Shaver, 2002) aimed at assessing compassionate responding to emotionally provocative stimuli (administered at follow-up only). After the TSST was completed, participants were asked to complete a questionnaire to assess ruminative thoughts induced by the task (Nolen-Hoeksema, 1991; Trapnell & Campbell, 1999). The MIT task requires a participant and her spouse or intimate partner to resolve a conflict while being video recorded. The participants' behavior during the session was then coded for specific affect from the video using the Specific Affect Coding System (SPAFF; Gottman, 1995; Gottman & Levenson, 1999; Giese-Davis, Piemme, Dillon, & Twirbut, 2005). Biological data was collected during the laboratory assessment at several time points to assess the stress response. During the TSST, blood pressure (BP) readings were used as indices of cardiovascular reactivity during the stress task and respiratory sinus arrhythmia (RSA) was used as an index of parasympathetic activity. Data was collected from participants assigned to the training via weekly online logs to assess how much they were practicing meditation during the 8-week training period.

Results from the study showed that teachers receiving CEB demonstrated reduced depression, negative affect, anxiety and repetitive negative thoughts (rumination) and increased positive affect and mindfulness compared to the control group. Furthermore, compared to controls, teachers assigned to CEB were better able to identify subtle facial expressions of emotions (METT), recovered more quickly from physiological stress responses induced during the TSST, were less likely to exhibit hostile behaviors in conflictual situations during the MIT and were more likely to exhibit compassion during the lexical decision procedure. All of these effects except for positive affect, TSST, and rumination were maintained for 5 months. Kemeny et al. (2012) also showed that participants assigned to the training who engaged in mindful awareness practices more frequently on their own during



the 8-week training period had greater reductions in physiological arousal to the TSST, greater reductions in anxiety, and greater increases in mindfulness at post.

CEB and the seminal discussions at the Mind and Life meeting in 2000 initiated a greater understanding of human beings' emotional health and led experts in emotion, meditation, and education to apply principles of mindfulness and emotion more specifically to addressing teachers' occupational stress. While CEB shows promise, some elements of the intervention are not completely secular and are therefore not appropriate for use in public schools in the United States (see Jennings, 2015). For example, the training includes introductions to Buddhist terminology such as the *four brahmaviharas* (*four immeasurables*) (see Wallace, 2004).

To better address the unique occupational stressors teachers face and to create a program that was completely secular, several investigators developed new interventions for teachers drawing from CEB's approach of combining mindfulness-based practices and emotion skills training. As a result, two of the most widely used and empirically supported MIBs were developed: Stress Management and Relaxation Techniques (SMART) in Education and Cultivating Awareness and Resilience in Education (CARE for Teachers). More thorough descriptions of the two programs and a review of related research follow.

### **14.3.2.3 Stress Management and Relaxation Techniques (SMART) in Education**

In 2007, Margaret Cullen, Linda Wallace, and Betsy Hedberg of "The Impact Foundation" applied principles of MBSR to the teaching context to create a more targeted MBI for teachers, Stress Management and Relaxation Techniques (SMART) in Education (Cullen & Wallace, 2010; PassageWorks, 2015). Currently, SMART is offered in two consecutive programs. SMART in Education 1 involves eight weeks of two-hour meetings occurring once per week, along with a four-hour weekend retreat (20 hours total). SMART in Education 2 is an advanced training that builds upon prior learning and involves six weeks of two-hour meetings occurring once per week and a six-hour weekend retreat (18 hours total). The trainings utilize many components of MBSR such as sitting and walking meditation and mindful movement. SMART adds emotion skills training similar to CEB and links curriculum to teachers' work experiences so participants can begin to incorporate mindfulness into their daily teaching practice. The curriculum also includes lessons related to forgiveness, kindness, compassion, and conflict management. In addition to the trainings, SMART offers a number of optional added resources such as an online learning and networking community, courses for introducing mindfulness to students, and additional retreats for teachers and administrators.

