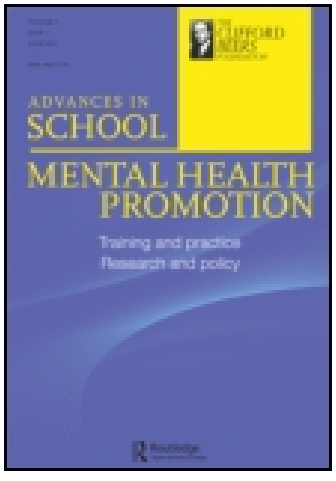

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Feasibility and preliminary outcomes of a yoga and mindfulness intervention for school teachers

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Many public school teachers face formidable challenges, including overcrowded classrooms, limited administrative resources, and high numbers of students with behavioral and emotional problems. Mindfulness-based strategies are a potentially promising means of reducing teachers' stress and enhancing their ability to handle job demands effectively. This pilot randomized study assessed the feasibility and preliminary outcomes of a 6-session yoga and mindfulness program for teachers developed by the Holistic Life Foundation, a local nonprofit organization. Seven urban public schools were randomly assigned either to receive the intervention or to a no-intervention control condition. A volunteer sample of teachers within those schools participated in the study, with 21 teachers attending the intervention and 22 teachers in the control arm. Intervention feasibility was assessed by examining recruitment response and intervention attendance and by gathering qualitative feedback from intervention instructors and participants. Participants also completed self-report measures of stress and burnout at baseline and post-test to provide preliminary information about intervention effects. Findings suggest the intervention may be beneficial for some teachers, but our recruitment response also highlighted feasibility challenges. Recommendations are presented for enhancing program feasibility and for advancing research on the use of yoga and mindfulness with teachers.

Keywords: mindfulness; yoga; teachers; stress; burnout; emotional exhaustion

Teachers in public schools serving disadvantaged communities in the United States face difficult circumstances. Many students in these settings have serious behavioral and emotional problems stemming from chronic stress exposure due to poverty and other adversities (Akee, Copeland, Keeler, Angold, & Costello, 2010; Sampson, Morenoff, & Gannon-Rowley, 2002). An alarming number of teachers, moreover, must function in a context of low levels of professional support, low wages, and overcrowded classrooms. Organizational factors related to workload, salary, and school climate often pose challenges for teacher job satisfaction and well being (DeAngelis & Presley, 2011; Ferguson, Frost, & Hall, 2012; Hughes, 2012; Kukla-Acevedo, 2009).

Classroom and administrative challenges may lead to a 'burnout cascade,' in which a teacher's social and emotional competence deteriorates in response to stress, causing a vicious cycle of increasing teacher hostility and decreasing student compliance (Jennings & Greenberg, 2009, p. 492). The cycle results in teacher burnout, which is a state of emotional exhaustion, disengagement, and perceived lack of personal accomplishment (Maslach, Schaufeli, & Leiter, 2001; McCarthy, Lambert, O'Donnell, & Melendres, 2009). Teachers suffering from burnout who remain in the profession frequently lack

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compassion and efficacy in the classroom and fail to meet the needs of more challenging students (Kokkinos, Panayiotou, & Davazoglou, 2005). This issue disproportionally affects low-income schools as students in those settings are at higher risk for academic problems and may require more skilled guidance (Howard, 2004). Although high rates and negative effects of teacher burnout have been documented (Lambert & McCarthy, 2006; Zellars, Hochwarter, & Perrewe, 2004), few studies have evaluated preventive interventions for teachers to reduce burnout and enhance well being (Jennings, 2011; Lambert & McCarthy, 2006).

Mindfulness-based techniques may offer a promising approach in this regard. *Mindfulness* derives from ancient Eastern contemplative traditions and involves present-focused awareness of thoughts and sensations, without action or judgment (Bishop et al., 2004). Mindfulness-based interventions have become increasingly popular in Western contexts (Cullen, 2011). Studies indicate that such interventions are beneficial for addressing a range of behavioral and emotional issues, including treatment of chronic pain, anxiety, depression, and substance use (Kabat-Zinn, 1982; Kirkwood, Rampes, Tuffrey, Richardson, & Pilkington, 2005; Pilkington, Kirkwood, Rampes, & Richardson, 2005).

There is increasing interest among researchers and practitioners in designing mindfulness-based interventions for teachers, in order to reduce occupational stress, enhance resilience, and foster more effective and compassionate pedagogy (Jennings & Greenberg, 2009; Meiklejohn et al., 2012; Roeser, Skinner, Beers, & Jennings, 2012). The small but growing base of empirical work in this area suggests that mindfulness-based programs for teachers may improve emotional functioning, including self-reported psychological symptoms and burnout (Anderson, Levinson, Barker, & Kiewra, 1999; Franco, Mañas, Cangas, Moreno, & Gallego, 2010; Flook, Goldberg, Pinger, Bonus, & Davidson, 2013; Gold et al., 2010; Jennings, Frank, Snowberg, Coccia, & Greenberg, 2013; Jennings, Snowberg, Coccia, & Greenberg, 2011; Roeser et al., 2013). Some data also indicate intervention benefits for enhancing attention (Flook et al., 2013; Roeser et al., 2013), prosocial interactions (Kemeny et al., 2012), and physiological stress responses (Kemeny et al., 2012).

