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In our twenty-first century world, the pace of change has gathered steam, and the requirements for student success have become increasingly demanding and complex (Collaborative for Academic, Social, and Emotional Learning [CASEL], 2008; Garner & Shonkoff, 2012). The knowledge explosion of the previous century, rapid technological innovations, and social forces such as globalization have created unprecedented challenges for educators not only in equipping students with the knowledge and skills they need to succeed but also in selecting the content and skills to be learned (Harsh & Mallory, 2013; McCarthy, Giardina, Harewood, & Jin-Kyung, 2003). Educators face the daunting task of leaving no child behind in a race to the top. Amidst this information overload and the stress it engenders, we can lose sight of the fact that certain social and emotional skills and dispositions are essential for the kinds of flexible decision-making, stress-hardiness, life-long learning, and

innovation that will certainly be required if we wish to maintain prosperity and civility in a rapidly changing world (CASEL, 2008).

Social and emotional skills provide the foundation for learning how to manage life effectively, from learning to channel attention and sustain motivation when work becomes demanding, to working well with others, to coping with inevitable frustrations, to avoiding behaviors that put health at risk (Roeser, Vanderwolf, & Strobel, 2001). Decades of research have consistently shown that well-designed and implemented classroom-based prevention programs can reduce conduct problems while building skills for mental health, interpersonal relationships, and academic achievement (Durlak et al., 2007; Greenberg et al., 2003; Payton et al., 2008). This is especially important during adolescence given it is a stress-sensitive period of development. As we discuss below, emotional distress appears to be heightened by virtue of the developmental stage of adolescence regardless of preexisting vulnerabilities. Thus, we need to prioritize the teaching of effective emotion regulation (distress tolerance) skills to all adolescents, not just to those at increased risk of problems, as part of comprehensive social-emotional learning (SEL) programming. Mindfulness may be uniquely suited to this task (e.g., Broderick & Metz, 2009; Roeser & Peck, 2009). In the following sections, we review certain strengths and vulnerabilities of

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the adolescent period and address how teaching mindfulness to youth can support resilience during this time of life.

Adolescent Strengths and Vulnerabilities

Adolescence is associated with major cognitive advances and gains in physical strength and vitality (Steinberg, 2008, 2014). However, this period is also notable for the onset of many physical and mental health problems that are *preventable* and that persist into adulthood, interfering with educational achievement and work productivity in long-lasting ways (Costello, Foley, & Angold, 2006; Spear, 2000). A recent Centers for Disease Control and Prevention (CDC) report (2010) confirms that behaviors which pose a physical and mental health risk across the life span often have their beginnings in childhood and adolescence and should be addressed by means of school health and other programmatic interventions to potentially reverse this trend. Demands for interpersonal, stress management, and problem-solving skills increase as students progress through the school years (Resnick et al., 1997). Yet, while there are many evidenced-based programs for younger children (e.g. PATHS; Greenberg, Kusche, Cook, & Quamma, 1995), far fewer well-established evidence-based programs exist for adolescents. Moreover, the tightly compacted schedule of academic courses found in most traditional comprehensive high schools often makes school-based SEL programs challenging to accommodate. This state of affairs represents a significant educational gap when we consider the importance of social-emotional skills to health and productivity. Mindfulness appears to strengthen foundational skills in self-awareness and self-regulation and supports the cognitive skills needed for learning. These are skills for *all* adolescents, given the opportunities and challenges of their stage of development. Because schools are the places where adolescents spend much of their time, school-based interventions may offer the best hope of a positive universal initiative.

Clearly, the dimensions of need are great, and evidence from large-scale epidemiological stud-

ies suggests the global scope of this problem (Patel, Flisher, Hetrick, & McGorry, 2007). Conduct problems have increased significantly over successive cohorts in the UK since 1958 (Collishaw, Maughan, Goodman, & Pickles, 2004). In Australia, affect-related disorders, including substance abuse disorders, contribute 60–70 % of the disease burden in young people (Public Health Group, 2005). The US Surgeon General's report (2000) concludes that one out of five children and adolescents in the USA suffers from significant social, emotional, and behavioral problems that place them at risk for school failure. A 1993 report by the American Academy of Pediatrics (AAP) that contained a list of threats to adolescent well-being was updated in 2001 to include the following items: school problems (including learning disabilities and attention difficulties); mood and anxiety disorders; adolescent suicide and homicide; firearms in the home; school violence; drug and alcohol abuse; HIV/AIDS; and the effects of media on violence, obesity, and sexual activity (AAP, 2001). These were called the “new morbidities.” As Dahl (2004) observes, most of these threats derive from emotional and behavioral dysregulation.

A Perfect Storm

Adolescence is known to be a stressful period. Adolescents report high levels of school-related stress associated with homework, tests, expectations for achievement, and interactions with teachers (Jacobshagen, Rigotti, Semmer, & Mohr, 2009; Ystgaard, 1997). The time pressures that challenge so many adults also affect the younger generation. Melman, Little, and Akin-Little (2007) reported a linear relationship between number of regularly scheduled activities in which adolescents were involved and their self-reported levels of anxiety. Frustration with impersonal schooling in the context of minimal support can lead to dropping out in large numbers, especially for minority youth (Bridgeland, DiIulio, & Morison, 2006). Although increasing needs for autonomy are normative and energizing, concerns about the future can translate into additional pressure (Luthar & Sexton, 2004).

Overall, these challenges require emotion regulation skills to be met successfully.

What is it about the adolescent period that makes it both a time of developmental opportunity and risk? Contemporary adolescents face a host of developmental challenges that can threaten their physical and emotional well-being, including increasing psychological, emotional, and behavioral autonomy from parents (Darling, Cumsille, & Martinez, 2008), a stage-environment mismatch between adolescents and their schools (Eccles et al., 1993) that is linked to a decline in academic orientation and disengagement from schools starting in the early adolescent years (Archambault, Janosz, Morizot, & Pagani, 2009; Gutman, Sameroff, & Cole, 2003), and self-consciousness about bodily changes (Rodriguez-Tome et al., 1993), increasing susceptibility to peer influence (Sim & Koh, 2003), and pressures of romantic relationships (Collins, 2003) associated with the onset of puberty. In addition, adolescent development may also be affected by youth participation in antisocial or risky behaviors (Reyna & Farley, 2006) or heavy exposure to media which may supersede behavioral expectations of the family and community (Comstock & Scharrer, 2006; Kaiser Family Foundation, 2010). The provision of supportive learning environments wherein competence and autonomy are enhanced can reverse threats to physical and mental well-being (see Eccles & Roeser, 2011). Mindfulness, concentration, and stress-reduction tools can be important components to positive youth development.

Neurobiological Changes of Adolescence

In addition to these developmental challenges, evidence is mounting that adolescence is a *sensitive period for stress* because of puberty-related changes in hormones and dramatic plasticity in the structure and function of the brain (Blakemore & Frith, 2005; Huttenlocher, 1979; Romeo, 2010). Appropriate environmental stimulation during a sensitive period is critical to normal brain development, and its absence during a particularly vulnerable period can produce enduring

modifications (Hubel & Wiesel, 1962). Although conditions for optimal brain development at adolescence are still unclear, evidence is beginning to demonstrate that adolescence is a period of particular vulnerability to social and emotional input from the environment based on studies of emotional information processing, emotion and behavior regulation, and stress reactivity.

Adolescents process emotional information in ways that are different from prepubertal children and adults. Mid to late pubertal adolescents show greater pupil dilation to emotion-related words, rate themselves as higher in negative affect, and tend to remember more emotion-related words in delayed recall tasks than younger children, suggesting increased limbic reactivity at puberty (Silk et al., 2009). While adults show increased amygdala responses only to images of fearful faces, adolescents show greater amygdala activation to both fearful and neutral faces (Thomas et al., 2001). Findings for adolescents of exaggerated startle reflex (a measure of fear processing) (Quevedo, Benning, Gunnar, & Dahl, 2009) and stronger interference effects from emotional stimuli on task completion (Hare et al., 2008) lend further support to the proposition that the adolescent brain is particularly reactive to emotional information (Blakemore, 2008; Casey, Jones, & Hare, 2008).

