

The Effectiveness of Mindfulness-Based Stress Reduction on Educator Stress and Well-Being: Results from a Pilot Study

Jennifer L. Frank · Diane Reibel · Patricia Broderick · Todd Cantrell · Stacie Metz

© Springer Science+Business Media New York 2013

Abstract We assessed the effectiveness of an adapted mindfulness-based stress reduction (MBSR) program on educator stress and well-being. The study included 36 high school educators who participated in either an 8-week adapted MBSR program or a waitlist control group. Results suggested that educators who participated in MBSR reported significant gains in self-regulation, self-compassion, and mindfulness-related skills (observation, nonjudgment, and nonreacting). Significant improvements in multiple dimensions of sleep quality were found as well. These findings provide promising evidence of the effectiveness of MBSR as a strategy to promote educator's personal and professional well-being. Implications and directions for future research are discussed.

Keywords Mindfulness · Mindfulness-based stress reduction · MBSR · Meditation · Teachers · Educators · Effectiveness · Self-regulation · Self-compassion · Sleep · Well-being · Observation · Nonjudgment · Nonreacting

Introduction

Ensuring teacher quality is a top priority for our national agenda to enhance student achievement and well-being. Research over the past decade has revealed that teachers play an important role in helping students to feel connected to their school and to develop trusting adult relations. The quality of student–teacher relationships is strongly linked to student achievement (Hamre and Pianta 2005; Mashburn et al. 2008) and can serve as a protective factor for children who are at risk for academic failure (Rimm-Kaufman et al. 2003).

Teachers are among the first nonparental adult role models young children are exposed to, and who through example, shape the development of key social skills (Jennings and Greenberg 2009). Not surprisingly, the quality of student's early relationships with teachers predicts later school engagement and achievement, especially among high-risk students (Bergin and Bergin 2009).

The development of effective emotion-regulation skills is critical to the success of professionals in a variety of settings (Mikolajczak et al. 2009; Kafetsios et al. 2013). These skills are particularly important for educators, who must learn to successfully interact with a diverse array of students, colleagues, and parents on a daily basis (Brackett et al. 2010). Teachers with well-developed emotion-regulation skills are better prepared to manage student behavior effectively, de-escalate conflict situations, and build more positive relationships with students, parents, and colleagues. Increasing diverse levels of racial, economic, linguistic, and learning ability place additional demands on teachers to address complex individual student needs.

Difficulty in coping with student misbehavior is a commonly reported stressor for many teachers (Carson et al. 2010; Montgomery and Rupp 2005; Sutton and Wheatley 2003). Pressures for increased accountability related to student test scores in the context of dwindling economic and other material resources add to the burden on teachers. Such stressors can initiate strong negative emotions that can interfere with teachers' capacity to deliver high-quality instruction (Sutton 2004; Emmer and Stough 2010; Maslach and Jackson 1981) and even compromise health. Moreover, frequent experience of negative emotions may undermine teacher's sense of professional self-efficacy (Kavanagh and Bower 1985; Maslach and Jackson 1981) and over time, lead to professional burnout (Tsouloupas et al. 2010). In fact, nearly 50 % of new teachers in the USA leave the profession within the first 5 years (Ingersoll and Smith 2003), and attrition rates are nearly double in high-poverty schools where professional demands

J. L. Frank (✉) · D. Reibel · P. Broderick · T. Cantrell · S. Metz
Prevention Research Center, Pennsylvania State University, Office
316C Biobehavioral Health, University Park, PA 16808, USA
e-mail: jfrank@psu.edu

and stressors are highest (Allensworth et al. 2009; Ingersoll 2002; Provasnik and Dorfman 2005). Difficulties in managing negative emotions and general professional stress are frequently cited as one of the primary factors contributing to teacher attrition (Darling-Hammond 2001; Montgomery and Rupp 2005). Unfortunately, few teachers receive explicit training in techniques designed to prepare them for coping with common classroom stressors.

Over the past decade, several investigators have explored the potential efficacy of utilizing mindfulness-based strategies with classroom teachers (Meiklejohn et al. 2012). Several published programs, such as Mindfulness-Based Wellness Education (Poulin et al. 2008, 2009), Cultivating Awareness and Resilience in Education (Jennings et al. 2011, 2013), and Stress Management and Relaxation Techniques in Education (Cullen and Wallace 2010; Benn et al. 2012) have all demonstrated very promising effects for a variety of teachers and students (for an excellent review of professional trends and other emerging programs, see Roeser et al. 2012).

Mindfulness-based stress reduction (MBSR) was originally developed by Kabat-Zinn and his colleagues at the University of Massachusetts Stress Reduction Clinic (Kabat-Zinn 1990). The MBSR program has proven useful in the treatment of a wide variety of physical and mental health problems, across a range of individuals of varying ages and diagnoses. The MBSR program follows a structured curriculum that is taught in a group format over 8 weeks. In comparison to traditional psychosocial therapies or workplace stress-reduction programs that emphasize discussion or analysis, MBSR is designed to help participants develop a greater sense of moment-to-moment awareness and acceptance. Participants develop specific skills in their capacity to become nonjudgmentally aware of thoughts, feelings, and sensations, and increase their capacity to replace automatic, habitual, and often judgmental reactions with more conscious and skillful responses. Session content themes include noticing the automaticity of thinking and behavior, becoming more aware of bodily sensations, learning how to get disengage from reactive patterns, and learning how to become more resilient when faced with life stressors. Program activities include experiences in mindful walking, sitting, eating, yoga/mindful movement, and group discussion. Program participants also complete daily homework practice to reinforce learning concepts.

