PROMOTING EDUCATORS’ SOCIAL-EMOTIONAL COMPETENCE, STRESS MANAGEMENT, AND WELLBEING THROUGH A SCHOOL-BASED CONTEMPLATIVE INTERVENTION: AN EVALUATION OF EFFICACY, IMPLEMENTATION PROCESS, AND MECHANISMS

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ABSTRACT

U.S. educators face increasing levels of stress and burnout that can impede their effective classroom practice and contribute to declines in wellbeing. To support educators in managing these stresses and providing healthy classroom climates facilitative of students’ academic and social-emotional development, attention must be given to educators’ own social-emotional functioning and wellbeing. The CALM study of Educator Health and Wellbeing sought to address these problems through the development and evaluation of an intervention to support educators’ emotional functioning, stress-management, and wellbeing in a sample of 64 educators in two middle schools.

Study 1 employed a wait-list control design and evaluated the feasibility and efficacy of CALM, a brief daily workplace contemplative intervention designed specifically for educators. Posttest (5 months past pre-test) comparisons provided evidence for CALM’s efficacy to: support some aspects of educators’ emotional functioning; promote efficacy for classroom management; reduce time urgency, one aspect of burnout, and reports of physical symptoms; and improve physiological indicators of blood pressure and cortisol functioning.

Study 2 was an implementation process evaluation exploring three dimensions of participant responsiveness (attendance, practice, and perceptions) within the intervention group. Analyses explored relationships between dimensions of responsiveness, baseline characteristics, and outcomes. Responsiveness was related to professional characteristics, such as efficacy and years in education, but not strongly linked with other baseline characteristics. Practice and attendance each explained differential improvements in intervention outcomes.

Study 3 employed mediation analyses to test a set of hypothesized mechanisms of change in the CALM logic model. Intervention-related posttest improvements in emotional functioning (mindfulness, positive affect and distress tolerance) mediated indirect impacts on teaching efficacy at follow-up the following school year (12 months past pre-test).

These studies add to a small but growing body of knowledge on intervention strategies to support educators’ social-emotional functioning and wellbeing. Results suggest that strategies like CALM are promising to support schools in promoting educators’ effective emotional and stress management, sustaining classroom performance, and supporting their health and wellbeing. The results have potential for strengthening professional development in the education field and they contribute to the prevention science literature on workplace strategies for promoting wellbeing.
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CHAPTER 1

Introduction
Educators play a central role in the development of healthy, competent, and thriving communities. They are charged with the enormous responsibility of scaffolding the academic, social, and emotional development of children while placed under an evaluative spotlight from children themselves, parents, and administrators. Educators strive to meet the goals of academic instruction while providing nurturing and care for the wellbeing of their students, because they know that students whose basic health and social-emotional needs are not met will not be successful learners. The importance of supporting students’ social emotional needs and school wellbeing has received growing attention in recent years from researchers and policy makers, while the wellbeing of the educators providing for those needs has often been overlooked (Jennings & Greenberg, 2009). Educators strive to contribute to a sense of collective wellbeing in the classroom as well as the school community, but there is a great need for schools to create organizational climates that demonstrate commitment to care for educators’ wellbeing (Day & Qing, 2009).

Teaching is an emotional practice that often is accompanied by significant stress. Hargreaves (1998) described the centrality of emotion to the teaching profession. Because emotional understanding is a necessary requirement for successful teaching and because teaching involves extensive emotional labor or emotional management, Hargreaves (1998) argued that emotional competence should be considered an essential component of educators’ professional development. Fifteen years later, however, few evidence-based professional
development strategies have been tested that support educators’ social emotional competence (Roeser, Skinner, Beers & Jennings, 2012). The emotion management involved in the classroom is a process of negotiating emotional displays and expressions in relation to situational goals and in consideration of the emotional experience of others (students, colleagues). Emotion management can have positive impacts on the functioning of the classroom, but can also cause a sense of vulnerability, stress, or exhaustion in the educator (Oplatka, 2009). Whether or not educators possess the emotional resources and emotional self-efficacy to competently manage difficult situations in the classroom has implications for educators’ sense of professional and personal wellbeing (Day & Qing, 2009).

The emotional conditions of teaching combine with other factors such as increased evaluative demands to create highly stressful conditions. Recent surveys of educators have revealed exceptional levels of job dissatisfaction and stress (MetLife 2012, 2013). Experiencing high levels of stress may lead to professional burnout and to decreased classroom performance. In fact, burnout is higher among educators than many other professions (Johnson, et al. 2005). High levels of stress and burnout have problematic implications for physical health and psychological wellbeing.

Social-emotional competence and stress management are thus key skills in order for teachers to manage their personal and professional wellbeing and successfully facilitate learning daily. Social-emotional competence involves emotional awareness and regulation, social awareness, the ability to manage stress,
decision making skills, and the ability to manage relationships, all essential elements of managing classroom interactions (Jennings & Greenberg, 2009). In addition, Roeser and colleagues (2012) have described certain “habits of mind” that are important to effective teaching and the creation of well-functioning relational learning environments. These include the capacity for observation, non-judgmental awareness, flexibility (cognitive, emotional, and behavioral), the ability to self-regulate emotions and attention, emotional resilience, and a sense of empathy and compassion toward self and others. To support educators’ stress management and wellbeing and to prevent burnout, professional development efforts should incorporate training in social-emotional competencies and beneficial “habits of mind” as central strategies (Jennings & Frank, in press).

Roeser and colleagues (2012) suggest that interventions involving contemplative practices hold particular potential for strengthening educator professional development. Contemplative interventions have recently emerged as a promising strategy to prevent stress-related problems and to promote physical and psychological wellbeing (e.g. Chiesa & Serretti, 2009), and contemplative intervention operate, at least in part, by strengthening social-emotional skills and habits of mind such as mindful awareness, self-regulation of attention, emotion regulation, and self-compassion (Hölzel et al., 2011; Mind and Life Education Research Network, 2012). A small but promising area of research has begun to develop around applications of contemplative interventions in educator professional development (e.g. Flook, et al., 2013; Jennings, et al., 2013; Roeser, et
al., 2013), but continued research is necessary to understand the feasibility, acceptability, efficacy, and mechanisms of such strategies. Accordingly, the overarching goal of this dissertation is to investigate the potential of one such contemplative intervention applied in the educational context to support educators’ emotional functioning, professional efficacy, and wellbeing.

**The current studies**

The series of studies in this dissertation address the need for innovative professional development models to support the wellbeing of educators. The studies provide an in-depth evaluation of a new contemplative intervention for educators, the Comprehensive Approach to Learning Mindfulness (CALM) program for educator health and wellbeing. CALM is a manualized intervention that is based in gentle yoga and mindfulness practices. CALM is innovative in its approach and format. Previous contemplative interventions with educators have trained teachers in mindfulness practices in a series of weekly workshops or intensive weekend trainings. CALM is offered daily, before school, in the school setting, and is open to all school personnel rather than only teachers. CALM aims to empower educators with a set of practices and skills to effectively regulate emotions, manage daily stressors, and support the development of their own wellbeing.

**Study 1**

The first study examined the feasibility and efficacy of CALM. This is the first program of its kind to be implemented in a brief daily format before school, so the first aim of this study was to examine the feasibility and acceptability of
implementing the CALM program with a group of educators (teachers, paraprofessionals, learning support) in a middle school setting. The second aim of the first study was to evaluate the efficacy of CALM in promoting educator emotional functioning and teaching efficacy, preventing stress and stress-related problems, and promoting educator wellbeing. Analyses compared the CALM intervention group with randomized waitlist control group on number of self-report and physiological measures.

**Study 2**

The second study was an implementation process evaluation conducted in the context of the CALM efficacy study. This process evaluation focused on participant responsiveness, including program attendance, personal practice frequency, and perceptions, and sought to accomplish three central goals. The first aim was to provide descriptive documentation these three dimensions of participant responsiveness and the interrelationships among them. The second aim focused on the relationships between participants' baseline characteristics and their responsiveness to the CALM intervention. The third aim examined the ways that two dimensions of responsiveness, attendance and practice, were associated with differential change in study outcomes.

**Study 3**

Through the use of mediation models, study 3 tested mechanisms of change hypothesized by the CALM logic model. Drawing from the prosocial classroom conceptual model (Jennings & Greenberg, 2009), CALM was hypothesized to impact
educators’ classroom practice through proximal intervention-related improvements in their emotional functioning (including mindfulness, positive affect, and distress tolerance). Study three tested the indirect effects of CALM at follow-up (one year after baseline) on three dimensions of educators’ efficacy for classroom practice (classroom management, student engagement, and instructional practice) through posttest gains in the three hypothesized proximal mediators.
References


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_. Advance online publication.


waitlist-control field trials. *Journal of Educational Psychology*. Advance online publication.

CHAPTER 2

Promoting Stress Management and Well-Being in Educators: Feasibility and Efficacy of the CALM Intervention
Introduction

Teaching is one of the most stressful professions, involving a high level of caregiving demands, emotional labor/emotion management, and work overload. Recently, teacher stress has substantially increased, and most teachers now report being under great amounts of stress several days per week (Metlife, 2013). Compared to many other occupations, teaching is rated worse in terms of physical health, psychological wellbeing, and job satisfaction, and job satisfaction for teachers recently reached a 25 year low (Johnson, et al. 2005; MetLife, 2012, 2013). Efforts to improve school climate and performance have given increasing attention to the importance of student social-emotional functioning (Atkins, Hoagwood, Kutash, & Seidman, 2010; Durlak, Weissberg, Dymnicki, Taylor, & Shellinger, 2011; Greenberg et al., 2003), but the role of educators’ own social-emotional functioning and wellbeing has been largely overlooked (Jennings & Greenberg, 2009).

Teachers are responsible to provide a stimulating learning environment to facilitate student engagement, motivation, and academic outcomes, and perhaps most challengingly, to provide a positive emotional climate to support student social emotional functioning. While striving to meet these goals, educators are constrained by the physical confines of a classroom, performing under a constant spotlight from students and support staff, and charged with the care of up to 30 young people. Because of this unique environment, educators are exposed to a variety of daily psychological and physical stressors and must cope effectively with their own emotional reactivity to student behaviors and situational stressors in order to
perform effectively (Day & Qing, 2009). Most educators are not prepared in any formal way for the daily strains of the constant work of managing their own emotional reactions and expressions in order to meet the demands of classroom performance (Brown & Valenti, 2013). Educators’ experiences of stress and negative emotion in the classroom over time may lead to decreased performance and burnout as well as poor student outcomes (Blase, 1986; Jennings & Greenberg, 2009).

While there has been some research focused on understanding educators’ particular experiences of stress and burnout (e.g. Blase 1986; Montgomery & Rupp, 2005), there have been few professional development approaches tested to support educators’ stress management and wellbeing (Roeser, Skinner, Beers, & Jennings, 2012). Such efforts may be critical to optimizing educators’ classroom performance and wellbeing and thus, a crucial step forward in improving the quality of educational contexts. Recent empirical research and theory suggests that interventions which involve contemplative practices may be particularly well-suited to improving teachers’ social-emotional competence and reduce the harmful effects of stress (Abenavoli, Jennings, Greenberg, Harris, & Katz, 2013, Roeser et al., 2012). The study reported here was an evaluation of one such strategy to support educators’ emotional functioning, stress management, and wellbeing using a place-based, daily support model.

The CALM program is a brief daily mindful yoga-based contemplative intervention for educators implemented in the school setting. CALM integrated
practices from yoga and other forms of meditation (e.g. mindfulness and lovingkindness) in the format of brief daily practices provided as a workplace wellness promotion intervention. The majority of prior research on contemplative interventions has focused on mindfulness meditation. Compared to many other contemplative interventions, CALM sessions: (1) included primarily yoga-based practices; (2) were offered in a more frequent much briefer format; (3) included less direct instruction and discussion on mindfulness. Nonetheless, the prior research on contemplative interventions informed the rationale and logic model for CALM, and a central goal of this study was to explore whether similar impacts might be achieved in a very different intervention model.

**Contemplative Practice as a Support for Health and Wellbeing**

Contemplative Interventions (CIs) take many forms, but much of the empirical research on CIs has centered on training in mindfulness, most commonly through Mindfulness Based Stress Reduction (MBSR; Kabat-Zinn, 1990). Mindfulness involves both sustained nonjudgmental attention to present moment experience and an orientation of openness, curiosity, and acceptance towards one’s experience (Bishop, 2004; Kabat-Zinn, 1990). The cultivation of mindfulness is not unique to MBSR and is a core process of other contemplative practices, such as various forms of meditation and yoga. Yoga is a form of contemplative practice that involves physical movements and postures, intentional breathing practices, and meditation (both alone and integrated with the two former practices).
Research on CIs within clinical and healthy adult populations has demonstrated their efficacy in reducing stress and improving mental health and wellbeing. Within clinical populations contemplative interventions are associated with improvements in health and wellbeing and reductions in symptoms such as pain, rumination, depressive symptoms, and anxiety (see Baer, 2003; Fjorback, Arendt, Fink, & Walach, 2011; Mars & Abbey, 2010; Ospina, 2007 for reviews). Fewer studies have been conducted with healthy populations, but a review of MBSR as a stress reduction intervention with healthy populations, including several studies with caregiving professionals (such as nurses, medical students, and therapists), suggests that it is efficacious as a method of preventing stress and burnout and promoting wellbeing, empathy, and self-compassion (Chiesa & Serretti, 2009; Cohen-Katz et al, 2005; Rosensweig et al, 2003; Shapiro et al 2005; Shapiro, Brown & Biegel, 2007). These results suggest that mindfulness-based interventions may be one promising strategy to counter the significant stressors of teaching.

**How Do Contemplative Interventions Work?**

Contemplative practices have been shown to alter the function and structure of the neural substrates underlying the development of attentional regulation and executive functions, body awareness, emotion regulation, and perspectives on the self (Holzel, et al, 2011, MLERN, 2012). The cultivation of positive emotion may be another key process for some types of CIs, such as loving-kindness meditation (Fredrickson et al., 2008). These changes support the development of improved psychological, physiological, and behavioral functioning (e.g. Carmody & Baer, 2009;
Fredrickson et al., 2008), and in the case of teachers, this may translate to improved occupational engagement and wellbeing, more effective classroom management and the ability to foster a positive relational climate with students (Roeser, et al. 2012).

Empirical studies have demonstrated that contemplative interventions result in increased mindfulness, emotion regulation, which at least partially mediate their effects on stress and wellbeing (Gard et al 2012; Nyclicek & Kuijpers, 2008; Shelov & Suchday, 2009). These practices may also lead to improvement in sleep quality which is important in the management of stress and stress related problems (Abenavoli, et al., 2013; Field, 2011, Harinath, et al., 2004). Physiologically, contemplative practices such as mindfulness and yoga may result in lowered blood pressure, reduced inflammatory response, and alterations in the body's biochemical response to stress, such as improved cortisol rhythms (Field, 2011; Kamei et al 2000; Kiecolt-Glaser, et al., 2010; Matousek, Dobkin, & Pruessner, 2009).

**Contemplative Interventions for Educators**

Recently, at least three mindfulness-based programs have been developed specifically for teachers (Benn, Akiva, Arel, & Roeser, 2012; Flook, Goldberg, Pinger, Bonus, & Davidson, 2013; Jennings, Snowberg, Coccia, & Greenberg, 2011; Jennings, Frank, Snowberg, Coccia, & Greenberg, 2013; Roeser et al, 2013). These three programs vary in content, session length, and duration, but involve intensive sessions incorporating experiential contemplative exercises, discussions, lectures, small group applications, and homework assignments to promote mindful
awareness, attention, emotion regulation, and compassion and to promote the direct application of these skills in the classroom.

In a small pilot study of a modified version of MBSR (n=18), Flook and colleagues (2013) found that elementary teachers showed improvements at posttest in several areas compared to a the control group, including self-reported psychological distress, mindfulness, self-compassion and burnout, as well as observed classroom performance and performance on attention and emotion processing tasks. There was also an effect on cortisol functioning with intervention teachers remaining stable in their morning peak cortisol levels (30 minutes after waking), while controls showed a significant decline indicating the negative effects of stress. CARE (Cultivating Awareness and Resilience in Education) is a CI that integrates emotion skills instruction, mindfulness practices, and compassion practices (Jennings et al., 2011). In a randomized trial of 50 teachers, CARE was delivered in five days of training spread over 4 weekend sessions and supported by coaching between sessions (Jennings et al., 2013). CARE intervention participants reported reductions in time pressure, burnout, and physical symptoms, and improvements in mindfulness, emotion regulation, and teaching efficacy. A third program, SMART-in-Education is an 8-week, 11-session CI focused on mindfulness and self-compassion training (Benn et al., 2012; Roeser et al., 2013). Teachers randomized to this program reported less stress, burnout, anxiety, and depression, and improved in their mindfulness, self-compassion, and attention. There were no
significant intervention-related impacts on physiological indices of blood pressure or salivary cortisol.

**The Current Study**

The current study investigates the efficacy of a new CI, CALM, as a support for educator wellbeing. CALM is based in gentle yoga and mindfulness practice and is hypothesized to improve emotional functioning and stress-management and to have benefits for classroom teaching, health, and wellbeing (see Figure 1). While other CIs have primarily focused on training in mindfulness and compassion, CALM uses yoga as a primary modality. Yoga has become accepted as a valid CI for various stress-related clinical disorders, and clinical studies have shown its benefits in psychological wellbeing, pain, sleep quality, cardio-respiratory functioning, and blood pressure (Field, 2011). Studies assessing the effects of yoga with normal populations indicate reductions in anxiety, depressive symptoms, and sleep-impairment, as well as improvements in wellbeing (Chong, et al., 2011).

The innovative, school-based, daily format of CALM was designed to increase accessibility, promote skill transfer, and to promote organization-level change. Contemplative interventions usually have an expectation of personal practice from participants to be conducted at home or applied during daily activities. CALM’s format provided participants with a direct model for a brief personal daily practice and instructed participants in brief daily practices that could be carried beyond the intervention sessions. This format was also designed to contribute positively to the climate of the school by demonstrating the schools’ commitment to teacher
wellbeing and building a shared sense of community among educators around self-care and wellbeing.

The current evaluation included 2 primary aims: to assess the feasibility of implementing the CALM intervention model and to evaluate its efficacy in a sample of middle school educators. This study reports intervention main effects at post-test from a two-school randomized waitlist control study. Potential preventive or wellness promotion impacts were explored in several areas: (a) mindfulness and emotional functioning (e.g. affect experience, emotion regulation, and distress tolerance); (b) stress (time pressure, perceived stress, and burnout); (c) teaching efficacy; (d) subjective wellbeing (physical symptoms and sleep-related impairment); and (e) physiological functioning (blood pressure and cortisol functioning).