Changes in the brain over the course of adolescence occur primarily in the frontal and parietal cortices, which are the site of executive functions, a general term used to describe higher-order cognitive and socioemotional processes. At puberty, a period of synaptogenesis in these regions accounts for a peak in gray matter volume that is followed by a gradual decline as the cortex is fine-tuned (Giedd et al., 1999). Synaptic pruning largely occurs in areas which play a role in judgment, impulse control, planning, and emotion regulation (Casey, Giedd, & Thomas, 2000). Some social and cognitive functions show a temporary decline in early puberty as this synaptic reorganization process begins (Chodhury, 2010; Huttenlocher, 1979). Myelination of the frontal cortex, which allows for smooth and efficient operations, proceeds continuously over the course of adolescence but is not complete until early adulthood. This neural rewiring project

follows a dyssynchronous developmental trajectory. For example, brain circuits that are involved in reward-seeking (e.g., nucleus accumbens) mature earlier than circuits that monitor and assess consequences of risk-taking (e.g., prefrontal cortex) (Casey, Getz, & Galvan, 2008; Fuster, 2002). Thus, it is hypothesized that adolescents' appetitive pull toward risky behavior is not sufficiently kept in check by a well-functioning internal monitor, a situation described by Dahl as "turbo-charging the engines of a fully mature car belonging to an unskilled driver" (2004, p. 18). Strengthening the executive capacities of the developing brain could go a long way towards risk reduction in adolescence.

Effects of Stress in Adolescence

In the context of such rapid neurobiological changes, the adolescent period may be uniquely sensitive to the effects of stress, although the precise mechanisms for this phenomenon are still unclear (Eiland & Romeo, 2013; Romeo, 2010). In general, the perception of threat or stress (i.e., feeling stressed-out) is accompanied by a cascade of endocrinological events, primarily the release of catecholamine and glucocorticoid hormones. Although the human stress response is adaptive in short bursts and helps mobilize energy reserves for goal-directed purposes, stress can negatively affect health, learning, and productivity when it is prolonged or when the stress response is dysregulated (McEwen, 2003). Attention and learning capacities as well as cardiovascular, gastrointestinal, immune, reproductive, and other bodily systems are negatively impacted by chronic stress (Romero & Butler, 2007). Cortisol, one of the glucocorticoid hormones, is released from the adrenal cortex as an end result of hypothalamic–pituitary–adrenocortical (HPA) axis activation and has been implicated in much of the aforementioned impacts. Glucocorticoids increase levels of glucose in the blood, alter immunity, and contribute to many chronic physical and mental illnesses (Miller & Blackwell, 2006). Executive functions, such as the ability to direct attention and solve problems

efficiently, show clear stress-induced disruptions, particularly when control over stressors is perceived to be lacking (Arnsten & Shansky, 2004). In the case of learning, mild stress can enhance memory, but chronic or excessive stress can result in damage to parts of the brain critical for new learning and memory consolidation to the point of killing hippocampal neurons (Sapolsky, 1999) and suppressing neurogenesis (Andersen & Teicher, 2008). Glucocorticoids also bind to stretches of DNA and act as gene transcription factors serving important functions of gene activation and suppression (Romero & Butler, 2007).

Given the potentially dire consequences of a chronically activated stress system, it is critically important to consider the effects of stress on adolescents' developing brains when such consequences can extend over a lifetime. Accumulating evidence from animal and some human studies that measure changes in stress-related hormones and autonomic functions at puberty supports the argument that adolescence is a stress-sensitive period. Basal cortisol levels in humans and animals have been found to rise over the transition to adolescence (Stroud et al., 2009). Animal studies confirm periods (infancy, childhood) of hyporesponsivity to stress hormones, presumably as protection for the developing brain, which are dramatically reversed at puberty when the brain becomes more sensitized to the effects of gonadal and stress-related hormones (Lee, Brandy, & Koenig, 2003; McEwen, 2005). Hormones are instrumental in laying down new neural pathways at adolescence, so overexpression of and increased sensitivity to cortisol during this period of rapid brain reorganization may signal a window of vulnerability for development of psychopathology (Spear, 2009).

Several recent human experimental studies have demonstrated that normally developing adolescents, compared to younger and older groups, display heightened stress reactivity on cortisol and other autonomic nervous system (ANS) measures during challenging situations. Stroud et al. (2009) assessed HPA axis and cardiac functions in a group of children (7–12) and adolescents (13–17) randomly exposed to two psychological stressors. Performance stress was assessed by

requiring participants to make a 5-min speech, answer mental arithmetic questions, and copy a picture from its mirror image in front of a small audience. Social stress was induced by means of a social rejection interaction involving confederates who gradually excluded the participant during conversation. Although no significant differences were noted between age groups in self-reported distress, adolescents showed consistently more pronounced physiological responsiveness on all stress-related measures. Cortisol levels were highest in response to the performance stressors.

Several recent studies have considered the physiological effects that mental anticipation of a stressor and memories about past stressors have on stress reactivity in normal adolescents. Sumter, Bokhorsta, Miersa, Van Pelt, and Westenberg (2010) investigated this question in a large sample of 9–17 year old boys and girls during the period prior to making a public presentation as well as during the actual task. Strongest cortisol rises were shown for adolescents during the anticipatory period, highlighting the potentially important role that perceptions of stress play in activating the stress response at adolescence (Folkman & Lazarus, 1988). A large prospective study of Dutch adolescents (Oldehinkel et al., 2010) also reported that level of perceived stress was positively associated with cardiac and cortisol measurements.

Adam (2006) investigated the normal fluctuations in emotional experience of adolescents' day-to-day lives using diary methods and cortisol sampling. Cortisol fluctuations covaried with momentary emotional states. When adolescents reported feeling angry or worried, their cortisol levels were significantly higher than what would normally be predicted for the individuals based on their typical daily patterns. The physiological impact is also substantial when stressors involve peer-rejection. Sebastian, Viding, Williams, and Blakemore (2009) asked young (11–13) and mid (14–15) adolescent female participants to play a 3-min computer game called "cyberball" which manipulated inclusion and ostracism conditions as a function of being "thrown" the ball or ignored by two other players. Compared to adult studies

using this manipulation, adolescents reported greater negative mood in both age groups, and younger adolescents also showed significant increases in distress. Even a short experience of social stress showed marked effects on affect. Considering the convergences of these factors, the "intersection of stress and the developing adolescent brain may represent a 'perfect storm' in the context of dysfunctional emotional development" (Romeo, 2010, p. 249). Alternatively, consistent with practices in indigenous cultures around the world, adolescence also has been seen as a key time for mental training and the cultivation of virtue. We believe that mindfulness training might capitalize on biological opportunities in ways that Western culture more often than not fails to do today (Larson, 2000).

The Importance of Emotion Regulation

The strategies used to motivate behavior and manage distress in order to respond to different situations or to achieve certain goals, such as those involved in learning, may be broadly defined as emotion regulation (Campos, Frankel, & Camras, 2004). Emotion regulation processes can include identification and acceptance of emotional experiences, capacity to sustain wholesome emotional and motivational states, prioritization among competing goals, management of distress and modulation of excitement, and adaptive adjustment of behavioral responses. Emotion regulation, as a overarching construct for these various processes, is viewed by contemporary researchers as a foundation for well-being, academic achievement, and positive adjustment throughout the life span (Eisenberg, Spinrad, & Eggum, 2010). Adolescents who possess more flexible regulatory skills are more resilient and less susceptible to emotional and behavioral disorders (Gross, 1998). Difficulties in emotion regulation represent a core feature of many adolescent-onset emotional and behavioral problems including depression, anxiety, conduct problems, deliberate self-injury, disordered eating, substance use, and abuse (Beato-Fernández,

Rodríguez-Cano, Pelayo-Delgado, & Calaf, 2007; Cisler, Olatunji, Felder, & Forsyth, 2010; Gross & Munoz, 1995; Laye-Gindhu & Schonert-Reichl, 2005).