MBSR outcome studies show improvements in physical and psychological functioning for individuals suffering from chronic pain (Kabat-Zinn et al. 1986; Randolph et al. 1999); in overall quality of life, stress reduction, and sleep quality for cancer patients (Carlson et al. 2003; Shapiro et al. 2003); in healing of psoriasis (Kabat-Zinn et al. 1998); in immune system functioning among HIV-positive patients (Robinson et al. 2003); in reduction of pain, fatigue, and sleep disturbances associated with fibromyalgia (Weissbecker et al. 2002); in symptom reduction among women with binge eating

disorder (Kristeller and Hallett 1999); as well as decreases in anxiety and depression (Kabat-Zinn et al. 1992) and reduction in depressive relapse (Ma and Teasdale 2004). Adults with primary chronic insomnia show significant improvements in multiple dimensions of sleep quality following participation in MBSR with improvements being comparable to treatment with pharmacotherapy (Gross, et.al 2011). MBSR has also shown to be effective in reducing the stress, and increasing perceived quality of life and self-compassion among healthcare professionals (Shapiro et al. 2005). Meta-analyses (Grossman et al. 2004; Hofmann et al. 2010) reported that MBSR was an effective intervention for enhancing both physical and mental wellness and for improving coping with both day-to-day and more serious stressors.

The purpose of the current study is to examine the feasibility and effectiveness of an adapted version of MBSR on educator stress and well-being. Based on prior research documenting the effectiveness of MBSR in adult populations (see above), we anticipated that educators who completed the MBSR program would demonstrate significant improvements in physical and psychological indicators of well-being. Given the well-established connection between effective emotion regulation and psychosomatic symptoms (see Cole et al. 2004 for a review), we anticipated treatment group participants would experience significant improvements in social-emotional indicators of well-being, higher levels of self-efficacy and emotional well-being, and improved sleep quality.

Method

Procedure

A quasi-experimental pretest–posttest comparison group design was utilized to assess the effectiveness of the adapted MBSR program. A convenience sample of 36 high school teachers drawn from two high schools matched on school-level demographics in the same suburban school district was selected to participate in the study. All full-time instructors, specialists, and administrators were eligible to participate in the study. An open orientation session was offered for teachers and administrators at the intervention school to inform them of the logistics of an 8-week adapted MBSR program to be offered at the school. A commitment to attend all classes and to practice formal mindfulness meditation (25–30 min a day), 6 days a week, was emphasized. The research protocol was also described. Twenty-three people attended the orientation session and of those attending, 18 voluntarily selected to participate in the MBSR program. Teachers and administrators from a sister school in the same district, who said they would be interested in taking an MBSR course if offered at their school, were recruited as a control group. Active consent

was obtained in accordance with university Institutional Review Board procedures prior to implementation (Table 1).

Participants

Participants included educators from two suburban high schools ($n=36$) in Pennsylvania. A majority of participants (97.2 %) were Caucasian and female (77.8 %). The age of participants ranged from 24 to 62 years old with a mean of 40.72 years of age ($SD=10.77$). All educators were employed full time, and the majority had completed 18 or more years of education (94.4 %). The majority of participants across both groups were regular or special education high school teachers. Other job titles included counselor ($n=2$), assistant principal ($n=2$), school nurse ($n=1$), music ($n=1$), and librarian ($n=1$). Chi-square tests were used to determine if categorical pretest characteristics differed by program group, and t tests were used to assess if continuous pretest characteristics differed by program group. No significant group differences in demographic characteristics were found between treatment and control groups at baseline.

Implementation of Adapted MBSR Program

Teachers in the treatment group participated in an 8-week MBSR program delivered by a certified MBSR instructor. The instructor was a certified MBSR teacher through the

Center for Mindfulness at the University of Massachusetts Medical School who has been teaching MBSR for over 18 years to a variety of populations. Sessions were delivered after school for 2 h per week across eight consecutive weeks (as compared to 2.5 h per session in the standard MBSR curriculum). During the 8-week intervention period, a variety of mindfulness meditation techniques were taught, including the body scan, awareness of breathing, mindful yoga, eating meditation, and walking meditation. Class time each week was divided between meditation practice, small and large group discussions, and mindfulness skill-building activities. Classes were designed to (a) enhance awareness of one's body and mind, (b) teach participants to replace automatic reactions with consciously chosen responses, and (c) bring greater awareness and skill to interpersonal communication. Group discussions focused on participants' experiences with meditation practices and on the application of mindfulness in daily life including in the classroom. Discussions took place first in dyads (mindful listening) and then in the large group. The primary focus of attention was on the participants' own body sensations, thoughts, and feelings. Participants were given CDs of guided mindfulness meditations and asked to practice 25–30 min of meditation a day at home (as compared to 45 min of home practice asked in the standard MBSR curriculum), 6 days a week.

Another adaption to the standard MBSR curriculum was made for teachers which included discussions/instructions on how to bring simple mindfulness practices into the classroom (short breathing practices, body scan, and mindful movement). This was introduced in class 5 and teachers were invited to bring practices of their choice into their classroom and fill out calendars (similar to the pleasant and unpleasant calendars used in MBSR) as a way to be mindful of their own experiences (body sensations, thoughts, and feelings) when introducing mindfulness practices to students. Bringing a short practice to students was a mindfulness practice for the teachers (including noticing how they react when they perceive students reactions). In classes 6 and 7, participants reported on their experiences and also received peer and MBSR instructor feedback on creative ways of integrating short mindfulness practices into the classroom.