**Method**

**Recruitment and Participants**

The study utilized an experimental wait-list control design. Two middle schools in the same district, serving similar populations, agreed to be randomized to receive the intervention in the first year of the study or in the second year after follow up data had been collected. Participants were recruited primarily through presentations by study staff in meetings and through announcements and distribution of brochures. Principals from both schools were supportive of teacher participation. All teachers and staff were eligible to participate as long as they were not currently pregnant or under a doctor’s orders to refrain from physical activity.
Research participation was capped at around 30 individuals per school due to assessment budget constraints; however personnel were welcomed to participate in intervention sessions even if they were not enrolled in the research study. Sixty-four educators (42 teachers, 22 para-professionals, learning support, etc.) from 2 middle schools (1 intervention school, n=34 and 1 control school, n=30) enrolled in the study. The participants were predominantly white, mostly female (8 men), had a mean age of 43 years, and an average of 14 years teaching experience. At posttest, one participant did not provide data, bringing the analytic sample size for this evaluation to 63. See Table 1 for additional demographic information.

**Intervention Procedures**

CALM is based in gentle yoga and mindfulness practices (Harris & Hudecek, 2013). The 64 intervention sessions, each lasting approximately 20 minutes, are offered four days per week for 16 weeks before the beginning of the school day. These sessions were taught by a certified yoga instructor (with experience in meditation practices) who assisted in the development of the program. The intervention was manualized, and each week involved a different thematic focus (e.g., present-centered awareness, balance, acceptance) with variations on the theme in each of the four daily sessions. Intervention sessions were scripted and a typical session included 2-3 minutes of centering and intention setting practices followed by 1-2 minutes of breathing exercises (e.g. breath awareness, diaphragmatic breathing), 7-10 minutes of movement practice, revisiting the breathing practice for 1-2 minutes, 3-4 minutes of a final relaxation or meditation
practice (with a varied focus on relaxation, mindfulness, self-care, caring and compassion for others, lovingkindness, and gratitude) and ended with a 1 minute closing practice involving setting an intention for the workday.

Participants were not expected to attend every session but were encouraged to attend CALM sessions at least 2 days per week and to engage in these practices outside of the sessions. Weekly personal practice cards were given to the participants to support extension of the strategies beyond the sessions. Participants were given examples of when and how they might practice specific brief strategies during the school day to aid in the management of stress, support positive relationships with students and colleagues, and to promote coping with work-related demands.

**Data Collection Procedures**

All data collection procedures were conducted following a protocol approved by the Pennsylvania State University’s Institutional Review Board. Data were collected through three methods: online survey of self-report questionnaires, in-person physiological assessment, and self-administered saliva collection.

**Participant Assessments**

Pretest assessments were administered in the Fall of year 1, and posttest assessments were administered in the Spring of year 1 after the intervention was complete, 5 months after the initial assessment. All participants were assigned unique identification codes in order to link data across formats and time points while preserving confidentiality. Self-report questionnaires were administered
online and required about 30 minutes to complete. In-person assessments lasting approximately 15-20 minutes were conducted at the schools with the main purposes of collecting physiological measurements and explaining saliva collection procedures.

In addition to the self-report survey and in-person assessment, at each assessment period, participants collected their own saliva 4 times over the course of one normal work day. Participants were given detailed written instructions and in-person training regarding the use of their saliva collection kits. Saliva samples were collected during one mid-week regular workday (e.g. Tuesday through Thursday). Saliva was collected at waking (before getting out of bed), 30 minutes after waking, at lunchtime, and at bedtime. Samples were refrigerated overnight and then returned to the school office, where they were retrieved daily and stored at \(-80\)° until assays commenced.

**Implementation Feasibility and Fidelity Data**

Two methods were used to collect data on the fidelity of intervention implementation. First, after each intervention session, the instructor completed an implementation self-evaluation. Second, to measure fidelity 20% of intervention sessions were observed after raters had been trained to a high level of agreement. Both the instructor self-evaluation and observer measures included ratings of adherence to the curriculum content, quality of delivery, and whether modifications were made for each activity. Participants’ attendance was recorded at each session by the instructor. At post-test, participants completed a survey with questions
addressing intervention feasibility, acceptability, engagement, perceived efficacy, and how frequently they engaged in each of several types of contemplative practice taught in the program.

**Measures of Educator Mindfulness and Emotional Functioning**

**Mindfulness**

The Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietmeyer, & Toney, 2006) was used to assess mindfulness. The FFMQ has 39 items comprising five subscales originally derived from a factor analytic study. Participants rate how true each item is for themselves on a scale of 1 (never or very rarely true) to 5 (very often or always true). The five subscales include: *degree of observation* (8 items, $\alpha = .79$, “I pay attention to how my emotions affect my thoughts and behavior”); *capacity for description* (8 items, $\alpha^{1} = .88$, “I’m good at finding words to describe my feelings”); *acting with awareness* (8 items, $\alpha = .93$, “When I do things, my mind wanders off and I’m easily distracted” reverse-coded); *non-judgment* (8 items, $\alpha = .93$, “I make judgments about whether my thoughts are good or bad” reverse-coded); and *non-reactivity* (7 items, $\alpha = .76$, “When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it”).

**Affect**

The Positive and Negative Affect Schedule Short Form (PANAS; Thompson, 2007; Watson, Clark, & Tellegen, 1988) was used to measure participants’ positive

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1 Cohen’s alpha statistics reported for all scales were calculated with pre-intervention data.
affect and negative affect. Participants rated 10 emotion words on the extent to which they had felt that way “during the past few week” on a scale ranging from 1 (very slightly or not at all) to 5 (extremely). The positive affect (PA) subscale included 5 items (α = .86; alert, inspired, attentive) and the negative affect (NA) subscale included 5 items (α = .81; upset, hostile, ashamed).

**Emotion Regulation**

The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) is comprised of 10 items forming two subscales that assess the habitual use of two emotion regulation strategies: cognitive reappraisal (6 items, α = .93, “When I’m faced with a stressful situation, I make myself think about it in a way that helps me stay calm”) and expressive suppression (4 items, α = .77, “I keep my emotions to myself”). Participants rate the extent to which they agree with each statement on a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

**Distress Tolerance**

The Distress Tolerance Scale (DTS; Simons & Gaher, 2005) assesses a meta-emotional construct that relates to individuals’ ability to experience negative psychological states and the extent to which they are able to handle or withstand negative emotions without acting to avoid or alleviate them or becoming absorbed in them. Participants rate on a scale of 1 (strongly agree) to 5 (strongly disagree) 15 items their beliefs about feeling distressed or upset. Based on a factor analytic study (Simons and Gaher, 2005), 4 subscales were used in scoring the DTS. The subscales include tolerance for emotional distress (3 items, “Feeling distressed or upset is..."
unbearable to me”), *absorption in negative emotions* (3 items, “My feelings of distress are so intense that they completely take over”), *appraisal* (6 items, “Other people seem to be able to tolerate feeling distressed or upset better than I can”), and effortful *regulation of distress* (3 items, “I’ll do anything to stop feeling distressed or upset”). These subscales were averaged to create a second order factor for general distress tolerance (α=.89).

**Relational Trust**

Relational Trust for teachers (Bryk & Schneider, 2001) was computed based on 6 items. Participants were asked to indicate the extent to which they agreed with each of the items on a scale from 1 (strongly disagree OR not at all) to 4 (strongly agree OR to a great extent). Example items include “Teachers in this school trust each other” and “I feel respected by other teachers in this school” (α=.91).

**Measures of Teaching Efficacy**

A subset of items from the Teachers’ Sense of Efficacy Questionnaire (TSES) assessed teaching efficacy (Tschannen-Moran & Hoy, 2001). Subscales measured three dimensions: *instructional practices* (4 items, α=.86, “how much can you use a variety of assessment strategies?”), *classroom management* (4 items, α=.9, “how well can you keep a few problem students from ruining an entire lesson?”), and *student engagement* (4 items, α=.82, “how much can you do to motivate students who show low interest in schoolwork?”). Responses to each question are rated on a scale ranging from 1 (nothing) to 9 (a great deal).

**Measures of Educator Stress Burnout**
**Time Urgency**

Eleven items were used to assess feelings of task-related time pressure and general hurry (Landy, Rastegary, Thayer, & Colvin, 1991). Participants rated their agreement with items on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Example items include “I am usually pressed for time” and “I find myself hurrying to get to places even when there is plenty of time” (α =.83).

**Perceived Stress**

A combination of four questions that asked participants to reflect on feelings they experienced in the last month made up a measure of perceived stress (4 items, α =.89, “In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?”). Responses ranged from 0 (Never) to 4 (Very Often).

**Professional Burnout**

Educator burnout was assessed with the Maslach Burnout Inventory – Educators Survey (Maslach & Jackson, 1981). Participants were asked to review 22 items stating job-related feelings and indicate on a scale of 0 (Never) to 6 (Everyday) whether they ever feel this way about their jobs. The MBI is made up of 3 subscales: **emotional exhaustion** (9 items, α =.91, “I feel emotionally drained from my work”), **personal accomplishment** (8 items, α =.82, “I deal very effectively with the problems of my students”), and **depersonalization** (5 items, α =.74, “I don’t really care what happens to some students”). At post-test, the depersonalization subscale
reliability decreased notably ($\alpha = .56$), so findings regarding this subscale are interpreted with caution.

**Measures of Wellbeing: Self Report**

**Physical Symptoms**

Participants’ experience of physical symptoms was measured with the Daily Physical Symptoms scale (Larsen & Kasimatis, 1991), in which participants are asked to indicate whether they have experienced a variety of symptoms (headache, backache, nausea, dizziness) on the day of administration. Participants’ physical symptoms were computed as a percent of the total possible physical symptoms.

**Sleep-related Impairment**

Problems related to poor sleep were measured with the Sleep-Related Impairment scale of the Patient-Reported Outcome Measure Information System (PROMIS) for sleep (Buysse et al., 2010). Sleep-related impairment was measured by a total score on 8 items ($\alpha = .93$), such as “I was sleepy during the daytime” and “I had a hard time concentrating because of poor sleep.” Participants rated their experience of these items based on the last 7 days on a scale that ranged from 1 (“not at all”) to 5 (“very much”).

**Measures of Wellbeing: Physiological**

**Blood Pressure**

Blood pressure was measured during the in-person assessments using an Omron® HEM-780 Automatic Blood Pressure Monitor with ComFit™ Cuff. Blood pressure readings were taken three times, waiting one minute between each
reading. Averages were computed for systolic blood pressure, diastolic blood pressure, and heart rate by taking a mean of the 2nd and 3rd readings.

**Salivary Biomarkers**

Cortisol assays were completed by the Biomarker Core Lab at the Pennsylvania State University. Duplicate samples from each participant from each of the four times of day were assayed using commercially available immunoassay kits, and retesting was conducted for any duplicate assays that varied by more than 5% error. Duplicate cortisol values were averaged and then converted nmol/L to produce values for analysis. For salivary assays, inter-assay covariances were less than 10%, and intra-assay covariances were less than 5%. Cortisol area under the curve (AUC) with respect to ground was computed with a formula that accounts for variability in time intervals between measurements to estimate total hormone concentration (Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003). Cortisol awakening response (CAR), which is characterized by a steep increase 30 minutes past waking, was computed by subtracting the waking hormone level from the level observed 30 minutes past waking (e.g. Grossi et al., 2005). To correct for skew and kurtosis, a log transformation was applied to cortisol AUC, and those log-transformed variables are used in the current analyses.

**Analytic Approach**

ANCOVA models tested intervention impacts with the following covariates: pre-test level of each outcome variable, gender, and years teaching. Two-tailed significance with an alpha level of .05 was used, but given the reduced power from a
small sample, alpha = .10 was used to indicate noteworthy trends. Analyses followed an intent-to-treat design, and all participants were included in the analyses regardless of their participation in the intervention. Effect sizes were computed with Cohen’s $d$ using covariate adjusted posttest means with pooled unadjusted posttest standard deviations using the following formula:

$$
Cohen's \ d = \frac{M_{T_{post}} - M_{C_{post}}}{\sigma_{pooled}}
$$

where $\sigma_{pooled} = \frac{[(N_T-1)\sigma^2_{T_{post}} + (N_C-1)\sigma^2_{C_{post}}]}{N_T + N_C}$

Results

Program Implementation

Fidelity

The mean adherence score for instructor self-evaluations was 3.9 out of 4; the mean from observer ratings was 3.77, indicating CALM was implemented with high fidelity.

Feasibility

Participants rated the length and duration of CALM as “just right.” The majority of participants agreed that it was feasible to attend CALM the recommended 2 days per week (72%), in the mornings before school (59%), in regular work clothes (90%), and to practice program skills outside of class (94%). 90% of participants indicated that they would continue participating if the program was offered again; 94% of participants indicated that they would recommend the program to other school personnel.

Attendance and Engagement
Participants attended an average of 24 sessions total (min=0, max=59), corresponding to an average of 8 intervention contact hours. Fifty-six percent of participants attended at least once per week, and 32% attended at least twice per week. Only one participant never attended a session. Participants reported engaging in each type of personal practice (centering, intention setting, breathing, movement/posture, caring, gratitude, relaxation, & CALM card practices), on average, about once per week.

**Intervention Efficacy**

Tables 2 – 5 display pretest and posttest unadjusted means, ANCOVA results, and effect sizes. There were very few significant baseline differences in educator characteristics, similar to what would be expected by chance. Educators in the intervention school were higher in positive affect at baseline ($t=2.73$, $p<.01$), and educators in the control school were higher in efficacy for student engagement ($t= -2.01$, $p<.05$). At posttest, the intervention was associated with statistically significant impacts ($p<.05$) on seven outcomes and notable trends ($p<.10$) for intervention impacts on two other outcomes (See Tables 1-3).

**Emotional Functioning**

At posttest CALM participants scored significantly higher in one aspect of mindfulness: mindful observation ($F(1,58)=4.91$, $p<.05$, $d=.41$). Intervention participants also had significantly improved scores compared to controls on the experience of positive affect ($F(1,58)=8.53$, $p<.01$, $d=.54$) but not negative affect, and
their distress tolerance ($F(1,56)=9.76, p<.01, d=.44$) but not the other two emotion regulation strategies.

**Teaching Efficacy**

CALM participants improved significantly in their efficacy for classroom management relative to control participants ($F(1,53)=4.18, p<.05, d=.41$). There were no significant differences in efficacy for instructional practice or student engagement.

**Stress and Burnout**

CALM participants improved in two aspects of work-related stress compared to control participants: there were trend level impacts on time urgency ($F(1,58)=2.93, p<.10, d=.31$) and the depersonalization aspect of burnout ($F(1,56)=3.49, p<.10, d=.36$). There were no significant differences in perceived stress or the other dimensions of burnout.

**Wellbeing: Subjective**

CALM participants reported significantly fewer daily physical symptoms compared to controls ($F(1,57)=4.39, p<.05, d=.40$). Differences between the two groups in sleep-related impairment were not significant.

**Wellbeing: Physiological**

ANCOVA models examining blood pressure and heart rate outcomes included a binary code for time of measurement (morning or afternoon) as an additional covariate. CALM participants showed a significant lowering of their diastolic blood
pressure compared to controls ($F(1,55)=4.07, p<.05, d=.30$), but no effect was found for systolic BP.

ANOVA models for cortisol included presence of steroidal/hormonal medications as an additional covariate. There was a significant intervention effect on CAR ($F(1,54)=5.88, p<.05, d=.63$); at posttest CAR was less steep in controls than in the CALM group. Follow-up analyses revealed this effect was due to an increased waking level in the control group, while their peak level 30 minutes after waking remained stable. At posttest but not pretest, the control group’s waking cortisol level was significantly higher than that of the CALM group ($F(1,55)=9.96, p<.01$), controlling for baseline level, gender, years teaching, and hormonal/steroidal medications. See Figure 2.

**Discussion**

This study investigated whether a daily yoga-based CI implemented at school was a feasible and efficacious support for educators’ wellbeing and work-related functioning. Results suggest that CALM was feasible to implement with fidelity and was well received by this sample of educators. Educators attended about 24 sessions on average and completed personal practices regularly (about once per week for each type). As hypothesized, analyses demonstrated that the program had significant effects in promoting mindfulness and emotional functioning, reducing time urgency and burnout, promoting efficacy for classroom practice, and improving self-report and physiological indicators of wellbeing. Small to moderate effect sizes were observed for most outcomes.
A key domain of proximal change hypothesized by the CALM logic model is educators’ mindfulness and emotional functioning, including their affect experience and emotion regulation strategies. CALM aimed to promote adaptive emotion regulation through mindful awareness of emotional experience, greater capacity to tolerate emotional perturbations, acceptance, and reduced reactivity to emotion (e.g. Baer, 2003; Biglan, Hayes, & Pistorello, 2008; Chambers et al., 2009). Additionally, specific elements of the CALM program were intended to facilitate the experience, awareness, and savoring of positive affective experiences (e.g. lovingkindness and gratitude meditations).

As hypothesized, CALM participants showed significant improvement on emotional functioning. Compared to controls, they showed improved mindfulness on the dimension of *degree of observation*. It is not surprising that a yoga-based program might result in greater improvements on this dimension, which may be especially indicative of body awareness (Hölzel et al., 2011). Effect size estimates suggest that the CALM group also showed improvement in other dimensions of mindfulness, although not to a significant degree. There also were significant intervention impacts on positive affect and distress tolerance, which is conceptualized as a meta-regulation process of how individuals’ react to uncomfortable emotions. The fact that no effect was found for the experience of negative affect suggests that CALM did not alter the frequency of negative affect, but instead helped participants to cope more effectively with negative emotions and distress. This is consistent with Fredrickson and colleagues’ (2008) research, in
which a workplace loving-kindness meditation intervention increased positive emotion and wellbeing while negative emotions remained stable. It is also congruent with conceptual models of mindful emotion regulation (e.g. Baer, 2003; Biglan, Hayes, & Pistorello, 2008; Chambers et al., 2009) which emphasize greater acceptance of emotion and less mental and behavioral reactivity to emotion (e.g. tendencies to become absorbed in or attempt to modify emotional experience). No differential changes were observed in suppression of emotion expression or reappraisal.

In addition to improving educators’ emotional functioning, CALM was effective in supporting educators’ classroom teaching experience. CALM participants reported increased efficacy in their classroom management, while the control group did not. Although significant effects were not observed for the other two domains of efficacy, the means for these also trended in the same direction. In future studies such findings should be verified by observations of teaching, and student ratings of classroom climate and student-teacher relationships. We also hypothesized that the daily shared experience of practicing self-care with colleagues might improve the sense of community or relational climate. Although there was no significant effect on the quantitative measure of relational trust, we have begun to examine focus group data that points to beneficial effects of the relational and community building aspects of CALM. Future studies might utilize educator and student ratings of school climate to gage changes in the schools’ relational climate and culture around stress and wellbeing.
CALM participants also showed improvements in other stress-related outcomes as well as subjective and physiological wellbeing. There were trend-level intervention effects on time pressure and the depersonalization aspect of burnout, but no significant differences were observed in other dimensions of burnout. CALM participants also showed significant reductions in average number of physical symptoms they experienced, which represent an improvement in the subjective experience of physical wellbeing.