Of great significance to educators is the fact that heightened emotional distress is predictive of behavior problems and academic failure (Needham, Crosnoe, & Muller, 2004). MacPherson et al. (2010) reported a link between distress tolerance and risky behavior in a large prospective study of adolescents. Adolescents with low distress tolerance were significantly more likely to have engaged in harmful risk-taking behavior than those with greater capacity for distress tolerance despite similar risk-taking propensity. Young adolescents' levels of school-related distress predicted their academic performance (Gumora & Arsenio, 2002), and levels of school-related strain mediated psychosomatic symptoms in a large group of Swiss secondary students (Jacobshagen et al., 2009). Roeser et al. (2009) suggested that emotional distress disrupts the learning process via several mechanisms including the reduction of self-regulatory efficacy and academic motivation and the amplification of experiential avoidance.

One of the tenets of SEL is that many problem behaviors have the same root causes (Weissberg & O'Brien, 2004). Negative emotionality, or emotional distress, has been identified as a causal risk factor for emotional, behavioral, and academic problems and not just the consequence (Daughters et al., 2009). The inability to manage distress (distress intolerance) leads to diminished goal-directed efforts and dysfunctional coping strategies that can ultimately reinforce avoidance by maladaptive means (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996).

The Contribution of Mindfulness for Training Attention and Emotion Regulation

“Mindfulness” is a term used to describe a certain kind of attention that is characterized by several attributes: intentionality, present moment focus, and non-evaluative, compas-

sionate observation of experience (Kabat-Zinn, 1994). Mindfulness can also refer to the act of paying attention in this way (e.g., being mindful). All of these attributes can be practiced by intentionally directing and maintaining attention on narrow (such as breath) or broad (such as a range of sensory phenomena) targets as is done in meditation or mindful awareness practice. Attention is purposefully and voluntarily directed to phenomena as they occur in the present moment and is marked by curiosity and openness to the nature of the experience as well as the quality of the attention itself. Nonjudgment refers to the dual capacity to notice that one's attention is captured by cognitive and emotional triggers related to experience and to counter this automatic tendency by intentionally exploring the experience without preconceptions or reflexive self-judgment. Practicing mindfulness does not imply entering a “zone” or some dreamlike, relaxed mental state, nor is it related to any specific mental content. Rather, mindfulness is full and engaged attention to whatever is occurring and is related to executive processes crucial to learning and self-regulation (Flook et al., 2010).

Over time, behaviors can become automatic and operate outside of conscious awareness in response to particular triggers (Berkowitz, 2008). Maladaptive behaviors (e.g., aggression, procrastination) may thus become impulsive automatic responses to emotional distress (e.g., anger, anxiety) or perceptions of unpleasantness (e.g., boredom). Practice of an attentive and non-reactive attitude toward impulses may “increase the gap between impulse and action” (Ekman, as cited in Boyce, 2005, p. 40). It is precisely to these automatic processes, often referred to as “automatic pilot,” that mindful attention is directed. Mindfulness practice may allow elements of conscious and less conscious experience to be perceived from a de-centered, de-contextualized, and more accepting stance. This approach disrupts reactivity, strengthens attention and openness, and brings problem-solving behavior under more conscious and reflective regulation (Zelazo & Cunningham, 2007).

Research on the effects of mindfulness training with adults has shown an array of benefits. These include enhanced interoceptive awareness (Lazar et al., 2005), and improved attention (Jha, Kropinger, & Baime, 2007; Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010) especially in advanced meditators (van den Hurk, Giommi, Gielen, Speckens, & Barendregt, 2010) but also after a brief period of meditation training (Tang et al., 2009; Zeidan, Johnson, Diamond, David, & Goolkasian, 2010). Benefits also include increases in positive mood and immune system functioning (Davidson et al., 2003), reductions in depressive relapse (Ma & Teasdale, 2004), enhanced empathy (Shapiro & Brown, 2007), reductions in substance abuse (Ostafin & Marlatt, 2008), and reduced stress (Chiesa & Serreti, 2009). Mindfulness meditation practice has been effective in reducing chronic pain (Grossman, Tiefenthaler-Gilmer, Raysz, & Kesper, 2007), aiding weight loss (Tapper et al., 2008), increasing telomerase activity (Jacobs et al., 2010), and protecting against age-related loss of gray matter (Pagnoni & Cekic, 2007).

Although research with children and youth is more limited, studies have documented improvements in attention skills (Napoli, Krech, & Holley, 2005; Zylowska et al., 2008), sleep quality (Bootzin & Stevens, 2005; Britton, Haynes, Fridel, & Bootzin, 2010), well-being in adolescent boys (Huppert & Johnson, 2010), reduced depressive symptoms (Kuyken et al., 2013; Raes, Griffith, van der Geuth, & Williams, 2014), improved executive functions, well-being and prosociality (Schonert-Reichl, Oberle, Lawlor, Abbott, & Thomson, 2015), and reductions in symptoms in clinic-referred adolescents (Biegel, Brown, Shapiro, & Schubert, 2009; Bogels, Hoogstad, vanDun, deSchutter, & Restifo, 2008; Semple, Lee, Rosa, & Miller, 2010). A recent meta-analysis (Zoogman, Goldberg, Hoyt, & Miller, 2015) reported small to moderate effects of mindfulness compared to active controls in nonclinical samples but larger effects for clinical groups. Presently, there is a need for more research on mindfulness interventions using rigorous experimental designs to assess effects of these

approaches among diverse groups across multiple settings. More research is also needed to explore the integration of mindfulness into ongoing school curricula as universal prevention. Learning to BREATHE is a mindfulness-based classroom program that was developed for this purpose.

Learning to BREATHE: A Universal Prevention Program

Learning to BREATHE (L2B; Broderick, 2013) is a developmentally appropriate universal prevention program that can be integrated into secondary education settings. The program is designed to increase emotion regulation, stress management, compassion and executive functions in order to promote well-being and support learning. L2B uses themes from Mindfulness-Based Stress Reduction (MBSR) developed by Kabat-Zinn (1990) and incorporates them into a program that is shorter, more accessible to students, and compatible with school curricula. The program includes instruction in the practice of mindful awareness and self/other compassion and provides opportunities to practice these skills in a group setting. L2B objectives are explicitly linked to standards for health, counseling, and other professional areas so that the L2B program may be incorporated into existing curricula and assessment plans.

The themes that form the core of the curriculum may be adapted for various student groups, including those in clinical settings, and may be presented in 6, 12, or 18 sessions within a health, school counseling, or other curriculum. Each lesson includes a short introduction to the theme, several activities for group participation and discussion to engage students in the lesson, and an opportunity for in-class mindfulness practice. Mindfulness practice, as used here, refers to the practice of training the mind to pay attention in a particular way: on purpose, in the present moment, and with openness (Kabat-Zinn, 1994). Several short mindfulness practices are taught as part of the program, including body scan, awareness of thoughts, awareness of feelings, and

loving-kindness and gratitude practices. Loving-kindness practice is a technique that supports self-compassion and compassion for others (see Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). Workbooks and audio files for home mindfulness practice are provided to students as part of this program.

Six major themes are built around the BREATHE acronym: B (Body) body awareness; R (Reflections) understanding and working with thoughts; E (Emotions) understanding and working with feelings; A (Attention) integrating awareness of thoughts, feelings, and bodily sensations; T (“Tenderness/Take it as it is”) reducing harmful self-judgments and increasing acceptance of self and others; and H (Healthy habits of mind) cultivating positive emotions and integrating mindfulness into daily life. The overall goal of the program is to cultivate emotional balance and inner empowerment (E) through the practice of mindfulness, an advantage referred to as gaining the “inner edge.” This curriculum has versions for younger and older adolescents. Classroom adaptations may be made to meet the needs of groups, and other informal mindfulness practice is encouraged between sessions.

