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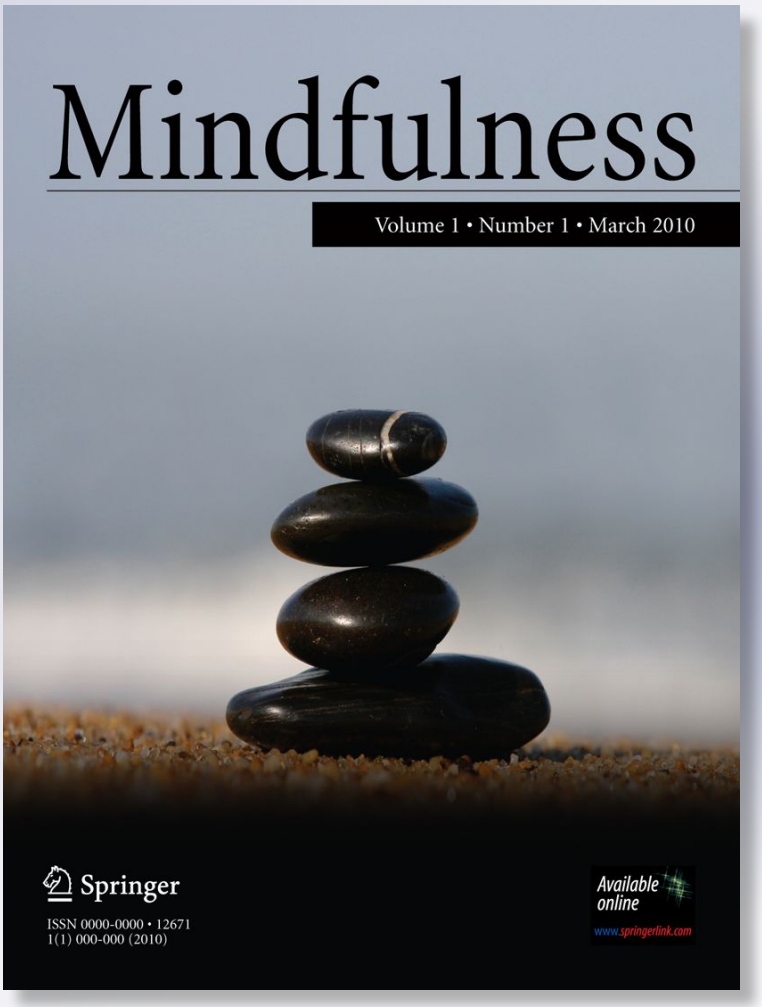

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REVIEW

Integrating Mindfulness Training into K-12 Education: Fostering the Resilience of Teachers and Students

John Meiklejohn · Catherine Phillips · M. Lee Freedman · Mary Lee Griffin · Gina Biegel · Andy Roach · Jenny Frank · Christine Burke · Laura Pinger · Geoff Soloway · Roberta Isberg · Erica Sibinga · Laurie Grossman · Amy Saltzman

Abstract Over the past decade, training in mindfulness—the intentional cultivation of moment-by-moment non-judgmental focused attention and awareness—has spread from its initial western applications in medicine to other fields, including education. This paper reviews research and curricula pertaining to the integration of mindfulness training into K-12 education, both indirectly by training teachers and through direct teaching of students. Research on the neurobiology of mindfulness in adults suggests that sustained mindfulness practice can enhance attentional and emotional self-regulation and promote flexibility, pointing toward significant potential benefits for both teachers and students. Early research results on three illustrative mindfulness-based teacher training initiatives suggest that personal training in mindfulness skills can increase teachers' sense of well-being and teaching self-efficacy, as well as their ability to manage classroom behavior and establish and maintain supportive relationships with students. Since 2005, 14 studies of programs that directly train

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students in mindfulness have collectively demonstrated a range of cognitive, social, and psychological benefits to both elementary (six studies) and high school (eight studies) students. These include improvements in working memory, attention, academic skills, social skills, emotional regulation, and self-esteem, as well as self-reported improvements in mood and decreases in anxiety, stress, and fatigue. The educational goals, target population, and core features of ten established mindfulness-based curricula are described. Finally, the need for more rigorous scientific evidence of the benefits of mindfulness-based interventions in K-12 education is discussed, along with suggestions of specific process, outcome, and research-design questions remaining to be answered.

Keywords Attention regulation · Emotional self-regulation · Mindful teaching · Mindfulness-based stress reduction · Social–emotional learning · Stress

Introduction

Interest in the benefits of mindfulness practice has grown rapidly over the past 15 years. From its initial applications in medicine, mindfulness training has spread into the fields of psychology, healthcare, neuroscience, business, the military, and education. An extensive peer-reviewed empirical literature now exists exploring the nature, application, and potential efficacy of mindfulness-based practices. This burgeoning interest has been fueled by evidence that numerous populations including both healthy adults and clinical populations with cancer, fibromyalgia, psoriasis, chronic pain, anxiety disorders, and depression have demonstrated measurable benefits from mindfulness practice (Baer 2003; Grossman, et al. 2004; Shapiro and Carlson 2009). There are increasingly convincing data that, in adults, mindfulness improves health and well-being by: reducing stress, anxiety, and depression; enhancing neuroendocrine and immune system function; improving adherence to medical treatments; diminishing need for medication; altering perception of pain; increasing motivation to make lifestyle changes; and fostering social connection and enriched interpersonal relations (Ludwig and Kabat-Zinn 2008; Ruff and Mackenzie 2009).

In the review that follows, we explore the rationales for bringing the reflective mind–body discipline of mindfulness to both K-12 educators and students, review research to date supporting such initiatives, highlight a sample of programs in the USA and abroad at the elementary, middle, and high school levels, and recommend policies and research needed to advance understanding of the contributions mindfulness may offer to the K-12 educational enterprise.

Defining Mindfulness

Mindfulness has been described as "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn 2003, p.144). It is a fundamental component of human consciousness and a mental capacity that can be strengthened through a variety of training methods. Mindfulness meditation is one such method. Although mindfulness meditation has historical roots in Buddhist practice, teachers of mindfulness in the West have adapted traditional mindful awareness practices into a secular discipline for the psychological and medical benefits they provide. All of the mindfulness programs noted in this article are secular in nature.

The practice of mindfulness meditation typically consists of initially directing attention to a specific focus, such as the breath, a sensation, a feeling (e.g., loving-kindness), or other attentional "anchor." As one practices, it becomes apparent that the mind will repeatedly drift off the chosen "anchor" into spontaneously arising thoughts, memories, feelings, or images. Upon noticing this drift, the practitioner brings his/her attention back repeatedly to the anchor. The intent is not to get rid of thoughts, feelings, or sensations. Rather, it is to cultivate a clearer awareness of direct moment to moment experience with acceptance and a kindly curiosity which is not obscured by judgments about the experience. Noticing whatever arises with a growing degree of acceptance and non-judgment leads to increased clarity and stability of attention and may lead to reduced reactivity in the body's physiological stress responses.