In addition to self-report outcomes, two physiological measures of wellbeing displayed intervention benefits. While CALM educators remained stable in their cortisol awakening responses at post-test, the response of the control group was blunted. This pattern was due to an increased waking cortisol level in the control group at posttest. Although research on the effects of some stress related conditions, like depression and burnout, on CAR has been inconsistent, both physical and psychiatric conditions have been associated with blunting of the CAR (Fries, Dettenborn, & Kirschbaum, 2009). As the CAR is a fairly stable characteristic, the changing waking levels in controls over the school year may be an adverse effect of work-related stress that was prevented in the intervention group.

CALM showed a significant effect on blood pressure which is associated with stress and is a key indicator of cardiovascular functioning and risk for poor health. CALM participants displayed a reduction in diastolic blood pressure over the school year compared to the controls. Although not a high-risk sample, the size of the
reduction found in blood pressure (effect size = .30) is consistent with those observed in lifestyle interventions for hypertension (Chobanian et al. 2003).

The results of this study replicate aspects of previous work on CIs, but they are differentiated from previous studies in two main areas: physiological impacts and positive affect. First, the unique nature of a daily yoga-based practice with physical movement and regulated breathing exercises might have particular potential for affecting the body’s response to stress. The reduction in blood pressure is especially noteworthy as this has important implications for educators’ health costs and outcomes. Second, previous CIs have not demonstrated effects on positive affect, but CALM was associated with a significant improvement in this area, which may be due to the daily nature of the practices including setting intentions, loving-kindness meditation, and self-care practices. Loving-kindness practice may be especially salient in the sustained increase of positive affect (Fredrickson et al., 2008).

**Strengths**

This study had a number of strengths, including an innovative intervention approach, diverse outcome measurement, and implementation monitoring. The measurement protocol was diverse and included both self-report and physiological assessments. Outcomes were conceptualized broadly in order to measure processes conceptualized as key proximal mediators and explore other hypothesized outcomes. Moreover, the fidelity of program implementation was closely monitored through multiple means. The instructor completed self-evaluations after each of the
64 sessions and met regularly with the primary developer to discuss implementation and problem-solve when necessary. Fidelity observations were also completed on more than 20% of the intervention sessions.

This study also addressed gaps in the literature by exploring yoga as a central intervention modality and by demonstrating impacts of brief daily contemplative practices. This was the first intervention study, to our knowledge, to implement a brief daily contemplative intervention with educators onsite at their school. This unique feature may increase acceptability and feasibility by normalizing participation and by its convenience and low cost. This school-based approach, by integrating into the routine of the building and being inclusive of other personnel, may also serve to promote a healthier climate around self-care for wellbeing and proactive stress management, ultimately affecting change in the culture of the school. In addition, although sitting meditation and compassion practices have been tested in interventions to reduce stress and promote wellbeing in teachers, yoga has not been the primary practice in any of these models. CALM adds mindful yoga to the menu of promising CIs to promote educators’ stress management and wellbeing.

Limitations and Future Directions

Although the sample size was adequate to test efficacy, it was relatively small and homogenous in terms of race and SES, and confined to only two schools in a relatively advantaged district. Assignment to the intervention was by school, rather than by individuals both to protect against contamination effects as well as follow our logic model of improving the building level climate around wellbeing and
support for educator relationships. In addition, this study used a waitlist control
group rather than an active control group. In order to investigate “specific effects,”
future studies should consider control groups that account for elements such as
physical activity, relaxation, and group interaction. Future research on the CALM
program and similar intervention models should include direct measures of
educators’ classroom performance and measures of school climate and educators’
relationships to test these aspects of the logic model. Future work will also test the
feasibility, acceptability, and efficacy of the program in a larger, more diverse urban
setting where stressors may be greater or qualitatively different from those
experienced by educators in this sample.

**Conclusions**

Educators’ emotional functioning and ability to cope with stress play an
important role in their own wellbeing and in their abilities to effectively support
students’ social-emotional and academic development. The research reported here
provides initial evidence that an innovative intervention model involving a brief
daily contemplative yoga practice was feasible to implement in a middle school
setting, acceptable to educators including classroom teachers and other personnel,
and efficacious as a support for their professional development and wellbeing.
Offering educators school-based contemplative interventions like CALM to support
their self-care and wellbeing may help to offset the increasing prevalence of
educator stress and burnout. This type of intervention shows promise for further
exploration of its potential to create a positive impact on the social-emotional
climate and performance of schools as well as to improve educators’ health outcomes.
References


through coordinated social, emotional, and academic learning. *American Psychologist, 58*, 466-474.


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_. Advance online publication.


Table 1-1.

Participant Demographics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M or %</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in Years</td>
<td>64</td>
<td>42.55</td>
<td>12.53</td>
<td>21-69</td>
</tr>
<tr>
<td>Percent Female</td>
<td>64</td>
<td>87.50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Caucasian</td>
<td>62</td>
<td>98.39%</td>
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<td></td>
</tr>
<tr>
<td>Household Income a</td>
<td>55</td>
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<td>3.99</td>
<td>1-19</td>
</tr>
<tr>
<td>Percent with Bachelor's Degree or Higher</td>
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<td>85.94%</td>
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<tr>
<td>Percent with Master's or Specialist Degree</td>
<td>64</td>
<td>37.50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of Experience in Education</td>
<td>64</td>
<td>13.96</td>
<td>9.01</td>
<td>0-39</td>
</tr>
</tbody>
</table>

Household income was measured on a scale of 1-19 where 1 = $20,000 – 29,999, 2 = $30,000 – 39,999 and so on, up to 19 = $200,000 or greater. The mean above indicates that the sample fell in the $80,000 – 99,999 range.
Table 1-2.

*Intervention impacts on educator emotional functioning: Unadjusted group means, ANCOVA results, and effect sizes.*

<table>
<thead>
<tr>
<th>Outcome</th>
<th>CALM</th>
<th>Control</th>
<th>Intervention Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre M SD</td>
<td>Post M SD</td>
<td>Pre M SD</td>
</tr>
<tr>
<td>Mindfulness</td>
<td></td>
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<td></td>
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<tr>
<td>Observe</td>
<td>3.29 0.65</td>
<td>3.56 0.61</td>
<td>3.26 0.60</td>
</tr>
<tr>
<td>Describe</td>
<td>3.56 0.62</td>
<td>3.65 0.58</td>
<td>3.54 0.65</td>
</tr>
<tr>
<td>Awareness</td>
<td>3.33 0.58</td>
<td>3.51 0.55</td>
<td>3.22 0.85</td>
</tr>
<tr>
<td>Non-Judgment</td>
<td>3.36 0.83</td>
<td>3.64 0.80</td>
<td>3.39 0.91</td>
</tr>
<tr>
<td>Non-reactivity</td>
<td>3.26 0.52</td>
<td>3.32 0.55</td>
<td>3.08 0.51</td>
</tr>
<tr>
<td>Emotion Regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reappraisal</td>
<td>5.14 1.08</td>
<td>5.27 0.82</td>
<td>4.77 1.24</td>
</tr>
<tr>
<td>Suppression</td>
<td>3.44 1.00</td>
<td>3.22 1.16</td>
<td>3.58 1.40</td>
</tr>
<tr>
<td>Distress Tolerance</td>
<td>3.72 0.79</td>
<td>3.96 0.64</td>
<td>3.66 1.02</td>
</tr>
<tr>
<td>Emotion Experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Affect</td>
<td>3.51 0.64</td>
<td>3.70 0.69</td>
<td>3.15 0.74</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>2.00 0.78</td>
<td>1.94 0.60</td>
<td>2.08 0.85</td>
</tr>
</tbody>
</table>

*Note:* Effect sizes (Cohen’s $d$) computed as follows: difference in unadjusted post-test means / pooled within group post-test SD. Effect sizes are coded so that positive effects indicate improvement in the intervention group relative to control group.

$+p<.10;$  $^*p<.05;$  $^{**}p<.01$
### Table 1-3.

**Intervention impacts on teaching outcomes: Unadjusted group means, ANCOVA results, and effect sizes.**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>CALM</th>
<th>Control</th>
<th>Intervention Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
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<tr>
<td><strong>Teaching Efficacy</strong></td>
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<tr>
<td>Student Engagement</td>
<td>6.35</td>
<td>1.18</td>
<td>6.57</td>
</tr>
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<td>Classroom Management</td>
<td>7.55</td>
<td>1.02</td>
<td>7.74</td>
</tr>
<tr>
<td>Instructional Practices</td>
<td>7.11</td>
<td>1.45</td>
<td>7.61</td>
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<tr>
<td>Relational Trust</td>
<td>3.45</td>
<td>0.50</td>
<td>3.38</td>
</tr>
</tbody>
</table>

*Note:* Effect sizes (Cohen’s *d*) computed as follows: difference in unadjusted post-test means / pooled within group post-test SD. Positive effect sizes indicate an improvement in the intervention group relative to the control group.

+ *p*<.10; * *p*<.05; ** *p*<.01
Table 1-4.

Intervention impacts on educator stress-related outcomes: Unadjusted group means, ANCOVA results, and effect sizes.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>CALM</th>
<th>Control</th>
<th>Intervention Effect</th>
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<tr>
<td></td>
<td>Pre M SD</td>
<td>Post M SD</td>
<td>Pre M SD</td>
</tr>
<tr>
<td>Perceived Stress</td>
<td>1.42 0.87</td>
<td>1.15 0.84</td>
<td>1.44 0.88</td>
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<tr>
<td>Time Urgency</td>
<td>3.67 0.52</td>
<td>3.42 0.51</td>
<td>3.62 0.56</td>
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<tr>
<td>Burnout</td>
<td></td>
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</tr>
<tr>
<td>Emotional Exhaustion</td>
<td>23.53 11.38</td>
<td>22.21 10.25</td>
<td>25.90 13.30</td>
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<tr>
<td>Personal Accomplishment</td>
<td>39.82 6.69</td>
<td>39.68 6.31</td>
<td>38.85 6.49</td>
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<td>Depersonalization</td>
<td>5.15 5.69</td>
<td>4.50 3.42</td>
<td>5.62 4.44</td>
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</table>

*Note:* Effect sizes (Cohen’s $d$) computed as follows: difference in unadjusted post-test means / pooled within group post-test SD. Positive effect sizes indicate an improvement in the intervention group relative to the control group. 

$+p<.10; \ast p<.05; \ast\ast p<.01$
Table 1-5.
 Intervention impacts on subjective and physiological wellbeing outcomes: Unadjusted group means, ANCOVA results, and effect sizes.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>CALM Pre M</th>
<th>SD</th>
<th>Post M</th>
<th>SD</th>
<th>Control Pre M</th>
<th>SD</th>
<th>Post M</th>
<th>SD</th>
<th>Intervention Effect F</th>
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<td>Physical Symptoms</td>
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<td>0.10  0.08</td>
<td></td>
<td>0.12 0.08</td>
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<td>0.12  0.09</td>
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<td>4.39*</td>
<td>0.40</td>
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<td>Sleep-related impairment</td>
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<td></td>
<td>17.47 6.10</td>
<td></td>
<td>20.60 7.03</td>
<td></td>
<td>20.00 7.29</td>
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<td>1.85</td>
<td>0.23</td>
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<td><strong>Physiological</strong></td>
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<td></td>
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<tr>
<td>Systolic</td>
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<td>109.7 13.13</td>
<td></td>
<td>117.9 12.69</td>
<td></td>
<td>116.2 14.20</td>
<td></td>
<td>2.32</td>
<td>0.24</td>
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<td>Diastolic</td>
<td>78.32 11.30</td>
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<td>75.37 10.74</td>
<td></td>
<td>81.76 9.51</td>
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<td>81.31 11.15</td>
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<td>4.07*</td>
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<td>Cortisol</td>
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<tr>
<td>Awakening Response</td>
<td>6.82 6.66</td>
<td></td>
<td>7.51  5.10</td>
<td></td>
<td>7.29 7.74</td>
<td></td>
<td>3.27  8.56</td>
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<td>6.04*</td>
<td>0.63</td>
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<tr>
<td>AUC</td>
<td>4.53 0.29</td>
<td></td>
<td>4.53  0.41</td>
<td></td>
<td>4.59 0.33</td>
<td></td>
<td>4.63  0.33</td>
<td></td>
<td>0.37</td>
<td>0.15</td>
</tr>
</tbody>
</table>

*Note: Effect sizes (Cohen's d) computed as follows: difference in unadjusted post-test means / pooled within group post-test SD.
Positive effect sizes indicate an improvement in the intervention group relative to the control group.
+p<.10; *p<.05; **p<.01
Figure 1-1. CALM Intervention Logic Model
Chapter 3

Linking Participant Characteristics, Responsiveness & Outcomes in a School-based Contemplative Intervention for Educators
Introduction

There has been increasing attention to the need for professional development (PD) and intervention strategies to support educators in managing their work related stress (Jennings & Frank, 2003; Jennings & Greenberg, 2009). Stress and burnout have become an overwhelming problem in the education profession: job satisfaction is falling among teachers and compared to other professions, their stress, physical and psychological wellbeing are among the worst reported (Johnson et al., 2005; MetLife, 2012, 2013). Although great strides have been made developing strategies for schools to promote mental health and wellbeing among students (Atkins, Hoagwood, Kutash, & Seidman, 2010; Durlak, Weissberg, Dymnicki, Taylor, & Shellinger, 2011; Greenberg, 2010; Greenberg et al., 2003), the needs of educators have been largely overlooked. As educators face increasing responsibilities and expectations in supporting student social-emotional and academic development, schools are now beginning to recognize the need to foster the social-emotional competence, health and wellbeing of personnel (Adelman & Taylor, 2006; Jennings & Greenberg, 2009). Yet, few evidence based strategies are available to promote educators’ social emotional competence and promote resilience to the harmful effects of stress (Roeser, Skinner, Beers, & Jennings, 2012). In addition, there is little research regarding how to effectively implement strategies to support educator stress management and wellbeing or what factors affect educators’ interest or engagement in such strategies.

The goal of the current study is to investigate what factors influence educators’ engagement when one such intervention model is offered on a daily basis.
in the school setting. The Comprehensive Approach to Learning Mindfulness (CALM) program is a professional development model for educators developed to promote social–emotional competence, effective stress management, and wellbeing through daily mindful yoga practice. This process evaluation of CALM documented the educator engagement process, explored factors affecting educator engagement, and examined the relationship between individual differences in engagement and intervention outcomes.

**Importance of Implementation Process Evaluations**

Rigorous experimental and quasi-experimental trials are needed to build an evidence base for what works in educator professional development. The primary goal of most intervention evaluations is to understand program impacts. This part of the preventive intervention research cycle is often described as Type 1 research. Although such outcome research on interventions is essential, it is often only the first step in understanding under what conditions, for whom, and how intervention programs may be successful. Type 2 research refers to the study of the contextualized processes involved in implementing interventions in practice (Spoth et al., 2013). Professional development programs are complex, often involving multiple components and activities delivered across multiple sessions. When evaluating complex interventions, it is essential to study the implementation process, that is, what actually happens in the intervention and how that compares to what was planned, and to examine ways that variability in the implementation process may be related to intervention outcomes (Domitrovich & Greenberg, 2000; Durlak & DuPre, 2008; Oakley et al., 2006; Spoth et al., 2013). Evaluations of the
implementation process often have one or more of the following goals: (1) to descriptively document various dimensions of the intervention’s implementation (e.g. quality of delivery or participant responsiveness); (2) to explore factors that influence one or more aspects of the implementation process (e.g. characteristics of the intervention instructors, participants, or settings); and (3) to examine how variability in the implementation process relates to program outcomes.

**Conceptual Model for the Current Study**

There are a number of models that have been used to conceptualize aspects of implementation (e.g. Dane & Schneider, 1998; Durlak & DuPre, 2008; Glasgow, 1999). Berkel and colleagues (2011) elaborated a conceptual model of implementation based on the 8 dimensions of implementation described by Durlak and DuPre (2008) in their synthesis of previous implementation research: differentiation, dosage, reach, monitoring, fidelity, quality, adaptation, and participant responsiveness. Implementation process evaluations have shed light on a variety of factors that influence the quality of the implementation process and ways that various dimensions of implementation are related to intervention outcomes (See Durlak & DuPre, 2008 for review). Because implementation of the current intervention was limited to one site and one instructor it is not possible to study how provider or setting level factors affect outcomes. Therefore, the current study focuses on the dimension of participant responsiveness as defined by Berkel (2011).

Participant responsiveness refers to participants’ engagement with the program, including their attendance, active participation in sessions, practice or
homework completed outside of sessions, and satisfaction with the program. Berkel distinguished between dosage (e.g. number/duration of sessions offered) and attendance (the number of sessions received by a participant), and included attendance as one aspect of participant responsiveness. This study explores: (1) how participants’ demographic and psychological characteristics are related to their responsiveness (e.g. attendance, home practice, and perceptions); (2) how dimensions of responsiveness are interrelated; and (3) how two dimensions of responsiveness (attendance and home practice) are related to intervention outcomes. See Figure 1.

**Factors that Influence Participant Responsiveness**

Theoretically, several factors shape participant responsiveness to intervention programs, including participants’ characteristics and beliefs, characteristics of the intervention program (e.g. its length, format, and content), contextual factors (e.g. school climate or principal support), and delivery quality (Berkel, 2011). As noted above, the focus of the current study is on participant characteristics: demographics, prior experiences, and psychological characteristics. At present, there is little evidence on what factors influence the responsiveness of educators to workplace interventions, but we can draw from the large professional development and health promotion literatures to inform hypotheses. Because the current study involved a yoga-based contemplative intervention, factors affecting responsiveness to yoga and other contemplative practice programs were reviewed where evidence was available, and some consideration was given to the usage of
these practices (yoga, meditation, and deep breathing) in the general U.S. population.

**Demographic Characteristics**

There is little evidence linking demographic characteristics with responsiveness to either professional development or work-place health promotion interventions. Women are consistently more likely than men to participate in workplace health promotion programs (Glasgow, McCaul, & Fisher, 1993; Hasson, Brown & Hasson, 2010; Lewis, 1996; Sloan & Gruman, 1988), and women are far more likely to report participating in yoga than men (Birdee et al., 2008; Saper et al., 2004). Yoga participation is also higher among those who are white and college educated (Birdee et al., 2008; Saper et al., 2004). In the general US population, yoga usage is higher among adults under age 65, but there is not a clear relationship between age and yoga prevalence. Research on physical activity interventions, however, suggests that older adults (55+) may be more likely to adhere to intervention exercise activities than younger adults (Martin et al., 2000). Few studies have specifically investigated demographic predictors of participant responsiveness for yoga or mindfulness-based interventions, but one RCT with healthy seniors found that neither gender, age, nor education level were significantly related to participant attendance or program completion (Flegal, Kishiyama, Zajdel, Haas, & Oken, 2007).