Clearly, attempts to bring mindful awareness practices into educational settings must take into consideration the needs of the entire system: administration, teachers, staff, etc. Therefore, it is very important for teachers and administrators to understand the nature and benefits of mindfulness practice themselves in order to support students and model mindfulness for them. The practice of mindful awareness offers a way to perceive every experience and task of the day with full attention, interest, and compassion. Mindfulness is not something that can be learned like a list of facts from a teacher, book, or curriculum manual. To be authentic and useful, mindfulness practice must be tried, experienced, applied, and incorporated into one’s day-to-day life. Thus, every moment of every day in the classroom is an opportunity to practice being mindful. Learning to BREATHE is best conceptualized as one contribution to a coordinated mindful SEL program.

Theory of Change and Developmental Assumptions

The L2B program assumes that the practice of mindful awareness will impact student academic and behavioral outcomes by reducing stress and increasing distress tolerance, strengthening executive functions, increasing emotional balance and behavioral regulation, cultivating acceptance of self and others, and ultimately supporting academic goals (Blair & Diamond, 2008). For the purposes of this model, stress is defined as the experience of conscious or nonconscious emotions and patterns of reactivity (e.g., anxiety, boredom, irritation, impulsivity) that cause regulatory processes to break down and impede goal-directed behavior. Figure 22.1 illustrates a model in which typical reactions to stress (distress) trigger pathways to emotional regulation or chronic dysregulation.

First, the perception of distress can be triggered by internal or external conditions or some combination of the two. Poor stress management (emotion and behavioral dysregulation) can interfere with accomplishments in important areas of adolescent functioning. Second, maladaptive response patterns generally take the form of avoidance of or over-engagement with the distressing object or condition in an effort to reduce distress. For example, adolescents may seek to “numb” feelings of social rejection by disengaging from school or, more seriously, by drinking, taking drugs, or cutting. Distress is temporarily blunted, relief is provided in the short-term, and the maladaptive behavior acquires reinforcing properties that strengthen dysfunctional patterns.

Not only do the maladaptive behaviors provide transient relief (positive reinforcement), but they also serve to permit escape from emotional pain (negative reinforcement). Alternatively, adolescents might become preoccupied with their distress in ways that strengthen the associations between automatic thoughts and negative affect. An example of this pattern is obsessive worry or rumination, which is constant reexamination or reexperiencing of distressing conditions or events in a misguided effort to resolve problems and regulate emotions.

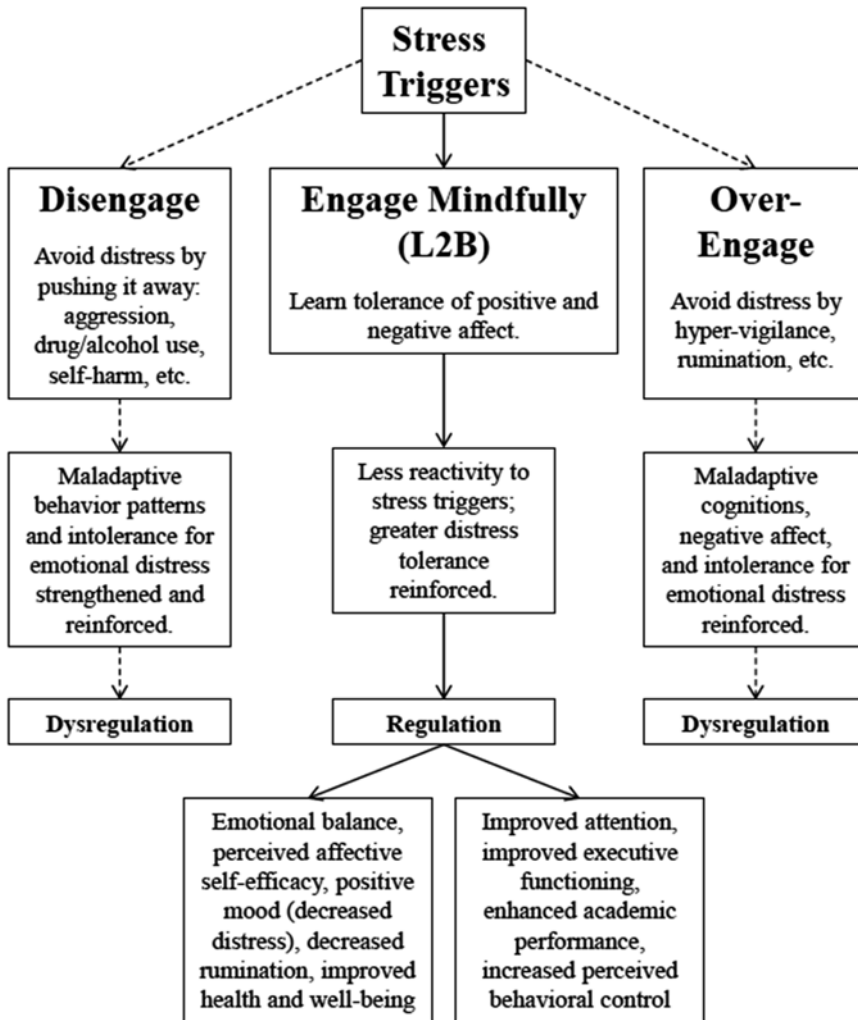


Fig. 22.1 Conceptual model of L2B

Rumination heightens attention to distress cues, amplifies rather than attenuates distress, and reduces the capacity of working memory to effectively engage in learning (Lyubomirsky & Tkach, 2004).

The practice of mindfulness may increase meta-cognitive awareness of mental processes that contribute to emotion dysregulation and offers a means of restoring balance when strong emotions arise. Emotions are not static. Therefore, to train in the skills of emotion awareness, identification, and management, it is useful to practice noticing emotions “on the spot.” This practice offers the opportunity to

develop resilience in the face of uncomfortable feelings that otherwise might provoke a harmful behavioral response. Mindfulness practice also strengthens attention by voluntarily and repeatedly orienting attention to a specific object of focus while letting go of distractions. Mindfulness practice includes establishing an intention to “pay attention” in a certain way, thus strengthening the executive skill of keeping a plan in mind while inhibiting distractions and shifting attention from irrelevant to relevant stimuli. Through mindfulness practice, automatic, non-reflective processes may come under more conscious control, fostering reflective

decision-making and reducing impulsive reactions. The practice of orienting to experience with curiosity, patience, and nonjudgment strengthens tolerance for distress and may reduce the threat appraisal that the adolescent brain is prone to make, providing a potential protective factor against stressors that abound in the environment. The practice of tolerating experience as it arises without engaging in automatic, possibly impulsive, reactions may strengthen resilience and support a sense of affective regulatory self-efficacy, control and self-compassion. Perception of control is an important criterion of effective stress management (Sapolsky, 2004), and learning skills to deal with feelings constructively could strengthen perceptions of personal efficacy.

Certain assumptions about adolescent development provide a framework for this approach to introducing mindfulness to adolescents (Broderick & Blewitt, 2014). Adolescents are involved at a deep psychological level with constructing an identity and developing autonomy from adults, a task that can become overwhelming and confusing. Although adolescents' ability to understand and manage emotions can advance, training in this area has often been neglected in school settings. The school-based format of Learning to BREATHE provides support for the exploration of mindfulness-based emotion regulation strategies and invites students to consider the usefulness of these strategies for their lives. The discussion and practice included in L2B complement adolescents' increased capacity for introspection while maintaining sensitivity to adolescents' internal pressure for social conformity and tendency to social comparison. Non-intrusive discussion of general stressors facilitates self-discovery in the peer context and reduces isolation. Information about how the mind works, i.e., the common tendency to be distracted or to hold onto thoughts that may not be helpful, can bolster the individual adolescent's realization that she or he is not alone. Finally, the active participation of students in practice, in-class, and at home supports integration of program content.