The mindfulness programs for teachers evaluated to date vary somewhat in content (see Roeser et al., 2012, for an overview of current programs). For instance, Cultivating Awareness and Resilience in Education (CARE; Jennings, 2011; Jennings & Greenberg, 2009) combines emotion skills instruction, mindfulness training, and compassion practices. Some programs (e.g., Flook, Goldberg, Pinger, Bonus, & Davidson, 2013; Gold et al., 2010) were adapted for teachers based on mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990), a widely-used curriculum with a large base of empirical support. Other programs draw on different aspects of contemplative tradition (e.g., mantra practice, Anderson et al., 1999).

As Greenberg and Harris (2012) noted, the two most common forms of mindfulness-based practice in Western settings are meditation and yoga. While several of the teacher programs above include yoga-based movement (e.g., Jennings et al., 2011, 2013; Kemeny et al., 2012; Roeser et al., 2013), the primary emphasis in the published research on teacher mindfulness programs to date is meditative practice. Meditation trains the mind by focusing the attention in a chosen manner; practices are varied and include attending to the breath or body sensations, eating with awareness, open awareness of experience, and cultivation of loving kindness. Emerging evidence suggests these practices enhance cognitive and emotion regulation through increased activity and connectivity in relevant areas of the brain, e.g., prefrontal cortex (Kilpatrick et al., 2011; Lutz, Slagter, Dunne, & Davidson, 2008).

Yoga pairs the practice of mindful focus with active body movements and breathing exercises. As such, it incorporates both mental and physical training and may offer physical health benefits similar to, or greater than, traditional exercise, including positive effects on cardiorespiratory and neuroendocrine systems associated with psychophysiological stress responses (Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012; Ross & Thomas, 2010). Yoga-based interventions have shown promise in improving stress-related immune response and reducing depression and anxiety (Arora & Bhattacharjee, 2008; Javnbakht, Hejazi Kenari, & Ghasemi, 2009; Pilkington et al., 2005). Teachers – whose occupation involves a substantive mental focus – may find that mild physical activity facilitates the development of new forms of awareness and attention. The feasibility and impact of incorporating yoga as a central component in a teacher mindfulness program has not yet been adequately studied.

The teacher programs referenced above vary in length, with many requiring substantive time commitments. For instance, the mMBSR program involves 26 hours over 8 weeks (Flook et al., 2013), the CARE program involves 30 hours over 4–6 weeks (Jennings et al., 2013), and Roeser et al. (2013) evaluated a 36-hour mindfulness training program delivered over 8 weeks. Given the demanding schedules and workloads of many teachers, the potential for briefer programs to provide stress reduction benefits merits exploration.

Another key question regarding mindfulness-based teacher programs involves their acceptability and impact for teachers in public schools serving disadvantaged communities. Emerging research supports the notion that mindfulness-based programs may be appropriate for implementation in low-income urban environments (e.g., Jennings et al., 2011). Data on implementation of contemplative teacher programs in disadvantaged settings, however, are scarce, particularly programs with a substantial yoga-based component. Such data are critical for informing the development of interventions that are feasible to deliver in resource-poor schools and culturally acceptable to the target teacher population.

This pilot study explored the feasibility and preliminary outcomes of a 6-session yoga and mindfulness intervention for teachers. The intervention was developed by the Holistic Life Foundation (HLF), a nonprofit organization founded by three community-based yoga instructors (Ali Smith, Atman Smith, and Andres Gonzalez) who are familiar with the stresses associated with teaching in disadvantaged urban communities. Our aim was to gather initial data to assist in intervention refinement and to guide further research on mindfulness and yoga programs for teachers. The intervention was delivered to a volunteer sample of elementary and middle school teachers employed in Baltimore City public schools serving low-income neighborhoods. Intervention feasibility and acceptability were based on response to recruitment efforts, intervention attendance, and feedback from intervention instructors and participants. Self-report quantitative data were also collected to evaluate the intervention's potential for reducing teacher stress and emotional exhaustion. We anticipated that the intervention would be feasible and acceptable for public school teachers and would be associated with benefits in stress and burnout.

Methods

Participants

Principals at four Baltimore City public schools serving low-income neighborhoods gave permission for the lead investigator to recruit their teachers to participate in the study and agreed to provide a location within their schools for delivering the intervention.

Recruitment efforts included describing the study at faculty meetings (at two of the four schools), posting flyers, and being present during teacher lunch hours to answer questions and encourage participation. To increase the study sample size, teachers from other Baltimore City schools were also permitted to participate using snowball sampling (i.e., teachers in the participating schools were encouraged to tell other teachers about the study) and word-of-mouth.

The sample that completed both pre and post-test measures consisted of 43 elementary and middle school teachers from seven schools. Thirty-five were teachers from the four schools in which the principals had agreed to support study recruitment; the remaining eight participants were teachers from three other Baltimore City schools who had learned about the study through colleagues or members of the study team. The seven schools were similar with respect to student demographics and test scores in math, science, and reading. Table 1 displays teacher sociodemographic characteristics by study group. Participating teachers were predominantly female (81.4%) and were fairly diverse with respect to race and age, with equal numbers of African American and White individuals and ages ranging from 20 to 50 and older. Intervention and control teachers did not differ significantly in average years of teaching experience ($M = 7.9$, SD = 5.53 and $M = 9.05$, SD = 10.02 respectively).