Mindfulness practice can be formal or informal. Mindfulness meditation, which can be practiced sitting, lying down, standing, or moving, refers to the formal practice of intentionally attending to thoughts, feelings, body sensations, and sensory experiences as they arise moment to moment, with acceptance and without getting caught up or identified with thoughts about the experience. Informal mindfulness practice refers to the weaving of mindful awareness into activities of everyday life, such as showering, walking, eating, and interpersonal interactions.

Rationale for Offering Mindfulness Training to K-12 Teachers

K-12 teachers face an array of stressors, yet are provided with few resources with which to alleviate them. Surveys indicate that K-12 teachers report experiencing a moderate to high level of stress, and ample evidence documents the causes and consequences of stress in teaching (Montgomery and Rupp 2005). Surprisingly, despite the professional stressors bearing upon teachers and the distress levels they

report, empirical research addressing potential solutions to teachers' work-related stress and burnout is sparse (Poulin et al. 2008). Jennings (2009) noted this dilemma:

> We ask an awful lot of teachers these days…Beyond just conveying the course material, teachers are supposed to provide a nurturing learning environment, be responsive to students, parents and colleagues, juggle the demands of standardized testing, coach students through conflicts with peers, be exemplars of emotion regulation, handle disruptive behavior and generally be great role models;…the problem is we rarely give teachers training or resources for any of them. (p. 1)

There is an evident need for innovative, cost-effective ways for school systems to train and better support the resilience of their teachers.

Neuroscience offers insights into how and why mindfulness training may offer such support. Expanding interest in the plasticity of the brain, the brain's ability to produce new neurons and neural connections across the lifespan, has prompted an exponential increase in cognitive and affective neuroscience research. This research has served as a backdrop to neuroscientific studies of the effects of mindfulness training on brain activity and higher cortical functions.

Two decades of neuroscientific, medical, and psychological research with adults provide accumulating evidence that, like other individuals, teachers can benefit personally and professionally from the reflective discipline of mindfulness. While this discipline is grounded in attention and awareness, its researched effects are wide-ranging and involve measurable physiological and psychological benefits through a reduction in stress physiology and through measurable changes in the function and structure of diverse areas of the brain. The brain regions that are impacted by mindfulness training are implicated in executive functioning (EF) and the regulation of emotions and behavior. Executive functioning is an umbrella term for cognitive processes such as planning, working memory, attention, problem solving, verbal reasoning, inhibition, mental flexibility, multi-tasking, and the initiation and monitoring of actions (Chan et al. 2008). In essence, evidence-based research is indicating that mindfulness training fosters enhanced resilience and more optimal brain function in adults. We highlight here a selection of these data that pertain to teaching.

A randomized controlled trial (RCT) of a healthy workplace group demonstrated that an 8-week training in mindfulness-based stress reduction (MBSR) reduced the subjective sense of stress, enhanced the subjective sense of well-being, improved immune function, decreased brain activity in regions associated with negative emotion, and increased activity in regions associated with positive emotion (Davidson et al. 2003). This was a ground-breaking study in part because it demonstrated that a relatively short mindfulness-based program can produce both beneficial changes in brain function and improved immune function. Of equal significance, it showed that the degree of activation of the left prefrontal cortex, associated with positive mood states, predicted the robustness of immune response, providing additional support on the interrelation of affect and immune function.

Greeson (2009) reviewed the effects of mindfulness on the mind, brain, body, and behavior by selecting, from hundreds of studies between 2003 and 2008, the 52 studies that exemplified the most rigorous empirical and theoretical research. The results demonstrated that cultivating mindful awareness via mindfulness training is associated with reduced emotional distress, more positive states of mind, and improved quality of life. In addition, the author stated, "mindfulness practice can influence the brain, the autonomic nervous system, stress hormones, the immune system, and health behaviors, including eating, sleeping, and substance use, in salutary ways" (Greeson 2009, p.10). More time spent in mindfulness practice, whether at home or in a group, has been associated with greater reductions in mood disturbance and symptoms of stress (Brown et al. 2007; Speca et al. 2000).

Like other demanding professions, teachers deserve and need methods of maintaining good executive function in the context of their elevated work-related stress. Preliminary findings between 2005 and 2009 showed correlations between mindfulness training and increased thickness of cortical structures (i.e., grey matter) associated with attention, working memory, processing sensory input, EF, self-reflection, empathy, and affective regulation (Hölzel et al. 2008; Lazar et al. 2005; Luders et al. 2009). These early findings are now buttressed by a more recent study at the Psychiatric Neuroimaging Research Program of Massachusetts General Hospital that is the first to document meditation-produced changes over time in the brain's grey matter. The researchers studied the effect of an 8-week MBSR training on brain regions associated with memory, sense of self, empathy, and stress. Participants spent an average of 27 min a day practicing mindfulness exercises. Neuro-imaging results showed increased grey matter density in the hippocampus, a region central to learning and memory, and in structures associated with self-awareness, compassion, and introspection. Participants' reports of subjective reduction in stress were correlated with decreased grey-matter density in the amygdala, a region known to regulate the human stress response (Hölzel et al. 2011). These preliminary findings suggest that, due to the brain's neuroplastic nature (i.e., its ability to create new neurons and neural connections), individuals can actively change their brain structure in ways that promote brain health and improve the quality of one's life.

The potential for mindfulness to mediate the impact of stress on cellular aging is now being investigated with intriguing early findings. Epel et al. (2004) tested the hypothesis that psychological stress affects health by its impact on cellular aging. The study examined healthy premenopausal women and focused on the length of telomeres—the protective caps on the ends of chromosomes—and telomerase, an enzyme that promotes cell longevity and long-term health. The study offered evidence that women with higher levels of perceived stress and chronic stress aged faster at the cellular level than low stress women as measured by the high stress group's shorter telomere length, lower telomerase levels, and higher oxidative stress—three factors known to affect cellular health and longevity.

Epel et al. (2009) theorized that mindfulness might promote telomere maintenance and slow the rate of cellular aging via its salutary impact upon psychological stress, suggesting possible links between telomere length and stress arousal. More recently, Jacobs et al. (2011) reported a study in which intensive mindfulness meditation produced positive psychological changes that were associated with increases in telomerase activity. This is the first study to show that, among the individuals undergoing intensive training, those that showed the greatest improvement in psychological measures of coping and well-being also showed the highest levels of telomerase. Can these changes and correlations be replicated in adults who undertake an 8-week MBSR training or school-based mindfulness training? We don't know. This is a new and ongoing line of research that is raising questions about the biological mechanisms by which mindfulness training may promote biological, as well as psychological, resilience to stress and cellular aging across the life span.

In light of the accumulating evidence base for the efficacy of mindfulness interventions with a broad range of adult populations, and given the elevated stress experienced by many K-12 teachers, it is now reasonable to offer mindfulness training and mindful awareness activities to teachers. Such practical training is already underway.

Review of Research on Mindfulness Training for Teachers

As a discipline, mindfulness can be integrated into the classroom using one of three basic approaches: indirect (the teacher develops a personal mindfulness practice and embodies mindfulness attitudes and behaviors throughout the school day); direct (programs teach the students mindfulness exercises and skills); or a combination of direct and indirect approaches. In this section, we examine the first of these three approaches.