The SMART program has been evaluated in two empirical trials. Benn, Akiva, Arel, and Roeser (2012) examined the effectiveness of SMART in a sample of parents ( $n = 32$ ) and teachers ( $n = 38$ ) of children with special needs. Participants were randomly assigned to a SMART group (16 parents and 19 educators) or a wait-list control group (16 parents and 19 educators), and assessed at three time points

**Table 14.1** Constructs and measures used in Benn et al. (2012)

Construct	Measure
Mindfulness	Five Facet Mindfulness Questionnaire (FFMQ), Baer, Smith, Hopkins, Krietemeyer, & Toney (2006)
Stress	Perceived Stress Scale (PSS), Cohen, Kamarck, & Mermelstein (1983)
Anxiety	State–Trait Anxiety Inventory for Adults (STAI), Kendall, Finch, Auerbach, Hooke, & Mikulka (1976)
Depression	Center for Epidemiological Studies Depression (CES-D), Radloff (1977)
Affect	Positive and Negative Affect Schedule (PANAS), Watson, Clark, & Tellegen (1988)
Well-being	Psychological Well-Being Scale (PWB), Ryff & Keyes (1995)
Self-compassion	Self-Compassion Scale (SCS), Neff (2003)
Forgiveness	Tendency to Forgive Scale (TFS), Brown & Phillips (2005)
Empathy	empathic concern subscale from Interpersonal Reactivity Index (IRI), Davis (1983)
Teaching self-efficacy	Teaching self-efficacy, Midgley et al. (2000)
Emotion Regulation	Emotion Regulation at Work Self-Efficacy Scale, Roeser et al. (2011)
Parenting self-efficacy	parenting self-efficacy Everyday Parenting Scale, Dunst & Masiello (2002)
Parenting stress	Parenting Stress Index, Abidin (1990)

(pre-intervention, 1 week post-intervention and 2 months after training completion). Participants completed a battery of self-report measures to assess mindfulness, stress, anxiety, depression, affect, well-being, self-compassion, forgiveness, empathy, teaching self-efficacy (teachers only), emotion regulation at work (teachers only), parenting self-efficacy (parents only), parenting stress (parents only) (refer to Table 14.1 for specific measures). The SMART program delivered for this study was longer than either of the programs currently offered, involving nine 2.5-hr sessions and 2 full days (36 hr total) (see Table 14.2 for training schedule and topics). Researchers also tracked how often participants engaged in mindfulness practices independently during the training period.

Investigators examined the effects of SMART with a series of analyses of covariance and then computed effect sizes, using Cohen's *d* with covariate adjusted means. Results indicated those in the treatment group experienced decreased stress and anxiety, as well as increased self-compassion, personal growth, empathy, and forgiveness compared to the control group. Mindfulness measured at post-intervention mediated the treatment effect on stress, anxiety, negative affect, and personal growth at 2 month follow-up, suggesting that mindfulness played a key role in how participants experienced benefits of the program.

Roeser et al. (2013) conducted a wait list-control study involving two samples of teachers, one in the United States and one in Canada. Researchers randomly assigned 113 elementary and secondary public school teachers to receive SMART or to a wait-list control group. Teachers were assessed at three time points

**Table 14.2** SMART program: summary of sessions, topics, and activities in mindfulness training curriculum

Session	Topic	Activities
1	Introduction	Mindfulness introduction; guided visualization; written reflection; raisin exercise.
2	Perceptions	Setting intentions, moods and thoughts exercise; stress didactic and discussion; body scan; silent eating; emotions didactic; mindful stretching; breath awareness.
3	Responding versus reacting	Mindful stretching; body scan; stress reaction cycle and coping didactic and discussion.
4	Pleasant, unpleasant, and neutral affect	Breath awareness and awareness of sound; events calendar charting and discussion.
5	Exploring forgiveness	Mindful stretching; awareness of breath, sounds, and physical sensations; forgiveness didactic and dyad exercise; guided visualization.
6	Working with conflict	Mindful stretching; awareness of breath and thoughts; aikido of communication; role play.
7	Compassion and kindness	Mindful stretching; awareness of breath, sounds, sensations, thoughts, emotions and mental states; kindness and compassion discussion; eyes on exercise; kindness meditation.
8	Working with anger	Choiceless awareness meditation; anger didactic; relived anger exercise; anger triggers/dyads and discussion, anger profiles.
9	Silent retreat	Awareness of the breath and choiceless awareness; mindful stretching; body scan; walking meditation; guided visualization; mindful eating; mindful movement to music; sitting meditation; walking meditation; kindness meditation; walking meditation with kindness on the go.
10	Working with fear	Mindful stretching; breath awareness and choiceless awareness; working with fear didactic and discussion; relived fear exercise; fear dyads.
11	Beginnings and endings	Body scan; guided visualization; mindful stretching; community resources and discussion of continuation of practice; personal reflections.

*Note.* All sessions were 2.5 hr long, except for Sessions 2 and 9, which were 6 hr long  
Source: Benn, Akiva, Arel, and Roeser (2012)

(pre-intervention, post-intervention and 3 months after training completion). Of the 113 teachers, 55 were located in the United States (28 assigned to SMART and 27 to the control group) and 58 were in Canada (26 assigned to SMART and 32 to the control group).