Five teachers agreed to participate but did not complete pretest surveys or engage further with the study. Four additional teachers completed pretest surveys but attended only a single intervention session and did not complete post-test surveys; the four individuals did not differ significantly from the rest of the sample with respect to demographic characteristics. These nine teachers did not participate in post-test qualitative or quantitative data collection.

Measures

Teacher stress

This was measured using the Teacher Stress Inventory (TSI; Fimian, 1988), a self-report instrument used in prior studies assessing teacher stress (e.g., Vance, Nutter, &

Table 1. Sociodemographic characteristics by study group.

	Intervention ($n = 21$) *n* (%)	Control ($n = 22$) *n* (%)	χ^2 (df)	*p*
Age group				
20–29	3 (14)	7 (32)	χ^2 (3) = 1.88	0.6
30–39	8 (38)	7 (32)		
40–49	6 (28)	5 (22)		
50 +	4 (19)	3 (14)		
Race				
White	12 (57)	6 (27)	χ^2 (2) = 5.77	0.06
Black	8 (38)	10 (46)		
Other	1 (5)	6 (27)		
Gender				
Female	18 (86)	17 (77)	χ^2 (1) = 0.023	0.88
Male	3 (14)	5 (23)		
Grades taught				
Elementary	17 (81)	22 (100)	χ^2 (1) = 4.62	0.03
Middle	4 (19)	0		

Humphreys, 1989). The TSI assesses teachers' occupational stress with 49 items distributed across 10 subscales. Items are scored on a 5-point Likert-type scale and consist of statements such as, 'The pace of the school day is too fast' and 'I feel frustrated having to monitor pupil behavior.' Each subscale is summed and averaged; subscale means are summed and averaged to produce a total score with possible range of 1–5. As a rough benchmark, it is suggested that scores less than 2 indicate mild stress, scores of 3 indicate medium stress, and scores greater than 4 indicate high stress; detailed test norms are also provided to facilitate comparisons by gender, grade level, and teacher type (http://www.instructionaltech.net/TSI/). The TSI has been found have good reliability (Fimian, 1988) and convergent validity (http://www.instructionaltech.net/TSI/). The Cronbach's α for the current sample was 0.91 (Table 2).

Teacher burnout

The Maslach Burnout Inventory-Educators Survey (MBI-ES; Maslach, Jackson, & Leiter, 1996) is a 22-item self-report instrument that assesses burnout symptoms using three subscales: Emotional Exhaustion, Depersonalization, and Exhaustion. The MBI is the most commonly used tool for assessing burnout and has been used in over 90% of research regarding burnout (Hastings, Horne, & Mitchell, 2004). We used the Emotional Exhaustion subscale as an outcome measure in this study; it has been used in prior studies on burnout based on literature highlighting the centrality of emotional exhaustion to the construct of burnout (Maslach et al., 2001; McCarthy et al., 2009). The Emotional Exhaustion scale includes nine items (e.g., 'I feel emotionally drained from my work;' 'I feel like I'm at the end of my rope') rated on a 7-point frequency scale ranging from 0 (*never*) to 7 (*everyday*), which are summed to create the Emotional Exhaustion score (range 0–54). Scores of 0–16 indicate low Exhaustion, scores of 17–26 moderate Exhaustion, and 27 or over high Exhaustion. The MBI has demonstrated good factor structure and psychometric properties in diverse teacher samples (Byrne, 2011; Kokkinos, 2006). Cronbach's α for Emotional Exhaustion in the current sample was 0.93.

Procedures

Informed consent was obtained at initial meetings held at each school for teachers interested in participating, and participants completed pretest self-report measures. The seven schools at which participants worked were then randomly assigned to the intervention or control condition. Randomization was conducted at the school rather than participant level to reduce potential for contamination due to teachers sharing intervention

Table 2. Group differences in perceived stress and emotional exhaustion.

	Intervention ($n = 21$) M (SD)	Control ($n = 22$) M (SD)	Cohen's d	t (p)
Stress				
Baseline	2.85 (0.74)	2.75 (.61)	0.15	0.49 (0.62)
Posttest	2.56 (0.63)	2.71 (0.64)	0.24	−0.88 (0.38)
Change score	−.29 (0.42)	−.04 (0.50)	0.54	−1.80 (0.08)*
Emotional exhaustion				
Baseline	31.48 (10.04)	30.05 (12.51)	0.13	0.41 (0.68)
Posttest	29.81 (8.50)	30.68 (10.81)	0.09	−.029 (0.77)
Change score	−1.67 (4.02)	.63 (6.60)	0.42	−1.39 (0.17)

*$p < 0.10$.

material with one another. Participants were informed of their study group assignment following completion of the baseline measures. Participants in the intervention group completed post-test measures on the last day of the intervention; control participants completed the post-test measures at approximately the same time. Additionally, a random subset of participants in the intervention group ($n=6$) was interviewed after the intervention ended to explore their experience in the intervention program. Study procedures were approved by the associated university Institutional Review Board.

Yoga and mindfulness intervention for teachers

The intervention was designed by Ali Smith, Atman Smith, and Andres Gonzalez, founders of the Holistic Life Foundation, Inc. The program's aim is to provide stress management skills for teachers working in under-resourced areas with high levels of occupational stress. A unique aspect of this intervention is that it was developed, not by researchers, but by individuals with intimate knowledge of the target community. Born and raised in West Baltimore, the HLF founders attended Baltimore City public schools and are familiar with the challenges facing urban public school teachers. The teacher intervention is based on HLF's yoga and mindfulness curriculum for youth, which was found to enhance self-regulation in a sample of urban students (Mendelson et al., 2010).