Mindful teaching (indirect approach), rather than directly teaching mindfulness skills (direct approach), is a key element both for the integration of mindfulness into K-12 education and within the programs reviewed below. These programs share an underlying belief that mindfulness-trained teachers embody mindful behaviors and attitudes through their presence and interaction with students in the classroom. A focus on mindful teaching encourages teachers to cultivate mindfulness skills and knowledge in their everyday lives both inside and outside the classroom, rather than utilizing mindfulness as just a resource to be taught directly to students. As will be discussed in the section on mindfulness for K-12 students, various programs also exist in which mindfulness exercises are either directly taught to children or conveyed through a combination of direct and indirect teaching approaches.

This section reviews three samples of mindfulness-based training programs for teachers: Mindfulness-Based Wellness Education (MBWE); Cultivating Awareness and Resilience in Education (CARE); and Stress Management and Relaxation Techniques (SMART) in Education. This discussion identifies key attributes of these programs, unique populations in which they are working and current research being done on them. Space limitations prevent a more comprehensive review of all the current mindfulness-based programs for teachers.

Mindfulness-Based Wellness Education (MBWE)

The MBWE program was created at the Ontario Institute for Studies in Education of the University of Toronto (OISE/UT) in 2005. Responding to the increasing rates of teacher stress and burnout and inspired by the growing proliferation of mindfulness-based interventions for clinical populations, Poulin et al. (2008) designed a mindfulness-based program targeting human service professionals, specifically teachers-in-training. It is taught within the initial teacher education program at OISE/UT in a 9-week (36 h) elective course entitled "Stress & Burnout: Teacher and Student Applications".

Modeled on the MBSR program, MBWE uses a "wellness wheel" as a framework to illustrate the principles and practices of mindfulness. The MBWE experiential curriculum uses the lens of mindfulness to explore various dimensions of wellness and teaching strategies, such as social wellness and mindful listening, which are then applied with students, parents, and colleagues (Soloway et al. 2011).

The first controlled 2-year study indicated increased mindfulness and teaching self-efficacy among MBWE participants compared with a control group. In addition, improvements in mindfulness predicted improved teaching self-efficacy and physical health ratings immediately after training (Poulin et al. 2008; Poulin 2009). A 2-year action research qualitative study has been completed. Findings elucidate the added-value of MBWE in teacher education through five core themes of teacher candidates' experience of

the training: (1) personal and professional identity, (2) reflective practice, (3) holistic vision of teaching, (4) social and emotional competence on practicum, and (5) engagement in teacher education. Furthermore, as part of the 2-year study, a formative evaluation of the MBWE program was completed and highlights two core learning objectives: mindful teaching and a pedagogy for well-being (Soloway 2011). A longitudinal component is underway following teachers who have taken MBWE into their first years of teaching.

Cultivating Awareness and Resilience in Education (CARE)

The CARE program for teachers in pre-K-12 classrooms (www.garrisoninstitute.org) has been offered in Denver, San Francisco, Philadelphia, and at the Garrison Institute in New York. The CARE intervention is based on the Prosocial Classroom model (Jennings and Greenberg 2009) including its four broad intervention aims to: (1) improve teachers' overall well-being; (2) improve teachers' effectiveness in providing emotional, behavioral, and instructional support to students; (3) improve teacher–child relationships and classroom climate; and (4) increase students' prosocial behavior. Three primary instructional components are used to achieve these aims: emotion skills instruction to help teachers recognize and regulate emotions in themselves and others; mindfulness/stress reduction practices to help teachers be more aware, present, and engaged; and compassion and listening practices to help teachers optimize opportunities for healthy emotional contact and understanding with students and others (Jennings 2011).

The CARE program has been presented in several formats: two 2-day training sessions; four 1-day sessions; and a 5-day intensive retreat. During time between sessions, CARE facilitators provide E-mails and individualized coaching sessions over the phone as participants begin to practice and apply learning from CARE into their teaching.

Preliminary studies, one with experienced teachers and the second with student teachers and their mentors, illustrate promising results related to improvements in teachers' levels of mindfulness, well-being, and in using a more autonomy supportive motivational orientation in the classroom (Jennings et al. 2011). Furthermore, experienced teachers who completed the CARE training in the first study were highly satisfied with the training, felt they were now better able to manage their classrooms and maintain supportive relationships with students, and that this type of professional development should be made available to all teachers.

Stress Management and Relaxation Techniques (SMART) in Education

SMART in Education (http://smart-in-education.org/) is a professional development program for K-12 teachers and administrators. Developed by Cullen through the sponsorship of the IMPACT Foundation, SMART is modeled upon MBSR and includes the following three curriculum elements: (1) Concentration, Attention, and Mindfulness; (2) Awareness and Understanding of Emotions; and (3) Empathy and Compassion Training. The training consists of 11 sessions over 8 weeks, including two day-long sessions. Participants are assigned 10–30 min of daily mindfulness practice.

SMART in education is currently being piloted in Colorado and Vancouver. Preliminary findings illustrate high rates of program completion and satisfaction, and teachers report that SMART has positively influenced their interactions with students and co-workers. Furthermore, compared with waitlist controls, teachers going through SMART report increased mindfulness, decreased occupational stress, and increased work motivation from pre- to post-intervention (Jennings et al. in press). SMART is currently conducting a study in the Vancouver School Board in conjunction with another mindfulness-based training called MindUp (http://www.thehawnfoundation.org/mindup), (Schonert-Reichl and Lawlor 2010), which is a curriculum for teaching mindfulness to students.

In summary, all three programs are experientially based on teachers learning and developing mindfulness in their personal and professional lives. Such an approach reflects the non-didactic embodiment of mindful teaching (i.e., an indirect approach) rather than focusing on preparing teachers to directly teach mindfulness skills to students. An indirect approach of practitioner presence is also a leading model for training other human service professionals including psychologists and doctors (Hicks and Bien 2008; Shapiro and Carlson 2009). These three programs also share a tendency to build from personal mindfulness practice to include more relational dimensions of mindfulness practice, such as listening more deeply and developing emotional awareness, empathy, and compassion in the classroom. The ability to be with students and improving the felt sense in the classroom is a central benefit to learning and development and thus a foundational component of mindfulness training for teachers. Research with teachers receiving this type of training has primarily focused on measures of teacher mindfulness and well-being. Future research will need to continue to investigate the short- and long-term impacts of mindful teachers in the classroom, for example, on classroom climate, teaching style, teacher efficacy, as well as the impact on students' learning. Further investigation is also needed to better understand the stages of professional development needed to sustain teachers' practice of mindful teaching.

A more direct approach for integrating mindfulness in K-12 education is training teachers to teach mindfulness to students. Training for teachers that focuses primarily on teaching mindfulness to students uses a more traditional

"toolbox" approach in education. A toolbox approach to training is focused on strategies teachers can take back with them and use in their classrooms, i.e., another tool for their toolbox. To develop mindfulness however—a process of human development—is not like other cookie cutter curriculums that can be learned in a day, outlined in a resource guide and then be brought into a classroom using a transmissive approach. Teachers may be able to pick up tips and techniques from these types of trainings that benefit student learning and development. However, more comprehensive benefits depend on a felt sense of presence that is embodied by the teacher in everyday classroom actions and instructional strategies. Training teachers to embody mindfulness by developing a foundation of personal practice creates a wider and more sustainable benefit to the system of education.