Research on Learning to BREATHE

A pilot study of the L2B program was conducted in a private high school for girls in suburban Pennsylvania (Broderick & Metz, 2009). All seniors ($n=120$) participated in the six-session program as part of their health curriculum. Program sessions were delivered one to two times per week during seniors' health classes over a period of approximately 5 weeks. Class sessions ranged from 32 to 43 min each. A small group of juniors served as the control ($n=33$).

No demographic characteristics or pretest subscale scores, except age, were significantly different between the program participants completing both assessments ($n=105$) and controls ($n=17$). Mean gain scores (posttest–pretest scores) were compared between groups to assess program effectiveness. In comparison to the control group, the program participants demonstrated a significant reduction in negative affect, mean gain score -2.51 vs. 1.63 , $t(120)=2.34$, $p<.05$, and a significant increase in feeling calm/relaxed/self-accepting, mean gain score of $.90$ vs. $-.65$, $t(120)=-2.06$, $p<.05$. No other mean gain scores demonstrated significant differences between the program and control groups.

Due to the very small sample size of the control group, there was low power to detect significant differences between program and control groups, if they existed. As a result, paired t -tests were computed within the mindfulness program group to examine differences from pretest to posttest across the multiple measures. Program participants, on the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) displayed a statistical reduction from pretest to posttest in negative affect, $t(103)=3.89$, $p<.01$, and a significant increase in feeling calm/relaxed/self-accepting $t(103)=-3.21$, $p<.01$. They also demonstrated a significant decline from pretest to posttest in the total score on the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), $t(103)=2.77$, $p<.01$, lack of emotional awareness (DERS subscale), $t(103)=3.12$, $p<.01$, and lack of emotional clarity (DERS subscale), $t(103)=2.16$, $p<.05$. No significant changes from pretest to

posttest ($p > .05$) were found within the Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991); whereas in the Somatization Index of the Child Behavior Checklist (SICBC; Achenbach, 1991), program participants demonstrated a significant reduction from pretest to posttest in feeling overtired, $t(104) = 2.95$, $p < .01$, and complaints of aches/pains (not headaches or stomach aches), $t(104) = 1.99$, $p < .05$.

The process evaluation revealed that 87 % of program participants were satisfied or very satisfied with the L2B program, with 65 % of participants practicing mindfulness techniques outside of class during the length of the program. Specifically, the in-class program activities rated most useful included in-class meditation practice, body scan meditation, and a music and emotions activity; the activity rated the least useful was in-class discussion. Approximately half of all participants reported that the most important skill they learned from the program was how to better deal with stressful thoughts and feelings.

Examples of free responses to the question, "What did you learn from the program?" include the following representative statements from students:

I learned to relax myself at a very stressful moment so that I don't feel sick.

I can now pay attention to something or someone for a longer period of time.

I have learned that, although a problem may seem huge at first, it is actually the size of a grain of sand in relation to the universe. Also I should treat myself kindly and respect my body.

I've learned that I can have space in my mind.

An unpublished pilot study by L. Pinger and L. Flook was implemented in two fifth grade classes in public schools in Madison, WI. Improvements in social competence for students receiving L2B were noted on teacher reports once the program was completed. Performance for L2B students on a computerized task of spatial working memory showed statistically significant improvements in strategy use

and reductions in error rate. The L2B students also demonstrated less depressed and anxious symptoms and a greater internal locus of control after program completion. Fifth grade teachers reported that the students learned to pause, if only briefly, and "acknowledge their thoughts and feelings, something that set L2B apart from most social skills programs" (<http://www.investigatinghealthyminds.org/cihmProjEducation.html>).

In addition to the pilot trials reported above, L2B has been implemented in other sites (including public high schools, alternative high schools, residential treatment programs, residential private schools, and after school-programs) although research data are not available or incomplete for many settings at the time of this writing. A L2B implementation at a public high school was recently evaluated (Metz et al., 2013). The evaluation used a pretest-posttest comparison group design which included 216 traditional education students currently enrolled in a concert choir course elective in either the L2B treatment or the instruction-as-usual comparison high school. The 18 program sessions were delivered on average once per week during the first 15 to 25 min of the concert choir class sessions. The students participating in the L2B program reported significantly lower levels of *perceived stress*, $F(1, 211) = 8.075$, $p < .01$, *psychosomatic complaints*, $F(1, 211) = 4.131$, $p < .05$, and higher levels of *efficacy in affective regulation*, $F(1, 211) = 19.682$, $p < .01$. Students in the treatment condition also evidenced significant larger gains in several emotion regulation skills including *emotional awareness*, $F(1, 211) = 5.900$, $p < .05$; *access to regulation strategies*, $F(1, 211) = 4.1418$, $p < .05$; *emotional clarity*, $F(1, 211) = 3.924$, $p < .05$; and *overall emotion regulation*, $F(1, 211) = 5.441$, $p < .05$. Overall, participants found program content and activities to be highly acceptable and socially valid via the process evaluation.

All of these implementations of the L2B program were preceded by initial training from the program developer (PB) coupled with weekly or bi-weekly phone supervision. Accommodations were made for each setting and students' needs. In addition, regular classroom teachers had the

opportunity to participate in mindfulness classes prior to and during the implementations in several settings. Feedback from these early implementations led to program refinements that reflect effective practice for youth of all genders in a range of settings. Overall, qualitative interview data suggest students understood the concepts taught in the lessons and valued the practical skills that they received through participation. In particular, students repeatedly mentioned feeling more aware of their emotions—more empowered and in-control because they had practiced self-regulation skills in the sessions. These benefits directly impacted their response to classroom learning and relationships with teachers.

Bluth et al. (2015) studied the effects of L2B in an alternative school that served students who had struggled in traditional public high school settings. A group of 27 ethnically diverse (54 % Hispanic, 24 % African-American, 18 % Caucasian, 3 % other) students who were primarily from low income families were randomly assigned to either L2B or the school's standard substance abuse prevention class. Teachers made various accommodations in L2B over the course of the 11 weeks of classes (50 min each), including changing the location from the classroom to a more private space in the gym and beginning each class session with either body scan or restorative yoga. Since the L2B teachers were not part of the school faculty, they made special efforts to attend student functions in order to build trust. Analyses indicated that L2B was associated with greater improvements in depression and anxiety relative to the control class and small to medium effects on social connectedness, perceived stress, and mindfulness. Interestingly, adolescents' perceptions of the meaningfulness of the mindfulness class changed over the course of the program. While L2B participants initially perceived their class to be less relevant compared to participants in the substance abuse prevention class, this trend shifted as the class progressed. By the end of the 11 weeks, L2B participants rated the class more credible and relevant while

these same variables decreased for substance abuse prevention students.

Mindfulness in Schools: Where to Start?

Introducing the inner work of mindfulness in any setting, but particularly in education, is a unique challenge. Unlike most current educational activities, whether they are being evaluated by researchers or not, mindfulness is a personal and highly experiential way of knowing that does not fit neatly into a conceptualization of learning with a set of "correct" answers. Simply adding one more program to an already full academic roster, especially if that program offers "more of the same" (i.e., more information about stress or wellness), may not necessarily add more value. Nor will it shift the dynamic from knowledge overload to deep, meaningful inquiry (see Zajonc, 2015). Mindfulness offers opportunities for silence and reflection in classrooms strained to their limits by the weight of curricular objectives, student needs, and limited time. In the process, it allows for the felt experience of deep connections with self and others, which can serve as the mental/emotional infrastructure for learning. Teacher and students alike must settle into present moment awareness and practice a specific skill set for paying attention. Openness, flexibility, and presence on the part of the teacher are important elements for facilitation.

How can this work be assessed in the service of building empirical support for contemplative educational practices? We offer some thoughts on how to marry mindfulness research in education with existing evaluation criteria, although this relationship is clearly in its infancy and will benefit greatly from future well-designed projects. We use the acronym S.C.H.O.O.L.S. to illustrate elements to consider in mindfulness-based educational research, using L2B and other programs as examples when appropriate. Given the limits of this chapter, we also restrict these comments to mindfulness-based programs despite the importance of studying creative and

informal applications of mindfulness in the day-to-day life of the classroom. Our fundamental assumption is that teachers themselves are the best “lessons” in mindfulness for their students. Therefore, opportunities to introduce and to practice mindfulness with teachers are of the utmost importance. This topic is addressed elsewhere in this volume.