Table 1 Demographic characteristics of treatment and comparison group participants

	Treatment group ($n=18$) n (%) or $M\pm SD$	Comparison group ($n=18$) n (%) or $M\pm SD$
Age (years)	40.7 \pm 10.6	40.8 \pm 11.25
Gender		
Male	5 (27.8)	3 (16.7)
Female	13 (72.2)	15 (83.3)
Race		
Caucasian	18 (100.0)	17 (94.4)
Asian	0	1 (5.6)
Years of completed education		
17	0 (0.0)	2 (11.1)
18	2 (11.1)	5 (27.8)
19	1 (5.6)	1 (5.6)
20+	15 (83.3)	10 (55.6)
Marital status		
Single/engaged	7 (38.9)	4 (22.2)
Married	9 (50.0)	14 (77.8)
Divorced/separated	2 (11.1)	0 (0.0)
No. of children	1.1 \pm 1.2	1.1 \pm 1.4

Measures

Brief Symptom Inventory (BSI; Derogatis 1975). The BSI a widely used Likert-type measure designed to assess clinically relevant psychological symptoms in adolescents and adults. For the purposes of this study, the somatization, depression, anxiety, and Global Severity Index were administered. The BSI is a nationally normed standardized assessment, validated across both clinical and nonclinical populations, with scale coefficient alphas ranging from 0.85 on the somatization scale, 0.89 on the depression scale, 0.86 on the anxiety scale,

and 0.97 on the composite Global Severity Index (Boulet and Boss 1991; Johnson et al. 1996).

Pittsburgh Sleep Quality Index (PSQI; Buysse et al. 1989). The PSQI is an 18-item measure of the quality and patterns of sleep in adults. The scale measures seven aspects of sleep including general sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the use of medication to sleep, and daytime sleep-related dysfunction over the past month. Four of the questions are open-ended and 14 are rated on a 0–3 Likert scale with higher scores reflecting more seriously impaired sleep function (0=better sleep to 3=more impaired sleep). Total sleep quality scores of less than 5 are considered to be reflective of good sleep quality, and scores above 5 indicative of poor sleep quality.

Self-compassion Scale (SCS, Raes et al. 2011). The SCS is a 26-item Likert measure designed to assess the degree to which respondents act in self-compassionate ways during difficult or challenging situations. The scale is comprised of seven subscales measuring self-kindness, self-judging, common humanity, isolation, mindfulness, over-identification, and total self-compassion. Items are rated on a 1–5 point Likert scale. Coefficient alphas for the self-kindness scale was 0.84, self-judging=0.87, common humanity=0.86, isolation=0.76, mindfulness=0.79, and over-identification=0.62.

Maslach Burnout Inventory (MBI-Educator's Version; Maslach et al. 1997) The MBI is a 22-item Likert measure designed to assess burnout-related symptoms in educators. The scale is comprised of three subscales measuring different facets of the burnout syndrome including *emotional exhaustion*, *depersonalization*, and sense of *personal accomplishment*. The MBI is a nationally normed standardized assessment, with scale coefficient alphas ranging from 0.86 for the emotional exhaustion scale, 0.72 for the depersonalization scale, and 0.74 for the personal accomplishment scale.

The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2008) is a 39-item Likert-type scale designed to measure different facets of mindfulness in adults. The scale is comprised of five subscales assessing individual's observing, describing, acting with awareness, nonjudgment, and nonreactiveness. Coefficient alphas for the observing scale was 0.83, describing was 0.92, acting with awareness was 0.91, nonjudgment was 0.94, and nonreactiveness was 0.83.

The 14-item Affective Self-Regulatory Efficacy Scale (ASRES) was used to assess self-efficacy in emotion regulation skills most relevant for mindfulness practice. The format of the ASRES measure is based on Bandura's measurement of self-efficacy (Bandura et al. 2003). The 14 items were measured on a five-point Likert scale from 1 (I am not confident at

all) to 5 (I am very confident in my ability to do this). Coefficient alphas for the acknowledgement scale were 0.64, calmness was 0.56, present awareness was 0.66, and acceptance was 0.68. Although items have a fairly high degree of face validity, reliabilities were of borderline acceptability for a field trial and should be interpreted with caution.

Analyses

Demographic characteristics at pretest were summarized by program versus control group. Chi-square tests (for categorical variables) and *t* tests (for continuous variables) were computed to assess statistical differences on pretest indicators between groups. No significant differences at baseline were observed. A series of paired *t* tests were conducted to examine whether there was significant pre-post changes within the treated sample. To correct for type I error due to multiple pairwise contrasts, *p* values were adjusted using a Benjamini–Hochberg (BH) correction (Benjamini and Hochberg 1995). The BH method adjusts for multiple comparisons by controlling false discovery rate instead of family-wise error rate which tends to result in overpenalization. Growing evidence suggests the BH method provides the best solution to the multiple comparisons problem across multiple practical applications (Williams et al. 1999). Cohen's *d* was calculated for each outcome measure with effect sizes of 0.3–0.5 considered small, 0.5–0.8 medium, and greater than 0.80 a large effect (Cohen et al. 2003). Although our sample sizes in this pilot study were quite small ($n=36$) teachers in treatment and control group were nested within schools. Although multilevel modeling is optimal in such circumstances, our sample size was not large enough to accommodate multilevel modeling. Due the relatively low-levels of missing data, list-wise deletion procedures were used to handle missing data during analyses.