Rationale for Offering Mindfulness Training to K-12 Students

The application of mindfulness-based approaches with children and adolescents is a newly evolving field, with current evidence suggesting these approaches are acceptable and feasible with youth. To date, current research stems largely from a clinical perspective, mirroring research trends with adults (Burke 2010). However, we suggest potential for broad-ranging and universal applicability of mindfulness in the K-12 education setting. Specifically, we suggest that mindfulness training can enhance students' capacities in self-regulation of attention and emotions, and buffer the developing brain from the deleterious effects of excessive stress.

Abundant child development research now highlights the effects of stress, as well as genetics and environment, upon whether children's lives get off to a promising or troubled start. The science of child development informs us that the brain is built over time and that excessive stress damages the architecture of the developing brain leading to vulnerability to lifelong problems in learning, behavior, and overall health (National Scientific Council on the Developing Child 2007).

In addition to the challenges of learning and achievement, students come to school with stressors arising from many sources including family-system disturbances, peer-interaction conflicts, socio-cultural components, and vulnerabilities to physical and mental health risk factors. Depending on the student and unique factors, stressors may combine in ways that are beneficial, tolerable, or toxic to a child's learning and development. Significant and/or sustained childhood stress are likely to impact on well-being, general functioning, and factors specific to learning, such as executive function and working memory. Research suggests that excessive stress impacts the developing brain (Evans and Schamberg 2009; Hedges and Woon 2010). Given that many children and youth exhibit learning, behavioral, attentional, and/or mental health problems that are stress-sensitive or stress-induced, the school setting offers an ideal environment for utilizing interventions that promote healthy brain development and function, and foster stress resilience. Evidence is accumulating that mindfulness training is one effective and cost-efficient way to achieve this goal.

For K-12 students, as for adults, mindful awareness emerges when they intentionally focus attention on their present moment experience while maintaining receptive attitudes of acceptance, kindly curiosity, and non-judgment (Bishop et al. 2004; Shapiro et al. 2006). The practice of mindful awareness allows students to relate to their internal and external experiences in ways that are present-centered, objective, and responsive, rather than in ways that are past or future-focused, subjective, or reactive. Short but regular formal mindfulness training exercises, combined with informal mindfulness awareness practices, can strengthen their innate capacities for being mindful, and therefore their capacities to relate to *any* experience—whether pleasurable, neutral, stressful, or difficult—in ways that are responsive rather than reactive and reflexive. These specific aspects of mindfulness training clearly support adaptive emotional regulation, including the ability to be aware of and express emotions and to modulate the intensity and duration of emotion-related arousal (Gatz and Roemer 2004). The emergence of this skill set is a core goal of social–emotional learning.

Regular practice of mindfulness exercises also strengthens students' capacity to self-regulate attention, by developing attentional control through repeated and intentional focusing, sustaining, and shifting of attention. Research evidence demonstrates improved measures of attention following mindfulness training with children (Napoli et al. 2005), adolescents (Zylowska et al. 2008), and adults (Jha et al. 2007).

Review of Research on Teaching Mindfulness to K-12 Students

Reviewed here is the current research on mindfulness instruction for children and adolescents conducted in both school and clinical settings, organized by school age. The studies included review secular mindfulness-based programs that: cultivate mindfulness as a core of their research intervention; are published in peer-reviewed journals; and include at least five participants. The most commonly utilized interventions in these studies are based on the MBSR and mindfulness-based cognitive therapy (MBCT) programs. As the field is still emerging and gradually gaining research rigor, we present the current evidence base, which includes a number of pilot, uncontrolled, and wait-list controlled RCT studies.

Elementary- and Middle-School-Aged Children

Napoli et al. (2005) conducted a RCT with 194 first to third grade students, from nine classrooms in two elementary schools, using the Attention Academy Program (AAP). Students were randomly assigned to attend AAP or no intervention. The AAP lasted for 12 sessions over 24 weeks for 45-min per session and included sitting, movement, and body-scan meditations as well as relaxation exercises. Compared with control students, AAP participants showed reductions in test anxiety and improvements in teacher-rated attention, social skills, and objective measures of selective attention.

Wall (2005) used a 5-week modified MBSR intervention (sitting meditation and mindful eating) with Tai Chi with 11 public school children, 11 to 13 years of age, referred by their teachers as having no significant behavioral issues. Self-reported findings included children feeling calmer, less reactive, enhanced experience of well being, relaxation, and improved sleep.

As a pilot study, Semple et al. (2005), conducted a 6-week, 45-min-per-week, manualized MBCT-C with five children, age 7–9 years, at an urban elementary school, referred by their classroom teachers based on observed symptoms of anxiety. Following the program, they found some improvements in attention, academic performance, and reductions in teacher-reported problem behavior.

Additionally, Semple et al. (2009), conducted a 12-week RCT using MBCT-C with 25 children 9 to 12 years of age, enrolled in a clinic-based remedial reading program. Students were assigned to MBCT-C or a wait-list control group. Compared with controls, who had not yet participated in the program, MBCT-C participants had significant reductions in parent-rated attention problems. Also, significant reductions in anxiety were seen in the subgroup of children who reported clinically elevated anxiety at baseline. Reductions in behavioral and anger management problems were noted by parent reports. See also Lee et al. (2008).

Flook et al. (2010) conducted a RCT of an 8-week program of mindful awareness practices (MAPs) with second and third grade children (n=64, mean age (M)=8.23 years) at an on-campus university elementary school. Children were randomized to MAPs (n=32) or waitlist control (n=32), and the primary outcomes of interest were teacher- and parent-rated executive functions (EF), i.e., cognitively based skills to manage oneself and one's resources. Although there was not an overall group effect, children with weaker initial EF who were exposed to the MAPs training showed significantly improved overall EF following training, as well as specific EF capacities such as attention shifting, monitoring, and initiating, compared with the wait-list control group.

Schonert-Reichl and Lawlor (2010) conducted a study of 12 elementary classrooms in which six were randomized to receive the Mindfulness Education (ME) program and six to waitlist control. ME consisted of the following four teacher-delivered components: quieting the mind, mindful attention (to sensation, thoughts, and feelings), managing negative emotions and thinking, and acknowledgment of self and others. Comparing participant and teacher surveys from before and after the program, students in the ME classrooms (n=139) reported increased optimism and increased teacher-rated behavior and social competence, but not significant differences in self-concept or affect.

High-School-Aged Adolescents

Bootzin and Stevens (2005) completed a multi-modal intervention which included components of MBSR with 55 patients, 13 to 19 years of age, in a residential substance abuse program, who reported sleep disturbances. This six-session intervention included elements of MBSR, insomnia treatment, and cognitive therapy and found improvements in sleep and reduced worry and mental distress.

