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Learning to BREATHE: A Pilot Study of a Mindfulness-Based Intervention to Support Marginalized Youth

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Abstract

Mindfulness-based curricular interventions can support adolescents who are at risk of school failure as they negotiate the transition from high school into young adulthood. Researchers hypothesized that a 6-week mindfulness-based intervention would lower participants' perceived stress while increasing their reported levels of self-esteem. Participants (N = 23) ranged in age from 17 to 20 years while the majority were male students of color. Pre- and postintervention survey mean responses revealed statistically significant differences on the Single-Item Self-Esteem Scale and 3 items on the Perceived Stress Scale (with small to moderate effect sizes). Postintervention focus group (n = 8) data indicated that the most valued daily practice was the body scan technique. Open coding of the focus group data also revealed several key themes in the form of overarching codes as participants discussed intervention benefits. These included (*a*) self-regulation, (*b*) attention-awareness, and (*c*) positive thinking.

Keywords

adolescence, at risk, stress, self-regulation, emotion

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In a standards-driven educational system, underresourced high schools and teachers have minimal classroom "air time" to address crucial nonacademic skills. Adolescents from marginalized communities, in particular, do not typically receive the necessary educational supports to negotiate the challenging transition into young adulthood and independent living.[1] Despite the growing popularity and influence of current educational literature, habits of mind such as the "effort" and "persistence" celebrated in researcher Carol Dweck's *Mindset*[2] or the "grit," "curiosity," and "character" highlighted in journalist Paul Tough's book *How Children Succeed*[3] are simply not featured in standard high school curricula.

More broadly speaking, "social emotional learning" (including the 5 fundamental skills of self-awareness, self-management, social awareness, responsible decision making, and relationship skills) has been researched most systematically in elementary school settings. (See the Collaborative for Academic, Social, and Emotional Learning: www.casel.org.). Yet high school students may benefit more from social emotional curricular interventions and tools than their elementary counterparts because adolescence, as a developmental period, is defined by a number of potentially destabilizing changes.

Literature Review

If adolescence is characterized by identity exploration in the context of prodigious change, youth who experience chronic poverty or other potentially destabilizing environmental stressors (eg, language barriers, inconsistent family support, substance abuse in the home, etc) face significant additional challenges. Researchers suggest that childhood adversity and prolonged stress may be associated with changes in brain development that can impair an individual's capacity for self-regulation.[4] Major categories of risk behaviors in youth include (*a*) drug and alcohol use and abuse; (*b*) unsafe sex, teenage pregnancy, and teen parenting; (*c*) school underachievement, school failure, and/or dropping out; and (*d*) delinquency, crime, and violence.[5] As many as 25% of adolescents also experience symptoms of anxiety and depression,[6] which can negatively affect academic, social, and family functioning with long-term detrimental outcomes.[7]

The good news is that some researchers are addressing the social and emotional lives of marginalized youth in programs and interventions that support success for all high school students as they transition into young adulthood and pursue further educational and career options.[8,9] This shift in the literature moves

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beyond basic life and self-advocacy skills[1] to address emotional intelligence[10] and social emotional learning[11] more directly.

According to the nation's leading Collaborative for Academic, Social, and Emotional Learning,

> social and emotional learning involves the processes through which children and adults acquire and effectively apply the knowledge, attitudes and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions.

A recent meta-analysis of 213 school-based social emotional learning programs indicated multiple benefits, including reduced emotional distress, positive social behavior, and improved tests scores—along with efficacy in a variety of school settings and with racially and ethnically diverse populations.[11] Other research[8,12] also makes a compelling case for linking social emotional learning programming to improved school attitudes, behavior, and performance, arguing that school-based prevention and youth development programs can effectively coordinate social, emotional, and academic outcomes.

Jon Kabat-Zinn's mindfulness-based stress reduction program[13] has emerged as a valuable educational tool that complements and builds on social and emotional learning curricular approaches. Having received significant attention in both medical and mental health contexts over the last several decades, Kabat-Zinn's mindfulness-based stress reduction curriculum was originally designed in 1979 to help patients manage chronic physical pain. The program focuses on mind-body connections and a series of attentional practices that help participants to experience their thoughts and feelings with a level of detachment. 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."[14] Over ten years ago, researchers, theorists, and practitioners attempted to operationalize a definition of mindfulness. Based on a series of meetings, Bishop and his colleagues proposed a 2-component model of mindfulness that features: (*a*) "the self-regulation of attention so that it is maintained on immediate experience" and (*b*) "adopting a particular orientation toward one's experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance."[15(p232)]

Jon and Myla Kabat-Zinn explain: "Mindfulness adds value to [social emotional learning] because it goes beyond cognitive understanding and is grounded in an actual practice that can be sustained or evoked throughout the day."[16(px)] Mindfulness training distinguishes itself through embodied exercises that foster a greater understanding of one's emotions and moods. These meditative tools form a continuously accessible "living practice repertoire" that may be regularly utilized. The Center for Mindfulness at the University of Massachusetts Medical School asserts that "students, teachers, and other members of the school community can benefit from mindfulness and other contemplative techniques in an effort to become more responsive and less reactive, more focused and less distracted, more calm and less stressed."[17(p7)] In a comprehensive meta-analysis, John Meikeljohn and his colleagues[18] reviewed 14 mindfulness-based studies conducted in educational settings since 2005 and found that these curricular interventions yielded multiple benefits for K-12 students such as 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.