The teacher intervention was designed to be brief – six sessions offered over three weeks – to reduce the time commitment required of busy teachers. Core intervention components present in each session included yogic breathing techniques, yoga postures, and guided mindful reflection practices. Each of these components is a means of training attention and awareness, enhancing teachers' capacity to stay present-focused with compassion and curiosity. These core components are theorized to counteract the effects of chronic occupational stress, enhancing teachers' ability to modulate difficult thoughts and emotions (e.g., anger), and to self-regulate during times of stress. This improved self-regulation, in turn, is hypothesized to reduce perceived stress and burnout and ultimately foster more compassionate and effective classroom behavior among teachers (Jennings & Greenberg, 2009). This hypothesized mechanism of action is consistent with the logic model presented in our previous pilot randomized trial with students (Mendelson et al., 2010).

Each session began with a focus on the breath, including a review of previously taught breathing techniques and introduction of new ones. Breathing was followed by yoga poses done while seated in a chair to accommodate varying levels of physical fitness and ability and to facilitate potential for teachers to practice the poses during the school day. The instructors discussed how to recognize activation of the stress response (e.g., while in the classroom), how to calm oneself mentally and physically, and how to relax and strengthen the body. Each session focused on a different theme, which was linked to the instructors' discussions and to meditative practices. The six themes were breath, stress, anger, thoughts, energy, and love. Sessions closed with a brief mindful reflection in which the instructor provided guided instructions for focusing attention on the breath or on a chosen thought or visualization. Terminology and approach throughout the program were secular and emphasized stressors common to educators in an urban school setting. Participants were encouraged to practice breathing exercises and poses between classes, both during the workday and at home. Participants were also encouraged to share daily experiences they found stressful (e.g., greeting students when they came into the classroom in the morning) in the class as a vehicle for teaching stress identification and stress management. Each HLF intervention developer led two of the six sessions, in which they introduced and

reinforced different techniques and topics. The intervention was held at two of the schools in spacious, unused classrooms; class sessions were held after school and lasted 45 minutes.

Data analysis

Intervention feasibility was explored by gauging ease of recruitment, tracking participant retention and attendance in the intervention, and obtaining qualitative feedback from selected participants and from the intervention instructors. The program instructors recorded attendance at each intervention session. After intervention completion, six randomly selected participants were interviewed individually by the lead author about their experiences in the program, including what they liked most and least, what they would change, and if they would recommend the program to other teachers. The lead author also interviewed the instructors to elicit their thoughts on intervention feasibility, including their perceptions of participant enjoyment and engagement in the intervention. The lead author and senior author reviewed the qualitative data and selected representative comments for description in the text.

Preliminary intervention outcomes. A power analysis based on α level of 0.05 and power of 0.80 indicated that a total sample size of 128 would be sufficient to detect an effect size of 0.50 (G*Power 3; Faul, Erdfelder, Lang, & Buchner, 2007). The effect size estimate was based on a meta-analysis of findings for mindfulness-based stress reduction (de Vibe, Bjørndal, Tipton, Hammerstrøm, & Kowalski, 2012). We did not have resources in this small pilot study to enroll adequate numbers of participants. As a result, we view our analysis of intervention outcomes as preliminary and exploratory in nature. We calculated *t*-tests of group differences in pre–post test changes in self-reported stress and emotional exhaustion. The literature suggests that difference scores can provide a reliable and unbiased estimate of change (Rogosa, 1988), and analysis of difference scores is recommended for small samples because one fewer parameter is required than in analysis of covariance, providing greater power (Maxwell & Delaney, 1990; Oakes & Feldman, 2001). A significance level of $p < 0.10$ was selected given the small sample size; we also report results corrected for experimentwise error using a Bonferroni correction ($p < 0.05$). Given our sample size, however, we explored preliminary intervention outcomes primarily by examining trends in the data and effect sizes for tests of group differences. Effect sizes were calculated as Cohen's *d*.

Results

Intervention feasibility

Recruitment

A total of 52 teachers consented to study participation. Four school principals had agreed to support the study; there were approximately 70 teachers across those schools from whom we could recruit. The lead author distributed study flyers at the four schools. He was able to describe the study at staff meetings at two of the four schools, with approximately 15 teachers in attendance at each meeting. At the third school, he sat in the teachers' lounge and spoke with approximately seven teachers. At the fourth school, an interested teacher volunteered to describe the study and was able to communicate with approximately 20 teachers. Forty-four teachers were recruited from these four schools. The remaining eight teachers were recruited using snowball sampling.

Retention

As described above, five teachers dropped out of the study before randomization and completion of the baseline assessment and an additional four teachers dropped out after completing the baseline assessment and attending one intervention session. Thus, the overall study retention rate was 82.7%.

Attendance and program completion

As noted, four teachers attended only one intervention session; the remaining 21 intervention participants attended an average of 5 out of the 6 sessions (range 3–6). Eighteen participants attended 4 or more of the 6 classes; three participants missed more than 2 classes. Thus, 72% of intervention participants attended 4 out of 6 classes, a mark of program completion.

Qualitative feedback from participants

Participants reported generally positive feelings about the intervention, particularly with respect to learning stress reduction techniques.