**Current Wellness Promoting Behaviors**

In physical activity interventions, responsiveness (exercise adherence) is higher among those with a history of physical activity (Martin et al., 2000), and this
effect has also been demonstrated in a workplace stress management/health promotion program (Hasson, Brown & Hasson, 2010). I therefore hypothesize that prior exposure to, or current usage of contemplative practices or health-promoting behaviors (e.g. physical activity), would predict participants’ responsiveness. Survey studies of the prevalence of yoga usage in the US population suggest that yoga is growing in its uptake, and that it is being used for prevention and wellness as well and in response to specific health concerns (Barnes et al., 2008; Birdee et al., 2008; Saper, 2004; Peregoy, Clarke, Jones, 2014). In a 2008 CDC National Health Statistics Report based on the National Health Interview Survey (NHIS), yoga, deep breathing, and meditation had each increased in prevalence between 2002 and 2007 and were among the most commonly used complementary or alternative therapies (Barnes et al., 2008). In 2007, yoga was used by 6.1%, deep breathing by 12.7%, and meditation by 9.4% of U.S. adults, and the prevalence of yoga appears to have continued its increase (to 8.4%) based on the 2012 NHIS (Peregoy et al., 2014). Participants who have current or recent engagement with yoga or other wellness-promoting behaviors may show more responsiveness because of more favorable outcome-expectancies or efficacy beliefs specific to the type of practices included in the intervention (Brawley & Culos-Reed, 2000).

**Psychological Characteristics and Physical Wellbeing**

Self-efficacy for intervention activities may be one of the most important predictors of intervention engagement (Brawley & Culos-Reed, 2000). Self-efficacy is a consistent predictor of engagement with health behavior change interventions; those who feel more efficacious or who report more efficacy for the targeted
behavioral change domain are more likely to participate and adhere to an intervention (Brawley & Culos-Reed, 2000; Martin et al, 2000; McAuley, 1992; Rejeski, Brawley, McAuley, & Rapp, 2000). Work-related self-efficacy is correlated with perceptions of professional development, including positive evaluations and perceived personal and career benefits (Noe & Wilk, 1993), and with engagement in professional development activities in teaching and other professions (Kwakman, 2003; Noe & Wilk, 1993). However, although work-related self-efficacy is consistently linked with engagement in self-reported professional development activities, self-efficacy may not have the same strong relationship with objective measures of engagement (Noe & Wilk, 1993).

Participants’ experiences of professional burnout and time-pressure may also influence their level of responsiveness to a workplace intervention. Employees who experience few situational constraints at work (e.g. feeling pressured for time to complete tasks) are more likely to have positive perceptions of PD (e.g. positive evaluation, higher perceived benefits) and to participate in PD activities (Noe & Wilk, 1993). For educators, perceived higher levels of work stress, burnout, and specifically a lower sense of personal accomplishment, are related to lower self-reported engagement in professional learning activities (Kwakman, 2003).

In the context of wellness-promotion intervention, physical wellbeing may influence participant’s participation and engagement, but findings have revealed mixed results. In some health promotion research better overall health predicts participation (Glasgow et al., 1993; Hasson et al, 2010; Martin et al., 2000), while some studies have found that those with specific risks, dissatisfaction, or problems
related to their physical wellbeing are more likely to participate (Glasgow et al., 1993; Grosch, 1998; Sloan & Gruman, 1988). Similar to health promotion programs, yoga participation is predicted by both better perceived overall physical wellbeing and by the presence of specific physical ailments (Birdee et al., 2008). For example, in one yoga intervention program completers had both higher baseline levels of multiple dimensions of physical wellbeing as well as higher baseline levels of physical pain compared to non-completers (Flegal et al., 2007). These mixed findings do not lead to a clear hypothesis for how physical wellbeing will affect responsiveness.

**Relationships Among Dimensions of Responsiveness**

In addition to the relationships between participant characteristics and their responsiveness, evidence suggests that dimensions of responsiveness will be intercorrelated. For example, perceptions of professional development activities (e.g. their need and usefulness) are associated with employees’ participation (Noe & Wilk, 1993). For teachers specifically, perceptions about the feasibility and meaningfulness of professional learning activities are related to level of participation (Kwakman, 2003). In a workplace wellness program, educators who perceive the program as feasible, acceptable/relevant, and useful may also be more likely to attend more and engage in practice more.

**Relating Participant Responsiveness to Outcomes**

Change processes are unlikely to occur as hypothesized if participants do not attend the program with sufficient frequency, or do not complete the intended activities. There is a growing body of evidence documenting that participant
responsiveness is associated with outcomes achieved by preventive interventions (see Berkel et al., 2011 & Durlak et al, 2008 for reviews). Indeed, many studies of contemplative interventions found evidence for a relationship between responsiveness (specifically attendance and home practice completion) and program outcome. Higher attendance in program sessions has been linked to improved outcomes in yoga-based and mindfulness-based interventions (Creswell, Myers, Cole, & Irwin, 2009; De Vibe et al, 2013), although most of the research has focused on home practice completion. In studies with diverse target populations (e.g. women with breast cancer, HIV-infected adults, chronic pain sufferers, individuals with stress related problems, illness, etc.) and various outcome measurement (e.g. mindfulness, sleep quality, physical and psychological symptoms), amount of time spent in Mindfulness Based Stress Reduction home practice has been related to benefits observed (Carmody & Baer, 2008; Creswell et al., 2009; Rosensweig et al, 2010; Shapiro, Bootzin, Figuerdo, Lopez, & Schwartz, 2003). For example, Carmody and Baer (2008) found that the total time participants spent in formal practice of MBSR skills such as sitting meditation, body scan, and yoga, predicted growth in mindfulness (FFMQ), which, in turn predicted improvements in symptoms, stress, and psychological wellbeing. It should be noted that, while this pattern of results has been replicated many times, it has not always been consistent; several studies of MBSR have found no associations between attendance or home practice and outcomes (Davidson et al., 2003; Nyklíček & Kuijpers, 2008; Shapiro et al., 2007). Outside of MBSR, a positive relationship between home practice and intervention outcomes has also been documented for
other contemplative interventions, including yoga and compassion meditation (e.g. Impett, Daubenmier, & Hirschman, 2006; Pace et al., 2009).

**The Current Study**

The current study investigated aspects of participant responsiveness in the CALM study of educator wellbeing, which involved the development and testing of a brief daily contemplative intervention to reduce stress and promote health and wellbeing in middle school educators. CALM is an innovative professional development intervention model; in contrast to other educator focused mindfulness programs that are offered on a weekly or retreat basis, CALM is offered in the daily format for teachers and other school personnel. The current study addressed three aims related to participant responsiveness.

**Aim 1. Describing Educators’ Responsiveness to a Daily Contemplative Intervention**

The first aim is to document the relationships among dimensions of participant responsiveness in the CALM intervention, including self-reported personal practice frequency, attendance in program sessions, and perceptions of the program. Three aspects of participant perceptions of the program were included: perceptions of feasibility; perceptions of relevance/acceptability; and perceptions of usefulness. I hypothesize that these perceptions, attendance, and home practice frequency would be positively inter-correlated.

**Aim 2. Linking Participant Characteristics and Responsiveness**

Aim 2 examines the relationships between educator baseline characteristics (demographic characteristics, wellness promoting behaviors, and psychological
characteristics) and the three dimensions of responsiveness to the program (perceptions, home practice, and attendance). Demographic characteristics included age, years in education, professional role, education level, and presence of children in the home. I hypothesize that age and years in education would be associated with responsiveness, such that older educators and those who have been in the profession longer would attend more sessions and report more personal practice. Because the intervention was held before the beginning of the school day, it may have been more difficult for educators with children in the home to participate.

Wellness promoting behaviors included contemplative practice and physical activity; I hypothesize that educators who were currently engaged in wellness promoting behaviors would respond more favorably to the intervention. Baseline Psychological Characteristics included the level of general teaching efficacy, mindfulness, perceived time pressure, and physical wellbeing. I hypothesize that higher teaching efficacy and mindfulness and lower time pressure and burnout would be related to more favorable perceptions of the program. Previous research also suggested that higher efficacy and lower time pressure and burnout at baseline may be associated with higher levels of attendance and home practice engagement. Physical wellbeing was included as an exploratory variable since previous health promotion research revealed mixed relationships with responsiveness.

**Aim 3. Linking Participant Responsiveness to Study Outcomes**

Aim 3 investigates the relationships between two dimensions of participant responsiveness, attendance and home practice, to observed change over time in key outcome variables. I hypothesize that both consistency of session attendance and
frequency of reported personal practice would be related to observed changes in self-report outcomes as has been observed in previous research.

**Method**

**Recruitment and Participants**

The sample was the intervention group from the CALM efficacy trial, which had an experimental wait-list control design. Two schools in one district serving similar populations participated in the study and agreed to be randomized to receive the intervention either in the first year of the study or in the second year after follow up data had been collected. Participants were recruited primarily through presentations in staff meetings, announcements and distribution of brochures at the participating schools. Principals from both schools were supportive of teacher enrollment. All teachers and personnel at the two schools were eligible to participate as long as they were teachers or staff at a school, were not currently pregnant, and were not under a doctor’s orders to refrain from physical activity. No one who consented and scheduled an initial pretest assessment was excluded from the pre- and posttest assessments for any reason. Thirty-four educators from the intervention school (25 teachers, 9 para-professionals/learning support, etc.) participated. The sample was predominantly white and included 31 women and 3 men (mean age = 40.65, SD = 12.42), with an average of about 14 years teaching experience and about 8 years at the current school. See Table 1 for complete demographics.
Intervention Procedures

The intervention was provided to educators in the school context at the beginning of the workday, 4 days per week for 17 weeks (during two weeks, the program was only offered for two or three days due to inclement weather-related school closings). The intervention curriculum was scripted and each week followed a different theme related to self-care (e.g., balance, acceptance, mindfulness). The twenty-minute sessions followed a regular format involving: (1) a brief centering and intention setting practice; (2) breathing practices; (3) about 10 minutes of movement practice; (4) returning to the breathing practice; (5) a 3-4 minute final relaxation and meditation practice; and (6) setting an intention for the workday. The sessions took place in the school auditorium and sessions were completed in time for educators to have 25 minutes remaining before the first bell to use for prep time.

Promotion of Participant Engagement

Promotion of Attendance

Participants were encouraged to attend two sessions per week and several measures were taken to promote attendance to the program. Participants were consulted in setting the time for the sessions in order to find a time that was convenient for most. Throughout the program period, emails and reminder notes were sent to participants periodically to encourage participation. In addition, one individualized letter was sent about two-thirds of the way through the program reminding participants about attendance expectations and summarizing participation up to that point. As a further incentive for participation, three times
during the program “Appreciation Days” were held where participants could gather after the session with refreshments provided. During one of these appreciation events, small prizes were given in a raffle where the number of entries corresponded to the number of sessions attended.

**Promotion of Personal Practice**

As part of the intervention model, participants were encouraged to use the CALM skills and practices outside of the program sessions. To encourage this personal practice, each week participants were given “personal practice cards” describing one brief practice that participants were encouraged to use during that week. The cards described the practice (e.g., “Pause and count to three. Slow down in breath, body, and mind.”), suggested a time or context to use it, gave detailed instructions, reviewed the week’s themes, and described ways that the week’s themes applied to teaching or daily life. The instructor reminded participants of the week’s personal practice during intervention sessions. In addition to the weekly suggestions for personal practice, the instructor periodically mentioned ways that various specific practices or skills in program sessions could be transferred “off the mat” to the classroom or daily life.

**Data Collection Procedures**

All data collection procedures were conducted following a protocol approved by the Pennsylvania State University’s Institutional Review Board. Pretest assessments were administered in the fall and posttest assessments were administered five months later after the intervention was complete. Self-report questionnaires were administered online and took approximately 30 minutes. At
posttest period, intervention participants completed a program evaluation survey that addressed their perceptions of the program (e.g. feasibility, relevance/acceptability, and usefulness).

**Measurement of Participant Responsiveness**

**Attendance**

Participants signed in as they entered the sessions and the instructor verified attendance. Two measures of attendance were utilized. The first is the total raw frequency of sessions attended. The second measure of consistency of attendance was computed as the total number of weeks in which the participant attended at least one session. The latter measure, consistency, was used in all statistical analyses, because it was viewed, conceptually, as a more appropriate measure of the duration of participation. For example, Participant A could have attended frequently for just the first few weeks and earned a relatively high raw attendance score compared to Participant B, who attended once a week for the entire 17 weeks, even though Participant A did not maintain their participation across the program period. This consistency across the program period was viewed as more important factor than raw days because it reflects a higher exposure to various program themes and skills.

**Frequency of Personal Practice**

Intervention participants reported on the frequency with which they practiced intervention skills and strategies outside of intervention sessions. Responses were given on a scale of 1 (never) to 7 (Every day). Items included frequency of using centering, breathing, intention setting, movement, caring,
gratitude, and relaxation practices, as well as frequency of completing the specific personal practices described on the weekly CALM personal practice cards. This information was collected during the post-intervention assessment.

**Perceptions: Feasibility**

Five questions addressed participants’ perceptions of the feasibility of participation in the program. These questions were rated on 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). Examples include “It was feasible for me to attend the program in the mornings before school” and “participating in CALM made my mornings feel rushed” (reversed).

**Perceptions: Relevance/Acceptability**

Six items addressed participants’ judgments of how acceptable and relevant the program content was. Items included statements regarding how well the program was matched for themselves (e.g. “the content of the program was relevant to my work” and “the content of the program conflicted with my beliefs about the world”) and for educators in general (e.g. “the program is useful for all school personnel”).

**Perceptions: Usefulness**

Five additional items addressed participants’ perceptions of the usefulness of aspects of the intervention sessions (e.g. sessions as a whole, breathing exercises, movement practices, etc.). These items were all rated on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree).
Measures of Demographic and Personal Background Characteristics

Demographics

Demographic questions included participants’ age, length of time in the education profession, living situation (presence of children in the home), professional role in the school (i.e. teacher or other personnel) and level of education (e.g. whether or not they had a master’s degree).

Current Wellness-promoting Behaviors

Contemplative practice background was assessed with two questions addressing participants’ engagement in contemplative practices over the past year, including their involvement in meditation (e.g. mindfulness/vipassana, zen concentration, guided visualization) and meditative movement (e.g. yoga, qi gong, tai chi, martial arts). Questions asked how frequently participants had engaged in each practice since the beginning of the school year, and responses ranged from 0 (“not engaged currently”) to 7 (“Multiple times per day”). Because the responses were heavily weighted with zeroes, these were recoded to create one categorical indicator of whether or not they were currently engaged in either of the practices (i.e. 0 for no contemplative practice and 1 for current meditation and/or meditative movement). Physical activity level was assessed with three questions measuring participants’ frequency of engagement in light, moderate, and vigorous physical activity (Ryff et al, 2004). For example, the moderate physical activity item asked, “how often do you engage in moderate physical activity, that is not physically exhausting, but it causes your heart rate to increase slightly and you typically work up a sweat? (Examples: leisurely sports like light tennis, slow or light swimming,
low impact aerobics, or golfing without a power cart; brisk walking, mowing the lawn with a walking lawnmower).” For each question, responses ranged from 1 (Never) to 6 (Several times per week or more). A mean score of the three physical activity items was computed to represent an overall indicator of frequency of physical activity.

**Measures of Psychological Characteristics**

All measures of psychological characteristics are presented below with the 5 (teaching efficacy, mindfulness, time pressure, burnout, and physical wellbeing) that were included as baseline predictors of responsiveness for Aim 2 presented first followed by those used only as outcomes for Aim 3.

**Teaching Efficacy**

A subset of 12 items from the Teachers’ Sense of Efficacy Questionnaire (TSES) was used to assess self-efficacy (Tschannen-Moran & Hoy, 2001). The 12 items form three subscales measuring the following three dimensions: instructional practices (e.g. “how much can you use a variety of assessment strategies?”), classroom management (e.g. “how well can you keep a few problem students from ruining an entire lesson?”), and student engagement (e.g. “how much can you do to motivate students who show low interest in schoolwork?”). Responses to each question are rated on a scale ranging from 1 (nothing) to 9 (a great deal). The total score for all 12 items ($\alpha = .90$), representing a general sense of efficacy for teaching, was used in the present analyses.
**Mindfulness**

The Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietmeyer, & Toney, 2006) was used to assess mindfulness. The FFMQ has 39 items comprising five subscales. Participants rated how true each item was for themselves on a scale of 1 (never or very rarely true) to 5 (very often or always true). The five subscales include: degree of observation (8 items, $\alpha = .79$, “I pay attention to how my emotions affect my thoughts and behavior”); capacity for description (8 items, $\alpha = .88$, “I’m good at finding words to describe my feelings ”); acting with awareness (8 items, $\alpha = .93$, “When I do things, my mind wanders off and I’m easily distracted” reverse-coded); non-judgment (8 items, $\alpha = .93$, “I make judgments about whether my thoughts are good or bad” reverse-coded); and non-reactivity (7 items, $\alpha = .76$, “When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it”). The FFMQ total mindfulness score used in the current study was created by computing a mean score of all 39 items ($\alpha = .92$).

**Time Urgency**

Eleven items assessing feelings of task-related time pressure and general hurry were included as a measure of time urgency (Landy, Rastegary, Thayer, & Colvin, 1991). Participants rated their agreement with items on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Example items include “I am usually pressed for time” and “I find myself hurrying to get to places even when there is plenty of time” ($\alpha = .83$).
**Burnout**

Educator burnout was assessed with the Maslach Burnout Inventory – Educators Survey (Maslach & Jackson, 1981). Participants were asked to review 22 items stating job-related feelings and indicate on a scale of 0 (Never) to 6 (Everyday) whether they ever feel this way about their jobs. The MBI is made up of 3 subscales: *emotional exhaustion* (9 items, $\alpha = .91$, “I feel emotionally drained from my work”), *personal accomplishment* (8 items, $\alpha = .82$, “I deal very effectively with the problems of my students”), and *depersonalization* (5 items, $\alpha = .74$, “I don’t really care what happens to some students”). At post-test, the depersonalization subscale reliability decreased notably ($\alpha = .56$), so findings regarding this subscale are interpreted with caution.

**Physical Wellbeing**

As a measure of physical wellbeing, participants completed the Daily Physical Symptoms scale (Larsen & Kasimatis, 1991), in which participants are asked to indicate whether they have experienced a variety of symptoms (headache, backache, nausea, dizziness) on the day of administration. Participants’ physical symptoms were computed as a percent of the total possible physical symptoms.