Participants completed a battery of self-report measures to assess mindfulness (FFMQ; Baer et al., 2008), occupational self-compassion (modified SCS; Neff, 2003), occupational stress (items drawn from Lambert, McCarthy, & Abbott-Shim, 2001; Roeser & Midgely, 1997) and occupational burnout (Maslach Burnout Inventory; Maslach et al., 2001). Teachers in the U.S. subsample only completed measures of anxiety (STAI; Kendall, Finch, Auerbach, Hooke, & Mikulka, 1976), and depression (Beck Depression Inventory; Beck, Steer, & Brown, 1996).

Biological measures were collected in person at baseline and post-intervention and included systolic blood pressure, diastolic blood pressure and resting heart rate. In Canada only, cortisol was measured from teachers' saliva collected with oral cotton rolls on a regular workday upon awakening, 30 minutes after waking, and at bedtime. To assess focused attention and working memory capacity (WMC), Canadian teachers completed the Operation Span Task (Ospan, Turner, & Engle, 1989) at baseline and post-intervention. Finally, teachers assigned to the SMART program were asked to complete a program evaluation survey and a daily mindfulness practice journal that were collected post-intervention.

Since researchers found few differences between the two subsamples (U.S. and Canada) on demographic characteristics and baseline outcome measures they decided to combine the intervention and control groups across sites. They then ran a series of analyses of covariance to examine direct effects of SMART on the outcome variables then computed effect sizes, using Cohen's *d* with covariate adjusted means.

Teachers who received SMART reported significant increases in mindfulness and occupational self-compassion and significant reductions in occupational stress and burnout at post-intervention and follow-up compared to controls after controlling for baseline measures. Teachers in the U. S. subsample showed slightly higher levels of improvement than the Canadian teachers. In addition, U.S. teachers showed reductions in anxiety and depression at post-intervention and follow-up compared to controls after controlling for baseline measures. Canadian teachers assigned to the SMART group demonstrated significantly higher Ospan (WMC) total scores at post-intervention, controlling for baseline scores, than controls. However there were no significant treatment effects on Canadian teachers' cortisol and no significant treatment effects on HR or BP in either subsample.

Results of mediation analyses similar to those conducted for the Benn and colleagues' (2012) study demonstrated that changes in teachers' mindfulness and self-compassion at post-intervention mediated reductions in occupational stress and burnout at 3-month follow-up. The same analyses were conducted with the U.S. subsample only and found the same mediated effect of mindfulness and self-compassion at post-intervention on depression, and anxiety at 3-month follow-up.

Approximately 60% of the teachers assigned to SMART completed and returned the home practice logs, and they reported an average of 15 min of daily home practice during the 8-week program. Higher levels of independent mindfulness practice during the intervention period consistently led to greater benefits once the treatment was removed. In other words, those who practiced on their own more during the intervention period showed greater improvements in outcome variables at follow-up.

While the research on SMART has been limited by small sample sizes and only short-term follow-ups, the studies suggest that the program is feasible, acceptable and may reduce teacher occupational stress and promote well-being. It is also notable in that mediation analyses suggest that it may be through developing mindfulness and self-compassion that teachers are more able to manage job stress. Since this research was conducted, one of the developers of SMART created a very similar program called Mindfulness-based Emotional Balance (Cullen, 2015), however no research on the program has yet been conducted.

### 14.3.2.4 Cultivating Awareness and Resilience in Education (CARE) for Teachers

Another MBI that adapted elements of CEB to be more specifically directed towards reducing teachers’ occupational stress is “Cultivating Awareness and Resilience in Education,” also called “CARE for Teachers.” Patricia Jennings worked as a researcher on the CEB trial and in 2007 invited colleagues Richard Brown and Christa Turksma to develop CARE for the Garrison Institute (CARE for Teachers, 2015; Jennings, 2011).

The program is typically delivered over four day long trainings spread across four to five weeks (typically in the fall) with a follow-up booster session occurring months later (typically in the spring). Additionally, trainers provide periodic coaching by phone between sessions to help teachers develop a regular self-care practice and apply CARE skills to their actual experiences in the classroom.

