Abstract

Investigating the Effects of an Audio-Guided Mindfulness Intervention for Elementary School Students and Teachers

by

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Mindfulness practices, used to focus and sustain attention, have been shown to promote school readiness, and to positively impact students' academic success. Yet, incorporating these practices into the normal school day has been difficult due to the curriculum changes and teacher training necessary for implementation and sustainable operation. This study utilized a quasi-randomized controlled trial (RCT) design, to measure the effects of a mindfulness program on student grades, on teaching operations, and on teacher mindfulness and stress. The program consisted of 90 audio-guided tracks, each 10 minutes in length. The automated delivery system, via an MP3 player and docking station, offered both students and teachers the opportunity to consistently participate in mindfulness practices each school day without impacting teaching operations. A total of 337 students in 2 schools participated in this study. There was a significant mindfulness intervention effect on students' grade point average (GPA) changes in School A ($N = 131$), between the treatment ($n = 64$, $M = 2.7995$, $SD = 3.13$), and control ($n = 67$, $M = .0448$, $SD = 2.61$) groups; $t(129) = 5.48$, $p < .001$ (2-tailed), 99% CI [1.76, 3.75], $d = .96$. In school B, ($N = 206$), there was a near significant mindfulness intervention effect on GPA changes between the treatment ($n = 103$, $M = .0357$, $SD = .065$) and control ($n = 103$, $M = .0091$, $SD = .126$) group; $t(204) = 1.91$, $p = .058$ (2-tailed), 95% CI [-.001, .054], $d = .27$. These results suggest that a daily audio-guided mindfulness practice can positively impact student grades across all subjects with less than 1 hour of teacher training and with no changes to the existing curriculum.

Chapter 3: Research Methods

Research Design and Methodology

To evaluate if a daily mindfulness practice could enhance elementary students' academic outcomes, without changing the existing curriculum, this quasi-randomized control trial (RCT) was conducted in 28 classrooms in four elementary schools. In an effort to maintain normal classroom operations without disruption, randomization was done at the classroom level, within each school, since those groupings were preexisting. This clustered design mirrored how the program would operate in a typical public school environment.

The study measured grades, feasibility and fidelity of implementation, curriculum impact, as well as teachers' mindfulness and stress. Behavior measures were not included in the current study. In the Pilot-1 study, there was high variability in reporting student behavior from classroom to classroom and from school to school. In the current study, the researcher anticipated that capturing quarterly principal referrals only, defined as when students are sent to the principal's office, and not classroom behavior events, would yield more uniform data. However, the total number of incidents was too small for analysis.

This design was selected for three reasons. First, there is evidence that mindfulness practices have a positive influence on children's mental health, attention and behavior regulation and on their school success, based on research conducted in non-school settings and/or with clinical student populations (Biegel et al., 2009; Semple et al., 2010; Zylowska et al., 2008), yet no published studies have examined the impact of mindfulness on grades within traditional classroom settings. These outcomes are important to administrators, parents, and students, and will likely be required if schools are to adopt this type of program more extensively. A comparison of grades is well suited to a quantitative RCT design.

Second, this intervention was designed to demonstrate universality in program delivery, in that every classroom can use this format with all students, with existing teaching staff, within existing curriculum parameters, and with very little equipment or room layout changes. Therefore, randomization was done at a classroom level, not at a student level, hence the classification as a clustered design.

Third, education policy is guided by *evidence-based* interventions, which means that interventions must show a statistically significant effect on key measures. Statistical significance of an intervention can be measured using a pre/post design, a pre/post design with both an intervention and a control condition, or a pre/post design with both intervention and control conditions and where participants in each condition are randomized. Randomization is the critical element that ensures, on average, that other possible causes are equal between the two groups; thus, any significant difference in outcomes between the groups can be attributed to the intervention. RCT's are considered the gold standard in this type of scientific research (Moher, Dulberg, & Wells, 1994; U.S. DOE, 2003). Of the eight studies profiled in Chapter 2, five were RCT's where the randomization was done from a group of volunteers, not from the entire teacher or student population, similar to the current study. In order to shift education policy nationally, regionally, and locally, this study design offers recognized scientific rigor toward achieving those outcomes.