Results

Main Effects of the Adapted MBSR Program

Unadjusted means and standard deviations at pre and post and tests of significance are presented in Tables 2 and 3, respectively. After adjusting *p* values for multiple comparisons, statistically significant and substantively meaningful improvements were found on measures of self-reported efficacy in acknowledgement ($t(33)=3.71$, $p=0.03$, $d=1.25$, calmness, $t(33)=4.36$, $p=0.02$, $d=1.47$) and present moment ($t(33)=3.69$, $p=0.01$, $d=1.25$). No significant improvements were found for the measure of efficacy in acceptance ($t(33)=1.10$, $p=0.40$, $d=0.37$).

Assessments of clinical symptomology on the BSI revealed no statistically significant changes in somatization ($t(33)=-0.77$,

Table 2 Unadjusted means and standard deviations of treatment and control groups at baseline and postintervention

	Treatment group		Comparison group	
	Baseline	Post	Baseline	Post
Affective self-regulation				
Acknowledgement	12.89±3.05	16.11±2.74	14.72±2.05	14.35±3.44
Calmness	11.56±2.99	15.61±2.68	13.33±1.91	12.94±3.42
Present moment	10.78±2.05	12.83±1.62	12.94±1.86	12.65±1.93
Acceptance	10.61±1.94	11.61±2.23	11.00±2.35	11.12±1.96
Brief Symptom Inventory				
Somatization	2.83±2.41	1.72±2.24	1.78±2.51	1.24±1.52
Depression	3.56±4.06	2.17±2.31	3.17±3.65	2.76±3.05
Anxiety	4.56±2.38	2.83±1.69	3.89±3.07	2.59±2.60
GSI	10.94±6.94	6.72±5.07	8.83±7.06	6.59±6.47
Maslach Burnout Inventory				
Emotional exhaustion	23.97±7.62	19.87±9.07	25.78±11.06	21.5±10.71
Personal accomplishment	37.38±6.14	38.87±8.89	40.33±3.71	40.88±5.35
Depersonalization	6.65±5.37	7.53±10.36	6.72±3.89	5.41±4.51
Self-compassion scale				
Self-kindness	2.72±0.83	3.36±0.75	3.10±0.86	3.16±1.00
Self-judging	3.39±1.01	2.62±0.96	2.86±0.89	2.71±0.87
Common humanity	3.3±1.11	3.44±1.10	3.71±0.79	3.68±0.82
Isolation	3.05±0.98	2.32±1.01	2.71±0.98	2.53±0.98
Mindfulness	3.18±0.89	3.61±0.52	3.83±0.70	3.54±0.82
Over-identification	3.18±0.97	2.51±1.03	2.58±0.61	2.62±1.01
Total self-compassion	2.93±0.77	3.49±0.70	3.42±0.60	3.42±0.70
Five Facet Mindfulness				
Observe	25.14±5.21	30.75±4.09	26.92±6.61	26.59±6.99
Describe	29.31±6.11	32.83±5.84	29.23±6.04	28.76±5.76
Act with Awareness	21.56±4.18	26.58±5.02	27.92±5.88	28.47±5.96
Non-Judge	25.22±7.97	29.67±7.15	31.00±6.04	30.88±5.73
Non-React	19.53±4.02	24.58±4.66	23.31±2.66	21.94±4.48
Sleep Quality Index (PSQI)				
Duration of sleep	1.00±0.84	0.28±0.46	0.46±0.52	0.71±0.77
Sleep disturbance	1.56±0.51	0.50±0.51	1.15±0.55	1.47±0.51
Sleep latency	0.89±1.02	0.17±0.51	0.69±0.63	0.71±0.77
Day dysfunction	1.33±0.59	0.33±0.49	0.85±0.69	0.94±0.66
Sleep efficiency	0.17±0.38	0.11±0.32	0.15±0.38	0.29±0.77
Overall sleep quality	1.17±0.62	0.44±0.62	0.92±0.49	1.06±0.80
Need meds to sleep	0.67±1.03	0.00±0.00	0.15±0.38	0.22±0.73
Total PSQI	6.78±2.94	1.78±2.07	4.38±1.89	5.17±3.22

$p=0.53$, $d=-0.26$), depression ($t(33)=-0.77$, $p=0.51$, $d=-0.21$), anxiety ($t(33)=-0.48$, $p=0.66$, $d=-0.16$), or general symptoms ($t(33)=-0.83$, $p=0.53$, $d=-0.28$). No significant improvements on measures of teacher burnout, including emotional exhaustion ($t(28)=-0.49$, $p=0.67$, $d=-0.18$), personal accomplishment ($t(28)=-0.25$, $p=0.80$, $d=-0.09$), or depersonalization ($t(28)=0.90$, $p=0.50$, $d=0.33$) were found.

Assessments of self-compassion revealed several significant and meaningful improvements in self-kindness ($t(33)=$

2.25 , $p=0.03$, $d=0.85$), decreased self-judging ($t(33)=-2.70$, $p=0.02$, $d=-0.91$), mindfulness ($t(33)=2.87$, $p=0.01$, $d=0.97$), over-identification ($t(33)=-2.92$, $p=0.01$, $d=-0.99$), and total self-compassion ($t(33)=3.33$, $p=0.01$, $d=1.13$). No significant improvements were found in teacher belief in a common humanity ($t(33)=0.78$, $p=0.55$, $d=0.26$) or general sense of isolation ($t(33)=-1.82$, $p=0.12$, $d=-0.61$).