CARE is similar to both CEB and SMART in that its core elements are mindful awareness practices, emotion knowledge and skills training, and compassion practices (see Table 14.3 for details). CARE is unique it that it was designed not only

**Table 14.3** CARE program components

Emotion skills instruction Approximately 40%	Mindful awareness practices Approximately 40%	Compassion practices Approximately 20%
1. Introduction to emotions, purpose, universal expressions, relevant brain research	1. Body awareness reflection	1. “Caring practice” – a series of guided reflections focused on caring for self, loved one, colleague, challenging person  2. Mindful listening partner practices, one person reads a poem or talks about a problem, partner listens mindfully practicing presence and acceptance
2. How emotions affect teaching and learning	2. Basic breath awareness practice	
3. Didactic information about “uncomfortable” or negative emotions (anger, fear, sadness) including physiology, cognitive and behavioral responses	3. Mindfulness of thoughts and emotion practice	
4. Didactic information about “comfortable” or positive emotions (joy, appreciation) including physiology, cognitive and behavioral responses	4. Mindful movement practices (standing, walking, stretching, centering)	
5. Exploring bodily awareness of emotions	9. Practice maintaining mindful awareness in front of a group	
6. Exploring individual differences in emotional experiences (emotional profile, triggers & scripts)	10. Role plays to practice mindfulness in the context of a strong emotion related to a challenging classroom situation	
8. Practice using mindful awareness and reflection to recognize and manage strong emotions		

reduce teachers' occupational stress but to also improve teachers' work performance. This aim is based upon the assumption that teachers' stress, and emotional reactivity in particular, interfere with their functioning, especially with regard to their ability to create an emotionally supportive environment and manage student behavior effectively (Jennings & Greenberg, 2009).

To further this aim, CARE includes activities that ask teachers to explore their emotional reactivity in response to particular past events by first re-experiencing them using reflective writing and somatic experiencing activities, sharing them in a mindful listening exercise and ultimately reenacting them in a "mindful" role play activity when they have the opportunity to apply the skills they have learned to the situation. The intention of these activities is to help teachers bring greater awareness to the physical sensations and mental processes associated with the triggering events and resulting emotions and to learn strategies to regulate them so they can respond to provocative situations thoughtfully, rather than reacting automatically. It also is intended to help teachers recognize habitual thought patterns or "scripts" that tend to reinforce reactivity. These are often inaccurate appraisals of student behavior that trigger anger and frustration. For example, teachers have a common tendency to assume a student's behavior is intentionally directed towards interfering with the teacher's instructional goals (e.g. disrespectful), rather than normal dysregulated behavior resulting from immaturity (Chang, 2009, 2013). The tendency to react in anger to such behavior tends to exacerbate the behavior, because students may feel unfairly attacked by the teacher and become defensive, reinforcing coercive cycles or power struggles and thus increasing teachers' stress and reducing their sense of teaching efficacy (for an extensive review article on this topic see Jennings & Greenberg, 2009).

Positive effects of CARE have been demonstrated in a number of empirical trials. Jennings, Snowberg, Coccia, and Greenberg (2011) first conducted two pilot studies to explore the effectiveness of the newly developed program. The first pre-post study (no control group), involving 31 elementary teachers from a low-performing urban school with high rates of poverty, showed teachers receiving the CARE training demonstrated greater mindfulness, as measured by the FFMQ, and the interpersonal mindfulness factor of the Mindfulness in Teaching Scale (MTS; Frank, Jennings, & Greenberg, 2015) and reported a reduction in the task-related hurry subscale of the Time Urgency Scale (TUS; Landy, Rastegary, Thayer, & Colvin, 1991) at posttest.

The second study was a pilot randomized controlled trial with educators working in suburban and semi-rural elementary schools. Investigators randomly assigned 43 participants (32 student teachers and 11 mentor teachers) to receive CARE (16 student teachers and 5 mentors) or a waitlist control group (16 student teachers and 6 mentors). The results of an ANCOVA suggested a significant treatment effect on Problems in Schools (PIS; Deci, Schwartz, Sheinman, & Ryan, 1981) motivating total score, suggesting that student teachers and mentors showed a more autonomy supportive orientation at post-test compared to those in the control group. This measure is based upon Ryan and Deci's (2000) self-determination theory that proposes that teachers' autonomy supportiveness promotes their students' intrinsic motiva-