**Affect**

The Positive and Negative Affect Schedule Short Form (PANAS; Thompson, 2007; Watson, Clark, & Tellegen, 1988) was used to measure participants’ positive affect and negative affect. Participants rated 10 emotion words on the extent to which they had felt that way “during the past few week” on a scale ranging from 1 (very slightly or not at all) to 5 (extremely). The *positive affect (PA)* subscale
included 5 items (α = .86; alert, inspired, attentive) and the negative affect (NA) subscale included 5 items (α = .81; upset, hostile, ashamed).

**Emotion Regulation**

The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) is comprised of 10 items forming two subscales that assess the habitual use of two emotion regulation strategies: **cognitive reappraisal** (6 items, α = .93, “When I’m faced with a stressful situation, I make myself think about it in a way that helps me stay calm”) and **expressive suppression** (4 items, α = .77, “I keep my emotions to myself”). Participants rate the extent to which they agree with each statement on a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

**Distress Tolerance**

The Distress Tolerance Scale (DTS; Simons & Gaher, 2005) assesses a meta-emotional construct that relates to the extent to which individuals are able to handle or withstand negative emotions without acting to avoid or alleviate them or becoming absorbed in them. Participants rate on a scale of 1 (strongly agree) to 5 (strongly disagree) 15 items assessing their reactions to feeling distressed or upset. The DTS includes 4 subscales: **tolerance for emotional distress** (3 items, “Feeling distressed or upset is unbearable to me”), **absorption in negative emotions** (3 items, “My feelings of distress are so intense that they completely take over”), **appraisal** (6 items, “Other people seem to be able to tolerate feeling distressed or upset better than I can”), and effortful **regulation of distress** (3 items, “I’ll do anything to stop feeling distressed or upset”). These subscales were averaged to create mean score for general distress tolerance (α = .89).
**Perceived Stress**

Perceived stress was measured with four questions that asked participants to reflect on feelings they experienced in the last month (4 items, \( \alpha = .89 \), “In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?”). Responses ranged from 0 (Never) to 4 (Very Often).

**Sleep-related Impairment**

Problems related to poor sleep were measured with the Sleep-Related Impairment scale of the Patient-Reported Outcome Measure Information System (PROMIS) for sleep (Buysse et al., 2010). Sleep-related impairment was measured by a total score on 8 items (\( \alpha = .93 \)), such as “I was sleepy during the daytime” and “I had a hard time concentrating because of poor sleep.” Participants rated their experience of these items based on the last 7 days on a scale that ranged from 1 (“not at all”) to 5 (“very much”).

**Analytic Approach**

To address Aim 1 descriptive statistics and correlations were computed to summarize participant responsiveness and describe relationships among the dimensions of responsiveness. To address Aim 2 correlations and t-tests were computed estimating associations between baseline participant characteristics (demographics, wellness behaviors, and psychological characteristics) and the dimensions of responsiveness. Correlations were computed for continuous/scale characteristics and t-tests were computed for categorical characteristics. For Aim 3, OLS regression models were utilized to examine the relationships between 2 dimensions of responsiveness (consistency of attendance and frequency of personal...
practice) and change from pretest to posttest in intervention outcomes. Each outcome model included the two responsiveness variables and controlled for pretest levels of that outcome, years in education, and gender.

**Results**

**Aim 1: Describing Educator Responsiveness**

Table 2 presents descriptive statistics summarizing educators’ perceptions of the program, their reported frequency of personal practices, and their attendance in program sessions. On average, educators attended about 24 sessions, although this varied widely (SD=18.8, range=0-59), and about 10 weeks of the program. More than half (53%) of participants attended sessions in at least 12 weeks of the program (75% of the weeks). The mean for personal practice frequency averaged across all practices was 4.9, which corresponds to “about once per week” on the response scale. Means for types of practice ranged from 3.84 for CALM card practices (a few times per month) to 5.53 for both movement and relaxation practices (more than once per week). Overall, participants’ perceptions of the program were positive. The average ratings for feasibility and relevance were 4.21 (range= 2.00-5.80) and 5.18 (range=3.40-6.00), respectively. The mean usefulness rating averaged across practices was 5.12 (range= 3.60 to 6.00), with ratings of individual practices ranging from 4.74 (centering and intention setting) to 5.42 (Breathing practices).

Table 3 presents correlations between dimensions of participant responsiveness. As expected, more favorable perceptions of the program were associated with higher attendance and more frequent personal practice.
Participants who perceived the program as more feasible showed higher levels of practice ($r=.52, p<.01$) and greater consistency of attendance ($r=.70, p<.001$). A similar pattern was observed for perceptions of relevance: perceived relevance was significantly correlated with practice frequency ($r=.52, p<.01$) and marginally correlated with attendance consistency ($r=.32, p<.10$). Perceptions of usefulness were significantly correlated with practice frequency ($r=.47, p<.01$) but not attendance ($r=.17, ns$). Notably, consistency of attendance was not correlated with frequency of personal practice ($r=.07, ns$).

**Aim 2: Linking Participant Baseline Characteristics and Responsiveness.**

Table 4 presents all t-tests and correlations examining relationships between baseline characteristics and participant responsiveness.

**Baseline Demographics**

Years in education was significantly correlated with both consistency of attendance ($r=.36, p<.05$) and frequency of practice ($r=.36, p<.05$), such that more experienced educators were more likely to attend sessions and report frequent engagement in personal practice. Years in education was also positively correlated with perceptions of feasibility at a trend level ($r=.34, p<.10$), but not with perceptions of relevance or usefulness. Age was correlated with frequency of practice at a trend level ($r=.33, p<.10$), but it was not associated with consistency of attendance or perceptions of the program. Having a master’s degree was associated at a trend level with higher perceptions of feasibility ($t=1.88, p<.10$), but not with any other responsiveness variables. Neither professional role nor presence of
children in the home were associated with any dimensions of participant responsiveness.

**Baseline Wellness Behaviors**

Recent engagement in contemplative practices (e.g. meditation or yoga) at baseline was not associated with attendance, practice, or perceptions of feasibility. However, there were trend level associations suggesting those who had been recently engaged in contemplative practices were more likely to perceive the program as relevant ($t=1.80, p<.10$) and useful ($t=1.86, p<.10$). Average level of physical activity at baseline was not correlated with any dimension of responsiveness.

**Baseline Psychological Characteristics**

Baseline teaching efficacy and baseline mindfulness were both significantly associated with higher frequency of personal practice ($r=.51, p<.01$; $r=.38, p<.05$ respectively), but not consistency of attendance. Teaching efficacy was also significantly positively correlated with perceptions of the program (feasibility, $r=.49, p<.01$; relevance, $r=.54, p<.01$; usefulness, $r=.52, p<.01$), but mindfulness was not. Time urgency was not significantly associated with any dimensions of responsiveness. The three dimensions of burnout were not significantly correlated with any dimensions of responsiveness. However, there was a trend level correlation between the loss of personal accomplishment aspect of burnout and both practice frequency ($r=-.34, p<.10$) and perceptions of usefulness ($r=-.31, p<.10$), such that those who a lower sense of personal accomplishment at baseline engaged in personal practice less frequently and perceived the program elements to
be less useful. Baseline physical symptoms were not associated with responsiveness.

**Aim 3: Linking responsiveness and outcomes.**

Tables 5 and 6 report the results of regressions using attendance consistency and practice frequency to predict residualized change in program outcomes. These results are divided into two sections. Table 5 displays links between responsiveness and educators’ emotional functioning outcomes (mindfulness, affect, emotion regulation). Table 6 displays links between responsiveness and educators’ efficacy, stress, and wellbeing outcomes.

**Emotional Functioning Outcomes**

The degree to which educators were engaged in the program explained gains in their mindfulness over the course of the program compared to other participants. Gains in mindfulness from pretest to posttest were positively predicted by both consistency of attendance ($\beta=.24$ $p<.10$) and self-reported frequency of practice ($\beta=.40$, $p<.01$), the former at a trend level. Differential gains in positive affect were not explained by either of the engagement indicators, while frequency of practice was a marginally significant predictor of reduction in negative affect ($\beta=-.26$ $p<.10$), such that those who reported higher rates of practice showed greater decreases in negative affect. Of the three emotion regulation indicators, increases in reappraising emotions were predicted by engagement. Those who attended the program more consistently show significantly greater increases in their use of reappraisal strategies ($\beta=.33$ $p<.05$). There were no effects of participant responsiveness on either emotional suppression or distress tolerance.
**Efficacy, Stress, and Wellbeing Outcomes**

Gains in teaching efficacy were not significantly explained by consistency of attendance or practice frequency. However, practice frequency did predict gains in efficacy for classroom management at a trend level ($\beta=.29$, $p<.10$). Consistency of attendance, but not practice frequency, was significantly associated with greater decreases in perceived stress ($\beta=-.35$ $p<.05$), while neither predictor explained differential change in time urgency. Change in burnout was not significantly explained by responsiveness. However, there was a trend suggesting that more frequent practice was related to greater decreases in the emotional exhaustion ($\beta=-.21$ $p<.10$) dimension of burnout. Greater decreases in physical symptoms were predicted by consistency of attendance ($\beta=-.30$ $p<.05$), but, unexpectedly, frequency of personal practice was associated with relative increases in physical symptoms ($\beta=.23$ $p<.10$), albeit only at a trend level. Finally, greater decreases in sleep-related impairment were predicted at a trend level by consistency of attendance ($\beta=-.28$ $p<.10$), but not practice frequency.

**Discussion**

This study explored one dimension of the implementation process, participant responsiveness, in an evaluation of a contemplative workplace intervention to support educator wellbeing. The first aim of the study was to describe and explore relationships among dimensions of participant responsiveness. Out of the 17 weeks and 64 sessions the program spanned, educators attended the program on average about 10 weeks and 24 sessions, although this varied widely. Educators reported engaging in personal practices
about once per week, on average. They reported engaging in movement/posture practice and relaxation practices most frequently, and use of the CALM card practices less frequently. Perceptions of the program, overall, were quite positive. Participants agreed, on average, that the program was feasible to attend, acceptable/relevant to educators, and that skills/practices taught in the program were useful. Ratings indicated that they found the breathing exercises and movement practices to be the most useful.

Examining the relationships among dimensions of responsiveness showed that perceptions were correlated with both attendance and practice, but the latter two dimensions were not correlated with each other. Educators who had more favorable perceptions of the program attended more sessions and practiced on their own more frequently. Interestingly, participants who attended sessions less consistently did not necessarily engage in less frequent personal practice. For some participants, encountering barriers to session attendance may have resulted in increased engagement with personal practice. In fact, this was suggested by comments made in our focus groups with low attenders and moderate attenders. Some described very low levels of engagement overall, but some commented that missing sessions motivated them to do more of the practices on their own.

The second aim of the study was to explore relationships between educators’ baseline characteristics and their responsiveness to CALM. Participant baseline characteristics were not strongly associated with responsiveness, overall. Years in education was the only demographic characteristic with a significant (stronger than trend level) association with responsiveness, and teaching efficacy was one of only
two (the other was mindfulness) psychological characteristics significantly associated with responsiveness. In addition, out of all the baseline characteristics (demographic, wellness behaviors, and psychological characteristics), years in education and teaching efficacy were the only variables associated with three or more responsiveness variables. Years in education were associated with feasibility perceptions, attendance and practice.

Teachers with higher baseline teaching efficacy were more likely to practice, and had higher perceptions of feasibility, relevance, and usefulness. However, teacher efficacy was not related to actual attendance, consistent with prior research demonstrating the relationship between self-efficacy and responsiveness to health promotion and professional development interventions (e.g. Kwakman, 2003; Martin et al, 2000; Noe & Wilk, 1993). While baseline mindfulness was associated with practice frequency, it was not associated with attendance. Taken together with the finding that personal practice and attendance were not correlated, it is possible that those who were higher in mindfulness before the program felt more confident in engaging in the practices independent of their session attendance.

Although previous research has demonstrated that prior engagement in physical activity is related to increased engagement with wellness promotion programs (Hasson, Brown & Hasson, 2010; Martin et al., 2000), this pattern was not replicated. Recent engagement in contemplative practices, such as yoga and meditation, was only marginally related to more favorable perceptions of the program’s relevance and usefulness, and not associated with practice frequency or consistency of attendance.
In summary, results from Aim 2 indicated that, more than other background demographic and psychological characteristics, professional characteristics were most influential in responsiveness to this workplace wellness promotion intervention. Future school-based implementations of contemplative interventions might expect more experienced educators to have higher attendance based on our results, but no other participant characteristics predicted attendance. The CALM program was designed to be accessible to all educators, regardless of any prior exposure to contemplative practice or level of physical fitness. Although we cannot compare the participants to other educators in the school that did not enroll in the study, the fact that most background demographic characteristics, wellness behaviors and psychological characteristics were not associated with engagement suggests that CALM achieved this goal of broad accessibility and relevance.

The third aim was to examine whether variation in intervention outcomes was explained by attendance consistency and/or practice frequency. In regard to emotional functioning outcomes, at least one aspect of engagement explained differential change in mindfulness, negative affect, and reappraisal. Consistent with prior research on contemplative interventions, participants who more frequently used the skills and practices taught in the intervention improved more in mindfulness (e.g. Carmody & Baer, 2008; De Vibe et al., 2013). This relationship emerged to a lesser degree for attendance in the sessions, consistent with De Vibe and colleagues’ (2013) findings that home practice was more strongly related to growth in mindfulness than attendance. Those who practiced more frequently also
reported greater decreases in negative affect over the intervention period, and those who attended more consistently reported using more reappraisal strategies.

Practice also explained differential changes in teaching efficacy, perceived stress, emotional exhaustion, physical symptoms, and sleep-related impairment. There was a trend suggesting that educators who practiced the skills from CALM more frequently showed greater improvement in their efficacy for classroom management, and also showed a trend to greater decreases in one aspect of professional burnout (emotional exhaustion). Those who attended sessions more consistently showed a greater decrease in perceived stress.

The relationship between engagement and wellbeing was mixed. As predicted, participants who attended the program more consistently experienced a greater decrease in their report of physical symptoms and sleep-related impairment (at a trend level). Contrary to expectations, however, participants who reported more frequent personal practice reported increasing physical symptoms over the intervention period.

In summary, results of Aim 3 suggest that attendance in program sessions and personal practice each had unique effects on program outcomes. Personal practice emerged as a stronger predictor of differential developments in mindfulness; however, attendance was more strongly related with benefits for perceived stress and wellbeing. The independent effects of personal practice suggest that even educators who are unable to attend consistently may still benefit when they are motivated to engage in contemplative practices on their own. Future
studies should further investigate the relationship between attendance and practice and how they are related to program outcomes.

The finding that greater practice was related to increasing physical symptoms is puzzling and leads to multiple possible interpretations. It is unlikely that the practices taught in the program actually led to increased physical symptoms, considering the outcome evaluation found a significant intervention effect of a decrease in symptoms compared to the control group (Harris, 2014). It is possible that educators who experienced an increase in symptoms over the school year began practicing more frequently in response. This highlights a significant limitation in our measurement of personal practice frequency, which is discussed below.

The previously reported (Harris, 2014) outcome evaluation of this intervention documented impacts of the intervention on several of the psychological outcomes reported here. Of the outcomes where intervention main effects were observed, participant responsiveness was related to variation in: mindfulness, teaching efficacy, and physical symptoms. However, participant responsiveness did not predict changes in two other significant trial outcomes: positive affect and distress tolerance (Harris, 2014). These changes in emotional functioning should be explored further in future work to better understand their relationships with session activities, skills and practices. There were also several outcomes where no intervention main effect was observed, but differential improvement was found in participants with higher engagement. These include negative affect, reappraisal, perceived stress, emotional exhaustion, and sleep-related impairment. Educators
who attended the program more and/or practiced more may have been more motivated to change in these dimensions of their psychological functioning. Alternately, program-induced improvements in the intervention group may not have been large enough compared to changes in the control group to detect in the small sample of the efficacy study. Future evaluations of CALM with a larger sample, and thus, more statistical power might expect to see impacts in these areas.

Limitations

This study of participant responsiveness was somewhat limited by a number of methodological limitations, namely selection bias, small sample size, and issues in measurement. Generalizations of the results to all educators are limited by present sample (i.e. potential selection bias). Participants were a subsample of educators (white, female, and living with a partner/spouse) who volunteered to participate in a study of educator health and wellbeing and whose school was assigned to the intervention group. The sample was relatively small (n=34), preventing more detailed subgroup comparisons and more statistically sophisticated analyses. It is not clear if outcome findings or results here on participant responsiveness will generalize to other populations of educators (e.g., urban school contexts, ethnic-minority educators, etc.).

Two dimensions of responsiveness, perceptions and personal practice, were affected by measurement limitations. Attendance was the strongest measure of responsiveness in this study because it was measured daily over the course of the intervention period. Personal practice and perceptions were measured only at the posttest assessment, and were retrospective reports. This weakens conclusions that
can be drawn about the directionality of relationships between practice frequency and intervention outcomes. In future studies, personal practice frequency should be measured at more frequent intervals (e.g. daily or weekly) and participants should also be asked to report on the number of minutes spent in personal practice, as has been done in many previous studies of contemplative interventions (e.g. Carmody & Baer, 2008; Impett et al., 2006; Rosensweig et al., 2010; Shapiro et al., 2003). Future work should also employ experience sampling methods to address how within-person variation in both attendance and home practice time is related to key outcomes; for example, on weeks when more practice time is reported, participants may experience greater positive affect (Impett et al., 2006). One final measurement limitation is that there was not a measure of self-efficacy or outcome expectancies specific to contemplative practice.

**Conclusions**

Despite the aforementioned limitations, this study makes a needed contribution to the growing field of contemplative education. Enthusiasm for the implementation of contemplative interventions in educational settings is quickly growing, and several promising intervention models have emerged specifically for educators. This study adds new findings crucial to build an understanding of how educators will respond to such programs, how they will engage with the practices and skills that are promoted therein, and how their engagement is related to variations in outcomes. The study indicates that daily, place-based contemplative interventions are feasible and relevant to the needs of educators. Further, such interventions appear relevant and feasible to a wide range of educators with varied
backgrounds and professional roles. This study demonstrates that both session attendance and personal practice appear to be important for intervention outcomes, and they appear to have unique impacts. Future work should continue to examine responsiveness, with improved measurement, in diverse settings and across diverse intervention formats (e.g. weekly training sessions, weekend retreats, daily programs).
References


Domitrovich, C.E. & Greenberg, M.T. (2000). The study of implementation: current findings from effective programs that prevent mental disorders in school-


development through coordinated social, emotional, and academic learning.

*American Psychologist, 58, 466-474.*


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### Table 2-1.