> I really enjoyed learning new ways to control my stress. Loved the deep breathing and the locks. I use this with some of the more emotional children in my class. (3rd grade teacher)
>
> The best part of the class for me was the meditation at the end. Just having the time to close my eyes and not think about students, tests, and parents was a blessing. (Resource instructor)
>
> I knew I was stressed but felt like it was just a part of the job. I learned that I can keep myself from getting too stressed by listening to my body and taking time to breathe deeply and calm down before continuing with my day. (2nd grade teacher)

Participants also described several program limitations and barriers to participation, as shown in the representative quotes below.

> I would have gotten more out of the program if more time was spent talking about how to use the lessons with my students. (4th grade teacher)
>
> As much as I liked coming to class it was hard to walk away from all my after school work at the end of the day. I enjoyed it so I went but then I did not have time to practice the lessons at night. (4th grade teacher)
>
> Unfortunately some other teachers in this school are known for being totally stressed out, and they didn't come to the program. I feel like some of the people who could use this class the most didn't sign up. (Physical education teacher)

Qualitative feedback from instructors

The instructors were encouraged by their perception that most teachers had enjoyed the program, had been engaged during classes, and had made efforts to practice the skills outside of class. The instructors reported that program implementation would have been enhanced by holding classes during a protected period during school hours (e.g., when students were in resource class), rather than after school, when teachers appeared distracted by a number of competing demands, including paperwork and lesson planning. In addition, they felt that the program should be offered earlier in the school year in subsequent implementations. The program was delivered near the end of the school year, a period of greater stress and more demands.

Preliminary intervention outcomes

Mean difference scores were in the predicted direction, with intervention participants showing a pattern of larger reductions in perceived stress and emotional exhaustion scores than control participants. Group differences in stress reduction were significant at the 0.10 level ($t(41) = -1.80$, $p = 0.08$); group differences in lowered emotional exhaustion were not ($t(41) = -1.39$, $p = 0.17$). When a Bonferroni correction was applied to adjust for experimentwise error ($p < 0.05$), neither test was significant. Effect sizes were of medium magnitude for group differences in pre-post change in stress and emotional exhaustion ($d = 0.54$ and $d = 0.42$ respectively).

Discussion

This study assessed feasibility and preliminary outcomes of a yoga and mindfulness intervention for elementary and middle school teachers in urban, low-income school settings. Our experience recruiting teachers for the study highlighted feasibility issues related to voluntary teacher participation in an after-school mindfulness and yoga program. Attendance rates and qualitative feedback from teachers who participated in the program, however, suggest that the program was acceptable and well received by this self-selected group. Our preliminary data indicate that the program may hold potential for reducing perceived stress and emotional exhaustion.

Feasibility

The high pre-test level of self-reported emotional exhaustion in our sample highlights the potential utility of an intervention to promote stress management. Solid attendance rates among teachers who went to more than one session suggest that once engaged, teachers enjoyed the program and made time for regular participation despite their busy schedules. Qualitative feedback from teachers also indicates that they found the program worthwhile and valued the opportunity to learn stress reduction techniques for use in their day-to-day lives. The 43 teachers in our final study sample, however, were only a subsample (approximately 55%) of the potential recruitment pool and thus may not be representative of the larger target teacher population. Recruitment challenges in this study point to issues with program feasibility that will be important to address in future work.

Barriers to teacher recruitment included both logistic difficulties gaining access to teachers to describe the study and reluctance of teachers to engage in an after-school activity. In future research, it will be beneficial to coordinate with principals prior to the start of the academic year, to ensure that time is scheduled in staff meetings to facilitate recruitment. In this study, the lead author was not able to interact directly with all potential participants to describe the study. Future recruitment efforts should also systematically survey reasons for teacher non-participation across the pool of potential participants to better understand barriers to engagement with the intervention or research.

Our sense from speaking with a few teachers who refused participation was that they were reluctant to take on an additional after-school commitment. Qualitative feedback from participating teachers provided additional evidence for challenges associated with holding the program after school hours. Although an after-school program has the advantage of not disrupting scheduled academic activities, it reduces teachers' time for lesson preparation and administrative work, an issue with critical implications for intervention feasibility and scale-up.

Some teachers also stated that they were not interested in yoga and mindfulness. A subset of teachers may simply not find this type of intervention appealing. It is also likely, however, that some teachers are not clear about the meaning of the terms 'yoga' and 'mindfulness' and may have misperceptions or stereotypes about them. Although the lead author described the program using terminology such as 'stress reduction,' it is possible that providing additional information about program skills and benefits prior to implementation may be helpful. Focus groups may be useful in identifying effective ways to introduce program goals and content to teachers. A brief yoga 'demo' workshop offered during a staff meeting may also serve to engage teachers.

Preliminary intervention outcomes

This pilot feasibility research was not designed as a rigorous test of intervention efficacy but was rather intended to provide preliminary data for examining trends in intervention response. Scores were in the predicted direction, with intervention participants reporting a pattern of greater reductions in perceived stress and emotional exhaustion than controls. Effect sizes indicated that group differences in change scores were in the moderate range (0.54 for stress and 0.42 for emotional exhaustion). Our effect sizes are comparable in magnitude to those reported in research using mindfulness-based interventions with non-teacher adult populations (for a review see de Vibe et al., 2012). This is encouraging, given the brief duration of the HLF teacher program.