**Table 14.4** Constructs and measures used in Jennings et al. (2013)

Construct	Measure
General well-being	Positive and Negative Affect Schedule (PANAS), Watson, Clark, & Tellegen (1988)
	Emotion Regulation Questionnaire (ERQ), Gross & John (2003)
	Center for Epidemiological Studies Depression (CES-D), Radloff (1977)
	Daily Physical Symptoms (DPS), Larsen & Kasimatis (1991)
Efficacy	Teachers' Sense of Efficacy Questionnaire (TSES) Tschannen-Moran & Woolfolk Hoy (2001)
Burnout/Time pressure	Maslach Burnout Inventory (Educators' Survey) (MBI), Maslach, Jackson, & Leiter (1997)
	Time Urgency Scale (TUS) Landy, Rastegary, Thayer, & Colvin (1991)
Mindfulness	Five Facet Mindfulness Questionnaire (FFMQ), Baer, Smith, Hopkins, Krietemeyer, & Toney (2006)

tion. However, results from the study did not show significant differences between the treatment and control groups on the other outcome measures (e.g. FFMQ, MTS, TUS).

These studies were methodologically limited by the small sample sizes and the lack of random assignment in Study 1. However, the results suggest that CARE may be more useful for in-service teachers (rather than pre-service student teachers who have not yet been exposed to the stresses of the classroom alone) and for teachers in high-risk settings who face more occupational and personal stress.

CARE was evaluated more thoroughly in a randomized controlled trial with 50 public school teachers from urban and suburban settings (Jennings, Frank, Snowberg, Coccia, & Greenberg, 2013). Elementary and secondary teachers were randomly assigned to CARE or a wait-list control group and assessed pre- and post-intervention on a battery of self-report measures to assess their general well-being, burnout, mindfulness and efficacy (see Table 14.4 for specific measures). Analyses of covariance were computed between the CARE intervention group and comparison group for each outcome, controlling for baseline scores, and effect sizes were calculated from unadjusted means as Cohen's *d* (Cohen, 1988).

Significant intervention effects were found on well-being, burnout, mindfulness and efficacy. More specifically for well-being, compared to controls, teachers who received CARE demonstrated an improvement in emotion regulation as measured by the ERQ. According to Gross and John (2003) optimal emotion regulation involves higher levels of reappraisal and lower levels of suppression. CARE teachers showed a significant increase in the *reappraisal* subscale of the ERQ. There was also a reduction in the *suppression* subscale score among CARE teachers, compared to controls; however it was only marginally significant. Also related to well-being, CARE teachers showed significant improvements in physical symptoms (DPS) associated with stress such as gastro-intestinal upset and aches and pains.



For efficacy, significant effects were found for TSSE total score, *efficacy in student engagement*, and *efficacy in instruction*. Regarding burnout/time pressure, significant intervention effects were found on the *general hurry* subscale of the TUS and the *personal accomplishment* subscale of the MBT. Finally, regarding mindfulness, significant intervention effects were found for the total mindfulness score on the FFMQ as well as the *observing* and *nonreacting* subscales. Reports from teachers assigned to receive CARE also suggested CARE was generally well received by them, and they felt it would be valuable for both teachers-in-training and in-service teachers.

While the results of this study suggest that CARE may promote various dimensions of well-being, emotional regulation via reappraisal, efficacy and mindfulness, and may reduce burnout and time pressure, there is no way to assess whether these effects would continue over time because data was collected at only two time points.

Most recently, researchers received a multi-million dollar grant from the Institute of Education Sciences (IES) to conduct a clustered randomized controlled trial on CARE (Jennings et al., 2017). The study involved 226 racially diverse teachers working in 36 different elementary schools in a high poverty areas (Bronx and Upper Manhattan) of New York City. It was the largest and most rigorous study on MIBs for teachers to date. It was the first to use advanced statistical analyses such as hierarchical linear modeling, which accounts for teachers nested within schools and students nested within classrooms (i.e. controlling for teachers and students in the same school/classroom having similar positive outcomes, not because of CARE but because of their school context). Furthermore, teachers' classrooms were observed and rated by research staff blind to the study aims and participants' group assignments, the study examined teacher outcomes at three time points over the course of 12 months and collected data on student outcomes (teacher reports pre-and post-intervention and school records for the intervention year and one year before and after the intervention).

A battery of self-report measures was administered immediately pre-intervention in the fall, immediately post-intervention in the spring and at a follow up period during the fall of the following year, approximately one year after the pre-intervention measurement. Teachers were randomized within schools to receive CARE or be in the wait list control group. Researchers conducted a series of factor analyses to reduce the number of assessments analyzed to those most theoretically and empirically relevant to the study. The resulting factors were *Mindfulness*, *Psychological Distress*, *Time Pressure* and *Teacher Efficacy* (see Table 14.5 for measures associated with these factors). The factor analyses found that the ERQ and two subscales of the MBI did not load well on any of these factors so these were analyzed by themselves.