Participants

Four socioeconomically diverse public elementary schools in three states (Illinois, New York, and Massachusetts) were targeted to participate in the study. The schools were chosen to be representative of U.S. public elementary schools. As depicted in Table 5, the schools serve an ethnically, socioeconomically, and geographically diverse student population, addressing another

deficit in existing literature. According to the Great Schools organization, an aggregator of public school demographic and performance data, the schools also have varied academic performance across key standardized test measures including reading, math, and science. The principal at each school agreed to participate in the study.

Table 5

School Demographics-Preliminary

Project schools	Race and ethnicity				SES: % of free/reduced lunch	Academic performance
	% H	% W	% B	% O		
School A (IL)	74	18	2	6	68	Rating 6 of 10, average performing
School B (NY)	1	97	0	2	14	Rating 8 of 10, high performing
School C (MA)	2	86	1	11	6	Rating 10 of 10, highest performing
School D (MA)	20	23	49	8	78	Rating 6 of 10 average

Note. H = Hispanic. W = White. B = Black. O = Native American and Other.

Measurement Techniques

Student academic outcomes were measured using students' term grades as the dependent variable in relation to a daily mindfulness practice. This academic data were already being collected and tracked by each school as a part of its normal operations. During the study, each

classroom teacher or the school administrator completed a grades tracker at the start and the conclusion of the study. The tracker was used to document student grades in each of six subject area, including reading, math, science, written language, spelling, and social studies for School A, and reading, math, science, written language, verbal communication, and social studies for School B. Each student was assigned a numerical identifier to be used throughout the study. No student names were shared with the researcher. Classroom teachers provided general demographic information on each student including gender and any learning related designations. Learning related designations included students who have an Individual Education Plan (IEP). IEP is a federally recognized subcategory of students who have been identified as having cognitive or behavioral learning disabilities or delays, including autism, Attention Deficit/Hyperactivity Disorder (ADHD), and/or other related disorders. These students may or may not be considered special education. Special education is a subset of IEP students who require more intensive support.

Program efficacy data were collected each week. Participating teachers reported if they were able to run the program each day, if they participated, and if they were able to complete the planned curriculum. They also noted if there were any specific issues related to the program, including issues with student participation. This information was used to assess the practical feasibility of running the program every day without changing the planned curriculum, as well as the fidelity of operation from teacher to teacher.

Additionally, each of the classroom teachers filled out two surveys, the MAAS to measure trait mindfulness and the PSS to measure perceived stress. The MAAS demonstrates good reliability with a coefficient alpha of .81 (Brown & Ryan, 2003). Currently, there is a debate within the mindfulness community about existing self-report survey's, including MAAS,

that claim to measure the complex traits associated with developing and embodying mindfulness (Grossman, 2011). There is limited convergent validity; in fact, most available self-reports appear to be measuring different aspects of trait mindfulness (Grossman, 2011). However, for this study, the MAAS was chosen to align with the prior Pilot-1 study. The PSS demonstrates acceptable reliability with a coefficient alpha of .78 (S. Cohen & Williamson, 1988).

Teachers completed either a paper or electronic version of the MAAS and the PSS at the beginning of the study and again at the end. While teacher mindfulness and stress were not the primary focus of this research, the pilot study, $n = 8$, showed a significant effect of increased mindfulness for participating teachers (Bakosh et al., in review). Teachers also communicated through a qualitative survey that they believed the program helped them to manage the classroom dynamics more effectively. This may provide another avenue to explore in future research.

Data Collection

Data were collected in all classrooms in three phases—Pre, Continuous, and Post:

Pre (prior to the start of the study):

- MAAS and PSS—completed by classroom teachers.
- Prior period grades—reported by classroom teachers or school administration. This includes Gender, IEP, Spec Ed, and ADHD designations.

Continuous (ongoing data collection):

- Program efficacy tracker (weekly)—completed by classroom teachers (treatment only).

Post (at the end of school year):

- Final grades—reported by classroom teachers or school administration.
- MAAS and PSS—completed by classroom teachers.

- Program Feedback Form—completed by classroom teachers (treatment only).