S: Settings

A mindfulness program for adolescents may be delivered within a school-based curriculum, an after-school program, a mental health outpatient/inpatient setting, or a residential setting. The setting of program delivery (universal, selective, indicated) often determines the level of impact (Gordon, 1987). Universal interventions, targeted at the general population, have widespread coverage and are most effective if administered in a school-based setting. Selective interventions target youth at risk of academic, social, or emotional problems while indicated interventions target youth who present early symptoms such as truancy, aggressive behavior, and depressed affect. Like universal interventions, these programs can be offered in the school as in special education or life skills classes although many are delivered in mental health outpatient settings (Biegel et al., 2009; Bogels et al., 2008; Tan & Martin, 2013). *Although L2B is intended to be universally administered, it could be used as a selective or indicated intervention.*

The maximum number of adolescents, including those who have not yet developed problems, may be reached via universal prevention, thereby reducing the stigma sometimes observed in selective/indicated interventions (Tomb & Hunter, 2004). Universal programming also increases the likelihood of sustainability and consistent positive outcomes over time (Hawkins, Kosterman, Catalano, Hill, & Abbott, 2005). Implementation setting and targeted level of intervention are important considerations for researchers and program users alike with regard to program selection and adaptations needed to ensure success.

C: Curriculum

Mindful teaching certainly *does not* require a curriculum and should be supported in all its authentic manifestations. However, if research is to be done to investigate the effectiveness of mindfulness with youth, researchers need to replicate findings in order to build an evidence base. This is possible when curricula are available. In selecting a mindfulness-based program that matches the needs and capacity of the setting and the students, several elements might be considered: the existing evidence base for the program, developmental appropriateness of the program, availability of a well-designed instructor’s manual, and instructor training. The instructor’s manual should at minimum provide the conceptual model for the program, session objectives, and thematic activities. Supplementary materials (e.g., workbooks) should be age-appropriate. The curriculum choice is also tied to the selection of instructors. It is our view that teaching mindfulness requires instructors to have a personal, experiential understanding of mindfulness. Mindfulness training for classroom teachers and professional staff that precedes or runs concurrently with the intervention is strongly recommended as a way of preparing teachers, of supporting the goals of the program, and of infusing mindfulness into the life of the school (see chapters by Jennings, Roeser 2015). If the program includes experiential activities such as yoga, a room with additional floor space or minimal outside distractions may be important. The length of the program and the time needed for each session as well as cost of materials and training should be considered for ease of incorporation into existing school structure. If researchers choose to develop a curriculum, care should be taken to ground it theoretically in strong knowledge of adolescent development, mindfulness practice, and effective pedagogy. A program logic model for stakeholders such as parents and school administrators illustrating the program inputs, activities, output, and outcomes could ease the transition of such programs into schools (see Table 22.2 for a basic outline).

Table 22.1 Recently published adolescent mindfulness program evaluations

Study	Level of prevention	Program content	N	Participants	Program location	Length and frequency	Research design	Quantitative outcome variables	Main results/effect size
Beets and Mitchell (2010)	Universal	Yoga intervention	55	Rural U.S. pacific NW public high school students	Mandatory ninth grade physical education class in public high school	Four or five 45-min group sessions over 2 wks	2×2 crossover design with baseline assessment (random assignment to sequences)	Perceived stress (PSS); depressive symptoms (CES-D); health-related quality of life (KINDL)	<i>Acute effects:</i> Decreased PSS; increased KINDL subscales of physical health, general feelings, and self-esteem (pooled ES across all outcomes was 0.39 for sequence 1 and 0.46 for sequence 2) <i>Carryover effects (baseline to after removal of treatment):</i> Increased KINDL subscales of physical health and self-esteem
Broderick and Metz (2009)	Universal	Learning to BREATHE mindfulness curriculum, (Broderick, 2010)	150	Female students aged 16–19y from a suburban PA private Catholic high school –93 % White	Senior health class in school	Six 40-min group sessions staggered over 5 wks	Pretest-Posttest Comparison Group Design [Intervention: 120 from entire senior class; Control: 30 juniors from same high school]	Positive and Negative Affect Schedule (PANAS); Difficulties in Emotion Regulation Scale (DERS); Ruminative Response Scale (RRS); Somatization Index of the Child Behavior Checklist (SICBC)	As compared to controls, mindfulness group decreased PANAS negative affect (ES=0.57) and increased calm/relaxed/self-accepting score (ES=0.53)
Beauchemin et al. (2008)	Selective	Mindfulness Meditation (Kabat-Zinn, 1994)	34	Youth aged 13–18y with learning disabilities from a private residential VT school –71 % male	Classes in school	5–10 min at beginning of each class period 5 days/wk for 5 consecutive wks	One-group pretest-posttest design	Social Skills Rating System (SSRS); State-Trait Anxiety Inventory (STAI)	Decreased trait anxiety and state anxiety STAI scores; improved student-reported SSRS social skills and teacher-reported SSRS social skills, student problem behavior and student academic achievement

Study	Level of prevention	Program content	N	Participants	Program location	Length and frequency	Research design	Quantitative outcome variables	Main results/effect size
Biegel et al. (2009)	Indicated	Mindfulness-based stress reduction (MBSR) training (Kabat-Zinn, 1990)	102	Adolescents aged 14–18y from current/past outpatient child and adolescent psychiatry department in a U.S. NE Kaiser Permanente hospital –73.5 % female –45 % White, 28 % Hispanic, 27 % other	Outpatient mental health facility	Eight 2-h group sessions, one per week	Pretest-posttest wait-list control group design [Intervention: 50 intent-to-treat sample and 34 for completer; Control: 52 analyzed for intent-to-treat sample and 40 for completer]	DSM-IV-TR diagnostic changes; Perceived Stress Scale (PSS-10); State/Trait Anxiety Inventory (STAI); Hopkins Symptom Checklist 90 (Revised) (SCL-90-R); Rosenberg Self-Esteem Scale (SES)	As compared to controls, MBSR participation reduced self-reported anxiety, depressive, and somatization symptoms, and improved self-esteem, sleep quality, and DSM-IV-TR diagnostics (for completer and intent-to-treat samples)
Bogels et al. (2008)	Indicated	Mindfulness-based cognitive therapy (MBCT) (Segal et al., 2002)	14	Adolescents from The Netherlands aged 11–18 who were referred to a community mental health center with a diagnosis of ADHD, ODD/CD, or ASD –57 % male	Community mental health center	Eight 1.5-h group sessions, one per wk	One-group pretest-posttest design including a 8-wk follow-up assessment	Several self-report scales measuring personal goals, symptoms, quality of life, and mindful awareness	Improved at posttest and 8-wk follow-up assessment on self-reported personal goals; Youth Self-Report/Child Behavior Checklist total symptoms score and subscales of externalizing symptoms and social problems; self-control; attention, happiness; mindful awareness (ES ranged from 0.5 to 1.5)

(continued)

Table 22.1 (Continued)