Each teacher's classroom was observed two times at pre- and post-intervention by trained research staff blind to the study aims and participants' group assignment. Observers coded each classroom using the *Classroom Assessment Scoring System* (CLASS; Pianta, La Paro, & Hamre, 2008), which assesses the quality of interactions between teachers and students. The measure assesses these interactions based upon three domains each comprised of several dimensions: *Emotional Support* (positive climate, negative climate, teacher sensitivity, and regard for student perspective), *Classroom Organization* (behavior management, productivity, and

**Table 14.5** Constructs and measures used for Jennings et al. (2017)

Constructs	Measures
<i>Mindfulness</i>	
Describing	Five Facet Mindfulness Questionnaire (FFMQ), Baer, Smith, Hopkins, Krietemeyer, & Toney (2006)
Non-judging	FFMQ subscale
Awareness	FFMQ subscale
Observing	FFMQ subscale
Non-reactive	FFMQ subscale
Interpersonal mindfulness	Mindfulness in Teaching Scale (MTS), Frank, Jennings, & Greenberg (2015)
PANAS – Positive	Positive and Negative Affect Schedule (PANAS), Watson, Clark, & Tellegen (1988)
<i>Psychological Distress</i>	
Depression	Patient Health Questionnaire 8-item Depression Scale (PHQ-8), Kroenke, et al. (2009)
Anxiety	Generalized Anxiety Disorder 7-item Scale (GAD-7), Spitzer, et al. (2006)
PANAS – Negative	Positive and Negative Affect Schedule (PANAS), Watson, Clark, & Tellegen (1988)
Sleep	PROMIS Sleep Disturbance Questionnaire, (Buysse, et al. (2010)
Emotional exhaustion	Maslach Burnout Inventory (Educators' Survey)(MBI), Maslach, Jackson, & Leiter (1997)
Perceived stress	Perceived Stress Scale (PSS), Cohen, Kamarck & Mermelstein (1983)
<i>Time pressure</i>	
Eating	Time Urgency Scale (TUS) Landy, Rastegary, Thayer, & Colvin (1991)
Speech	TUS subscale
General hurry	TUS subscale
Task-related	TUS subscale
Competitiveness	TUS subscale
<i>Efficacy</i>	Teachers' Sense of Efficacy Questionnaire(TSES) Tschannen-Moran & Woolfolk Hoy (2001)
<i>Emotion regulation</i>	Emotion Regulation Questionnaire (ERQ), Gross & John (2003)
<i>Physical symptoms</i>	Daily Physical Symptoms (DPS), Larsen & Kasimatis (1991)

instructional learning formats), and *Instructional Support* (concept development, quality of feedback, and language modeling).

Primary study outcomes at post-intervention were analyzed using 2-level Hierarchical Linear Models for continuous outcomes or 2-level Hierarchical Generalized Linear Models for count outcomes to account for the nesting of teachers within schools. Longitudinal analyses to examine the long-term effects of CARE and analyses of student data were preliminary and papers reporting the results were underway at the time of this writing and will not be reported here. Further analyses are also being conducted to examine potential mediators and moderators of the direct effects of CARE and will be reported in later publications.

The results showed that teachers receiving CARE reported increased mindfulness and improved adaptive emotion regulation (based upon the average of the two subscales of the ERQ, *reappraisal* and *suppression*, reverse scored) compared to the control group. Treatment group teachers also reported less time pressure and less psychological distress than control group teachers. Lastly, results showed that teachers receiving CARE scored significantly higher on CLASS observational ratings of dimensions of *Emotional Support* than control teachers (Jennings, et al., 2017). More specifically for the domain of *Emotional Support*, teachers were observed to be more sensitive to their students needs and perspectives (*teacher sensitivity*) and have classrooms where there were more emotionally positive interactions (*positive climate*) than controls. For the domain of *Classroom Organization*, teachers were observed to encourage greater *productivity* than controls. These results are particularly important because they show that CARE not only improved teachers' personal well-being and functioning, but also improved the overall quality of the classroom interactions associated with an optimal learning environment.

This study was the first rigorous investigation to show effects at the classroom level for a mindfulness-based program. The findings are particularly intriguing because the CARE curriculum does not include any content that specifically addresses pedagogy or classroom management. The program assumes teachers have teaching skills, but lack the ability to manage their emotion reactivity, which impairs their teaching efficacy. CARE activities focus on helping teachers self-regulate in the midst of challenging situations, but do not provide instruction on specific classroom management or instructional strategies.