Mindfulness-based interventions with adolescents, in particular, appear to target some of the emotional and attentional processes that can support and bolster self-regulation[19] and mindfulness has been widely theorized to improve self-regulation relative to emotions, behavior, and cognitive processes.[20] According to numerous studies, improved self-regulation may result from increased self-awareness and acceptance of emotions rather than impulsive emotional reactions, rumination, or chronic avoidance of emotions.[21-24]

However, there is a paucity of research that has investigated how to best engage and maintain the participation of marginalized youth in mindfulness-based interventions. Available studies indicate that these interventions generate enthusiasm in youth, but a main barrier to overcome in producing positive effects is increasing intervention attendance rates.[25,26] In an outpatient clinic setting, researchers found that of 130 adolescent patients who had initially agreed to participate in the 9-session mindfulness-based intervention, only 33% attended 1 or more sessions.[25] Although 81% of youth who attended at least 1 session returned for the majority of the sessions. Researchers suggested that significant scheduling and logistical difficulties experienced by the families were related to low attendance rates.

In a study centered on a school-based mindfulness intervention, although a majority of students (73.5%) participated in three-quarters or more of mindfulness intervention classes and were enthusiastic about participating, most of the class absences were due to students missing school.[26] Because youth typically spend a significant portion of their time attending school, interventions in the education setting, rather than in a clinic, could present a more feasible option for generating positive outcomes for marginalized youth. Importantly, low-income youth are at higher risk of being chronically absent from school, defined as missing 10% or more of a school year.[27] Rates for chronic absenteeism rise throughout middle and high school, with some high poverty urban areas reporting up to one-third of their students as chronically absent.[27] It appears that a key facilitator in enhancing the benefits of mindfulness-based interventions is increasing school attendance through means such as family-school-community partnering.[28]

Regardless of these challenges, feasibility studies of mindfulness interventions with at-risk adolescents are being conducted in multiple settings including homeless shelters,[29] juvenile detention centers,[30,31] outpatient clinics,[32,33] and

schools.[34-36] Positive psychosocial outcomes include decreases in anxiety, depression,[29] and stress.[30] Two of the aforementioned studies[34,35] featured the *Learning to BREATHE* curriculum (http://learning2breathe.org), which is specifically designed for high school students. "*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 developed by Jon Kabat-Zinn.[13] It offers participants a way to empower themselves as they grapple with the psychological tasks of adolescence" (http://learning2breathe.org). Broderick and Metz conducted a nonrandomized pilot trial of high school students using a 6-session *Learning to BREATHE* program.[35] 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. More recently, Bluth and her colleagues[34] conducted a randomized pilot study of the same curriculum with "ethnically diverse at-risk adolescents" who were primarily Hispanic youth. Twenty-seven participants were assigned to either a substance abuse class or the *Learning to BREATHE* mindfulness program for one semester (50-minute courses once a week). When compared with the students in substance abuse class, students participating in the mindfulness class experienced a relief in stress as well as a reduction in depressive symptoms; furthermore, student participants expressed a desire to continue the course.

This pilot study complements the research above by exploring the feasibility and acceptability of a mindfulness-based intervention (eg, *Learning to BREATHE*) with ethnically diverse and marginalized youth at an alternative high school in the Northwest. This pilot trial also builds on previous work by employing a mixed methods design that not only addresses self-report data relative to psychosocial well-being (Research Questions 1-3 below), but also qualitative data from a focus group that reveals participants' understanding of sustainable curricular concepts and practices (Research Question 4 below). Based on an active collaboration with the high school staff at the school, the following research question (and subquestions) guide this inquiry: What are the perceived benefits of participating in the 6-week *Learning to BREATHE* curriculum?

1. Do participants' perceived levels of stress decrease after participating in the program?
2. Do participants' perceived levels of mindful attention increase after participating in the program?
3. Do participants' perceived levels of self-esteem increase after participating in this program?
4. Which curricular concepts, skills, and/or practices featured in the *Learning to BREATHE* curriculum do participants believe are the most valuable to them–in both the classroom and at home?

Methods

Curricular Intervention

Learning to BREATHE: A Curriculum for Cultivating Emotional Regulation, Attention, and Performance features the following goals: (*a*) foster mental health and wellness, (*b*) enhance capacity for emotion regulation, (*c*) strengthen attention and support academic performance, (*d*) expand repertoire for stress management, (*e*) help students integrate mindfulness into everyday life, and (*f*) increase self-awareness and self-management.[16]

Broderick's curricular components cohere around the following themes, which are based on the B.R.E.A.T.H.E. acronym: (*a*) Body, (*b*) Reflections (thoughts), (*c*) Emotions, (*d*) Attention, (*e*) Tenderness; take it as it is, and (*f*) Habits for a healthy mind with the ultimate goal of Empowerment—gaining an inner edge.[16] Drawing on cognitive behavioral theory and Kabat-Zinn's mindfulness-based stress reduction course,[13] this evidence-based curriculum—specifically created for an adolescent audience—was delivered over six 45-minute lessons on Tuesday mornings in February and March of 2014. During each class, students engaged in mindfulness practices and discussions for approximately 50% of a given session (eg, body scans, mindful movement, breathing meditation, and/or loving kindness meditation). The remaining portion of each class was devoted to introducing the B.R.E.A.T.H.E. theme or topic for each session and engaging in curricular activities and discussions that focused on reframing thoughts, understanding and managing stress, improving distress tolerance, and enhancing self-care.