*Intervention participant demographics*

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<tr>
<th>Variable</th>
<th>Mean or Frequency</th>
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</thead>
<tbody>
<tr>
<td>Age in Years</td>
<td>40.65 (12.42)</td>
</tr>
<tr>
<td>Gender</td>
<td>91% Female</td>
</tr>
<tr>
<td>Years in Education</td>
<td>13.72 (9.07)</td>
</tr>
<tr>
<td>Years at Current School</td>
<td>8.35 (6.57)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>97% White</td>
</tr>
<tr>
<td>Living with Spouse or Partner</td>
<td>82%</td>
</tr>
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<td>Children in household</td>
<td>36%</td>
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<td>Education Level</td>
<td></td>
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<tr>
<td>Some College</td>
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</tr>
<tr>
<td>College Degree</td>
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</tr>
<tr>
<td>Some graduate school</td>
<td>12</td>
</tr>
<tr>
<td>Master’s or Specialist degree</td>
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</tr>
<tr>
<td>Role in school</td>
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</tr>
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<td>Teacher</td>
<td>25</td>
</tr>
<tr>
<td>Paraprofessional</td>
<td>4</td>
</tr>
<tr>
<td>Learning support</td>
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</tr>
<tr>
<td>Other</td>
<td>3</td>
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</table>
Table 2-2.

Descriptive statistics for participant responsiveness: attendance, personal practice, and perceptions

<table>
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<th>M</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
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<tr>
<td><strong>Attendance</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Raw Attendance – Days</td>
<td>23.91</td>
<td>18.89</td>
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<td>59</td>
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<tr>
<td>Attendance Consistency – Weeks</td>
<td>9.97</td>
<td>5.94</td>
<td>0</td>
<td>16</td>
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<tr>
<td><strong>Personal Practice</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Average Practice Frequency</td>
<td>4.91</td>
<td>1.38</td>
<td>1.62</td>
<td>7.0</td>
</tr>
<tr>
<td>Centering practices</td>
<td>4.63</td>
<td>2.04</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Breathing practices</td>
<td>5.26</td>
<td>1.79</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Intention setting</td>
<td>4.52</td>
<td>1.86</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Movement practices or postures</td>
<td>5.53</td>
<td>1.59</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Caring practices</td>
<td>4.94</td>
<td>1.79</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Gratitude practices</td>
<td>5.06</td>
<td>1.65</td>
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<td>7</td>
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<td>Relaxation practices</td>
<td>5.53</td>
<td>1.37</td>
<td>1</td>
<td>7</td>
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<tr>
<td>Practices on weekly CALM Cards</td>
<td>3.84</td>
<td>1.72</td>
<td>1</td>
<td>7</td>
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<tr>
<td><strong>Perceptions</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Feasibility</td>
<td>4.21</td>
<td>1.08</td>
<td>2</td>
<td>5.8</td>
</tr>
<tr>
<td>Relevance/Acceptability</td>
<td>5.18</td>
<td>.78</td>
<td>3.4</td>
<td>6</td>
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<tr>
<td><strong>Usefulness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Usefulness Score</td>
<td>5.12</td>
<td>.79</td>
<td>3.6</td>
<td>6</td>
</tr>
<tr>
<td>CALM sessions as a whole</td>
<td>5.03</td>
<td>0.89</td>
<td>3</td>
<td>6</td>
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<tr>
<td>Centering and intention setting</td>
<td>4.74</td>
<td>1.15</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Movement</td>
<td>5.32</td>
<td>0.87</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Breathing exercises</td>
<td>5.42</td>
<td>0.96</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Relaxation, caring, and gratitude</td>
<td>5.23</td>
<td>0.96</td>
<td>3</td>
<td>6</td>
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</tbody>
</table>
Table 2-3.
Correlations among dimensions of participant responsiveness

<table>
<thead>
<tr>
<th></th>
<th>Practice</th>
<th>Feasibility</th>
<th>Relevance</th>
<th>Usefulness</th>
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<tbody>
<tr>
<td>Attendance</td>
<td>.07</td>
<td>.70***</td>
<td>.32+</td>
<td>.17</td>
</tr>
<tr>
<td>Consistency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice Frequency</td>
<td>1</td>
<td>.45*</td>
<td>.52**</td>
<td>.47**</td>
</tr>
<tr>
<td>Feasibility Relevance</td>
<td>1</td>
<td>.66***</td>
<td>.53**</td>
<td>.89***</td>
</tr>
<tr>
<td>Usefulness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: One participant who never attended the program was dropped from the sample for all correlations that involve perceptions of relevance and usefulness.

+p<.10 *p<.05 **p<.01 ***p<.001
Table 2-4.  
Associations between participant responsiveness and baseline characteristics: correlations and t-tests with demographic characteristics, wellness behaviors, and psychological characteristics.

<table>
<thead>
<tr>
<th></th>
<th>Test Attendance consistency</th>
<th>Practice Frequency</th>
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<th>Perceptions</th>
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<tr>
<td><strong>Demographics</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>$r$</td>
<td>0.24</td>
<td>0.33+</td>
<td>0.29</td>
</tr>
<tr>
<td>Years in Education</td>
<td>$r$</td>
<td>0.36*</td>
<td>0.36*</td>
<td>0.34+</td>
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<tr>
<td>Professional Role</td>
<td>$t$</td>
<td>-0.54</td>
<td>1.02</td>
<td>-0.17</td>
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<td>Children in Home</td>
<td>$t$</td>
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<td>-0.19</td>
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</tr>
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<td>Education Level</td>
<td>$t$</td>
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<td>-1.88+</td>
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<td><strong>Wellness Behaviors</strong></td>
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<td>Contemplative Practice</td>
<td>$t$</td>
<td>-0.29</td>
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</tr>
<tr>
<td>Physical Activity</td>
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<td>0.11</td>
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</tr>
<tr>
<td><strong>Psychological Characteristics</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching Efficacy</td>
<td>$r$</td>
<td>0.19</td>
<td>0.51**</td>
<td>0.49**</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>$r$</td>
<td>-0.15</td>
<td>0.38*</td>
<td>0.04</td>
</tr>
<tr>
<td>Time Urgency</td>
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<td>-0.11</td>
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<tr>
<td>Emotional Exhaustion</td>
<td>$r$</td>
<td>-0.03</td>
<td>-0.07</td>
<td>-0.20</td>
</tr>
<tr>
<td>Depersonalization</td>
<td>$r$</td>
<td>-0.06</td>
<td>-0.04</td>
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<tr>
<td>Loss of Personal</td>
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<td>0.02</td>
<td>-0.34+</td>
<td>-0.23</td>
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<tr>
<td>Accomplishment</td>
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<tr>
<td>Physical Symptoms</td>
<td>$r$</td>
<td>-0.10</td>
<td>-0.29</td>
<td>-0.23</td>
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</table>

Note: One participant who never attended the program was dropped from the sample for all correlations that involve perceptions of relevance and usefulness. For t-tests of relationships between responsiveness and baseline categorical indicators, positive $t$ values indicate the category coded as ‘1’ had a higher responsiveness value. For professional role, 1=teacher, 0=other personnel; Children in home, 1=present, 0=absent; education level, 1=masters degree or above, 0= no graduate degree; contemplative practice, 1= current meditation or meditative movement practice, 0=none.

+p<.10  *p<.05  **p<.01
Table 2-5.

*Responsiveness as a predictor of intervention outcomes: standardized regression results for emotional functioning*

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Weeks Attended</th>
<th>Frequency of Practice</th>
<th>Model R²</th>
</tr>
</thead>
<tbody>
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<td>Mindfulness</td>
<td>.24+</td>
<td>.40**</td>
<td>.63</td>
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<tr>
<td>Affect</td>
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</tr>
<tr>
<td>Positive</td>
<td>.18</td>
<td>.14</td>
<td>.61</td>
</tr>
<tr>
<td>Negative</td>
<td>-.17</td>
<td>-.26+</td>
<td>.53</td>
</tr>
<tr>
<td>Emotion Regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reappraisal</td>
<td>.33*</td>
<td>.20</td>
<td>.36</td>
</tr>
<tr>
<td>Suppression</td>
<td>-.24</td>
<td>-.11</td>
<td>.22</td>
</tr>
<tr>
<td>Distress</td>
<td>.08</td>
<td>.01</td>
<td>.64</td>
</tr>
<tr>
<td>Tolerance</td>
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</tr>
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</table>

Note: Parameter estimates are standardized betas for the indicator predicting the posttest level of the dependent variable, controlling for pretest level, years teaching, and gender.

+p<.10  *p<.05  **p<.01
Table 2-6.  
Responsiveness as a predictor of intervention outcomes: standardized regression results for teaching efficacy, stress and wellbeing

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Weeks Attended</th>
<th>Personal Practice</th>
<th>Model R²</th>
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<tr>
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<td>-.08</td>
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<td>.40</td>
</tr>
<tr>
<td>Classroom Management</td>
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<td>.29+</td>
<td>.40</td>
</tr>
<tr>
<td>Student Engagement</td>
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<td>.10</td>
<td>.17</td>
</tr>
<tr>
<td>Instructional Practice</td>
<td>-.02</td>
<td>.18</td>
<td>.32</td>
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<tr>
<td>Stress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Stress</td>
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<td>.07</td>
<td>.51</td>
</tr>
<tr>
<td>Time Urgency</td>
<td>-.19</td>
<td>-.25</td>
<td>.38</td>
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<td>Burnout</td>
<td></td>
<td></td>
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<tr>
<td>Emotional Exhaustion</td>
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<td>-.21+</td>
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<td>Depersonalization</td>
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<tr>
<td>Physical Symptoms</td>
<td>-.30*</td>
<td>.23+</td>
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</tr>
<tr>
<td>Sleep Impairment</td>
<td>-.28+</td>
<td>-.16</td>
<td>.47</td>
</tr>
</tbody>
</table>

Note: Parameter estimates are standardized betas for the indicator predicting the posttest level of the dependent variable, controlling for pretest level, years teaching, and gender.

+p<.10 *p<.05 *p<.01
Figure 1. Process model of participant responsiveness for a workplace contemplative professional development intervention for educators
CHAPTER 4

Improvements in Mindfulness and Emotional Functioning Mediate the Impact of a Contemplative Intervention on Teaching Efficacy
Introduction

Educators’ capacity to manage their emotions effectively is an essential component for healthy classroom functioning and for their own wellbeing, but this aspect of educators’ training and professional development has received inadequate attention (Jennings & Greenberg, 2009; Roeser, Skinner, Beers & Jennings, 2012). Education research has illuminated the salience of educators’ emotional experience in the classroom; it has recognized that educators’ abilities to monitor and manage their own emotional reactions and displays in the classroom is critical for effectively facilitating classroom activities and for maintaining their own wellbeing (Garner, 2010; Hargreaves, 1998; Schutz & Zembylas, 2009). Yet, there is a dearth of empirical evidence on specific strategies to support educators’ development of emotion management skills for use in the classroom and how they are linked with improved classroom functioning (Jennings & Greenberg, 2009).

Contemplative interventions are a class of interventions that employ training in practices such as mindfulness, meditation, and yoga, to support aspects of social-emotional competence and healthy habits of mind. Training in these practices scaffolds the use of volitional control (using intention and attention) over mental and physical habits that are normally unregulated, such as breathing patterns or reactions to thoughts and emotions (MLERN, 2012). A growing body of evidence suggests that contemplative interventions are efficacious in supporting some aspects of emotional competence, such as the ability to mindfully focus attention and awareness on the present, the ability to sustain positive affect, and the ability to tolerate negative emotional states (see Hölzel et al., 2011 for review). Such
improvements in mindful awareness and the ability to effectively manage emotions have been proposed as core mechanisms of contemplative practice (Baer, 2003; Chambers, Gullone, & Allen, 2009; Hölzel et al., 2011). For example, Hölzel and colleagues (2011) propose a conceptual model based on research that hypothesizes improvements in body awareness (mindful awareness and observation of bodily sensations associated with breath, emotion, etc.) and emotion regulation as two of the four key processes involved in mindfulness training. Improved mindful observation/awareness of experiences may lead to more realistic understanding of those experiences (e.g. "thoughts are just thoughts") and more effective coping strategies (Baer, 2003). Emotion regulation in the context of mindfulness and other contemplative practices differs from cognitive emotion regulation strategies (such as reappraisal and modification); mindful emotion regulation involves nonjudgmental openness and exposure to all emotions as they arise and acceptance or tolerance of emotional experience without the need to react, become absorbed, or immediately modify emotion (Baer, 2003; Chambers et al., 2009; Hölzel et al., 2011). This increased awareness is thought to change one’s relationship with distress and uncomfortable thoughts and lead to increased experience of contentment and positive emotion over time (Chambers et al., 2009).

Contemplative interventions that target such processes have been linked with improvements in stress management and physical and psychological wellbeing in both clinical and healthy samples of adults. For example, Mindfulness Based Stress Reduction, a widely-researched contemplative intervention, has produced significant reductions in anxiety, depression, and even chronic pain in clinical
populations (e.g. Grossman, Neimann, Schmidt, & Walach, 2004) and has also reduced stress and promoted mindfulness in normative populations (e.g. Chiesa & Serretti, 2009). Research on yoga specifically has also yielded similar support for its efficacy as a clinical intervention (e.g. Field, 2011; Yang, 2007) and as a way to promote wellbeing and reduce stress in healthy adults (e.g. Chong, 2011), although the methodological rigor underlying areas of this body of evidence is somewhat limited.

**Contemplative Interventions and Educators’ Professional Development**

Improved mindfulness and emotion management may be particularly useful for educators, resulting in improvements in wellbeing, classroom practice, and student outcomes, as hypothesized by the Prosocial Classroom Model (Jennings & Greenberg, 2009; Roeser et al., 2012). According to this model, professional development interventions that promote mindfulness and emotion management skills will enhance teacher functioning in the classroom, improving instructional practices, classroom management, and student engagement, and ultimately improved student outcomes.

Recently, several intervention studies have provided initial evidence that contemplative interventions designed or adapted as professional development models for educators may provide similar benefits for improving stress, wellbeing, and social-emotional competence (Meiklejohn et al., 2013; Roeser, et al., 2012). For example, The CARE (Cultivating Awareness and Resilience in Education) and SMART-in-Education (Stress Management and Relaxation Techniques) programs involve training in mindfulness, compassion, and emotion skills applied to the work
of teaching (Benn, Akiva, Arel, Roeser, 2012; Jennings, Frank, Snowberg, Coccia, & Greenberg, 2013; Roeser et al., 2013). In a randomized efficacy evaluation, CARE was associated with improvements in educators’ mindfulness and emotion regulation skills, enhanced teaching efficacy, and reduced stress and burnout. In the context of the SMART program, effects on teachers’ wellbeing and occupational stress and burnout were mediated by improvements in mindfulness and self-compassion (Benn, et al., 2012; Roeser et al, 2013). However, despite evidence for benefits in teachers’ efficacy for classroom practice, studies have not examined mechanisms of change to determine whether improved mindful awareness or emotion regulation skills actually mediate improvements in teacher efficacy and classroom functioning, as hypothesized.

The focus of the current study is a yoga-based contemplative intervention also designed for educators. The CALM Program is a brief daily intervention, involving yoga-based breathing, movement, and meditation practices, implemented within the school setting before the start of the school day (Harris and Hudecek, 2013). In a small efficacy study, educators assigned to receive CALM improved relative to the control group at posttest in areas of mindfulness, distress tolerance, positive affect, and teaching efficacy (as well as other indicators of health and wellbeing) (Harris, 2014). The current study examined mechanisms of change in the CALM program, testing elements of the Prosocial Classroom Model (Jennings and Greenberg, 2009) theorizing that improvements in educators’ emotional functioning would result in improvements in classroom practice. Specifically, this study explored hypothesized links between intervention-related proximal gains in three
aspects of emotional functioning (mindfulness, distress tolerance, and positive affect experience) and distal improvements in educators’ self-efficacy for classroom practice, including their efficacy for classroom management, instructional strategies, and student engagement (Figure 1).

**Educators’ Efficacy for Classroom Practice**

In this study, educator’s reports were used to assess their perceived effectiveness in areas of instructional practice, classroom management, and student engagement. According to social cognitive theory, efficacy beliefs are self-perceptions of competence in a particular domain, formed in light of experience with relevant tasks and situations (Bandura, 1977). Efficacy for a particular behavior is a strongly predictive proximal indicator of that behavior, and self-efficacy for teaching is recognized as an important construct in educational studies of teaching effectiveness (see Tschannen-Moran, Hoy & Hoy, 1998 for review). For example, teachers with higher efficacy are more committed to teaching (Ware & Kitsantis, 2007), make fewer negative predictions about student success (Tournaki & Podell, 2005), and are less likely to experience significant job stress and burnout (Schwarzer & Hallum, 2008; Tang, Au, Schwarzer, & Schmitz, 2001). Moreover, educators’ beliefs about their efficacy for successful classroom practice are related not only to their own performance but also to student outcomes (e.g. Midgely, Feldlaufer, & Eccles, 1989).

The current study focused on educators’ development in three areas of efficacy for classroom practice identified and validated by Tschannen-Moran & Hoy (2001): classroom practice, instructional strategies, and student engagement. These
three areas of efficacy for classroom practice cover multiple areas of expertise required for effective teaching. Because educators’ efficacy beliefs are presumed to be relatively stable, understanding factors that could promote increased teaching efficacy has the potential to shape the way educators’ classroom practice is supported through professional development (Tschannen-Moran & Hoy, 2001).

**Emotional Functioning as a Mediator of Teaching Efficacy and Classroom Practice**

Although educators’ emotional functioning is theoretically linked with classroom practice, the empirical research supporting those links is quite limited (e.g. Collie, Shapka, & Perry, 2012; Jennings and Greenberg, 2009). Limited correlational evidence suggests that competence in emotion regulation is related to more adaptive work-related outcomes in educators, such as a sense of personal accomplishment and improved efficacy for classroom management and student engagement (Brackett, Palomera, Mojsa-Kaja, Reyes, & Salovey, 2010; Chan, 2004; Sutton, Mudrey-Camino, & Knight, 2009). In the current study, mindful awareness, distress tolerance, and positive affect experience were examined as three mediators of change in educators’ efficacy for classroom practice, based on conceptual models and existing empirical evidence that they represent aspects of emotional functioning supportive of effective classroom practice (Jennings & Greenberg, 2009; Roeser, et al. 2013), and because they have each emerged as proximal outcomes of contemplative practice (see Hölzel et al., 2011; Shapiro et al., 2006 for reviews). Drawing from research on work performance, efficacy, and teachers’ professional...
lives, the review below will draw connections between these three mediators and classroom practice.