Study	Level of prevention	Program content	N	Participants	Program location	Length and frequency	Research design	Quantitative outcome variables	Main results/effect size
Huppert and Johnson (2010)	Universal	Mindfulness training (Kabat-Zinn, 1990)	155	UK male students aged 14–15y in independent school (fee) boys' – 95 % White British	Religious education classes in school	Four 40-min group classes, one per wk	Pretest-posttest comparison group design [Intervention: 6 classes with 78 with complete data; Control: 5 classes with 56 with complete data]	Cognitive and Affective Mindfulness Scale-Revised (CAMS-R); Ego-Resiliency Scale (ERS); Warwick-Edinburgh Mental Well-being Scale (WEMWBS); Ten-Item Personality Inventory (TIPI)	As compared to controls, mindfulness group increased in CAMS-R ($sr^2 = .06$) and WEMWBS score ($sr^2 = .05$)
Khalsa et al. (2013)	Universal	Modified Yoga Ed program for secondary schools	121	Adolescents aged 15–19y receiving regular education – 57.8 % male	Mass. rural secondary school	Two to three 30–40-min yoga sessions per wk for 11 wk	Pretest-posttest control group design [Intervention: 74 (4 classes); Control/physical education as usual group: 47 (3 classes) from same school]	Self-Report of Personality Version of the Behavioral Assessment Survey for Children V2 (BASC-2); Profile of Mood States Short Form (POMS-SF); Resilience Scale (RS); Perceived Stress Scale (PSS); Inventory of Positive Psychological Attitudes-32R (IPPA)	As compared with physical-education-as-usual group, the treatment group demonstrated the statistical improvements in BASC-2 anger control (Std ES = 0.48), POMS-SF fatigue/inertia (Std ES = 0.48), and in resilience (RS) (Std ES = 0.53) from pretest to posttest
Khalsa et al. (2013)	Indicated	Modified yoga Kripalu-style curriculum	135	Residential music students of a 6-wk summer program at university for advanced adolescent musicians – 43.7 % male – 73 % Caucasian – Mean age 16y	Mass. university residential summer program	Three 60-min Kripalu-style yoga classes each wk for 6 wk	Pretest-posttest control group design [Intervention: $n = 84$; Control: $n = 51$]	Performance Anxiety Questionnaire (PAQ); Music Performance Anxiety Inventory for Adolescents (MPAI-A); Performance-related Musculoskeletal Disorders Questionnaire (PRMD-Q)	As compared to the control group, the intervention group displayed statistical reductions from baseline to posttest in music performance anxiety of the PAQ and also in the MPAI-A total scale score and subscales of somative/cognitive and performance evaluation

Study	Level of prevention	Program content	N	Participants	Program location	Length and frequency	Research design	Quantitative outcome variables	Main results/effect size
Kuyken et al. (2013)	Universal	Mindfulness in Schools Programme (MISP)	522	Adolescents aged 12–16 in 12 secondary schools in the UK	UK	Nine weekly lessons; student participation rate of varied across the schools from a single class within a single year group to all classes in a year group	Non-randomized controlled parallel group (MISP programme vs. matched control group) study, with assessment of outcomes at baseline (pre-intervention), post-intervention and follow-up (3 months after baseline)	Warwick–Edinburgh Mental Well-being Scale (WEMWBS); Perceived Stress Scale (PSS); Center for Epidemiologic Studies Depression Scale (CES-D); Assessment of mindfulness practice	As compared to the comparison schools, students in the intervention schools reported fewer depressive symptoms (CES-D) at posttest and follow-up, lower perceived stress (PSS) at follow-up, and higher well-being (WEMWBS) at follow-up
Metz et al. (2013)	Selective	Learning to BREATHE mindfulness curriculum, (Broderick, 2010)	216	Adolescents in tenth to twelfth grade from two suburban PA public high schools in same school district – 34% male	Concert choir course elective	Eighteen sessions 15–25 min at beginning of class sessions; typically once a wk over 16 wks	Pretest-posttest comparison group design [Experimental school: 6 classes with 129 with complete data; Comparison school: 3 classes with 87 with complete data]	Difficulties in Emotion Regulation Scale (DERS); Psychosomatic Complaints Scale; Affective Self-Regulatory Efficacy Scale; single-item of perceived stress level	As compared to comparison group, experimental group reported statistically lower levels of perceived stress ($d = .40$) and psychosomatic complaints ($d = .28$), and higher levels of efficacy in affective regulation ($d = .62$) and emotion regulation skills ($d = .33$) [including DERS subscales of emotional awareness ($d = .34$), access to regulation strategies ($d = .30$), emotional clarity ($d = .28$)]
Raes et al. (2014)	Universal	Mindfulness group program	408	Students aged 13–20y from five secondary schools (i.e., equivalent to American high schools)	Belgium	Eight weekly 100-min sessions	Pretest-posttest control group design (randomized controlled trial) with 6-month follow-up	Depression Anxiety Stress Scales (DASS-21)	As compared to the control group, the intervention group reported statistically greater reductions in depression (DASS-21-D) from pretest to posttest (<i>Cohen's</i> $d = 0.32$) and from pretest to 6-month follow-up (<i>Cohen's</i> $d = 0.32$)

(continued)

Table 22.1 (Continued)

Study	Level of prevention	Program content	N	Participants	Program location	Length and frequency	Research design	Quantitative outcome variables	Main results/effect size
Sibinga et al. (2011)	Selective	Mindfulness-based stress reduction (MBSR)	26	Youth aged 13–21y from a pediatric primary care clinic of an urban tertiary care hospital – 23 % male – 100 % African-American – Mean age of 16.8 y – 42 % HIV+	Pediatric primary care clinic of an urban tertiary care hospital	Nine sessions per wk over 8 wk	One group pretest posttest design	Child Health and Illness Profile – Adolescent Edition (CHIP-AE); Symptom Checklist-90 Revised (SCL-90R)	There were statistical reductions from pretest to posttest in the hostility SCL-90R subscale and in the CHIP-AE general discomfort subscale and in the general discomfort domain of emotional discomfort
Tan and Martin (2013)	Indicated	Taming the Adolescent Mind [Mindfulness-based cognitive therapy (MBCT)]	10	Adolescents aged 13–17y with a diagnosed mental health disorder (and parents) recruited from outpatient child and youth mental health service in Australia – 30 % male – 100 % Caucasian – Mean age of 15.7y	Outpatient Child and Youth Mental Health Service in Australia	5-wk, 1-h group intervention	One group pretest posttest design with a 3-month follow-up assessment	Youth: Depression Anxiety Stress Scale (DASS-21); Rosenberg Self-Esteem Scale; Children's Acceptance and Mindfulness Measure (CAMM); Avoidance and Fusion Questionnaire for Youth (AFQ-Y8) Parents: Child Behavior Checklist (CBCL)	Some subscales of the DASS-21 statistically showed improvement from pretest to the 3-month follow-up assessment including: total ($d=0.28$), anxiety stress ($d=0.36$), anxiety ($d=0.48$), and depression ($d=0.42$). There were also statistical improvements from pretest to the 3-month follow-up in self-esteem ($d=-0.42$), mindfulness (CAMM) ($d=-0.04$), psychological inflexibility (AFQ-Y8) ($d=.66$), and the parental CBCL score ($d=0.70$)

Study	Level of prevention	Program content	N	Participants	Program location	Length and frequency	Research design	Quantitative outcome variables	Main results/effect size
Zylowska et al. (2008)	Indicated	Mindfulness training: Mindful Awareness Practices (MAPs) (Kabat-Zinn, 1990; Segal et al., 2002)	8	Adolescents aged 15+ diagnosed with ADHD – 62.5 % female	Not specified	Eight weekly 2.5-h group sessions, daily at-home practice	One-group pretest-posttest design	Self-report scales of ADHD, depression, and anxiety symptoms; battery of cognitive tests	Negligible changes in depression and anxiety (no statistical testing performed due to small sample size)

Table 22.2 Basic program logic model

Inputs	Activities	Outputs	Outcomes
Resources for implementation and evaluation	Program strategies and procedures	Direct products of the program that help to monitor program reach or process	Benefits resulting from program
<ul style="list-style-type: none"> • Staff (and staff time)—for program facilitation and evaluation 	<ul style="list-style-type: none"> • Training of program facilitators 	<ul style="list-style-type: none"> • Number of teachers trained for program delivery 	<ul style="list-style-type: none"> • Student self-report (knowledge, attitudes, values, behavior)
<ul style="list-style-type: none"> • Volunteers (and volunteer time) 	<ul style="list-style-type: none"> • Number and length of sessions/modules 	<ul style="list-style-type: none"> • Number of students reached 	<ul style="list-style-type: none"> • Student behavior/performance (routinely collected school documentation)
<ul style="list-style-type: none"> • Money 	<ul style="list-style-type: none"> • Example of activities 	<ul style="list-style-type: none"> • Number of classes taught 	<ul style="list-style-type: none"> • Physiological response (heart rate, cortisol, blood pressure)
<ul style="list-style-type: none"> • Fee for program use 		<ul style="list-style-type: none"> • Number of objectives taught within each class 	<ul style="list-style-type: none"> • System measures (teacher-reported classroom and school climate)
<ul style="list-style-type: none"> • Supplies/equipment 		<ul style="list-style-type: none"> • Number of distributed educational materials 	
<ul style="list-style-type: none"> • Space allocation 		<ul style="list-style-type: none"> • Satisfaction surveys with students and teachers 	
		<ul style="list-style-type: none"> • Number of volunteers recruited 	