School Context, Participants, and Measures

The pilot study was conducted at an alternative high school housed in a university in the Northwest region of the United States. The school's primary goal is to ensure that underachieving teens finish high school and prepare for success in college, career, and the community, so students are commonly referred to the school by their public high school counselors, or they self-select to apply because they have dropped out or are at-risk of not graduating due to low grades and lost credits. All students had at least 10 course credits completed on admission, and junior or senior status. The majority were students of color, including children of immigrants and refugees. In addition, the majority of students qualified for the federal free and reduced lunch program.

As a member of the school's advisory board, the primary researcher participated with the staff in the strategic planning process in 2013-2014 relative to a central goal outlined in their plan (ie, "Assess and demonstrate improvement in students' social emotional learning"). Staff members collaborated with the researcher in selecting a curriculum that would address students' identified needs (ie, to reduce stress and increase attention/focus); they also worked together to determine class logistics (the length of the intervention, weekly meeting times, etc) as well as the number and type of self-report measures that could be used to measure the efficacy of the intervention. As the educational psychologist on the team, the primary researcher led the 6-week intervention because she was the member of the team with an ongoing personal mindfulness practice as well as training in mindfulness-based stress reduction on which the *Learning to BREATHE* curriculum was based. Students met in a university classroom one floor above the

Table 1. Paired Sample *t*-Test Results by Time.

	Preintervention, Mean (SD)	Postintervention, Mean (SD)	*t*	*df*	*P*	*d*
Perceived Stress Scale[a]						
Item 3	2.30 (1.11)	2.23	2.82 (1.03)	22	.04	.49
Item 5	2.65 (1.15)	2.23	2.13 (.92)	22	.04	.50
Item 8	2.61 (.94)	2.40	2.21 (1.20)	22	.02	.37
Single-Item Self-Esteem Scale[b]						
Item 1	5.00 (1.22)	−2.12	4.38 (1.50)	12	.05	.45

[a]Likert-type scale: 0-4 (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often).
[b]Likert-type scale: 1-7 (eg, I have high self-esteem; 1 = not very true of me; 7 = very true of me).

alternative high school every Tuesday morning for six 45-minute classes. Staff and researchers jointly selected this classroom with the intent of providing students with a break from their regular classroom environment along with a more spacious and open setting for engaging in mindfulness practices. Two classroom teachers participated in the weekly intervention, but they did not directly assist the facilitator.

After obtaining human subjects approval for the intervention from the local university, the facilitator encouraged but did not require student participation in classroom activities. Depending on their comfort level, some student participants chose to engage in mindfulness practices with their eyes open (rather than closed) or in a seated position (rather than lying down). Students could opt out of a classroom activity at any time if they felt uncomfortable.

High school juniors and seniors participating (N = 23) in this pilot study ranged in age from 17 to 20 years (M = 18.87 years; SD = 1.01) while the majority were male (65%) students of color (75%); classroom attendance was sporadic for some students, with 19 of 23 students (83%) regularly attending class sessions. Students completed a pre- and postintervention survey 1 week prior and 1 week after program participation, which featured the following scales: (*a*) the 10-item Perceived Stress Scale (see Appendix A),[37] (*b*) the Single-Item Self-Esteem Scale (see Appendix A),[38] and (*c*) the 14-item Mindful Attention Awareness Scale for Adolescents (see Appendix B).[39] Researchers selected 2 of the 3 scales based on the results of an informal survey where students indicated 2 social emotional learning priorities at the start of the academic year: (*a*) the desire to increase their self-esteem and (*b*) the desire to reduce stress over the academic year. Staff members requested that researchers include a measure of attention, rating this dependent variable as an area of primary concern. The test-retest reliability of the Single-Item Self-Esteem Scale, the Perceived Stress Scale, and the Mindful Attention Awareness Scale met the interclass correlation criterion of >.70 in all cases.[38,40,41]

Additionally, 8 students participated in a focus group conducted by a trained objective party (ie, an on-site school counselor) 1 week after the intervention ended. Focus group questions addressed perceived changes in stress and attention levels and aspects of the curriculum (eg, concepts and daily practices) valued most by participants. The researchers transcribed the data and engaged in an open coding analytical process that featured several cycles of coding, including precoding using "in vivo" codes (determined by the participants' words) followed by 3 cycles of refining where they clarified "descriptive" categories (or themes) as well as subcodes.[42,43] Researchers achieved 91% intercoder agreement with 10% of the data.