**Mindfulness**

Mindfulness can refer to a practice or a capacity to intentionally pay attention to present-moment experiences, such as thoughts, sensations, and emotions, with an attitude of acceptance, non-judgment, and non-attachment (Kabat-Zinn, 1990; Shapiro et al., 2006). This may be conceptualized both as a state that varies within individuals’ and a trait that varies between individuals and that can be promoted by training in contemplative practices, such as yoga and other forms of meditation. Research suggests suggest that mindfulness may be an asset for work-related outcomes. For example, employees’ self-reports of their work-related functioning as well as supervisor reports of their performance were explained in part by employees’ degree of work-related mindful awareness (Reb, Narayana, & Ho, 2013). Mindfulness may be supportive of educators’ classroom performance as well. For example, among educators in the control group of the CALM study, mindfulness at the beginning of the school year predicted concurrent teaching efficacy and changes in teaching efficacy five months later (Abenavoli et al., 2013; Abenavoli, Harris, Katz, Jennings & Greenberg, 2014).

In educators’ classroom practice, mindfulness may be related to certain dispositions that facilitate effective instruction, good classroom management, and positive student-teacher relationships. In the classroom management literature, “mental set” or “withitness” have been identified as dispositions that characterize educators’ abilities to successfully manage classroom activities and student
behavior (Brophy, 1996; Kounin, 1970; Marzano, Marzano, & Pickering). Withitness is a type of broad present-centered awareness, where teachers are in tune with the moment-to-moment happenings in the whole classroom. For example, educators characterized by withitness are able to effectively work with a small group while remaining aware of and responding appropriately to behaviors of students outside of that group. Going beyond the need for external awareness, Schussler (2013) argues that self-awareness of values, intentions, and perceptions is essential for effective teaching: “teachers require more than just an awareness of the external context to teach most effectively. Teachers need an awareness of the self, in order to understand how they are interpreting a teaching situation through their own individual lens” (p. 74).

It is likely that benefits for classroom practice could result from training to improve mindfulness, through the mechanism of improvements in educators’ ability to observe and be aware of their classroom experience (Roeser et al., 2012). Through the lens of mindfulness, observation and awareness of the classroom environment is conceptually coupled with self-awareness and observation of internal experience – thoughts, emotions, perceptions, and mental reactions to external stimuli like student behaviors and comments. When a student fails to follow instructions or interrupts a lesson, for example, the teacher may take the behavior personally (e.g. “she never listens to me!” or “he has no respect for me!”) and have an emotional reaction (anger, physiological arousal) that leads to an ineffective or harsh response. In order for educators to disrupt their own patterns of reactivity and bring better alignment between values or intentions and behaviors,
they must be aware of their own emotional experience in the classroom and the
thoughts and behavioral reactions that follow. Thus, developing this type of
awareness of self and others through contemplative practices like yoga and
mindfulness meditation may be linked with developments in teaching efficacy.

**Distress tolerance**

Teaching is an emotional practice, and effective strategies for dealing with
difficult emotions are necessary for educators to maintain a healthy classroom
environment (Schutz & Zembylas, 2009; Hargreaves, 1998). Much of the research on
educators’ emotional experience and its effects on their classroom performance is
based in rich qualitative description of educators’ professional experiences (e.g.
Blase, 1986; Sutton, 2004). According to teachers’ accounts, the distressing
emotions, especially anger, that accompany the stresses of teaching can have
detrimental impacts on their classroom performance (Blase, 1986). Based on social-
cognitive theory, emotional arousal is an important source of efficacy beliefs
high levels of distress in the classroom may have lower efficacy expectancies for
their own competence in teaching. Indeed, educators themselves note that emotion
regulation is a highly salient aspect of the teaching experience: in an interview
study, most teachers spontaneously brought up efforts to handle distressing
emotions even before specific questions on the topic were broached (Sutton, 2004).
Educators reported some difficulty in the down-regulation of negative emotions,
and a third of those interviewed discussed “losing it” when they were unable to cope
with anger. Educators emphasized that their capacity to handle distressing
emotions like anger was an important skill that helped them to be more effective in the classroom for achieving academic goals and maintaining good relationships with their students (Sutton, 2004; Sutton, Mudrey-Camino, & Knight, 2009). Often, however, educators seem to equate managing distressing emotions with controlling, concealing, or suppressing those emotions (Sutton, 2004).

One response to the common experience of distressing emotions in the classroom has been to advise educators to operate with “emotional objectivity.” Educators are advised that remaining emotionally objective to student behavior and infractions will help them manage the classroom in a more fair and consistent manner, while advancing instructional goals and protecting their own wellbeing. For example, Marzano and colleagues (2003) advise educators in emotional objectivity for classroom management:

It simply means carrying out the various aspects of classroom management without becoming emotionally involved regarding the outcomes—without personalizing the actions of students. This is very difficult to do because the normal human reaction to student disobedience or lack of response is to feel hurt or even angry. Such high-arousal emotional states do not provide a good basis on which to implement rules, execute disciplinary actions, or establish relationships (p. 69). The tone of Marzano and colleagues’ suggestions does not imply that suppression of emotions is desirable, and they go on to specifically contrast emotional objectivity to emotional aloofness. However, this idea of emotional objectivity could be interpreted in unrealistic ways by educators. Attempting to remain emotionally
objective could lead to feelings of failure or self-criticism when negative emotional reactions inevitably do arise.

In the current study, I hypothesize that distress tolerance, the capacity for experiencing negative emotional states without immediately reacting, becoming absorbed in, or attempting to change or suppress them (Simons & Gaher, 2005), will lead to improved efficacy for classroom practice. Highlighting the potential role of distress tolerance recognizes that negative emotions are a common daily experience; it also taps into a more subtle dimension of the type of emotion regulation taught in contemplative interventions – a shift in the context of emotions that enables one to simply recognize and be present with particular emotions without immediately reacting (Biglan, Hayes & Pistorello, 2008; Holzel, et al; 2011; Shapiro, et al., 2006). Research on acceptance, a similar construct, informs this perspective on the potential benefits of distress tolerance for educators’ work-related functioning. Acceptance, which is conceptualized as a willingness to be exposed to experiences rather than avoid them so that ensuing behavior can be taken based on values and goals rather than reactions to emotions, has been related longitudinally to employees’ work performance and wellbeing (Bond & Bunce, 2003). In addition, acceptance mediated changes in work-related and mental health outcomes in an emotion-focused workplace stress management intervention (Bond & Bunce, 2000). This supports the hypothesis that in school settings, a contemplative intervention improving educators’ ability to tolerate distress, and thus respond based on values and goals rather than impulsive reactions to
emotions, may lead to improvements in teaching efficacy and other work-related outcomes.

**Positive Affect**

In addition to mindfulness and distress tolerance, the CALM logic model includes increased positive affect as a mediator of improved classroom practice. In their literature review on affect in the workplace, Brief & Weiss (2002) describe the implications of affect for work-related perceptions and performance. For example, positive affect is related to improved work performance in areas such as problem solving, creativity, cooperation, helping behavior, negotiation, decision-making, interpersonal relations, and efficacy judgments (e.g. Baron, 1990; Isen, 1999; Isen, 2008; Staw & Barsade, 1993; Staw, Sutton, & Pelled, 1994; Wright & Staw, 1999). While these impacts have not been studied specifically in teachers, the work outcomes documented are relevant for effective classroom practice. In addition, studies of educators have shown a relationship between positive affect and efficacy for classroom practice. For example, positive affect is associated with a sense of work-related personal accomplishment (Brackett et al., 2010), and educators’ beliefs about displaying positive emotions are related to their efficacy for student engagement and classroom management (Sutton, Mudrey-Camino, Knight, 2009).

The broaden-and-build theory of positive emotions provides one model for conceptualizing how positive affect may translate into better work performance or classroom outcomes (Fredrickson, 2001). The experience of positive emotions may produce a broadened perspective or outlook that allows for new ways of thinking or widens perception and attention to make new connections. This *broadening*, over
time, leads to opportunities to build new personal resources and improve wellbeing. In a test of the broaden-and-build hypothesis, Fredrickson (2008) showed that increases in the experience of positive affect following a workplace lovingkindness meditation intervention predicted changes in several personal resources, including environmental mastery and relationships with others. For educators, a workplace intervention that increases daily experiences of positive affect might bring about a broadened perspective on the classroom, one that is useful in managing the moment-to-moment interactions involved in teaching to a classroom full of students and at the same time attending to their individual needs to maintain relationships, engagement, and a healthy classroom climate.

**The Current Study**

The current study tested mechanisms of change posited in the logic model of the CALM program. The aim of this study was to test whether change in three key intervention targets (mindfulness, distress tolerance, and positive affect experience) at the end of the intervention school year (post-test) predicted change in educators’ efficacy measured in the fall of the subsequent year (7 months after post-test) for three dimensions of classroom practice: classroom management, instructional practice, and student engagement. Each of these potential mediators (mindfulness, distress tolerance, and positive affect experience) showed significant improvement in the intervention group at posttest compared to the control group (Harris, 2014). The current study determines whether those proximal intervention effects mediate longer-term changes in educators’ efficacy for classroom practice.
Method

Recruitment and Participants

Two schools in one district serving similar populations participated in the study and were randomized to receive the intervention in the first year of the study or to a wait-list control group. The control condition received the intervention in the second year after data used in this study was collected. All teachers and personnel at the two schools were eligible to participate for as long as they were teachers or staff at a school, were not currently pregnant, and were not under a doctor’s orders to refrain from physical activity. Educators were compensated for their time completing assessments.

At pretest, 64 educators participated, and at post-test one participant did not respond to assessment scheduling requests. At follow-up, 12 participants were excluded from assessments due to non-eligibility because they were no longer employed as educators (e.g. retired, on medical leave, changed professions). Four additional participants were unresponsive to repeated contact attempts at follow-up. All other participants were included in analyses regardless of their participation level in the intervention program. See Figure 2. The current study sample includes 48 educators (35 teachers, 13 para-professionals/learning support, etc.) who participated in all three waves of the study. The sample of educators involved in the study was predominantly white (98%) and included 41 women and 7 men (mean age=42), with an average of about 13 years teaching experience and about 8.5 years at the current school. See Table 1 for complete demographics.
Data Collection Procedures

All data collection procedures were conducted following a protocol approved by the Pennsylvania State University’s Institutional Review Board. Data for the current study were collected through a 30-minute online survey of self-report questionnaires administered three times: 1. at pretest in the fall prior to the start of the intervention; 2. at posttest 5 months later, in the spring after the intervention was complete; and 3. at follow-up in the fall of the following school year, one year after the pretest. Additional study details are available in the report of the efficacy study (Harris, 2014).

Measures of Proximal Social-emotional Mediators

Mindfulness

The degree of observation subscale of the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietmeyer, & Toney, 2006) was used to assess mindfulness. Participants rated the degree to which each of 8 items (“I pay attention to how my emotions affect my thoughts and behavior”) described them using a scale of 1 (never or very rarely true) to 5 (very often or always true). The mean score was used to assess degree of observation (α = .79).

Distress Tolerance

The Distress Tolerance Scale (DTS; Simons & Gaher, 2005) assessed the extent to which individuals are able to handle or withstand negative emotions without acting to avoid or alleviate them or becoming absorbed in them. Using a scale of 1 (strongly agree) to 5 (strongly disagree), participants rated 15 items describing their reactions to feeling distressed or upset. Subscales reflected four
dimensions: *tolerance for emotional distress* (3 items, “Feeling distressed or upset is unbearable to me”), *absorption in negative emotions* (3 items, “My feelings of distress are so intense that they completely take over”), *appraisal* (6 items, “Other people seem to be able to tolerate feeling distressed or upset better than I can”), and *effortful regulation of distress* (3 items, “I’ll do anything to stop feeling distressed or upset”). These subscales were averaged to create a total scale score for general distress tolerance (α =.89).

**Affect**

The Positive and Negative Affect Schedule Short Form (PANAS; Thompson, 2007; Watson, Clark, & Tellegen, 1988) was used to measure participants’ positive affect. At each assessment, participants rated the extent to which they had felt 5 positive emotions (e.g. alert, inspired, attentive) “during the past few week,” using a scale ranging from 1 (very slightly or not at all) to 5 (extremely). A mean score of these items was used to assess positive affect (α =.86).

**Measure of Efficacy for Classroom Practice**

A subset of items from the Teachers’ Sense of Efficacy Questionnaire (TSES) was used to assess self-efficacy for classroom practice (Tschannen-Moran & Hoy, 2001). Subscales measured the following three dimensions: *classroom management* (4 items, α =.9, “how well can you keep a few problem students from ruining an entire lesson?”), *student engagement* (4 items, α =.82, “how much can you do to motivate students who show low interest in schoolwork?”), and *instructional practices* (4 items, α =.86, “how much can you use a variety of assessment
strategies?”). Responses to each question were rated on a scale ranging from 1 (nothing) to 9 (a great deal).

**Analytic Approach**

Regression models were employed to test the hypothesis that proximal gains in mindfulness, distress tolerance, and positive affect during the intervention year would predict teaching efficacy in the following year (controlling for pre-test levels). First, each of the mediators was regressed on the intervention indicator, controlling for gender, years teaching, and the pretest score, to represent the proximal impact of the intervention on mindfulness, distress tolerance, and positive affect and produce residualized gain scores for each of the mediators. Second, to establish paths between these mediators and the teaching efficacy outcomes, three separate regression models were computed (one for each outcome), including the residualized change scores for the mediators (mindfulness, distress tolerance, positive affect), and controlling for gender, years teaching, and the intervention indicator. In the third step of the analyses, a 90% confidence interval for the indirect (mediated) effect was computed using the distribution of the product of the coefficients method (Tofighi & MacKinnon, 2011). Because of the small sample size and the exploratory goals of this study, effects are reported at the trend level (p<.10) and a 90% confidence interval was chosen for testing the indirect (mediated) effects. For each of the regression models, standardized betas are presented as an approximation of effect size.
Results

Table 2 displays correlations among study variables, including pre-post residualized change scores on the mediators, pretest efficacy scores, and follow-up efficacy scores. Residualized change in mindfulness was associated with residualized change in positive affect at a trend level ($r=.27, p<.10$). Residualized change in distress tolerance was not correlated with either of the other mediators.

Intervention-related Change in Proximal Social-emotional Processes

Table 3 reports the results of the impacts of the intervention on the three hypothesized mediators. In each of the regression models, there were significant intervention impacts, replicating results previously reported based on ANCOVA models (Harris, 2014). Intervention participants increased significantly more during the intervention year (from pretest to posttest) than those in the control condition in mindfulness, ($\beta=.28, p<.05$), frequency of positive affect ($\beta =.21, p<.05$), and distress tolerance ($\beta =.21, p<.05$) compared to those in the control group.

Predicting Change in Teaching Efficacy at Follow-up

Table 4 displays the impacts of the mediators on the three indicators of efficacy for classroom practice and the test of the indirect effect. Figures 3-5 display the regression results for each teaching efficacy outcome and the three mediators.

Classroom Management

Efficacy for classroom management in the year following the intervention (controlling for pretest baseline levels) was partially predicted by pretest to posttest change in mindfulness, positive affect, and distress tolerance, represented by residualized change in the intervention year. This model controlled for the other
two mediators and the covariates (gender, years in education, pretest score) in the model. For mindfulness and positive affect, the effect was at a trend level ($\beta = .21$, $p < .10$ and $\beta = .22$, $p < .10$, respectively), and for distress tolerance, the effect was significant ($\beta = .28$, $p < .05$). Results indicate that there was an indirect intervention effect on educators’ efficacy for classroom management mediated by proximal intervention effects on mindfulness, $\mu = .15$, $p < .10$, 90% asymmetric confidence interval for the mediated effect (CI) = .006-.336; positive affect, $\mu = .11$, $p < .10$, 90% CI = .004-.351; and distress tolerance, $\mu = .21$, $p < .05$, 95% CI = .024-.473.

**Student Engagement**

Efficacy for student engagement in the year following the intervention (controlling for pretest baseline levels) was partially predicted by residualized pretest to posttest gains in mindfulness during the intervention year ($\beta = .29$, $p < .05$). This model controlled for the other two mediators and the covariates (gender, years in education, and pretest score). Results indicate that there was an indirect effect of the intervention on educators’ efficacy for student engagement mediated by its effect on mindfulness, $\mu = .22$, $p < .10$, 90% CI = .023-.484.

**Instructional Practice**

Efficacy for instructional practice in the year following the intervention (controlling for pretest baseline levels) from was partially predicted by residualized pretest to posttest gains in two of the three mediators. This model controlled for the other two mediators and the covariates (gender, years in education, pretest score). This effect was observed at a trend level for mindfulness ($\beta = .22$, $p < .10$) and for positive affect ($\beta = .25$, $p < .10$). Results indicate that there was an indirect effect of
the intervention on educators’ efficacy for instructional practice mediated by its
effect on mindfulness, $\mu = .16$, $p < .10$, 90% CI = .005-.359, and its effect on experience
of positive affect, $\mu = .12$, $p < .10$, 90% CI = .006-.379.

**Discussion**

This study explored the indirect effects of the CALM yoga-based
contemplative intervention on efficacy for classroom practice through changes in
three hypothesized mediators: mindfulness, distress tolerance, and positive affect.
Changes in efficacy for classroom management from pretest to one year follow-up
were indirectly impacted by the intervention through pre- to post-test changes in all
three mediators. For changes in student engagement, the indirect effect of the
intervention was mediated through intervention-related changes in mindfulness,
but not the other two mediators. Finally, changes in efficacy for instructional
practice were indirectly impacted by intervention related gains in mindfulness and
positive affect, but not distress tolerance.

The results provide support for a core aspect of the CALM logic model,
linking program participation to classroom practice by way of improved emotional
functioning. Participating in the CALM program, educators learned and engaged in
contemplative practices, including intention-setting, mindful awareness, yogic
breathing exercises, yogic movement and posture sequences, and meditations
focused on mindfulness, lovingkindness, and gratitude. These practices were
presented in the context of self-care for educators’ professional lives, and
participants were encouraged to integrate practices into their professional practice
and personal lives. Over the course of this program, educators increased in their
degree of mindful observation of internal and external experience, improved in their abilities to tolerate distress, and experienced higher rates of positive affect. These improvements, in turn, led to higher levels of efficacy for classroom practice in the following school year.

This study was strengthened by the inclusion of longitudinal follow-up, one year past pretest (7 months after post-test). This allowed for a more rigorous mediational test of the logic model using data from three time points. An additional strength of the study is the consideration of all three hypothesized mediators together to determine their independent contributions to improved efficacy for classroom practice. Based on the current results, it appears that improved mindfulness was a core mediator, important in all three aspects of classroom functioning, while positive affect and distress tolerance did not consistently mediate across all three realms of teaching efficacy, independent of the other mediators. Increased positive affect was a mediator for classroom management and instructional practices, but not student engagement, and improved distress tolerance was only an independent mediator for classroom management. These results will need to be replicated, but they provide initial evidence for a more detailed understanding of the ways that educators’ emotional functioning is related to their efficacy for classroom practice. Improvements in efficacy for classroom management were linked with all of the proximal mediators, suggesting that efficacy for classroom management may be the aspect of classroom functioning that is most sensitive to the impacts of emotional functioning. It is possible that instructional practice and student engagement may be more heavily influenced by competencies
other than emotional functioning. Growth in mindful observation over the intervention period was the only mediator that was associated with later improvement in all three aspects of classroom practice. This may be due to the fact that mindful observation was the mediating process most greatly affected by the intervention ($\beta=.28$ for intervention impact on mindfulness, compared to .21 for positive affect and distress tolerance), or the benefits of mindfulness skills may generalize to more areas of classroom practice than the other two aspects of emotional functioning examined here.