In comparison with our effect size of 0.54 for stress reduction, Roeser et al. (2013) reported significant improvements in teacher stress following mindfulness training with post-test effect size of 0.57 (Cohen's d for covariate adjusted means). In comparison with our effect size of 0.42 for MBI emotional exhaustion, Flook and colleagues reported that the mMBSR intervention had a small effect ($d = 0.25$) on MBI emotional exhaustion (Flook et al., 2013), and Jennings and colleagues did not obtain a significant finding for this MBI subscale in response to CARE in their recent RCT ($d = 0.04$; Jennings et al., 2013). Roeser and colleagues reported medium to large covariate-adjusted effects on the combined MBI scale at post-test ($d = 0.76$). Thus, our effects appear comparable – in some cases, greater than – those obtained in other studies of mindfulness-based programs for teachers, although comparisons should be made with caution given our small sample size and lack of adjustment for covariates.

Other studies on mindfulness-based programs for teachers included outcomes that were not assessed in the present study, including self-reported mindfulness and psychological symptoms, as well as physiological measures of stress response, neurocognitive tasks of attention and memory, and classroom observations (Flook et al., 2013; Franco et al., 2010; Gold et al., 2010; Jennings et al., 2013; Kemeny et al., 2012; Roeser et al., 2013). Future research on HLF's teacher program should assess a broader range of outcomes. Objective measures, including physiological indicators (e.g., cortisol) and classroom observation, avoid potential recall and social desirability biases of self-report measures and can also provide a more nuanced understanding of potential intervention mechanisms, such as reductions in physiological reactivity to stress.

Future directions

This study has implications for the development of effective yoga and mindfulness programs for teachers. Our experience indicates that it will be important for future evaluations of the HLF teacher program to consider ways of enhancing program feasibility. Some other researchers have had success engaging teachers in after-school

mindfulness programs. For instance, Roeser et al. (2013) successfully implemented an after-school mindfulness program in public schools in western Canada and a suburb in the western United States. Feedback from the teachers in our sample, however, suggests that engaging in after-school activities is not feasible for many public school teachers in our low-income urban context and will likely limit participation.

Thus, it may be helpful to deliver the intervention in a protected time during the day (e.g., professional development time). Providing continuing education credits may also be critical for facilitating teacher engagement and uptake. These sorts of strategies should be explored in future research. Some teachers also commented that colleagues most in need of the program did not participate. If administrators were to provide the program to all teachers (e.g., as part of professional development), teacher involvement would be enhanced and would likely create stronger motivation for engagement, a set of shared skills in the teacher community, and greater potential for changing school climate.

Our qualitative feedback also suggests that urban teachers responsible for managing students with high rates of behavioral problems value not only stress reduction techniques for themselves but also easy-to-use skills for teaching their students to manage stress more effectively. The program could perhaps be augmented by a more extensive focus on skills, such as breathing techniques, that teachers can use in the classroom to calm students, improve student attention and behavioral control, and facilitate a productive learning environment. In a similar vein, a number of researchers have noted the potential for linking teacher and student mindfulness programs (Greenberg & Harris, 2012; Meiklejohn et al., 2012; Mendelson et al., 2013; Roeser et al., 2013), and this possibility merits further study. For instance, HLF's yoga and mindfulness program for students (Mendelson et al., 2010) could potentially be provided concurrently alongside the teacher program or teachers could be trained to co-facilitate or lead the student program.

Identifying optimal intervention dosage, intensity, and timing is another important task for future research. The HLF program implemented in this study consisted of six 45-minute sessions with no between-class supervision from instructors and no follow-up boosters. By contrast, almost all the other mindfulness programs for teachers of which we are aware provide more extensive exposure to training, e.g., 26 hours in mMBSR (Flook et al., 2013), 30 hours in CARE (Jennings et al., 2013), 36 hours in MT (Roeser et al., 2013), as well as individualized support and coaching in some models (e.g., CARE). It is encouraging that our preliminary findings support potential benefits of HLF's program despite its brief format. Given that mindfulness programs for teachers are in early phases of development, it is not yet known what constitutes an 'adequate' intervention dose or how this may vary by program, setting, and teacher characteristics. Development of brief teacher training programs is advantageous in that such programs may be less costly and less difficult to integrate within the academic schedule and thus may be more feasible for schools to implement on a city or statewide basis. However, brevity must be balanced by maximizing intervention impact. Future research on HLF's teacher intervention should explore whether it is advantageous to include additional class sessions, individual support components, and/or booster sessions.

Finally, as mindfulness programs for teachers develop, more rigorous research strategies are needed to evaluate their efficacy. Randomized controlled designs with active control conditions will be necessary for establishing program effects, as noted by several researchers in this area (e.g., Meiklejohn et al., 2012). Research is also needed to explore which sorts of teachers benefit most from which mindfulness-based approaches. For instance, Jennings and colleagues reported more positive pre–post intervention changes for urban teachers of high-risk youth than for suburban/rural teachers in more supportive

school environments (Jennings et al., 2011). The extent to which baseline levels of stress and burnout – or other individual or school-level factors – may influence intervention response should be explored. Identifying mechanisms of action in mindfulness-based programs for teachers is another area for future research. The field would benefit from careful evaluation and iterative refinement of program logic models, as well as comparisons of programs that emphasize different mindfulness-based practices (e.g., yoga versus meditation).