Results

Pre- and Postintervention Survey Data

Participants' postintervention survey results indicated a reduction in stress on completion of the program. A paired sample *t*-test comparing pre- and postintervention mean responses revealed statistically significant differences on three items on the Perceived Stress Scale[37] (see Table 1) with small to moderate effect sizes. Participants reported that they were less "nervous and "stressed" (Item 3) and more "on top of things" (Item 8) with life "going my way" (Item 5). There were no significant mean differences relative to responses on the Mindful Attention Awareness Scale, which measures an adolescent's ability to use "a receptive state of attention that, informed by an awareness of the present experience, simply observes what is taking place."[39]

Participants' postintervention results indicated higher levels of self-esteem on completion of the program. A paired sample *t*-test comparing pre- and postintervention mean responses revealed statistically significant differences on the Single-Item Self-Esteem Scale.[38] The item read: "I have high self-esteem (circle a number below). Not very true of me 1 —— 2 —— 3 —— 4 —— 5 —— 6 —— 7 Very true of me."

Focus Group Data

More than one-third of the participants in the pilot study (n = 8) volunteered to participate in a focus group with a trained and objective party 1 week after the intervention ended. Questions directly addressed the study's research questions, and the transcripts featured a discussion of (*a*) the most valued instructional practices and activities and (*b*) participant dialogue regarding the perceived benefits of participating in the 6-week curriculum.

Valued Instructional Practices and Activities. Participants indicated that the most valued and potentially sustainable daily practices were the (*a*) body scan relaxation technique for managing stress and (*b*) breath awareness practices. For the body scan, participants chose to either lie down on a mat or sit in a chair while the instructor directed them to focus on relaxing individual body parts sequentially from head to toe (or vice versa) over a period

of 10 to 15 minutes. When discussing the beginning of the body scan process, one girl in the class referred to the teacher:

> She'll be like, "Concentrate all your energy on like the soles of your feet." You'll just feel like a pulse or something warm. You're just kind of relaxed about it; you're not thinking about maybe, 'Oh, I have a test today. I'm gonna focus on one thing.

Another participant focused on relaxation as well, claiming, "At first you're all tense and then toward the end, you're just relaxed and your arms feel like they are super heavy."

"Breath awareness" (or the "mindful moment"), the second most notable practice by participants, typically occurred at the start of class when the teacher invited students to anchor their attention on some part of their body while breathing (eg, the feeling of air coming in and out of their nostrils or the expansion and contraction of their chest or belly). In describing this practice, participants in the focus group talked less about the concentration of attention on breathing sensations and more about the way that this experience helped them to control their thinking, "have a blank mind," and "kind of forget about everything that happened." One participant described the use of this practice in helping him to cope with both stress and insomnia:

> I would go to sleep and it was taking at least two hours, but then I started doing the mindful moment, so then I would notice that I would be much more relaxed and take less time [to fall asleep]. I would be stressed about work. And after probably the first month or first classes, I started noticing that at work I would be like, "Okay, I'm ready. Let's go."

The other 2 classroom practices that participants occasionally noted (5 times each) were gentle yoga/stretching as well as a daily home practice where they had to pick a common activity (eg, brushing their teeth, riding the bus, waiting in line) and focus on the physical experience of that activity.

Another instructional activity noted by participants was a simulated "My Mind is a Cast of Characters" experience where class members read and represented various hypothetical voices (ie, parents, teachers, and friends) literally circling the head of a seated student who pretended to mentally prepare for a math test. This activity highlighted elements of cognitive behavioral therapy and positive self-talk as the instructor debriefed the activity by discussing methods for reframing thoughts and focusing attention on positive outcomes while acknowledging the phenomenon of mind chatter. In reflecting on this experience, participants highlighted the importance of trying not to do "fifty million things at once" and the challenge of "dealing with certain people or comments popping back into your head." One girl shared,

> I don't know if anybody else thought this, but I think you should have selective hearing sometimes and just hear things that are going to make you better. Like "I can do this! Let's do this!" Or positive thoughts only. Get rid of the thoughts that you know aren't going to be helpful to you.

The other instructional activity mentioned by participants complemented the one above. In the scenario situation activity (called "The Big Event") class members wrote down all the thoughts and feelings they experienced as they heard 2 different scenarios read by the instructor. In one, the hypothetical student believes she is being ignored by a friend at an important social event, and in the other, the student realizes the friend didn't actually see her in the first place. This activity helped participants to (*a*) normalize default assumptions and (*b*) discuss how initial perceptions and cognitive distortions can prompt particular emotions and behaviors. Participants acknowledged the importance of not automatically viewing a situation as "such a bad negative" while one reassured herself that "it kind of helped knowing that other people do the same thing you do—it's not just you."

Perceived Benefits: Key Themes

Apart from identifying the specific practices and activities acknowledged by participants, researchers engaged in open coding of the focus group data[42,43] to explore participants expressed understanding of central ideas garnered from the class and their descriptions of the perceived benefits of the intervention. Several key themes emerged in the form of overarching descriptive codes, based on a number of "in vivo" subcodes (drawn from the participants' own language). These key themes included (*a*) self-regulation, (*b*) attention awareness, and (*c*) positive thinking.