H: History of Program Approach

Some existing mindfulness-based programs for children and youth are derived from secular approaches such as MBSR, Mindfulness-Based Cognitive Therapy (MBCT), and positive psychology and are supported by recent advances in the neurosciences. A solid understanding of the theoretical foundations of existing programs can inform teachers' understanding of techniques, rationales, objectives, and assessments. The underlying assumptions about the mechanisms of change that serve as the program's foundation should be clear in order to make an informed decision. Despite the challenge of translating contemplative disciplines into contemporary educational language, it is very important not to lose their ethical character, wisdom, and experiential nature lest they become another rote activity. Current efforts to clarify components of mindfulness interventions from a psychological science perspective provide a useful approach for researchers and users of secular programs (see Baer, 2015).

O: Objectives

In educational settings, it is important to clearly define program objectives and link them to stated goals of schools, school districts, or national standards. For instance, the National Health Education Standards (NHES) provide expectations for what students should know and be able to do by grades 2, 5, 8, and 12 to promote personal, family, and community health (The Joint Committee on National Health Education Standards, 2007). Standard 7 indicates that students in grades 9–12 will demonstrate the ability to practice health-enhancing behaviors. Each of the six L2B program objectives linked to Standard 7, which made this program a good fit for a health class curriculum. For example, a L2B program objective was to increase body awareness. One way this standard was addressed was by means of the Body Scan activity. Instructors completed an activity completion checklist (process evaluation) and students completed a somatization questionnaire (outcome evaluation) in order to assess if the objective was met. Programs

may stand a better chance of sustainability in educational settings if they can be clearly linked in some way to the objectives of the institution.

O: Outcomes

Outcomes are the benefits to program participants. Outcomes may be elicited via qualitative assessment (e.g., focus groups, unstructured interviews, journaling, or open-ended survey questions) and quantitative assessment (e.g., closed-ended item questionnaires from students or others, student school record extraction, or medical apparatus measurement of physiological responses). Often well-designed program evaluations use a mixed-methods approach, using the quantitative approach to compare results with other interventions and standardize them over time along with the qualitative approach to elicit unexpected outcomes. In the L2B program, several valid and reliable instruments as well as process evaluation measures were administered to assess program effects. In their work, Bogels et al. (2008) used both adolescent and parental reports of adolescent behavior. Physiological response measures can also be employed to assess the interaction between psychological and physiological health (Cicchetti & Gunnar, 2008). These measures include blood pressure, heart rate, respiratory sinus arrhythmia, cortisol levels, ANS reactivity, and hypothalamic–pituitary–adrenal (HPA) axis reactivity (Barnes, Davis, Murzynowski, & Treiber, 2004; Oldehinkel et al., 2010). For instance, Barnes et al. (2004) found a positive effect of meditation on the resting and ambulatory heart rate and blood pressure in middle school students. System outcomes such as teacher-reported classroom management or school climate surveys may also provide a school-wide measure of success. At minimum, outcomes should be assessed before and immediately after the program. Addition of a long-term follow-up assessment is a particularly helpful tool in building an evidence base for mindfulness in schools (see Kuyken et al., 2013).

Process evaluation data may help to explain why specific program components were effective at producing positive outcomes while others were not. Specifically, five implementation factors are used to structure a process evaluation (Grembowski, 2001; Israel et al., 1995): completeness (amount of implemented program activities), fidelity (extent to which program activities are implemented as intended), coverage (extent to which the target population received program activities), student reaction (target population’s satisfaction with and reaction to program activities), and teacher reaction (teachers’ satisfaction with and reaction to program activities). See Table 22.3 for an outline of possible process evaluation measures for teachers, students, and classroom observers.

Table 22.3 Process evaluation measures and purpose of data

Source	Measure	Purpose of collected data
<i>Teachers</i>		
	Post-training survey	Teachers reaction
	Teachers curriculum checklist (assesses content, method of delivery, and self-efficacy)	Completeness, fidelity, coverage, teacher reaction
	Post-implementation survey	Teacher reaction
	Focus groups	Teacher reaction
<i>Classroom observer</i>		
	Video-taping and reviewer checklist	Completeness, fidelity, coverage
	Classroom observer checklist	Completeness, fidelity, coverage
<i>Students</i>		
	Student curriculum checklist	Completeness, student reaction
	Student homework verification	Completeness, fidelity, coverage
	Forms	
	Post-program student satisfaction	Students reaction
	Survey	
	Focus groups	Student reaction

L: Layout or Design

The layout or design helps determine the effectiveness of a study. The randomized pretest-posttest control group design is the gold standard design in which a group is randomized into receiving or not receiving the program. Randomization minimizes the possibility that an extraneous factor is associated with the changes, but it is not always feasible in schools. Therefore, the nonrandomized pretest-posttest comparison group design is often used in which one school receives the program and pretest-posttest changes are compared to the pretest-posttest changes of a comparable group of students at another school who do not receive the program. The comparison group should be very similar to the program group in terms of basic demographics. At minimum, the one-group pretest-posttest design should be employed in which one group of students receives the program and outcomes are measured before and immediately after the program.

S: Sustainability

The active support of the school's mindfulness program is critical to its success and sustainability. Initially, a workgroup composed of teachers, counselors, psychologists, administrators, and parents who are interested in mindfulness might be formed to take responsibility for program implementation and evaluation and for proposing the initiative to school stakeholders such as parents and top-level administrators. Because mindfulness is a practice, opportunities to practice mindfulness (e.g., lunchtime meditation groups, workshops for parents, teen groups) might be built into the schedule and open to the whole school community. Ongoing training of instructors and regular in-service offerings help sustain interest and prepare teachers to expand programs. For research purposes, efforts should be made to integrate the outcome evaluation into the data monitoring or assessment system already in place which will feed directly into annual and long-term plans for the program. Partnerships with regional academic institutions

that may supply free or low-cost evaluation services or with developers of research-based programs can aid in implementation and research. Program highlights should also be regularly communicated to parents and the outside community through annual reports, newsletters, and press releases that support contemplative educational innovations.

Conclusion

The purpose of this chapter was to present a rationale for a universal approach to teaching mindfulness to adolescents and to describe an example of a program that was developed for this purpose. We reviewed some of the developmental opportunities and challenges of the adolescent period, with special attention to neurobiological changes. We also discussed the particular benefits of mindfulness, both as an antidote for stress and a trainable regulatory skill. The elements of Learning to BREATHE, a universal prevention program, were presented as an example of a mindfulness education program for school settings. Overall, existing data suggest the feasibility and efficacy of L2B as a form of universal prevention delivered in schools for adolescents with regard to the normative stresses of life during this time. Finally, we identify some important elements for researchers and educators to consider when selecting or implementing a mindfulness-based program.

In conclusion, current research is affirming what many people over the course of history have already discovered. Mindfulness practice has the power to help reduce distress, open the heart, and promote a deep sense of wellness. For contemporary adolescents, this is an urgent need. Thus, it is important for researchers, practitioners, and school professionals to work together within educational settings to support the well-being of all adolescents by means of effective empirically supported universal programming. Supporting the inner work of adolescents through mindfulness can have far-reaching consequences for the good of students at this stage of their development and beyond.

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