Beauchemin et al. (2008) studied 32 adolescents attending a private residential school for students with learning disabilities. Students were led in mindfulness meditation for 5 to 10 min at the beginning of each class period, 5 days per week, for five consecutive weeks, by two classroom teachers. Students' self-reports revealed decreased state and trait anxiety. Teacher ratings showed improvements of students' social skills, problem behaviors, and academics.

Zylowska et al. (2008) used the MAPs intervention with psycho-education for attention-deficit hyperactivity disorder (ADHD) with a mixed group of adults (N=24) and adolescents (N=8), 15 years of age and older. Participants were recruited through university-based clinical and research programs for ADHD. Subjects with co-morbid serious mental and substance use disorders were excluded, and those in psychiatric treatment continued their usual care. Following the intervention, participants showed improvements in self-reported ADHD symptoms, anxiety, depressive symptoms, and working memory.

Bogels et al. (2008) conducted a study using an 8-week MBCT program with 14 adolescents with externalizing disorders (ADHD, OCD, and ASD), 11 to 18 years of age. The adolescents' parents also participated in a parallel MBCT course. Following MBCT, improvements were found in self- and parent- reported measures of sustained attention, behaviors, personal goals, subjective happiness, and mindful awareness.

Biegel et al. (2009) conducted a RCT with 102 adolescents 14 to 18 years of age in an outpatient psychiatric clinic with heterogeneous diagnoses utilizing the 8-week MBSR for Teens (MBSR-T) intervention. All study participants

received treatment as usual (TAU). Participants were randomly assigned to receive TAU plus MBSR-T program or TAU only. Compared with TAU, the MBSR-T group had statistically significant reductions in self-reported anxiety, depression, somatization, perceived stress, obsessive symptoms, and interpersonal problems; and statistically significant increases in Global Assessment of Functioning scores, changes in *DSM-IV* diagnoses, improved self-esteem, and sleep quality. Further analysis found that statistically significant increases in mindfulness were present and were significantly related to positive changes in mental health (Brown et al. 2011).

Broderick and Metz (2009) conducted a non-randomized pilot trial of 137 high school females using a six-session Learning to BREATHE program, a school-based mindfulness curriculum. Compared with the 17 juniors who served as controls, the 120 seniors who received the intervention showed reductions in self-reported negative affect, tiredness, aches and pains, and increases in emotion regulation, feelings of calmness, relaxation, and self-acceptance.

Sibinga et al. (2011) conducted a study of an 8-week MBSR program for 33 urban youth 13–21 years of age recruited from the pediatric and adolescent clinics of an urban academic hospital. Seventy-nine percent attended the majority of the MBSR sessions and were considered "program completers." Among program completers, 11 were HIV-infected, 77% were female, all were African American, and the average age was 16.8. Following the MBSR program, participants had a significant reduction in hostility, general discomfort, and emotional discomfort. Interview data showed perceived improvements in interpersonal relationships (including less conflict), school achievement, physical health, and reduced stress. Interview data from an HIV-infected sub-group revealed improved attitude, behavior, and self-care (including medication adherence), and decreased reactivity (Sibinga et al. 2008), with transformative experiences of variable levels described by all participants (Kerrigan et al. 2011).

The current evidence base for mindfulness-based interventions for children and adolescents is limited due to issues of sample size, design, and methods of measurement. In general, the research methodologies are still evolving and lack sufficient precision thus limiting the validity of most findings. Nevertheless, the aforementioned studies demonstrate that mindfulness interventions for children and adolescents are feasible and acceptable in these populations. Additionally, the findings suggest that mindfulness approaches may be beneficial to children and adolescents. In both uncontrolled and RCT studies, improvements were seen in cognitive (e.g., executive function, attention), mental health (e.g., anxiety and depression, stress), and interpersonal outcomes. Current research is particularly lacking regarding the absence of active control conditions in the comparator study arms. Although still nascent and limited in quantity and quality, mindfulness-based research for children and adolescents reveals preliminary outcomes that encourage future and more rigorous research.

Mindfulness Training Programs for K-12 Students

Within the past 10 to 15 years, a number of mindfulness-based curricula for children and teens have been developed and implemented around the world. Table 1 describes the underlying principles, methods, length, and supporting research of ten such programs. These programs have been included based on an underlying foundation of mindfulness as well as on recommendations from educators and researchers active in the field of mindfulness education. This list is believed to be a representative sample of programs available, but it is not intended to be exhaustive.

The typical foundation of mindfulness-based curricula for K-12 students includes age-appropriate mind–body practices that aim to increase focused attention, social competencies, and emotional self-regulation. Curricula lessons that target awareness of inner/outer experiences include: focused attention on breath and sensory experiences; awareness of thoughts and emotions; movement practices; and caring or kindness practices. Skills are learned over time, and the intention is that, through sustained practice, mindful awareness becomes a positive way of being in the world for students—whether learning and interacting at school, at home, or in the community.

The programs are taught by experienced mindfulness practitioners/instructors or by classroom teachers who have received prior mindfulness training. In addition, several programs offer teacher, educational assistant, and/or parent training components. Program delivery models provide lessons in school and after-school settings as well as within the community, research settings, and outpatient clinics. One program specifically targets students and classroom teachers assigned to alternative and special education classrooms in diverse inner city schools (Wellness Works). The length and frequency of lessons and the duration of the programs vary according to the age of the student and the setting. Several programs have been implemented on a universal, school-wide scale (e.g., Inner Resilience Program, Learning to BREATHE, Stressed Teens, Mindful Schools, and Sfat Hakeshev/The Mindful Language).

The mindfulness-based programs for school aged children and teens reviewed in Table 1 have been influenced predominantly or in part by the mindfulness-based stress reduction program (Kabat-Zinn 1990). However, additional programs and therapies have influenced specific programs. These include Dance Movement Therapy with Young Children (Tortora 2005); Mindfulness-Based Training for OCD