Self-Regulation. When a participant discussed his/her ability to internally manage (or control) emotions, thoughts, breath, and/or stress in order to calm, relax, and slow down, researchers categorized this as "self-regulation." Participants referenced "self-regulation" processes over 50 times, more than any of the other themes highlighted above. Table 2 features representative comments from several participants as they relate their understanding of core ideas in the class that coalesce around this theme. When describing self-regulation, comments tended to group around 3 general topics. First, participants referenced some of the practices cited above—use of body scans and breath awareness—as tools for helping them to "calm, relax, and slow down" and clear their heads to manage stress. A second set of comments highlighted participants' desire for greater awareness and "control" of thoughts and emotions. Third, when participants' referenced self-regulation processes, they were sometimes associated with descriptions of planning, problem solving, and prioritizing.

Attention-Awareness. Although responses on the Mindful Attention Awareness Scale did not reveal mean significant

Table 2. The Theme of Self-Regulation: Participants' Descriptions of Course "Take-Aways."

Topics	Comments
Self-regulation: Using tools and practices	The most memorable things that you are supposed to take back are the methods and ways to relax and calm your body and your mind, so you can focus more so you can relieve yourself from all this extra stress.—Isaiah
	The body scan actually really helped. I literally just kind of go to bed and think "Everything tomorrow is going to suck. I can't sleep; it's horrible." But then with the body scan, it just kind of calms you down, slows you down . . . and you're just not focused on the stress or anything that happened earlier in the day, and it just kind of relaxes you.—Keandra
Self-regulation: Awareness and control	I thought it was all about how to control your emotions and the way you breathe.—Neal
	I agree with everybody, but to be slightly more specific, the thing that I took away was how to control your emotions . . . and being more mindful of what you're thinking about and what thoughts you allow yourself to have.—Amayah
Self-Regulation: Problem-solving and prioritizing	One thing I took is how to mentally get out of your body. . . . For example, if there was a problem going on and you have so much stress, you're meant to get out of your head and see how you can get through it and solve the problem.—Juan
	But sometimes it [the class] makes me slow down a situation and really think, "Is this a good idea? Should I really be doing this?" And before I wouldn't do any of that. I would just be like yeah, that sounds fine, let's do it.—Amayah

differences between pre- and posttest, focus group participants frequently described their experiences of present moment awareness along a continuum. On one end, "focused attention" involved a narrow, sharpened ability to attend to a thought or object of focus, and on the other end, participants' ability to broadly sense or notice something within themselves or their surroundings was characterized as "open awareness." Participants referenced "open awareness" processes nearly 40 times, and "focused attention" processes more than 20 instances. When describing attention along this focused attention to open awareness continuum, participants' comments centered on using "open awareness" to check in to the present moment experience, which often operated as a calming, grounding technique, in contrast to operating in autopilot, which one participant described as "spacing out" and "overlook[ing] . . . simple things that are probably the most important in life." For example, a participant described using open awareness to appreciate her present moment experience, saying

> I used to glance over [things] and be like 'Oh hey, the sun's out; I don't care.' Now I'm actually starting to appreciate [things]. 'We rarely ever get this . . . ' or like when good things happen, I'm really like 'okay, that's actually really good; I'm not going to overlook it.

On the other end of the continuum, comments regarding "focused attention" centered on removing distractions, like self-deprecating or multiple overwhelming thoughts, and focusing on positive thoughts or present moment experiences. When describing the "My Mind is a Cast of Characters" activity, an intervention participant realized the benefit of using focused attention, saying "your brain can't really multi-task; you've got to pick one thing and just kind of stick with it . . . you can't do fifty million things at once." Likewise, another participant discussed using focused attention during this activity to ". . . try to focus on the task ahead and not focus in on all the little things people have said around you."

Positive Thinking. When a study participant discussed belief in self (ie, confidence), self-care, and/or the ability to question negative, default responses and replace those responses with encouragement and self-acceptance, researchers coded this phenomenon as "positive thinking." Participants referenced "positive thinking" processes 25 times, and their comments centered primarily on using positive self-talk to accomplish goals and feel better about themselves, while rejecting old patterns of negative thinking that had held them back and allowed feelings of sadness to flourish. One participant said,

> What was really helpful was actually telling yourself you can do it. Like positive words. You are sad and you can't do something. You start thinking to yourself, and you start telling yourself you can do it; it actually really helped.

Another described identifying and endorsing positive thought patterns, such as centering on a goal and maybe one thought that is going to help you reach your goal. Like a friend saying,

> "You're going to ace this test" and then you're focused on the test instead of your teacher saying, "If you fail this test it's 60% of your grade." And so focusing . . . on the friend giving you the drive you need.

Positive thinking also helped one participant reduce his stress:

> Before the class I was dealing with a lot of stuff at work and off work. This little situation was killing me. She taught us how

> to say positive things to yourself and that everything will be okay. So I was really negative before. I would look at a person and say, "He or she doesn't really like me or like this person or that person is looking at me funny." But now I look at things differently. It's changed my mood a lot. I'm more positive and happier as well.