On the FFMQ, participants in the treatment group demonstrated significant improvements their reported levels of

Table 3 Significance tests of treatment–comparison group contrasts of change scores (post–pre)

	Treatment Group <i>M</i> ± <i>SD</i>	Comparison Group <i>M</i> ± <i>SD</i>	<i>t</i>	<i>p</i>	B–H <i>p</i>	<i>D</i>
Affective self-regulation						
Acknowledgement	3.22±3.14	-0.41±2.62	3.71	0.01	0.03	1.25
Calmness	4.06±2.88	-0.35±3.10	4.36	0.01	0.02	1.47
Present Moment	2.06±2.24	-0.35±1.54	3.69	0.01	0.01	1.25
Acceptance	1.00±2.57	0.06±2.51	1.10	0.28	0.40	0.37
Brief Symptom Inventory						
Somatization	-1.11±2.35	-0.41±2.98	-0.77	0.45	0.53	-0.26
Depression	-1.39±3.35	-0.47±3.73	-0.77	0.45	0.51	-0.21
Anxiety	-1.72±2.35	-1.18±4.19	-0.48	0.64	0.66	-0.16
GSI	-4.22±5.98	-2.06±9.2	-0.83	0.41	0.53	-0.28
Maslach Burnout Inventory						
Emotional Exhaustion	-4.71±7.52	-3.31±8.09	-0.49	0.63	0.67	-0.18
Personal Accomplishment	0.11±9.66	0.75±3.19	-0.25	0.80	0.80	-0.09
Depersonalization	1.36±10.14	-1.09±3.68	0.9	0.37	0.50	0.33
Self-compassion Scale						
Self-kindness	0.64±0.64	0.05±0.77	2.52	0.02	0.03	0.85
Self-judging	-0.77±0.72	-0.18±0.58	-2.7	0.01	0.02	-0.91
Common humanity	0.15±0.82	-0.04±0.59	0.78	0.44	0.55	0.26
Isolation	-0.73±0.62	-0.22±1.00	-1.82	0.08	0.12	-0.61
Mindfulness	0.43±0.87	-0.31±0.63	2.87	0.01	0.01	0.97
Over-identification	-0.67±0.69	0.07±0.81	-2.92	0.01	0.01	-0.99
Total self-compassion	0.56±0.46	0.00±0.54	3.33	0.01	0.01	1.13
Five Facet Mindfulness						
Observe	6.04±3.71	-0.15±2.97	4.63	0.01	0.01	1.85
Describe	2.75±5.91	-0.85±3.56	1.86	0.08	0.12	0.74
Act with Awareness	4.54±5.29	0.15±2.64	2.66	0.01	0.03	1.06
Non-Judge	6.17±4.71	0.08±3.33	3.76	0.01	0.01	1.50
Non-React	4.71±4.51	-1.15±2.76	3.95	0.01	0.01	1.58
Sleep Quality Index (PSQI)						
Duration Of sleep	-1.06±0.80	0.23±0.6	-4.87	0.01	0.01	-1.77
Sleep disturbance	-1.06±0.80	0.23±0.6	-4.87	0.01	0.01	-1.77
Sleep latency	-1.06±0.80	0.23±0.6	-4.87	0.01	0.01	-1.77
Day dysfunction	-1.00±0.84	0±0.58	-3.7	0.01	0.01	-1.35
Sleep efficiency	-0.06±0.54	0.08±0.64	-0.62	0.54	0.60	-0.23
Overall sleep quality	-0.72±0.75	0.08±0.64	-3.1	0.01	0.01	-1.13
Need meds to sleep	-0.67±1.03	-0.08±0.28	-2.01	0.05	0.09	-0.73
Total PSQI	-5.00±4.01	0.23±2.31	-4.21	0.01	0.01	-1.53

B–H $p = p$ values corrected for multiple comparisons using Benjamini–Hochberg correction

observation ($t(23)=4.63$, $p=0.01$, $d=1.85$), acting with awareness ($t(23)=2.66$, $p=0.03$, $d=1.06$), nonjudgment ($t(23)=3.76$, $p=0.01$, $d=1.50$), and nonreaction ($t(23)=3.95$, $p=0.01$, $d=1.58$). No statistically significant changes in the describing scale were found ($t(23)=1.86$, $p=0.12$, $d=0.74$).

Finally, on measures of sleep quality, several significant and very large effects were found. Specifically, teacher in the treatment group reported significant improvements in their duration of sleep ($t(29)=-4.87$, $p=0.01$, $d=-1.77$), level of

sleep disturbance ($t(29)=-4.87$, $p=0.01$, $d=-1.77$), latency to fall asleep ($t(29)=-4.87$, $p=-4.87$, $d=-1.77$), daytime dysfunction due to sleep problems ($t(29)=-3.70$, $p=0.01$, $d=-1.35$), and overall sleep quality ($t(29)=-3.10$, $p=0.01$, $d=-1.13$). No significant improvements in general sleep efficiency were found ($t(29)=-0.62$, $p=0.60$, $d=-0.23$). A particularly noteworthy finding was the substantial decreases in teacher's reported use of medication to sleep among participants in the treatment group. Although group differences became nonsignificant once p values were adjusted for

multiple comparisons $t(29)=-2.01$, $p=0.09$, $d=-0.73$, it is noteworthy that 100 % of all participants in the treatment group who reported taking medication to sleep at baseline (39 %), discontinued this practice after participating in the intervention. Finally, total sleep quality scores significantly improved for treatment group participants ($t(29)=-4.21$, $p=0.01$, $d=-1.53$). Within the treatment group, sleep quality scores moved from the range indicative of “poor sleep quality” ($M=6.78$, $SD=2.94$) to the “good sleep quality” ($M=1.78$, $SD=2.07$), whereas sleep quality declined for comparison group participants during that same time period (baseline $M=4.38$, $SD=1.89$; post $M=5.17$, $SD=3.22$).