These results provide support for theoretical models hypothesizing improved emotional functioning as core mechanisms of contemplative interventions (Baer, 2003; Chambers et al., 2009; Hölzel et al., 2011). Most previous work on mechanisms of contemplative interventions has been conducted in the context of more intensive mindfulness meditation based programs (e.g. MBSR and MBCT, Carmody, Baer, Lykins, Olendzki, 2009; Nyklíček & Kuijpers, 2008; Shahar, Britton, Sbarra, Fruerverdo, & Bootzin, 2010; Shapiro, Brown, & Biegel, 2007), and very little research has examined mechanisms of yoga-based interventions (Gard et al., 2012; Shelov, Suchday, & Friedberg, 2009). The current research adds to this literature by explicating aspects of emotional functioning as core mechanisms for an innovative brief daily mindfulness-focused yoga program.

The results reported here also provide support for theoretical models specifically hypothesizing benefits of contemplative practice for education (Jennings & Greenberg, 2009; Roeser et al., 2012). For example, the Prosocial Classroom Model hypothesizes that training in contemplative practice and emotion
management will lead to improved classroom outcomes, in part, through improved emotional competencies. This study provides the first empirical evidence for this aspect of the Prosocial Classroom Model. The current study also enhances the evidence base for contemplative practices as relevant and efficacious components of educator professional development. Previous studies have demonstrated: (1) that contemplative interventions improve teaching efficacy (Benn, et al. 2012; Jennings et al., 2013; Roeser et al., 2013) and (2) that increased mindfulness at post-test was a key process mediating the effects of contemplative interventions on teachers’ wellbeing and burnout at follow-up (Benn, et al., 2012; Roeser et al., 2013). However, analyses reported here of the mechanisms of CALM are the first to demonstrate that intervention-related gains in mindfulness and emotional functioning are a key mediators linking contemplative interventions with teaching efficacy.

**Limitations**

The limitations of this study include the small sample size, the wait-list control design, and the reliance on self-report measures of teaching efficacy. The follow-up sample size (48) was relatively small to test for indirect intervention effects and too small for the use of structural equation modeling. This sample size reflected a 25% reduction from the post-test sample. However, this level of attrition was due primarily to educator turnover (hence, ineligibility) rather than non-response, and there was not differential attrition across the two conditions. While the wait-list control design randomized the two schools and provided a comparison condition to strengthen conclusion, the intervention was assigned at the school
level, making it impossible to completely rule out extraneous variables that may have somehow impacted emotional functioning and teaching efficacy in one school compared to the other. Finally, the distal outcome measure included in this study, teaching efficacy, was a self-report indicator of classroom practice, and was thus subject to self-report biases. This was, however, an important first step in order to establish conceptual linkages before implementing more costly performance based measures.

**Future Directions**

There are many unanswered questions that can be addressed by future work to continue building the evidence base regarding what works, how, and for whom in applying contemplative interventions to educational contexts. One primary question is whether this model of mechanisms can be replicated in the context of other contemplative interventions for educators, such as CARE and SMART (Jennings et al., 2013; Roeser et al., 2013). Do those programs also achieve their benefits on classroom practice through proximal gains in aspects of emotional functioning? The current analyses will also need to be replicated in a larger evaluation of CALM, with the addition of performance measures of classroom practice, such as observer or student ratings of instruction and the classroom climate. In addition, it is possible that certain variables, such as age or years of experience in education, could moderate the indirect effects observed here. For example, more experienced educators may be more stable in their teaching efficacy and classroom practices compared to pre-service or early career service educators and, thus, less sensitive to intervention effects (Tschannen-Moran et al., 1998).
Another important question for future research that was beyond the scope of this study involves a more detailed analysis of the order of the mediating processes. Here, developments in mindfulness, distress tolerance, and positive affect were examined as parallel proximal processes resulting from contemplative training. It is possible, however, that developments in mindfulness occur first, followed by additional changes in emotional functioning (e.g. Carmody et al., 2009; Shapiro et al., 2006) or that positive affect induced by the intervention facilitates growth in mindfulness, as would be hypothesized by the broaden and build theory of positive emotions (e.g. Fredrickson et al., 2008). These processes of growth in mindfulness, other aspects of emotional functioning, and teaching efficacy may also be reciprocal and occur based on intervention-related experiences on a much shorter time scale (i.e. days and weeks rather than months) which would require a more intensive longitudinal design to investigate (for example, bursts of daily data collection before and during the intervention). Finally, the current investigation was limited to one dimension of mindfulness which been impacted by the intervention at post-test, the degree of observation, but it is possible that these proximal intervention-related gains in mindful observation could have led to distal gains in other dimensions of mindfulness, such as non-judgment and non-reactivity.

Conclusions

Educators’ effective emotional functioning is a crucial competency for effective classroom practice, and innovative professional development strategies to support educators in this area of their professional lives have been long overdue (Jennings & Frank, in press; Jennings & Greenberg, 2009; Roeser et al., 2012). The
results of this study demonstrate that the CALM program indirectly impacted educators’ efficacy for classroom practice through its proximal improvements in emotional functioning. This provides initial support for the CALM logic model as well as aspects of the Prosocial Classroom theoretical model (Jennings & Greenberg, 2009) and conceptual models of the mechanisms of mindfulness (e.g. Hölzel et al., 2011). Brief daily contemplative practice interventions, such as CALM, that target aspects of emotional functioning like mindfulness, distress tolerance, and positive affect, represent a promising area of study to support educators’ professional development and their professional wellbeing. Future research should continue to investigate such strategies and the mechanisms by which they achieve their impacts.
References


Table 3-1.

*Follow-up participant demographics*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M or %</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td>48</td>
<td>41.69</td>
<td>10.95</td>
<td>21-60</td>
</tr>
<tr>
<td>Percent female</td>
<td>48</td>
<td>85.42%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Caucasian</td>
<td>47</td>
<td>97.87%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household income</td>
<td>42</td>
<td>7.29</td>
<td>4.07</td>
<td>1-19</td>
</tr>
<tr>
<td>Percent with bachelor’s degree or higher</td>
<td>48</td>
<td>89.58%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent with master’s or specialist degree</td>
<td>48</td>
<td>39.58%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of experience in education</td>
<td>48</td>
<td>13.45</td>
<td>7.58</td>
<td>0-39</td>
</tr>
<tr>
<td>Years at current school</td>
<td>48</td>
<td>8.47</td>
<td>6.14</td>
<td>0-22</td>
</tr>
</tbody>
</table>

*Household income was measured on a scale of 1-19 where 1 = $20,000 – 29,999, 2 = $30,000 – 39,999 and so on, up to 19 = $200,000 or greater. The mean above indicates that the sample fell in the $80,000 – 99,999 range.*
Table 3-2.

*Correlations between proximal mediators and teaching efficacy at pretest and follow-up.*

<table>
<thead>
<tr>
<th>Mediators: Pre-Post Residual Change</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mindfulness (Observe)</td>
<td>0.27+</td>
<td>0.19</td>
<td>0.19</td>
<td>0.09</td>
<td>0.07</td>
<td>0.36*</td>
<td>0.36*</td>
<td>0.35*</td>
</tr>
<tr>
<td>2. Positive Affect</td>
<td>1</td>
<td>0.24</td>
<td>-0.06</td>
<td>-0.11</td>
<td>-0.10</td>
<td>0.26+</td>
<td>0.18</td>
<td>0.24+</td>
</tr>
<tr>
<td>3. Distress Tolerance</td>
<td>1</td>
<td>.05</td>
<td>-0.05</td>
<td>-0.06</td>
<td>0.33*</td>
<td>0.07</td>
<td>0.19</td>
<td></td>
</tr>
</tbody>
</table>

Pretest Teaching Efficacy

| 4. Classroom Management           | 1   | 0.47** | 0.58*** | 0.65*** | 0.50*** | 0.40** |
| 5. Student Engagement             | 1   | 0.62*** | 0.26+ | 0.57*** | 0.35* |
| 6. Instructional Practice         | 1   | 0.43** | 0.50*** | 0.61*** |

Follow-up Teaching Efficacy

| 7. Classroom Management           | 1   | 0.60*** | 0.62*** |
| 8. Student Engagement             | 1   | 0.64*** |
| 9. Instructional Practice         | 1   |     |

Note: Mediators are residuals of posttest regressed on pretest, controlling for gender and years teaching.

+p<.10, *p<.05, **p<.01, ***p<.001
Table 3-3.

*Intervention impacts on change in proximal social-emotional processes at posttest*

<table>
<thead>
<tr>
<th>Mediator</th>
<th>$b$</th>
<th>SE</th>
<th>$p$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mindfulness (Degree of Observation)</td>
<td>0.35</td>
<td>0.14</td>
<td>0.01</td>
<td>0.28</td>
</tr>
<tr>
<td>Positive Affect</td>
<td>0.38</td>
<td>0.16</td>
<td>0.03</td>
<td>0.21</td>
</tr>
<tr>
<td>Distress Tolerance</td>
<td>0.36</td>
<td>0.14</td>
<td>0.01</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Note: All parameter estimates are the effect of the intervention indicator on the mediator based on OLS regression models where controls include pretest score, gender, and years in education. Standardized betas are included as approximations of the effect size. These analyses replicate results originally reported in (Harris, 2014).
Table 3-4.

*Effects of the mediators on teaching efficacy and indirect effects of the intervention through the mediators.*

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Mediator</th>
<th>b</th>
<th>SE</th>
<th>P</th>
<th>B</th>
<th>μ</th>
<th>SE</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Management</td>
<td>Mindfulness</td>
<td>0.42</td>
<td>0.23</td>
<td>0.08</td>
<td>0.21</td>
<td>0.15</td>
<td>0.10</td>
<td>90% (0.006, 0.336)</td>
</tr>
<tr>
<td></td>
<td>Positive Affect</td>
<td>0.40</td>
<td>0.22</td>
<td>0.08</td>
<td>0.22</td>
<td>0.15</td>
<td>0.11</td>
<td>90% (0.004, 0.351)</td>
</tr>
<tr>
<td></td>
<td>Distress Tolerance</td>
<td>0.58</td>
<td>0.22</td>
<td>0.01</td>
<td>0.28</td>
<td>0.21</td>
<td>0.12</td>
<td>95% (0.024, 0.473)</td>
</tr>
<tr>
<td>Student Engagement</td>
<td>Mindfulness</td>
<td>0.63</td>
<td>0.31</td>
<td>0.05</td>
<td>0.29</td>
<td>0.22</td>
<td>0.14</td>
<td>90% (0.023, 0.484)</td>
</tr>
<tr>
<td></td>
<td>Positive Affect</td>
<td>0.40</td>
<td>0.28</td>
<td>0.16</td>
<td>0.21</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Distress Tolerance</td>
<td>0.05</td>
<td>0.29</td>
<td>0.86</td>
<td>0.02</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Practice</td>
<td>Mindfulness</td>
<td>0.45</td>
<td>0.25</td>
<td>0.08</td>
<td>0.22</td>
<td>0.16</td>
<td>0.11</td>
<td>90% (.005-.359)</td>
</tr>
<tr>
<td></td>
<td>Positive Affect</td>
<td>0.43</td>
<td>0.23</td>
<td>0.07</td>
<td>0.25</td>
<td>0.16</td>
<td>0.12</td>
<td>90% (.006-.379)</td>
</tr>
<tr>
<td></td>
<td>Distress Tolerance</td>
<td>0.33</td>
<td>0.24</td>
<td>0.18</td>
<td>0.17</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Beta coefficients are independent effects of residualized change in each mediator on the specified outcome, controlling for the other mediators, pretest score, gender, and years teaching. Standardized betas are included as approximations of the effect size. Parameter estimates for μ represent the indirect effect of the intervention on the specified outcomes through the specified mediator and were computed using the distribution of the products of the coefficients method (Tofhigi &MacKinnon, 2011).
Figure 3-1. Conceptual Model: A simplified version of the CALM logic model, highlighting hypothesized proximal processes related to classroom practice.
Figure 3-2. Participant flow in the CALM study.
Figure 3-3. Indirect effects of CALM on classroom management.
Figure 3-4. Indirect effects of CALM on student engagement.
Figure 3-5. Indirect effects of CALM on instructional practice.
CHAPTER 5

Discussion
Prior research and theory suggest that contemplative interventions that train educators in mindfulness and emotion regulation skills are a promising direction for supporting educators' professional efficacy and their wellbeing (Roeser, Skinner, Beers, & Jennings, 2012). The studies in this dissertation add to a small but growing body of evidence supporting this premise. Although this is not the first contemplative intervention model demonstrating efficacy for supporting educators, the studies in this dissertation go beyond the prior research in several ways: (1) testing an innovative delivery format; (2) testing yoga as the primary intervention activity; (3) investigating educators’ responsiveness to a workplace contemplative intervention; (4) testing mechanisms linking intervention-related proximal gains in emotional functioning with distal improvements in educators’ classroom practice.

Study 1 provided support for CALM’s efficacy in the hypothesized domains of mindfulness and emotional functioning, teaching efficacy, stress-related outcomes, and wellbeing. The innovative brief daily format of CALM differs substantially from prior intervention models, which have used intensive weekly sessions or weekend retreats. In addition, CALM is the first contemplative intervention for educators to use yoga as a primary intervention activity. Despite these substantial differences in the intervention approach, evaluation results provided evidence supporting CALM’s efficacy in supporting outcomes similar to those observed in other studies of contemplative interventions. CALM impacted observed changes in self-reported indicators of emotional functioning, stress-related outcomes and wellbeing. These self-report measures were strengthened by
significant changes in two physiological indicators of wellbeing: blood pressure and cortisol functioning. These results, combined with the effect on efficacy for classroom management, support the promise of the underlying intervention model, that offering the opportunity for a brief contemplative practice in the school setting may be a convenient and effective way to support educators’ professional lives and wellbeing.

Study 2 investigated an aspect of the implementation process that has yet to be examined in any other studies of contemplative interventions for educators: participant responsiveness. Previous studies of contemplative interventions in clinical and wellness-promotion settings have demonstrated that participant responsiveness is an important feature of the intervention change process (e.g. Carmody & Baer, 2008; Creswell et al., 2009; Rosensweig et al, 2010; Shapiro, Bootzin, Figuerdo, Lopez, & Schwartz, 2003). However, there is a surprising scarcity of knowledge regarding educators’ engagement in professional development or wellness promotion programs. The results of Study 2 showed that educators responded positively to the CALM program, and that their levels of engagement were related to the degree of change they experienced in some study outcomes. Notably, this was true for both consistency of attendance and personal practice independently, but in different patterns. Practice was more strongly related to developments in mindfulness, and attendance was more strongly related with improvements in stress and wellbeing. Study 2 also suggested that although educators’ engagement with the program was influenced by their professional
experience and efficacy, it was not dependent on their prior wellness behaviors or other baseline demographic characteristics. The integration of CALM into the daily routine of the school setting may have been especially effective in promoting its accessibility and acceptability for educators.

Study Three adds a substantial contribution to the field by testing a key relationship hypothesized by conceptual models of contemplative interventions for educators (Jennings & Greenberg, 2009; Roeser, Skinner, Beers & Jennings, 2012). The theoretical mechanism that supporting educators’ mindfulness and emotional functioning would lead to improvements in their classroom practice has not been empirically tested in previous intervention studies. Study Three demonstrated that educators who improved in mindfulness and emotional functioning during CALM were more likely to have improved in teaching efficacy at the start of the following school year. This relationship was especially robust for mindfulness as a mediating process and for indirect effects on classroom management. Developments in mindfulness were linked with later improvements in efficacy for all three dimensions of classroom practice. This demonstrated that mindfulness was a central intervention process relevant to educators’ classroom practice. Proximal gains following CALM in all three emotional functioning mediators (mindfulness, positive affect, and distress tolerance) explained differential gains in classroom management. This, combined with the fact that classroom management was significantly impacted at the posttest assessment as well, suggests that classroom
management may be an aspect of educators’ professional lives where contemplative interventions are especially beneficial.

Taken together, these studies provide strong initial support for CALM and contribute to our understanding of important aspects of educators’ professional development and wellbeing. Although these studies were small in scale and faced some methodological limitations, they demonstrated support for the CALM logic model in three ways: (a) CALM was related to post-intervention improvements in key domains of educators’ functioning; (b) increased program engagement was related to degree of improvement in key outcomes among the intervention group; (c) there was support for a change process in which core mechanisms targeted by the intervention supported later professional functioning.

Future work will be needed to replicate the intervention model and these processes in additional settings, but this set of results provides a strong foundation on which future research can be built. In future studies, it will be important to integrate additional perspectives, such as qualitative study of educators’ daily experiences related to the intervention or students’ perspectives on educators’ classroom practice. There are implications for both prevention science and educational policy if additional evidence supports the effectiveness of strategies like CALM. Such strategies may be useful to support schools in reducing educator burnout, sustaining educator classroom performance, preventing educator attrition, and reducing educator healthcare costs. Given the importance of educators’ work
for the wellbeing of communities, continued work in this area should be prioritized by researchers and policy-makers.
References


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Education

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2004 Rhodes College, Bachelor of Arts with Honors in Psychology, Magna cum Laude

Selected Research Experience

2010-2014 Training Interdisciplinary Education Scientists (TIES) Predoctoral Research Fellowship (Funded by the Institute of Education Sciences, research arm of the US Department of Education)
2012-2014 Comprehensive Approach to Learning Mindfulness (CALM) Study of Teacher Health and Wellbeing (Co-PIs Patricia Jennings and Mark Greenberg, Penn State; funded by the 1440 Foundation and the Penn State Children, Youth and Families Consortium)
2011-2014 School-based Mindfulness Intervention to Prevent Substance Use for Urban Youth (Co-PIs Mark Greenberg, Penn State and Tamar Mendelson, Johns Hopkins; funded by NIDA)
2010-2014 Character Education Study (PI Celene Domitrovich, funded by Department of Education)
2011-2012 Excellence in Social Emotional Learning (ExSEL) for Middle Schools
2009-2011 PROmoting School-University-Community Partnerships to Enhance Resilience (PROSPER) (PIs Richard Spoth and Mark Greenberg, funded by NIDA)
2001-2009 Developmental Psychology/Narrative Research Group (Marsha Walton), Rhodes College

Selected Papers and Presentations