Ambivalent or Negative Reactions. A few participants described specific practices that they considered not useful or relevant such as the gentle yoga practice or the "Voices in the Head" role playing activity. Overall, these comments were isolated to individuals (ie, when a participant mentioned disliking a practice, others did not respond by either agreeing or disagreeing). However, there was one exception: a boy in the group expressed a negative reaction to the body scan (e.g. "The body scan, I didn't like . . . I don't want to describe it; I just didn't like it."), which prompted a series of questions and challenges from other members of the group who insisted on its benefits. This individual's negative reaction may indicate emotional discomfort with the body scan, which highlights the importance of encouraging youth to participate in mindfulness activities while being sensitive to and respectful of an individual's background, exposure to trauma, and general willingness to engage. For example, facilitators might allow an individual to simply observe rather than participate in a practice or to use a modified approach during the body scan such as sitting up with eyes open. This recommendation is consistent with instructions from many mindfulness training protocols, which advise individuals to modify exercises according to their level of physical and emotional comfort[44] while considering a hybrid approach to using mindfulness-based interventions with individuals who experience maladaptive reactions to trauma.[45]

Apart from the handful of ambivalent or negative participant comments, the combined results from this pilot study, both quantitative and qualitative, suggest that the students in this alternative high school setting benefitted from the *Learning to BREATHE* intervention. First, postintervention mean results indicated a reduction in stress on completion of the program. Second, postintervention mean results suggested higher levels of self-esteem on completion of the program. Third, after coding the focus group data, several key themes emerged in commentary about course outcomes, including reported benefits to (*a*) self-regulation, (*b*) attention-awareness, and (*c*) positive thinking, demonstrating shifts in participants' perceptions of their cognitive processes and the potential for enhanced metacognitive skills.

Discussion

Survey Data

Because this was a community-based research study that emerged from a larger strategic planning goal (ie, "Assess and demonstrate improvement in students' social emotional learning"), staff members requested that all students participate in the *Learning to BREATHE* mini-course. Although the pre- and post-test study design was not optimal (as opposed to a randomized controlled trial), all students at the school had the opportunity to engage with the curriculum and the strategies and tools offered. Despite the small number of participants ($N = 23$) in this brief, non–credit-based course, pre- and post-intervention mean differences on several items within the Perceived Stress Scale[37] as well as the Single Item Self-Esteem Scale[38] were statistically significant with small to moderate effect sizes. However, no statistically significant mean differences occurred on the Mindful Awareness Attention Scale.[39] This could be attributed the brevity of the mindfulness-based practice, yet this brief intervention *did* yield significant mean differences on items in Single Item Self-Esteem Scale and the Perceived Stress Scale. Perhaps the reported improvements in self-esteem and reductions in stress could be linked to elements of the curriculum that focused on reframing thoughts rather than those elements devoted to redirecting and refocusing attention. The intervention featured six 45-minute sessions that included approximately 20 to 25 minutes of mindfulness-based practices per session, totaling no more than 2.5 hours of classroom practice. Furthermore, although invited to engage in home practices such as the body scan, all study participants did not necessarily do regular "homework" to reinforce such attentional practices.

Research demonstrates that both the consistency and the amount of participant practice is linked to improvements in mindfulness skills.[46,47] To increase students' capacity for developing attention, future interventions might be enhanced by (*a*) lengthening the class time from 6 to 8 sessions (another option in the *Learning to BREATHE* course materials), (*b*) increasing the proportion of time allotted for attention-based practices versus instruction and discussion, and (*c*) taking a more proactive stance during instruction to assigning, discussing, and promoting weekly home practices. When consulted, staff members agreed that students could benefit from using tools and strategies more consistently at home, suggesting that a recording or tracking method for course credit might be the most useful. Students with access to technology could use phone apps like "Take a Chill," or online meditation resources such as Destressify or Headspace.

Focus Group Data

Apart from the quantitative data collected in this pilot study, the qualitative study design also holds several limitations. First, although they were not incentivized, eight participants self-selected to participate in the focus group at the conclusion of the intervention; therefore, these 8 participants may have been more likely to speak positively about the intervention than the other study participants. Second, regardless of the fact that an objective and trained, third party (a school counselor) conducted the focus group, participants' commentary may reflect

the social desirability bias—the tendency of respondents to answer questions so that they will be viewed favorably by others (eg, other focus group peers, the focus group facilitator, and ultimately, the researcher). Third, although all questions were open-ended and the facilitator did not ask leading questions, the changes student participants described may not necessarily be attributed to the intervention itself, and it is even more difficult to determine which aspects of the intervention (eg, body scan practices, breathing practices, elements of cognitive behavioral therapy) were ultimately most influential on student participants based on the transcribed data collected. Finally, despite achieving interrater reliability (91%) in coding 10% of the data with a research assistant, the coding process itself has limitations. Qualitative studies often feature a small sample size, can be subject to the biases of the investigators, and are considered to be descriptive in nature with potentially limited generalizability.[48,49]

"Control" and Awareness. Regardless of the noted limitations, a very careful coding process led researchers to identify central topics or themes that emerged from focus group commentary about the benefits of the curriculum. Participants spoke most frequently about (*a*) self-regulation and (*b*) open awareness. The self-regulation category was coded when an individual discussed his or her ability to internally manage thoughts, breath, and/or stress in order to calm, relax, and slow down their default physiological and mental responses. Interestingly, references to self-regulation sometimes reflected a tendency to refer to management or "control" of thoughts and feelings (ie, participants referenced "control of emotions" and "control of actions," and control of "how you breathe" several times). A few comments reflected both the language of "control" intertwined with language acknowledging the mindful skill of "open awareness" (coded when participants discussed an ability to see and/or broadly sense or notice something within themselves or their surroundings). For example, one participant shared: "the thing that I took away was how to control your emotions . . . and being more mindful of what you're thinking about and what thoughts you allow yourself to have." The use of the words "control" and "allow" sandwiched and somewhat subsumed the reference to mindful, open awareness in this statement, a skill that was actually at the heart of the curriculum.