Table 1 Sample of mindfulness-based programs for children and youth

Program	Country	Age group targeted	No. years in use	Program principals, methods, length, and supporting peer-reviewed research
Inner Kids Program www.susankaisergreenland.com	United States	Pre-K-8	11	The New ABCs—Attention, Balance and Compassion—are taught through games, activities, instruction and sharing to develop: (1) Awareness of inner experience (thoughts, emotions, and physical sensations); (2) awareness of outer experience (people, places and things); (3) awareness of both together without blending the two. Program length and frequency varies depending on students' ages and the needs of the facility. In general, young children meet twice a week for 30-min sessions for 8 weeks. Older children meet once a week for approx. 45 min for 10–12 weeks. A general formula is used of play, followed by introspection, and then sharing to help children to: better understand their introspective experience; relate it to their daily lives; and understand the importance of helping within both their families and their communities. Peer-reviewed research to date: Flook, et al. (2010). Effects of mindful awareness practices on executive functions in elementary school children. *Journal of Applied School Psychology, 26*(1), 70–95. doi:10.1080/15377900903379125
Inner Resilience Program (IRP) www.innerresilience-tidescenter.org	United States	K-8, teachers, parents, and administrators	9	The Inner Resilience Program's mission is to cultivate the inner lives of students, teachers, and schools by integrating social and emotional learning with contemplative practice. The mindfulness-based approaches used in IRP help create healthy environments for teaching and learning by assisting both teachers and students to hone the skills of self-regulation, attention, and caring for others. The underlying principle of teaching specific skills to teachers and students through sustained practice and the development of a mindful classroom environment may provide value-added benefits because of the emphasis on repeated practice of skills over time in the context of a caring learning community. The implementation of IRP includes weekend residential retreats for school staff, professional development workshops, individual stress reduction sessions, and parent workshops at school sites. IRP has also developed a K-8 curriculum: Building Resilience from the Inside Out. The curriculum involves a 10-h training and follow-up staff development visits to each individual classroom of the teachers trained. The IRP framework has the following essential ingredients: regular classroom instruction to develop students' social, emotional and inner life skills; a more mindful approach to behavior and classroom management aligned with Inner Resilience methods; a safe, orderly and peaceful classroom climate which values reflection; mindfulness based practices integrated throughout the curriculum; Inner Resilience workshops that inform and engage parents; professional development for staff on their personal learning of these skills as well as support for implementing this work in the classroom. The focus of mindfulness educational practices is grounded in contemplative neuroscience including the concept of neuroplasticity—the notion that the brain is the key organ in the body that is designed to change in response to experience and training of various kinds. Marrying the idea of neuroplasticity with the kinds of mental training offered by contemplative practices, educators are learning just how much we can train the mind and change our brains/bodies in the directions of greater attentional focus, emotional calm, awareness and insight, and caring for others. Peer-reviewed research to date: Metis Associates. (2011). Building inner resilience in teachers and their students: results of the inner resilience pilot program. Available at Inner Resilience Program web site: http://innerresilience.org/documents/IRP_Pilot_Program_Results_AERA2011_updated_6.9.pdf
Learning to BREATHE http://learning2breathe.org	United States	Adolescents	4	Learning to BREATHE is a universal school-based prevention program for adolescents which integrates principles of social and emotional learning with mindfulness components of mindfulness-based stress reduction (MBSR) developed by Jon Kabat-Zinn (1990). It offers students a way to empower themselves as they grapple with the psychological tasks of adolescence. The program also rests on theoretical developments from therapies that focus on emotion regulation skills, notably acceptance and commitment therapy (ACT; Hayes et al. 1999) mindfulness-based cognitive rherapy (MBCT; Segal, Williams and Teasdale 2002), and dialectic behavior therapy (DBT; Linehan 1993).

Table 1 (continued)

Program	Country	Age group targeted	No. years in use	Program principals, methods, length, and supporting peer-reviewed research
				Program goals: (1) To provide universal, developmentally appropriate mindfulness instruction that fosters mental health and wellness (2) To enhance capacity for emotion regulation (3) To strengthen attention (4) To expand the repertoire of skills for stress management (5) To help students integrate mindfulness into everyday life Six lessons are built around the BREATHE acronym, and each lesson has a core theme. The six themes include body awareness, understanding and working with thoughts, understanding and working with feelings, integrating awareness of thoughts feelings and bodily sensations, reducing harmful judgments, and integrating mindful awareness into daily life. The program includes six structured class sessions, which may be adapted for different groups and ages. The lessons are structured to take approximately 30–45 min each but may be adapted to accommodate space and time limitations. Peer-reviewed research to date: Broderick and Metz (2009). Learning to BREATHE: A pilot trial of a mindfulness curriculum for adolescents. *Advances in School Mental Health Promotion, 2*, 35–46.
Mindfulness in Schools Project (MiSP) www.mindfulnessinschools.org	England	Age14–18 years	3	The backbone of this curriculum is a 9-week course. Core MBSR/MBCT teachings are distilled and made accessible for an adolescent audience. Teachings include: mindfulness of breath, body scan, mindful eating, mindful movement, mindfulness of thought and sound, several variations on the 3 min silence, and mindful texting. The program is offered during normal school lessons. Research to date: Huppert and Johnson (2010). A controlled trial of mindfulness training in schools: The importance of practice for an impact on well-being. *Journal of Positive Psychology, 5*, 264–274. doi10.1080/17439761003794148 See the MiSP website for internal research that as yet is not peer-reviewed.
Mindful Schools www.mindfulschools.org	United States	K-12	5	The mission of Mindful Schools, located in Oakland, California, is to integrate mindfulness into education. The program involves direct teaching to students in K-12 schools and through trainings for educators. In its first 5 years, Mindful Schools has brought an in-class program to over 11,000 children in 41 schools, 71% of which serve low-income students. The 15-session program delivered over 8 weeks engages children through lessons including mindfulness of sound, breath, body, emotions, test taking, generosity, appreciation, kindness and caring, and others. They offer parent classes at the schools where they teach and in the coming year will provide a mindfulness manual for parents. They have trained 1,500 educators through a Mindfulness Fundamentals Course, a Curriculum Course, and conferences. Research to date: Liehr and Diaz (2010). A pilot study examining the effect of mindfulness on depression and anxiety for minority children. *Archives of Psychiatric Nursing, 24*, 69–71. doi:10.1016/j.apnu.2009.10.001 See the Mindful Schools website for internal research that as yet is not peer-reviewed.
MindUP www.thehawnfoundation.org	United States	Pre-K-8	8	MindUP is a classroom-tested, evidence-based curriculum framed around 15 easily implemented lessons that foster social and emotional awareness, enhance psychological well-being, and promote academic success. MindUP pursues objectives roughly parallel to those of the five-point framework of competencies laid out in the work of the Collaborative for Academic, Social, and Emotional Learning (CASEL). The core practice of MindUP is mindful breathing which is ideally done three times a day (for a few minutes each time) at intervals reflective of classroom culture and needs. The program is currently being used in about 250 schools throughout North America. Research may be found at the MindUP website. Peer-reviewed research to date: The following study is on an earlier and different version of MindUp, called Mindfulness Education. See the MindUp website for research on the current version that as yet is not peer-reviewed.

Table 1 (continued)