Study limitations and strengths

Study limitations include small sample size, use of a volunteer sample, lack of an active control condition, a limited number of self-report measures with no inclusion of objective instruments to assess stress responses and other outcomes, and lack of follow-up assessments. Given our small sample size, we did not control for sociodemographic variables and were also unable to statistically account for the clustering of teachers within different schools. Fidelity of implementation also was not evaluated, given the early phase of intervention development.

Study strengths include use of a control group and randomized design, as well as collection of both qualitative and quantitative data on participant experiences. The intervention was developed and evaluated with urban teachers in schools serving low-income neighborhoods, a particularly vulnerable population of teachers with substantial needs.

Conclusion

Teachers play a critical role in children's personal and academic development. The highly demanding nature of this profession calls for innovative methods of training and supporting teachers. Those who teach in under-resourced settings are particularly in need of interventions tailored to their unique experiences led by facilitators who understand the challenging environments in which they teach. Our findings indicate that yoga and mindfulness techniques may hold promise for improving the well being of such populations. Further work is warranted to enhance the feasibility of such programs and to evaluate their benefits in school settings.

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References

Akee, R. K. Q., Copeland, W., Keeler, G., Angold, A., & Costello, E. J. (2010). Parents' incomes and children's outcomes: A quasi-experiment. *American Economic Journal: Applied Economics*, *2*, 86–115.

Anderson, V. L., Levinson, E. M., Barker, W., & Kiewra, K. R. (1999). The effects of meditation on teacher perceived occupational stress, state and trait anxiety, and burnout. *School Psychology Quarterly*, *14*, 3–25.

Arora, S., & Bhattacharjee, J. (2008). Modulation of immune responses in stress by yoga. *International Journal of Yoga*, *1*, 45–55.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., … Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*, *11*, 230–241.

Büssing, A., Michalsen, A., Khalsa, S. B. S., Telles, S., & Sherman, K. J. (2012). Effects of yoga on mental and physical health: A short summary of reviews. *Evidence-Based Complementary and Alternative Medicine, 2012*, 1–7. Article ID 1665410.

Byrne, B. M. (2011). The Maslach burnout inventory: Testing for factorial validity and invariance across elementary, intermediate, and secondary teachers. *Journal of Occupational and Organizational Psychology*, *66*, 197–212.

Cullen, M. (2011). Mindfulness-based interventions: An emerging phenomenon. *Mindfulness*, *2*, 186–193.

DeAngelis, K. J., & Presley, J. B. (2011). Toward a more nuanced understanding of new teacher attrition. *Education and Urban Society*, *43*, 598–626.

de Vibe, M., Bjørndal, A., Tipton, E., Hammerstrøm, K., & Kowalski, K. (2012). Mindfulness based stress reduction (MBSR) for improving health, quality of life, and social functioning in adults. *Campbell Systematic Reviews*, *3*, 1–127.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175–191.

Ferguson, K., Frost, L., & Hall, D. (2012). Predicting teacher anxiety, depression, and job satisfaction. *Journal of Teaching and Learning*, *8*, 27–42.

Fimian, M. (1988). *Teacher stress inventory*. Brandon, VT: Clinical Psychology Publishing Company.

Flook, L., Goldberg, S. B., Pinger, L., Bonus, K., & Davidson, R. J. (2013). Mindfulness for teachers: A pilot study to assess effects on stress, burnout, and teaching efficacy. *Mind, Brain, and Education*, *7*, 182–195.

Franco, C., Mañas, I., Cangas, A. J., Moreno, E., & Gallego, J. (2010). Reducing teachers' psychological distress through a mindfulness training program. *The Spanish Journal of Psychology*, *13*, 655–666.

Gold, E., Smith, A., Hopper, I., Herne, D., Tansey, G., & Hulland, C. (2010). Mindfulness-based stress reduction (MBSR) for primary school teachers. *Journal of Child and Family Studies*, *19*, 184–189.

Greenberg, M. T., & Harris, A. R. (2012). Nurturing mindfulness in children and youth: Current state of research. *Child Development Perspectives*, *6*, 161–166.

Hastings, R., Horne, S., & Mitchell, G. (2004). Burnout in direct care staff in intellectual disability services: A factor analytic study of the Maslach Burnout Inventory. *Journal of Intellectual Disability Research*, *48*, 268–273.

Howard, T. (2004). Who receives the short end of the shortage? Implications of the U.S. teacher shortage on urban schools. *Journal of Curriculum and Supervision*, *18*, 142–160.

Hughes, G. D. (2012). Teacher retention: Teacher characteristics, school characteristics, organizational characteristics, and teacher efficacy. *The Journal of Educational Research*, *105*, 245–255.

Javnbakt, M., Hejazi Kenari, R., & Ghasemi, M. (2009). Effects of yoga on depression and anxiety in women. *Complementary Therapies in Clinical Practice*, *15*, 102–104.

Jennings, P. A. (2011). Promoting teachers' social and emotional competencies to support performance and reduce burnout. In A. Cohan & A. Honigsfeld (Eds.), *Breaking the mold of pre-service and in-service teacher education: Innovative and successful practices for the 21st century*. New York, NY: Rowman and Littlefield.

Jennings, P. A., Frank, J. L., Snowberg, K. E., Coccia, M. A., & Greenberg, M. T. (2013). Improving classroom learning environments by cultivating awareness and resilience in education (CARE): Results of a randomized controlled trial. *School Psychology Quarterly*, *28*, 374–390.