In light of this phenomenon, the subcode of "control" (under self-regulation) emerged for researchers as the *Learning to BREATHE* mindfulness practices and curriculum centered around nonjudgmental acceptance and the ability to simply observe, name, and label present moment experience from a position of curiosity and detachment. However, the direct references to "control" in this data set suggest that some participants misinterpreted, misunderstood, or had not yet experienced or internalized the benefits of a more open-minded and accepting mental stance after 6 weeks of classroom practice.

Relationship to Thought. The complete set of subcodes representing self-regulation featured direct references to (*a*) control, (*b*) breathing to regulate or calm, (*c*) relaxing or slowing down, (*d*) managing stress, and (*e*) a participant's expressed relationship to thought. The fifth subcode, "relationship to thought" encapsulated a tension between thinking less (eg, "clearing your mind out," "not thinking as much," "having a blank mind") and thinking more (eg, "I'm overthinking. That's my problem" or "I'm thinking deeper"). Participants' comments reflected a range of descriptors addressing their relationship to thought, which was challenging for researchers to categorize within their coding framework. Participants who discussed clearing their minds or detaching from thoughts consistently spoke of it positively while participants who described greater attachment to thoughts framed this occurrence as both negative and positive, depending on the participant. One boy viewed "overthinking" as his "problem" while 2 girls described "overthinking" as both a negative and a positive. One of the girls implicitly referenced mindfulness practice by claiming,

> I really don't need to be thinking about a [particular object] for twenty minutes, but sometimes it makes me slow down a situation and really think, "Is this a good idea? Should I really be doing this?" And before I wouldn't do any of that.

Enhanced Metacognitive Awareness. The responses above indicate that participants were consciously reflecting on the degree to which they were immersed in (or perhaps detached from) conscious mental processing. Furthermore, their responses indicate that they were actively evaluating their relationship to thought by assigning labels such as "over" thinking or "under" thinking. Metacognition or "thinking about thinking" involves a top-down regulation of information,[50,51] and self-monitoring plays a central role in metacognition. Schunk[52] claims that self-monitoring (as a self-regulatory process) enhances individuals' awareness of thoughts and behaviors and supports them in evaluating and ultimately improving behaviors.

While our initial research questions did not target metacognition as a dependent variable, both the descriptive code "self-regulation" and the subcode of "relationship to thought," featured prominently in the focus group data. Currently, mindfulness-based interventions in schools are primarily promoted to enhance students' well-being, but evidence that these interventions affect cognitive processing and performance is growing.[53] A therapeutic intervention with adults called mindfulness-based cognitive therapy has been directly linked to enhanced metacognitive awareness, while current research[54-56] provides evidence based on "brain indexes of attention processing" that mindfulness practices affect metacognition in adolescents as well, helping them to control negative thoughts and hypercritical self-beliefs. Furthermore, researchers have recently proposed a multilevel metacognitive model of mindfulness that

addresses metacognitive knowledge, experiences, and skills.[51] Further educational research directly linking mindfulness-based interventions with increased metacognitive awareness, improved behavioral outcomes, and enhanced academic performance would be very beneficial to the field.

Overlapping Processes and Implications for Further Research. Despite achieving interrater reliability, another phenomenon that emerged during coding was the occurrence of multiple overlapping codes. Many of the participants' individual comments received several overarching descriptive codes (eg, "self-regulation" and "attention-awareness" or "positive thinking" and "self-regulation"), which reflected the interconnectivity of curricular ideas as focus group members reflected their understanding of course concepts and practices. The mental processes and dispositions described by participants did not necessarily lend themselves easily to categorization, and mindfulness processes themselves have not been clearly and decisively operationalized to the full satisfaction of the research community.[15,54] Furthermore, study participants' ability to articulate their understanding of mindfulness and its benefits after a 6-week intervention may differ from their ability to actively utilize and internalize mindfulness tools over a sustained period of time.

Self-Regulation. Regardless, the focus group commentary in this study featured one particular behavioral outcome that was most frequently associated with the curriculum: enhanced self-regulation. When asked directly about the benefits of the curriculum, participants most readily reported a greater ability to calm their physiology, slow down, and better regulate their thinking processes.

The results of several research studies with adolescents certainly indicate that mindfulness interventions can play a role in increasing self-regulatory skills.[19,30,57,58]

Some researchers theorize that mindfulness may enhance self-regulation along with the reciprocal processes of cognitive functioning (attentional flexibility), psychological functioning (emotional states), and coping behaviors (responses to challenges).[19] Psychological shifts may be associated with improvements in multiple domains, including improved intentional shifts in attention, increased flexibility of attention, reduced emotional intensity and duration of emotional response, and reduced belief in automatic thoughts.[21] Further qualitative research studies of long-term mindfulness practitioners could enhance understanding of the mechanisms underlying mindful awareness and the interplay between open, nonjudgmental awareness and enhanced self-regulatory capacity.