Procedure

Each school principal introduced the program to teachers in all elementary grade levels, first through an informational e-mail, then at a staff meeting to solicit volunteers prior to the start of the term. A list of teacher volunteers was provided to the researcher and matched by grade level by school. The randomization was done by grade level, by putting each teacher's name in a container and selecting one at a time, first for treatment, then for wait-list control, and so on until each name was selected. When there was an odd number of volunteers for a grade level, for instance three for second grade, then the same procedure applied for the next grade; however, the procedure was reversed, selecting control first, so that the total group of treatment and wait-list control classes per school was as close to equal as possible. Each school included at least four classrooms, two in each condition. All four schools launched the program in March, 2013.

A 60-minute training session was held within 1 week prior to the planned launch at each of the participating schools, which covered normal program operation and the research protocol. Teachers were notified of their randomization assignments into either the treatment or wait-list control condition at the start of the training. Teachers in the wait-list control condition were told they would have the opportunity to participate in the program at the start of the next term. All teachers participated in the first 30 minutes of training, which included a review of general information related to mindfulness, the informed consent agreement, and the research protocol. Only teachers in the treatment group participated in the last 30 minutes of training, which was a review of the Inner Explorer Program operation, the weekly program tracker, and frequently asked questions.

The training session began with a sitting mindfulness exercise so that teachers could experientially understand what the program entailed. The researcher then provided an overview of mindfulness research related to cognition, stress, and educational outcomes. Each teacher received two copies of the informed consent agreement (Appendix A), which included the researcher's signature. The informed consent agreement was reviewed as a group and all questions were answered. Teachers were asked to sign the agreement because they were self-reporting on mindfulness and stress measures.

Students and parents did not sign assent or consent agreements in alignment with the American Psychological Association Publication Manual (APA, 2012), Ethical Standards for the Reporting and Publishing of Scientific Information, 8.05 Dispensing With Informed Consent for Research. According to these guidelines, the proposed research is eligible to waive consent for the following reasons: all academic information is already collected in each school as part of the normal operation, student grades were blinded to the researcher, and there was no specific identifiable student information collected for this study (APA, 2012). All teachers signed both copies of the informed consent in the meeting and handed one to the researcher and kept the other copy for their records.

Both treatment and control teachers were given the grades tracker, which mirrored their districts' grading practice. They were asked to complete the grades tracker (Appendix B and C) with student grades from the term that just ended, as the pre condition for the study. They were also given the PSS and MAAS forms. For all forms and trackers, teachers were asked to complete either the electronic version or the paper version within 1 week. Once complete, they could either e-mail it back to the researcher or leave it in the administrator's office in a special folder that was set up for the study.

When the first portion of the training was completed, which took 30 minutes, the control teachers were excused from the meeting. During the remaining 30 minutes, the researcher provided instructions for the research protocol for the weekly tracker (Appendix D). On the weekly tracker, each treatment teacher documented with a *Yes* or *No* if he or she ran the program each available day that week, if he or she participated in the program with students, if he or she accomplished the planned curriculum and if there were any issues related to the program. Available days included all normal school days and excluded any planned or unplanned days off, for instance a snow day, as well as any day that more than half the day was spent off campus, for instance on a field trip. If Yes was marked on the issues column, teachers were asked to write an explanation in the space provided below the column, describing the issue(s) in detail. Teachers were asked to e-mail the form to the researcher or to leave the paper copy in the administration office in the special research folder.

During the training for the treatment group, the researcher also provided an overview of the Inner Explorer Program, the Teacher's Manual, which includes frequently asked questions, and the general operation of the program equipment. The treatment classrooms each received a classroom kit, which was on loan for the duration of the study. The kits included the preloaded iPod MP3 player with 90 Inner Explorer MBSEL tracks, a docking station with speakers, Teachers' Manual, parent letter student journaling notebooks, as well as a few classroom tools including a rain stick and glitter ball, as well as a teacher gazing stone. The rain stick is used on the recordings to indicate the start and end of the recordings each day. The researcher demonstrated how to use the rain stick to reengage students into a mode of mindfulness, as well as how to use the glitter ball to explain that mindfulness practices allow strong thoughts and emotions to settle, like the glitter, so that clearer choices can be made. Additionally, teachers

were encouraged to use the gazing stone as a focusing point so they could participate in the program even if they were uncomfortable closing their eyes.