In terms of home practice (monitored using daily logs), MBSR participants practiced mindfulness meditation outside of class approximately four times per week ($M=3.86$, $SD=1.50$) for a mean of 22.61 min ($SD=4.60$) per practice period over the 8 weeks of the course.

Discussion

The purpose of this study was to determine the potential feasibility and effectiveness of an adapted version of MBSR on educator stress and well-being in a regular high school setting. The results of this study demonstrated that educators who participated in the adapted MBSR program demonstrated significant improvements in their efficacy to self-regulate several dimensions of affect. Specifically, teachers in the treatment group reported significantly greater gains in their efficacy to engage in key mindfulness-related practices such as acknowledgement, remaining calm, and adopting a present moment focus. These changes in perceived efficacy mirrored similar significant increases in teacher’s reported levels of mindfulness-related traits as measured by the FFMQ. Interestingly however, teachers in the treatment group did not report significantly higher levels of perceived efficacy in their ability to engage in acceptance of challenging thoughts, sensations, and emotions. These finding suggests that although typical MBSR implementation does indeed result in significant changes in participants ability to exercise the cognitive skills associated with mindfulness practice and feel efficacious in doing so, it is possible that the dimension of acceptance may require additional practice or time to develop fully.

In addition, participation in the MBSR group resulted in significant improvements in several dimensions of teacher’s reported levels of self-compassion. Relative to the control group, teachers who participated in the MBSR program demonstrated significantly greater levels of self-kindness, mindfulness, and overall self-compassion. Similarly, levels of self-judging and over-identification showed significantly greater declines for treatment group participants compared to controls. Interestingly, the most consistent and strongest benefits

related to participation in the MBSR group were found related to improvements in teacher sleep quality. Treatment group participants demonstrated significant improvements in multiple dimensions of sleep quality including the overall duration of sleep, level of disturbance in sleep, latency until the onset of sleep, reduced daytime dysfunction due to a lack of sleep, and overall perceived sleep quality. Of particular significance was the fact that 100 % of participants in the treatment group who were taking medication to help sleep at night discontinued this practice by the end of the intervention. Although small sample sizes reduced power to detect statistical significance, this finding is encouraging and worthy of future attempts at replication.

Participation in MBSR has been reported to result in significant improvements in sleep measures in various patient populations including people with cancer (Carlson et al. 2003), fibromyalgia (Weissbecker et al. 2002), and primary chronic insomnia (Gross et al. 2011). Improvements in sleep seen with MBSR participation in people with primary chronic insomnia were on the same magnitude as a control group treated with pharmacotherapy (Gross, et.al 2011).

Contrary to expectations, participation in MBSR did not significantly lower levels of somatization, depression, or anxiety in this sample as measured by the BSI, although the MBSR group did report larger reductions in symptomology over time as compared to comparison group participants. Although participation in MBSR did not significantly lower levels of somatization, depression, or anxiety in this sample, reductions in each symptom category in the direction expected were noted. Moreover, it is important to note that participants were drawn from a nonclinical universal sample of educators. As such, the severity of symptoms reported was quite low for both groups. We are also unable to detect statistically significant changes on measures of teacher burnout. Although the exact reasons for the lack of effects is unclear, this finding is consistent with findings of other randomized trials with teachers in which exacting change on dimensions of burnout as measured by the MBI have yielded null or mixed results (e.g., Jennings and Greenberg 2009; Shapiro et al. 2005; Galantino et al. 2005). In reflecting on this finding, it is possible that global burnout measures may be more heavily influenced by other environmental factors, such as school climate or school organizational demands, that may not be effectively addressed by mindfulness-based approaches. However, additional research is recommended to examine this issue in greater depth.

This study had several strengths, including a comparison-group design, and utilization of a well-established and manualized intervention protocol; however, it is not without limitations. First, exclusive reliance on self-report is a methodological limitation. Although self-report of participant behaviors, emotions, and dispositional state is a reasonable approach, future research should examine the extent to which

changes in self-report translate into observable changes in teacher performance in the classroom and other objective measures of teacher well-being and performance. Results of this study suggested a fairly meaningful impact on teacher sleep quality, and future research is recommended to examine the potential benefits of mindfulness on this outcome with educators, given the important implications for health and wellness. A second design limitation is the fact that this study utilized a quasi-experimental design in which teachers in matched schools were group-randomized into treatment and control group conditions. Although such designs limit possible confounds due to contamination of treatment and control group conditions, generalizability of findings is limited. Finally, the nature of this pilot study prevented examination of the durability of effects over time. Future longitudinal studies with extended follow-up periods are recommended to explore this issue in-depth.

Despite these limitations, this study contributes to the existing literature on the effectiveness of MBSR by demonstrating the potential promise of this approach for promoting the general health and well-being of educators. The results of this study provide further evidence of the effectiveness of MBSR on indices sleep, and emotional well-being among high school educators. Our study provides further evidence documenting the feasibility of implementing MBSR programs in real-world school settings and willingness of educators to participate in mindfulness-based training. Our training was well-received by participants, who chose to continue to sustain a weekly mindfulness practice group for the rest of the school year after the study had ended (for 6 months). Outcome analyses add to the growing literature documenting that MBSR programs can positively influence teacher affective self-regulation, self-compassion, general levels of mindfulness including skills in observing, acting with awareness, and engaging in nonjudgmental and nonreactive behaviors among educators.