Larger studies with a randomized controlled design could operationalize self-regulation as a dependent variable through self-report measures such as the Difficulties in Emotion Regulation Scale[59] as well as observed behavioral outcomes. Because the *Learning to BREATHE* intervention[16] features mindfulness-based practices as well as some elements of cognitive behavioral therapy, a larger study could also include several treatment groups or conditions (eg, mindfulness only, cognitive behavioral therapy only, mindfulness and cognitive behavioral therapy) and a control group.

Conclusion: Program Feasibility

Overall, participants in the focus group (representing more than one-third of the participant population) responded positively to *Learning to BREATHE* curricular concepts and mindfulness-based practices. As a result, school staff suggested that the *Learning to BREATHE* curriculum might be offered as a more formal, credit-based option to increase attendance rates and student "buy in." Both students and teachers informally proposed that mindfulness concepts and practices could also be woven into the school day and overarching curriculum in the following ways: (*a*) introducing each class with a "mindful moment," (*b*) taking breaks for gentle yoga-based stretches during advisory periods and/or lunch, and (*c*) presenting and contextualizing stress management tools and concepts within the context of science class with a focus on brain research and learning.

These suggestions complement and build on evidence-based recommendations drawn from other feasibility studies[34(p103)]: (*a*) establishing a physical space where students feel safe, (*b*) utilizing school personnel as class assistants, (*c*) spending informal time outside of class with students to establish trust, (*d*) inviting students to participate and not judging them for not participating, and (*e*) being flexible to minor curriculum adaptations in order to meet students' needs. It is also important to consider that the *Learning to BREATHE* curriculum, along with other mindfulness-based programs, involves one or more instructors actively leading and participating in exercises to build mindfulness capacities in youth; to authentically deliver this type of curriculum, an instructor's ongoing personal mindfulness practice provides the embodied modeling that is essential to helping students flourish in their own development of these skills.[60]

As a pilot study at an alternative high school, the data holds value as it indicates recommendations for program feasibility as well as possible school-wide and classroom-based practices that might benefit this student population. This curriculum has the potential to empower adolescents with greater self-esteem while enhancing their perceived self-regulation and stress management skills as well as their metacognitive awareness. The mindfulness-based practices and life management skills featured in the *Learning to BREATHE* curriculum can serve as valuable social emotional learning tools in the challenging transition from high school to college, career, and young adulthood.

Appendix A

Perceived Stress Scale and Single-Item Self-Esteem Scale

Name _____
Age _____
Gender (Circle): M F

The questions below ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

0 = Never, 1 = Almost Never, 2 = Sometimes, 3 = Fairly Often, 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?	0 1 2 3 4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0 1 2 3 4
3. In the last month, how often have you felt nervous and "stressed"?	0 1 2 3 4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0 1 2 3 4
5. In the last month, how often have you felt that things were going your way?	0 1 2 3 4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0 1 2 3 4
7. In the last month, how often have you been able to control irritations in your life?	0 1 2 3 4
8. In the last month, how often have you felt that you were on top of things?	0 1 2 3 4
9. In the last month, how often have you been angered because of things that were outside of your control?	0 1 2 3 4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0 1 2 3 4

I have high self-esteem (circle a number below).
Not very true of me 1 —2 —3 —4 —5 —6 —7 Very true of me.

Appendix B

Mindful Attention Awareness Scale

Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be.

1 = almost always
2 = very frequently
3 = somewhat frequently
4 = somewhat infrequently
5 = very infrequently
6 = almost never

	Never Almost Always Almost
1. I could be experiencing some emotion and not be conscious of it until some time later.	1 2 3 4 5 6
2. I break or spill things because of carelessness, not paying attention, or thinking of something else.	1 2 3 4 5 6
3. I find it difficult to stay focused on what's happening in the present.	1 2 3 4 5 6
4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	1 2 3 4 5 6
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1 2 3 4 5 6
6. I forget a person's name almost as soon as I've been told it for the first time.	1 2 3 4 5 6
7. It seems I am "running on automatic" without much awareness of what I'm doing.	1 2 3 4 5 6
8. I rush through activities without being really attentive to them.	1 2 3 4 5 6
9. I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there.	1 2 3 4 5 6
10. I do jobs or tasks automatically, without being aware of what I'm doing.	1 2 3 4 5 6
11. I find myself listening to someone with one ear, doing something else at the same time.	1 2 3 4 5 6
12. I find myself preoccupied with the future or the past.	1 2 3 4 5 6
13. I find myself doing things without paying attention.	1 2 3 4 5 6
14. I snack without being aware that I'm eating.	1 2 3 4 5 6

Authors' Note

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Author Contributions

ALE was responsible for conceptualizing, designing, and conducting the study and resulting analyses. NMT contributed to the qualitative analysis and writing the article.

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Ethical Approval

The study protocol was approved by Seattle University's Institutional Review Board.

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