The study also marked the field's most empirically rigorous design and analyses to date, and it greatly strengthened the confidence in MIBs as worthwhile interventions for addressing teachers' occupational stress and performance. An examination of the longitudinal outcomes, student outcomes, and possible moderators and mediators will provide additional confidence in CARE as an effective intervention to reduce teacher occupational stress and improve performance. These analyses will also help us better understand the mechanisms that underlie the main effects providing information on how CARE and other MBIs might be refined to improve feasibility and effectiveness.

The studies reviewed here all included an evaluation component to assess the CARE's acceptability and the training and facilitator quality and training fidelity. In every case, teachers reported high levels of satisfaction with the training and the trainings were delivered with high degrees of fidelity. Furthermore, during the most recent study, teachers' home practice throughout the training period was assessed and their participation, attendance, and level of engagement in each program session were evaluated. Data was also collected at each of the three time points on what practices the teachers were engaging in that might be similar to CARE. Future analyses of these data will explore how these variables relate to CARE's direct effects on teachers, classrooms, and students.

### **14.3.3 Summary**

Early investigations of MBIs for teachers explored how training teachers in meditation practices led to changes in stress and well-being through pilot studies, pretest-posttest, and quasi-experimental designs. These studies were also interested in examining the feasibility and acceptability of MBIs to determine if teachers would be motivated to continue using mindful awareness practices on their own outside of the formal training sessions. These preliminary studies showed that MBIs were feasible for use in educational settings and were acceptable to teachers.

With the development of MBIs designed especially for teachers came a trend toward more empirical rigor in their evaluation and the studies began to employ more experimental designs and advanced statistical procedures such as hierarchical linear modeling. The results of these studies continued to show positive effects of MBIs for teachers, although the research lacked evidence of lasting effects. Most recently, a large cluster randomized controlled trial of a large sample of teachers has demonstrated CARE's promise for reducing teachers' occupational stress and improving classroom environments. Future analyses of these data have the potential to fill gaps in the current literature by examining long-term effects and potential mechanisms that underlie these effects.

## **14.4 Limitations and Future Directions**

The limitations of the current body of work on mindfulness programs for teachers are worth noting. As is the case for the mindfulness research field in general, there are a number of gaps in the research literature (Davidson & Kaszniak, 2015; Dimidjian & Segal, 2015). Most of the studies reviewed here relied on small samples and did not examine the long-term effects of the MBIs on teachers' occupational stress. Generally studies employed a limited range of outcomes measured and only the recent CARE study examined outcomes associated with teacher job performance. None of the studies reviewed here examined the effects of intervention with teachers on student outcomes, although the CARE research to examine this is underway. A critical limitation is the lack of examination of potential moderators and mediators of effects. Understanding for whom and under what conditions intervention efforts are most successful and understanding the mechanisms of change are critical to refining MBIs for teachers to become viable professional development programs for the prevention and reduction of occupational stress.

Most of the aforementioned studies relied primarily on self-reported measures of stress and well-being. Social desirability, reliance on recall, and the influence of other biases may have played a role in teachers' reports of their own psychological improvements. This is particularly an issue with measures of mindfulness for assessing the effects of a MBI. Since participants are instructed in new language for

describing their experience, this may affect how they respond to such questionnaires (Davidson & Kaszniak, 2015).

While measurement limitations were consistently an issue in the research reviewed above, several studies applied multi-method approaches to address the limitations of self-report including measuring physiological indicators of stress, task-based laboratory measures of behavior, and observational measures of teachers' performance. Measuring physiological changes such as cortisol levels or blood pressure may provide a more objective assessment of teacher stress and well-being. Roeser et al. (2013) examined physiological indicators of stress, but significant intervention effects were not found. This could be due to the small sample size and/or frequency of measurement, since cortisol collection was limited to only one day, which may have impaired the reliability of this measure.

The CEB evaluation used behavioral tasks to measure emotional awareness, hostility and compassion in the context of real time interpersonal interactions, which were targets of the intervention (Kemeny et al., 2012). The most recent CARE study examined the observed quality of teachers' interactions with their students (Jennings et al., 2017). The physiological and behavioral (task based and observed) outcome data lend support to the case that MBIs may not just change participants' thoughts and perceptions of stress, but also their physiological reactivity and interpersonal behavior, which is particularly important for teachers who are constantly interacting with others. Future studies should aim to measure similar outcomes related to teaching and learning.