Program	Country	Age group targeted	No. years in use	Program principals, methods, length, and supporting peer-reviewed research
				Schonert-Reichl and Lawlor (2010). The effects of a mindfulness-based education program on pre- and early adolescents' well-being and social and emotional competence. *Mindfulness*, 1, 137–151.
Sfat Hakeshev (The Mindfulness Language)	Israel	Ages 6–13 years, parents and teachers	18	Goals include mindful learning (experiential awareness and mind–body practices) as a way to: develop cognitive and emotional skills; guide students to "stop", "tune in", "pay attention to what's inside"; and teach constructive rest as a useful catalyst in cognitive learning. Methods include mindfulness of: breath, body boundaries, body sensations, postures and movements, sounds, emotions and imagery processes.
				Research to date: not available
Still Quiet Place www.stillquietplace.com/	United States	Pre-K-12, parents and teachers	10	This program offers age appropriate mindfulness and inquiry based practices for school age children.
				It focuses on developing mindful awareness to support participants in responding rather than reacting to difficult situations, and in cultivating peace and happiness.
				A typical session consists of a mindfulness practice, discussion of the practice, a wiggle or stretch, discussion of the application of mindfulness in responding to upset, and cultivating joy, and review of home practice. Mindfulness practices taught include awareness of: Breath, Body, Thoughts, Feelings, Loving Kindness, and Walking, as well as Yoga, Mindfulness in Daily life, and Responding vs. Reacting.
				Sessions are 45 min to 1½ h every week for 8 weeks depending on the setting.
				Peer-reviewed research to date:
				Saltzman and Goldin (2008). Mindfulness based stress reduction for school-age children. In: S.C. Hayes and L.A. Greco (eds.), Acceptance and mindfulness interventions for children, adolescents and families (pp.139–161). Oakland: Context Press/New Harbinger.
Stressed Teens www.stressedteens.com	United States	Ages 13–18 years	7	Mindfulness-Based Stress Reduction for Teens (MBSR-T) is closely related to the traditional MBSR program created by Jon Kabat-Zinn and colleagues at the Stress Reduction Clinic at the University of Massachusetts Medical Center in Worcester, MA. The primary focus is on formal and informal mindfulness practices.
				Specific mindfulness practices taught include: Body scan, Walking meditation, Sitting meditation, Sitting meditation with heartfulness, Yoga, Mindful stopping, Mindful homework/test taking.
				This is an 8-week program for 1.5–2 h per week.
				Peer-reviewed research to date:
				Biegel et al. (2009). Mindfulness-based stress reduction for the treatment of adolescent psychiatric outpatients: a randomized clinical trial. *Journal of Clinical and Consulting Psychology*, 77, 855–866.
Wellness Works in Schools™ www.wellnessworksinschools.com	United States	Ages 3–18 years	11	Wellness Works in Schools™ is a health and wellness program based on mindful awareness principles and practices. The program responds to contemporary educational challenges by helping students develop the needed skills to address important issues like: stress, mental health, emotional balance, behavior, and learning readiness. Wellness Works embraces a whole person/whole child perspective and is grounded on universal health and wellness principles, validated by contemporary medical and science-based research.
				Wellness Works in the classroom is generally presented in a series of 8–15 sessions, 45–50 min each, with sequenced lessons (according to grade level and readiness). Students explore emotions, intentions, goals, resilience, and problem-solving skills.
				An integral part of our program is our Wellness Works: Classroom Integration Teacher Training™ (CITT). The training is conducted in a series of sessions, approximately 8–12 h, to assist teachers in strengthening their mindfulness skills and, with practice, more fully integrating mindful awareness approaches in their classrooms for both themselves and their students.
				Research to date:
				See the website of *Wellness Works in Schools*™ for internal research that is not as yet peer-reviewed.

(Schwartz and Begley 2002); Attachment/Attunement Theory (Siegel 1999); Acceptance and Commitment Therapy (Hayes et al. 1999); Mindfulness-Based Cognitive Therapy (Teasdale et al. 2000); and Dialectical Behavior Therapy (Linehan et al. 2006) as well as by the Ojai Foundation Council Program (Wasson 2010/2011).

Practical challenges reported by developers/implementers of mindfulness-based curricula within school settings include: (a) the need for continued development and refinement of the best practices for adapting well established adult mindfulness training for younger populations; (b) lack of agreement on the active ingredients of the programs and ways to measure their effectiveness through rigorous scientific research; (c) motivating schools to embrace the curricula; (d) frequent changes in school's educational policies, budgeting, priorities, proposed solutions, and decision makers; (e) the need for funding; (f) finding trained and experienced mindfulness teachers to teach teachers, students, and parents; and (g) scheduling teaching in multiple schools, including finding a suitable time within the school curriculum, and finding space conducive to practice within a school. These identified challenges point to the indispensible role that ongoing research will need to play in broadening the credibility and appeal of mindfulness training for K-12 students.

Integrating Mindfulness Training into Educational Settings: An Agenda for Future Research, Policy, and Practice

In light of both an emerging body of evidence to support the adoption and implementation of mindfulness-based practices for K-12 students and a substantial growth in the availability and breadth of classroom-based curricula, therapeutic interventions, and professional development programs, there is a need for ongoing as well as more rigorous scientific investigation to deepen the empirical evidence of the efficacy of these interventions. An evidence base is the result of a program of research designed to provide practitioners with trustworthy empirical information regarding (a) intervention effectiveness, (b) how and why the intervention works, and (c) predictions for whom and under what conditions the intervention will be effective. A strong evidence base begins with a cogent theory of change, is strengthened by the accumulation of high-quality empirical evidence for efficacy and effectiveness, and, lastly, needs to establish the "transportability" of the proposed intervention. Transportability demonstrates whether the intervention is feasible, flexible, socially valid, and sustainable in real-world settings. The following guidelines and questions are offered to assist in expanding the quality and quantity of evidence in this burgeoning new educational field:

Establish a Theory of Change for Mindfulness-Based Programs

One of the challenges facing research on K-12 mindfulness programs is the absence of an easily articulated theory of change model. Specific questions facing the field include: (a) What is the most promising theoretical framework for conceptualizing the effects of mindfulness training? How might mindfulness processes be conceptualized from a behavioral, cognitive, or bio-behavioral perspective, or from the perspective of executive function? (b) What are the core intervention activities and processes common to mindfulness practices with youth, and how do they differ from those with adults? (c) What short- and long-term outcomes can reasonably be hypothesized to result from mindfulness practice? (d) How can a short- or long-term outcome from one practice (e.g., open awareness) be distinguished from the outcome of another (e.g., loving-kindness)? (e) What are the specific mechanisms of action that link mindfulness practices to these outcomes? (f) How much mindfulness practice is necessary to predict a certain outcome in different age groups? (g) And finally, should mindfulness be defined narrowly as attention training, or broadly as a multi-faceted portal to greater social and emotional well-being?

Expanding the Evidence-Base for Mindfulness-Based Programs

Once an intervention's theory of change is established, basic and applied research is used to build a case for the efficacy and effectiveness of the intervention or program. Although systematic and narrative reviews of existing studies of mindfulness-based practices with children and adolescents have been performed, several important questions remain, namely: (a) What are the strengths and weaknesses of various research designs in assessing effectiveness of K-12 mindfulness-based interventions? (b) What is an appropriate comparison group for mindfulness-based intervention studies? (c) What mindfulness outcomes can be measured with adequate reliability and validity? (d) What are the appropriate factors to monitor with regards to intervention fidelity and dosage? (e) How do we know how "much" mindfulness-based intervention an individual has received? (f) What is the minimal level of reporting required to ensure a mindfulness-based intervention can be replicated? (g) What characteristics of the practice, instructor, setting, and client are necessary and sufficient to report?

Development and Validation of Appropriate Outcome Measures

There are a number of additional issues that researchers must address to broaden empirical support for implementing

mindfulness-based practices in schools. To date, there are three validated measures of mindfulness for children and adolescents: The Child Acceptance and Mindfulness Measure (CAMM; Greco et al. 2011), the Mindful Thinking and Action Scale for Adolescents (MTASA; West et al. 2007; West 2008), and the Mindful Attention Awareness Scale-Adolescent (MAAS-A; Brown et al. 2011). Although the validation process for each measure is ongoing, all three measures appear to have demonstrated acceptable internal consistency and multiple forms of validity evidence despite distinct pros and cons related to the potential use of each measure. To date, preliminary data generated by the three measures points to the need for additional research to develop valid measures of mindfulness for younger children and adolescents.