References

- Allensworth, E., Ponisciak, S., & Mazzeo, C. (2009). The schools teachers leave: Teacher mobility in Chicago Public Schools. Chicago: Consortium on Chicago School Research. Retrieved April 5, 2013, from http://ccsr.uchicago.edu/publications/CCSR_Teacher_Mobility.pdf.
- Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D., & Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329–342.
- Bandura, A., Caprara, G. V., Barbaranelli, C., Gerbino, M., & Pastorelli, C. (2003). Role of affective self-regulatory efficacy in diverse spheres of psychosocial functioning. *Child Development, 74*(3), 769–782. doi:10.1111/1467-8624.00567.
- Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: a practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society, Series B, 57*, 289–300.
- Benn, R., Akiva, T., Arel, S., & Roeser, R. W. (2012). Mindfulness training effects for parents and educators of children with special needs. *Developmental Psychology, 48*(5), 1476–1487. doi:10.1037/a0027537.
- Bergin, C., & Bergin, D. (2009). Attachment in the classroom. *Educational Psychology Review, 21*, 141–170.
- Boulet, J., & Boss, M. W. (1991). Reliability and validity of the Brief Symptom Inventory. *Journal of Consulting and Clinical Psychology, 3*, 433–437.
- Brackett, M. A., Palomera, R., Mojsa-Kaja, J., Reyes, M. R., & Salovey, P. (2010). Emotion-regulation, ability, burnout, and job satisfaction among British secondary school teachers. *Psychology in the Schools, 47*, 406–417. doi:10.1002/pits.20478.
- Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry research, 28*(2), 193–213.
- Carlson, L. E., Speca, M., Patel, K. D., & Goodey, E. (2003). Mindfulness-based stress reduction in relation to quality of life, mood, symptoms of stress, and immune parameters in breast and prostate cancer outpatients. *Psychosomatic Medicine, 65*, 571–581.
- Carson, R. L., Baumgartner, J. J., Matthews, R. A., & Tsouloupas, C. N. (2010). Emotional exhaustion, absenteeism, and turnover intentions in childcare teachers: examining the impact of physical activity behaviors. *Journal of Health Psychology, 15*(6), 905–914.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Erlbaum.
- Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: methodological challenges and direction for child development research. *Child Development, 75*, 317–333. doi:10.1111/j.1467-8624.2004.00673.x.
- Cullen, M., & Wallace, L. (2010). *Stress Management and Relaxation Techniques in Education (SMART) training manual*. Unpublished manual, Impact Foundation: Aurora, CO, USA.
- Darling-Hammond, L. (2001). The challenge of staffing our schools. *Educational Leadership, 58*(8), 12–17.
- Derogatis, L.R. (1975). *Brief Symptom Inventory*. Clinical Psychometric Research: Baltimore, MD.
- Emmer, E. T., Stough, L. M., & Emmer, E. T. (2010). Classroom management : a critical part of educational psychology, with implications for teacher education. *Educational Psychologist, 36*, 103–112.
- Galantino, M., Baime, M., Maguire, M., Szapary, P. O., & Farrar, J. T. (2005). Association of psychological and physiological measures of stress in health-care professionals during an 8-week mindfulness meditation program: mindfulness in practice. *Stress and Health, 21*, 255–261. doi:10.1002/smi.1062.
- Gross, C. R., Kreitzer, M. J., Reilly-Spong, M., Wall, M., Winbush, N. Y., Patterson, R., et al. (2011). Mindfulness-based stress reduction versus pharmacotherapy for chronic primary insomnia: a randomized controlled clinical trial. *Explore: The Journal of Science and Healing, 7*, 76–87.
- Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits. *Journal of Psychosomatic Research, 57*, 35–43. doi:10.1016/S0022-3999(03)00573-7.
- Hamre, B. K., & Pianta, R. C. (2005). Can instructional and emotional support in the first-grade classroom make a difference for children at risk of school failure? *Child Development, 76*, 949–967.
- Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: a meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*, 169–183. doi:10.1037/a0018555.