Researchers and program developers are examining alternative models of program delivery, which may boost the impact MAPs may have on physiology. For example, a recently published study examined the feasibility and efficacy of a brief, daily MBI presented to middle school teachers for 20 minutes before school four days per week for 16 weeks (Harris, Jennings, Katz, Abenavoli, & Greenberg, 2015). Two middle schools were randomly assigned to intervention or wait-list control and 64 educators (42 teachers, 22 paraprofessionals, learning support, etc.) from these schools were recruited to participate in the study ( $n = 34$  intervention,  $n = 30$  control). Results of a series of analyses of covariance showed significant intervention effects on blood pressure (BP), and cortisol awakening response (CAR). While teachers in the control school showed blunted CAR at post-intervention assessment, the treatment teachers maintained a healthy CAR pattern suggesting that the intervention protected teachers against the cumulative negative effects of occupational stress on CAR. Similar to other studies, significant treatment effects were also found on mindfulness (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) positive affect (PANAS; Watson, Clark, & Tellegen, 1988), efficacy for classroom management (TSSES; Tschannen-Moran & Woolfolk Hoy, 2001) distress tolerance (measured by the Distress Tolerance Scale; Simons & Gaher, 2005), and physical symptoms (DPS; Larsen & Kasimatis, 1991). Furthermore, program participants showed high degrees of satisfaction and engagement. While the study was limited by the small sample size and quasi-experimental design it demonstrated the feasibility of offering regular daily MAPs to teachers in their work setting and preliminary evidence of promise. The results also suggest that to affect diurnal patterns of

cortisol requires more consistent daily practice. Future research should examine such programs in the context of more rigorous studies.

Researchers should also explore other measurement strategies that are just beginning to be applied to studying teachers in the context of their working day. A number of new and innovative methods that involve momentary assessment are showing promise for refining our understanding of teachers' occupational stress and how best to craft our intervention efforts (Carson, Weiss, & Templin, 2010; Cross & Hong, 2012; McIntyre et al., 2016).

Another critical limitation of the current research is that most of the samples were self-selected. This may limit the generalizability of their results to teachers without a predisposed interest in learning mindfulness. The issue of teachers' motivation to engage in a mindfulness intervention is one to consider for administrators seeking to implement school- or district-wide mindfulness programs for all teachers, as it is possible that the programs may only benefit those motivated to receive them. This is a common concern for all new professional development programs because one's level of intrinsic motivation to engage in any activity typically leads to improved performance and prolonged engagement (Ryan & Deci, 2000). Future studies can more closely investigate how motivation to enroll in a MBI is related to outcomes.

A similar point is the issue of teachers' motivation and willingness to independently engage in mindfulness practices beyond the duration of the program. The studies that tracked teachers' independent practice of mindfulness techniques found a wide range of reports in how often teachers practiced on their own. The reason why some teachers practiced more regularly was not specifically investigated in these studies, but possible reasons for the differences in practice could be related to variability in the teachers' time availability, family dynamics, dispositional characteristics, or a host of other factors. It would be worthwhile for future studies to investigate teachers' motivation to engage in mindfulness practices, barriers that limit practice, and how frequency of practice relates to improvements in well-being.

Finally, in addition to the challenges faced by the mindfulness research more generally (Davidson & Kaszniak, 2015; Dimidjian & Segal, 2015), researchers conducting trials in schools must perform research within the constraints of educational settings which pose their own methodological challenges. Many of the early studies on MBIs for teachers employed pretest-posttest designs, which contain numerous threats to validity. Others used random assignment and waitlist controls, which begins to mitigate threats to validity by distinguishing treatment effects from maturation or other effects. However, all but the most recent CARE study did not account for the nesting that is inherent in educational settings (e.g. teachers nested within schools and students nested in classrooms). However, it is promising that Jennings et al. (2017) found significant effects on teachers and classrooms when utilizing advanced statistical methods (HLM) that accounted for the teachers and classrooms nested within schools.

Encouragement can also be found in IES's funding of a large-scale evaluation of a MBI for public school teachers. As mindfulness becomes increasingly popular in Western culture, its presence in public settings is receiving a warmer response than what may have been the case decades ago. Continual funding of MBIs and rigorous

evaluation studies will expand the research base on mindfulness in teaching and provide greater accessibility to interested teachers.

The field of mindfulness in education and mindfulness for teachers has experienced rapid growth in the last 15 years, and public interest in MBIs continues to grow. The research base supporting MBIs for teachers is also growing and developing greater rigor. The present chapter tracked the evolution of the field to demonstrate mindfulness training for teachers is a promising approach for reducing stress and burnout while improving well-being.

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