Assess Socially Valid Outcome Measures

In conjunction with the development of measures for children and adolescents, researchers and program developers must continue to demonstrate the connection between changes in mindfulness and other desired educational outcomes. In the current high-stakes accountability context, it may be necessary to provide evidence that mindfulness-based education programs result in improved academic achievement (i.e., higher test scores) for students. Educators and policymakers will require evidence that time and money spent on any educational program result in improvements on the indexes by which students, educators, and schools are evaluated. Other valued outcomes that might be connected to the implementation of mindfulness-based programs also merit considerations. Additional rigorous research demonstrating that mindfulness-based programs can improve classroom behavior and social competence, increase attentiveness, and/or reduce violence and bullying would broaden mindfulness-based programs' appeal and acceptability to many educators.

Address School-Based Implementation Barriers

Lastly, even the most effective educational programs with a solid empirical foundation still must establish the feasibility of implementation across a variety of school settings. Program developers need to address this issue of transportability. For example, there are the challenges of determining who is "qualified" to teach mindfulness to children and adolescents and whether the extent of training to teach young children differs from the training required to teach adolescents or adults. How these issues are resolved will directly impact how transportable mindfulness-based programs will be among schools. Currently, some pilot programs rely upon certified MBSR teachers. Others offer classroom teachers and educational staff instruction in developing a mindful awareness practice for their own well-being and then, over time, support these educators as they integrate mindfulness instruction into their classroom routines. A third option would be to manualize mindfulness-based practices so they can be delivered by teachers with limited training. This last approach introduces its own set of difficulties. Scripted programs might be inauthentic or implemented with limited fidelity, resulting in limited positive outcomes. The first two options appear to be the most promising.

Conclusion

K-12 teachers, like their students, need and deserve supports to flourish, professionally and personally. In an educational era of high stakes testing, tightening budget constraints, and other increased pressures, K-12 educators all too often encounter a cascade of stressors and warrant interventions that support their resilience and social–emotional competencies. Such interventions can lower the risk of professional languishing and/or burnout due to emotional exhaustion. An extensive body of medical, neurological, and psycho-social research data supports the contention that mindfulness training holds promise for being one such intervention for teachers. Indeed, with over 250 stress reduction clinics now established at hospitals and medical centers worldwide and hundreds of peer-reviewed studies on a wide variety of populations, the MBSR model of mindfulness training for adults can accurately be said to be a proven and accepted intervention for stress reduction and mood problems. As a result, through building upon existing initiatives, such as Mindfulness-Based Wellness Education (MBWE), Cultivating Awareness and Resilience in Education (CARE), and Stress Management and Relaxation Techniques (SMART) in Education, among others, it is now timely for educators, administrators, and funding resources to develop pilot mindfulness programs to support classroom teachers, with the understanding that rigorous research should be an integral program component.

For the past 10 years, exploratory initiatives have been unfolding in the USA, UK, Canada, Israel, and other countries to integrate the discipline of mindfulness into the field of K-12 education for the benefit of both students' as well as teachers' physical, emotional, and mental well-being. Although the term mindfulness is relatively new to public education, the idea and value of training the mind to pay attention on purpose, moment to moment has been recognized for centuries among many cultures. The field of mindfulness training for K-12 students is young, its research nascent and the findings preliminary. The quality and quantity of the research to date limit the conclusions that can be drawn. The current research points to benefits for

children and adolescents similar to the benefits for adults. School-based mindfulness training appears to offer a means for students to cultivate attentional skills as well as an array of other aptitudes that may enhance their capacity to cope with their psychosocial as well as academic challenges. Potential benefits include: fostering pro-social behavior via strengthening self-regulation and impulse control; alleviating the effects of stress that obstruct learning; and providing a skill set that promotes brain hygiene, and physical and emotional well-being across the life span.

To merit its ongoing integration and acceptance into K-12 education, school-based mindfulness training needs to broaden its evidence base. The following recommendations are made in support of this process:

Objectively Assess the Rigor of Existing Research

The US Department of Education has tasked the What Works Clearinghouse (WWC 2008) with reviewing and evaluating the research that supports educational programs. A review of the existing research support for school-based mindfulness practices using the WWC criteria would provide the field with a measure of its progress towards demonstrating the efficacy of these practices. Furthermore, establishing a WWC baseline for the research support for mindfulness-based practices in schools might energize researchers and other interested stakeholders to invest the necessary time and resources to implement more rigorous research designs.

Integrate Research into Programs and Publish Findings

Program directors, researchers, and other stakeholders need to be more proactive in linking current and new initiatives with a well-designed research component and publishing their findings in peer-reviewed journals. These efforts should include more RCTs as well as a combination of quantitative with qualitative research.

Design Longer Trials

The next generation of research needs to assess school-based interventions of longer duration. Currently, most researched mindfulness-based interventions for students are 5–8 weeks in length. Mindfulness appears to impact developmental skill sets in students (e.g., attention regulation and other executive functions, stress resilience, and emotional/ behavioral self-regulation) which strengthen incrementally over time by repeated and sustained practice. Research on half-year, full-year, and multi-year interventions will be more effective in delineating these developmental benefits, their sustainability, and the amount and types of intervention required for a particular outcome.

Conduct More Universal Interventions

Additional initiatives offering mindfulness to youth as a universal intervention are needed as well as ones for specific student populations (e.g., anxiety-prone, academic problems, attention-deficit/hyperactivity disorder, learning disabled). These additional universal interventions will assist in clarifying the degree and nature of benefits of mindfulness-based services for the general K-12 student population.

Delineate Relationship with Valued Educational Outcomes

Students and teachers are often evaluated by indices that don't directly measure mindfulness and stress resilience. Consequently, research needs to continue to clarify the relationship between implementing mindfulness in the school setting and the valued and measurable educational outcomes of academic achievement, classroom behavior, social competence, emotional self-regulation, and the capacity to regulate one's attention.

Integrate Teacher and Student Programs

Lastly, the field will strengthen its service to schools by integrating interventions for both teachers and students. To date, many mindfulness-based programs have focused primarily on bringing this training either to K-12 educators or directly into the classroom for the benefit of students. Nurturing teachers' inner resilience via mindfulness-based training creates a relational foundation in the classroom for offering students age-appropriate mindful skills that, in turn, appear to nurture their own inner resilience. Thus, combining the indirect and direct methods of school-based mindfulness training holds promise of creating a wider and more sustainable benefit to a school community than either approach alone might achieve. Programs that combine the classroom-based strengths of a program such as Mindful Schools or InnerKids with the support of teachers' resilience and emotional competence, inherent in initiatives like the Inner Resilience Program, CARE, or MBWE will likely broaden the appeal, efficacy, and scalability of integrating mindfulness into K-12 education.

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