- Ingersoll, R. M. (2002). The teacher shortage: a case of wrong diagnosis and wrong prescription. *NASSP Bulletin*, 86(631), 16–31.
- Ingersoll, R., & Smith, T. (2003). The wrong solution to the teacher shortage. *Educational Leadership*, 60(8), 30–33.
- Jennings, P. a., & Greenberg, M. T. (2009). The prosocial classroom: teacher social and emotional competence in relation to student and classroom outcomes. *Review of Educational Research*, 79(1), 491–525. doi:10.3102/0034654308325693.
- Jennings, P. A., Snowberg, K. E., Coccia, M. A., & Greenberg, M. T. (2011). Improving classroom learning environments by Cultivating Awareness and Resilience in Education (CARE): results of two pilot studies. *Journal of Classroom Interaction*, 46(1), 37–48.
- Jennings, P.A., Frank, J.L., Snowberg, K., Coccia, M., & 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*. doi:10.1037/spq0000035.
- Johnson, L. C., Murphy, S. A., & Dimond, M. (1996). Reliability, construct validity, and scale norms of the Brief Symptom Inventory when administered to bereaved patients. *Journal of Nursing Measurement*, 4, 117–121.
- Kabat-Zinn, J. (1990). *Full catastrophe living: using the wisdom of your body and mind to face stress, pain, and illness*. New York: Dell.
- Kabat-Zinn, J., Lipworth, L., Burney, R., & Sellers, W. (1986). Four year follow-up of a meditation-based program for the self-regulation of chronic pain: treatment outcomes and compliance. *Clinical Journal of Pain*, 2, 159–173.
- Kabat-Zinn, J., Massion, A. O., Kristeller, J., Peterson, L. G., Fletcher, K. E., Pbert, L., et al. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry*, 149, 936–943.
- Kabat-Zinn, J., Wheeler, E., Light, T., Skillings, A., Scharf, M. J., Cropley, T. G., et al. (1998). Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemotherapy (PUVA). *Psychosomatic Medicine*, 60, 625–632.
- Kafetsios, K., Anagnostopoulos, F., Lempesis, E., & Valindra, A. (2013). Doctors' emotion regulation and patient satisfaction: a social-functional perspective. *Health Communication*. doi:10.1080/10410236.2012.738150.
- Kavanagh, D. J., & Bower, G. H. (1985). Mood and self-efficacy: impact of joy and sadness on perceived capabilities. *Cognitive Therapy and Research*, 9(5), 507–525.
- Kristeller, J. L., & Hallett, C. B. (1999). An exploratory study of meditation-based intervention for binge eating disorder. *Journal of Health Psychology*, 4, 357–363. doi:10.1177/135910539900400305.
- Ma, S. H., & Teasdale, J. D. (2004). Mindfulness-based cognitive therapy for depression: replication and exploration of differential relapse prevention effects. *Journal of Consulting and Clinical Psychology*, 72, 31–40. doi:10.1037/0022-006X.72.1.31.
- Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O. A., Bryant, D., Burchinal, M., Early, D.M., & Howes, C. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child Development*, 79(3), 732–749.
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Occupational Behaviour*, 2, 99–113.
- Meiklejohn, J., Phillips, C., Freedman, M. L., Griffin, M. L., Biegel, G., Roach, A. T., et al. (2012). Integrating mindfulness training into K-12 education: fostering the resilience of teachers and students. *Mindfulness*, 3, 291–307. doi:10.1007/s12671-012-0094-5.
- Mikolajczak, M., Tran, V., Brotheridge, C. M., & Gross, J. J. (2009). Using an emotion regulation framework to predict the outcomes of emotional labor. In N. M. Ashkanasy, W. J. Zerbe, & C. E. J. Ha'rtel (Eds.), *Research on emotion in organizations: emotions in groups, organizations and cultures* (pp. 245–273). Bingley, UK: Emerald Group.
- Montgomery, C., & Rupp, A. A. (2005). A meta-analysis for exploring the diverse causes and effects of stress in teachers. *Canadian Journal of Education / Revue canadienne de l'éducation*, 28(3), 458–486. doi:10.2307/4126479.
- Poulin, P. A. (2009). *Mindfulness-based wellness education: A longitudinal evaluation with students in initial teacher education*. Unpublished doctoral dissertation. University of Toronto, Toronto, Ontario, Canada
- Poulin, P. A., Mackenzie, C. S., Soloway, G., & Karayolas, E. (2008). Mindfulness training as an evidence-based approach to reducing stress and promoting well-being among human services professionals. *Mindfulness in Human Services*, 46, 35–43.
- Provasnik, S., & Dorfman, S. (2005). Mobility in the teacher workforce (NCES 2005-114). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
- Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the self-compassion scale. *Clinical psychology & psychotherapy*, 18(3), 250–255.
- Randolph, P. D., Caldera, Y. M., Tacone, A. M., & Greak, M. L. (1999). The long-term combined effects of medical treatment and a mindfulness-based behavioral program for the multidisciplinary management of chronic pain in west Texas. *Pain Digest*, 9, 103–112.
- Rimm-Kaufman, S.E., Pianta R.C., Cox, J.J., & Bradley, R. (2003). Teacher-rated family involvement and children's social and academic outcomes in kindergarten. *Early Education and Development*, 14, 179–198.
- Robinson, F. P., Mathews, H. L., & Witek-Janusek, L. (2003). Psychoendocrine-immune response to mindfulness-based stress reduction in individuals infected with the human immunodeficiency virus: a quasi experimental study. *Journal of Alternative and Complimentary Medicine*, 9, 683–694.
- Roeser, R. W., Skinner, E., Beers, J., & Jennings, P. a. (2012). Mindfulness training and teachers' professional development: an emerging area of research and practice. *Child Development Perspectives*, 6(2), 167–173.
- Shapiro, S. L., Bootzin, R. R., Figueredo, A. J., Lopez, A. M., & Schwartz, G. E. (2003). *Journal of Psychosomatic Research*, 54, 85–91. doi:10.1016/S0022-3999(02)00546-9.
- Shapiro, S. L., Astin, J. A., Bishop, S. R., & Cordova, M. (2005). Mindfulness-based stress reduction for health care professionals: results from a randomized trial. *International Journal of Stress Management*, 12, 164–176. doi:10.1037/1072-5245.12.2.164.
- Sutton, R. (2004). Emotional regulation goals and strategies of teachers. *Social Psychology of Education*, 7(4), 379–398.
- Sutton, R. E., & Wheatley, K. F. (2003). Teachers' emotions and teaching: a review of the literature and directions for future research. *Educational Psychology Review*, 15, 327–358.
- Tsouloupas, C. N., Carson, R. L., Matthews, R., Grawitch, M. J., & Barber, L. K. (2010). Exploring the association between teachers' perceived student misbehaviour and emotional exhaustion: the importance of teacher efficacy beliefs and emotion regulation. *Educational Psychology*, 30(2), 173–189.
- Weissbecker, I., Salmon, P. G., Studts, J. L., Floyd, A. R., Dedert, E. A., & Sephton, S. (2002). Mindfulness-based stress reduction and sense of coherence among women with fibromyalgia. *Journal of Clinical Psychology in Medical Settings*, 9, 297–304.
- Williams, V. S. L., Jones, L. V., & Tukey, J. W. (1999). Controlling error in multiple comparisons, with examples from state-to-state differences in educational achievement. *Journal of Educational and Behavioral Statistics*, 24(1), 42–69.