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*, 491–525.

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*, 37–48.

Kabat-Zinn, J. (1982). An outpatient program in behavioral in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry*, *4*, 33–47.

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York, NY: Delta.

Kemeny, M. E., Foltz, C., Cullen, M., Jennings, P., Gillath, O., Wallace, B. A., … Ekman, P. (2012). Contemplative/emotion training reduces negative emotional behavior and promotes prosocial responses. *Emotion*, *12*, 338–350.

Kilpatrick, L. A., Suyenobu, B. Y., Smith, S. R., Bueller, J. A., Goodman, T., Creswell, J. D., … Naliboff, B. D. (2011). Impact of mindfulness-based stress reduction training on intrinsic brain connectivity. *Neuroimage*, *56*, 290–298.

Kirkwood, G., Rampes, H., Tuffrey, V., Richardson, J., & Pilkington, K. (2005). Yoga for anxiety: A systematic review of the research literature. *British Journal of Sports Medicine*, *39*, 884–891.

Kokkinos, C. M. (2006). Factor structure and psychometric properties of the Maslach burnoutinventory-educators survey among elementary and secondary school teachers in Cyprus. *Stress and Health*, *22*, 25–33.

Kokkinos, C., Panayiotou, G., & Davazoglou, A. (2005). Correlates of teacher appraisals of student behaviors. *Psychology in Schools*, *42*, 79–89.

Kukla-Acevedo, S. (2009). Leavers, movers, and stayers: The role of workplace conditions in teacher mobility decisions. *The Journal of Educational Research*, *102*, 443–452.

Lambert, R., & McCarthy, C. (Eds.). (2006). *Understanding teacher stress in an era of accountability* (Vol. 3). Greenwich, CT: Information Age.

Lutz, A., Slagter, H. A., Dunne, J., & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, *12*, 163–169.

Maslach, C., Jackson, S., & Leiter, M. (1996). *The Maslach Burnout Inventory manual* (3rd ed.). Palo Alto, CA: Counseling Psychologists Press.

Maslach, C., Schaufeli, W., & Leiter, M. (2001). Job burnout. In S. Fiske, D. Schacter, & C. Zahn-Waxler (Eds.), *Annual review of psychology* (Vol. 52, pp. 397–422). Palo Alto, CA: Annual Reviews.

Maxwell, S. E., & Delaney, H. D. (1990). *Designing experiments and analyzing data: A model comparison perspective*. Pacific Grove, CA: Brooks/Cole.

McCarthy, C., Lambert, R., O'Donnell, & Melendres, L. (2009). The relation of elementary teachers' experience, stress, and coping resources to burnout symptoms. *The Elementary School Journal*, *109*, 282–300.

Meiklejohn, J., Phillips, C., Freedman, M. L., Griffin, M. L., Biegel, G., Roach, A., … Saltzman, A. (2012). Integrating mindfulness training into K-12 education: Fostering the resilience of teachers and students. *Mindfulness*, *3*, 291–307.

Mendelson, T., Dariotis, J. K., Feagans Gould, L., Smith, A. S. R., Smith, A. A., Gonzalez, A. A., & Greenberg, M. T. (2013). Implementing mindfulness and yoga in urban schools: A community-academic partnership. *Journal of Children's Services*, *8*, 276–291.

Mendelson, T., Greenberg, M., Dariotis, J., Gould, L., Rhoades, B., & Leaf, P. (2010). Feasibility and preliminary outcomes of a school-based mindfulness intervention for urban youth. *Journal of Abnormal Psychology*, *38*, 985–994.

Oakes, J. M., & Feldman, H. A. (2001). Statistical power for nonequivalent pretest–posttest designs: The impact of change scores versus ANCOVA models. *Evaluation Review*, *25*, 3–28.

Pilkington, K., Kirkwood, G., Rampes, H., & Richardson, J. (2005). Yoga for depression: The research evidence. *Journal of Affective Disorders*, *89*, 13–24.

Roeser, R. W., Schonert-Reichl, K. A., Jha, A., Cullen, M., Wallace, L., Wilensky, R., … Harrison, J. (2013). Mindfulness training and reductions in teacher stress and burnout: Results from two randomized, waitlist-control field trials. *Journal of Educational Psychology*, *105*, 787–804.

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*, 167–173.

Rogosa, D. (1988). Myths about longitudinal research. In K. W. Schaie, R. T. Campbell, W. M. Meredith, & S. C. Rawlings (Eds.), *Methodological issues in aging research* (pp. 171–209). New York, NY: Springer.

Ross, A., & Thomas, S. (2010). The health benefits of yoga and exercise: A review of comparison studies. *The Journal of Alternative and Complementary Medicine*, *16*, 3–12.

Sampson, R. J., Morenoff, J. D., & Gannon-Rowley, T. (2002). Assessing neighborhood effects: Social processes and new directions in research. *Annual Review of Sociology*, *28*, 443–478.
Vance, B., Nutter, N., & Humphreys, S. (1989). Responses of laboratory school teachers to the teacher stress inventory. *Perceptual and Motor Skills*, *68*, 939–944.
Zellars, K., Hochwater, W., & Perrewe, P. (2004). Experiencing job burnout: The roles of positive and negative traits and states. *Journal of Applied and Social Psychology*, *34*, 887–911.