The researcher co-developed the Inner Explorer MBSEL Program that was used in this study. The program included 90 MP3 audio-guided tracks. Each track is approximately 10 minutes in length, and includes a journaling integration exercise for the last 2 minutes of the recording. The program was designed as a curriculum-neutral method of delivering mindfulness training to students, so that it can be used each school day in all elementary classrooms during normal transition times, for instance, after lunch or in between two challenging subjects. It was expected that the program could be consistently operationalized into the normal school day, to improve student performance, without changing the existing curriculum.

The treatment classrooms participated in the 10-minute-per-day audio-guided mindfulness program, from the 90-track series. Each day, the classroom teacher selected and played one track, in sequential order, using the preloaded MP3 player and speaker system in the classroom. Teachers were encouraged to pick a normal transition time to run the program, for instance, after lunch or recess or in between two intense subjects. They were encouraged to stay with the selected time throughout the study. It was expected that running the program would not require changes to the existing curriculum. Teachers were encouraged to participate in the program, along with students, by sitting and listening to the recording each day, while either closing their eyes or looking at a gazing stone. Teachers filled out the tracker each day documenting if they ran the program, if they participated, if they were able to complete their planned curriculum, and if there were any issues associated with the program. The control classrooms simply continued with the existing curriculum.

Treatment of Data

The data were analyzed using SPSS version 21 software. All four data sets including one each for, School A grades, School B grades, Teacher MAAS, and Teacher PSS, were initially assessed for validity with ANCOVA algorithms. One of the data sets was not compliant with the homogeneity of regression test (School B grades) and one was not compliant with the linearity test (Teacher PSS). As a result, all four data sets were analyzed using independent samples *t*-tests. Bonferroni's correction was applied to guard against Type I errors across six school subjects.

Data from both schools were analyzed to compare the overall changes in Grade Point Average (GPA) for mindfulness treatment and control student in each school. Additionally, by-subject *t*-tests were conducted to determine which specific subjects were influenced by mindfulness practices, as well as the influence of student IEP, Special Education and ADHD designation on grade changes in each school. The significance level was set at 95% confidence interval, with a *p*-value of .05 and Bonferroni's correction was applied to the by-subject analysis, with an adjusted *p*-value of .0083,to limit the potential for Type I (false positive) errors.

Data from the two teacher scales, PSS and MAAS, were analyzed using an Independent Samples *t*-test to assess the change in pre- and post-outcomes within and between treatment and control conditions. The significance level was set at 95% confidence interval, with a *p*-value of .05. Bonferroni's correction was applied to the teacher scales analysis, with an adjusted *p*-value of .025 for each.

Internal / External Validity

This study contained three threats to internal validity, the degree to which findings accurately measure the treatment effects. First, since the treatment and control students were in

the same grades at the same school, it is possible that there may be cross contamination due to student sharing details about the mindfulness intervention. This could weaken the treatment effect. Second, changes in teachers' mindfulness and stress may impact student academic performance (Singh, Lancioni, Winton, Karazsia, & Singh, 2013). Teachers in the Pilot-1 study significantly increased their ability to be mindful as measured by the MAAS change scores, $t(178) = .79$, $p = .012$, and reported a reduction in stress, although that result failed to reach significance. These effects may impact student outcomes. Since teachers and students were both participating in the program at the same time, it is difficult to decouple these factors because teachers' mindfulness and stress levels could not be held constant. This is an area for further research. Third, randomization was done within a group of volunteer teachers, not from all possible teachers within each school or each district. While students did not volunteer but were randomized by classroom clusters, it is possible that some self-selection bias occurred within the teacher population.

This study was designed to increase external validity, or the degree to which the findings can be generalized to all elementary students, in five ways. First, there was a relatively large initial sample size of 643 students in the four schools. Second, students from all elementary grades, first through fifth, participated, including special needs students. This allowed for an analysis that included students in all grade levels, 1-5, as well as an analysis specifically within the special education student population. Third, schools from different states across the country were included to consider geographic differences. Fourth, participating schools were included based on reported diversity in socioeconomic and cultural backgrounds. Finally, student achievement was used to select schools with varying performance from a 5 of 10 through a 10 of 10 on the Great Schools.org rating scale. The analysis will include an evaluation and comparison

of these subcategories to establish the usefulness of the MBSEL program in various U.S. public elementary school settings.

Please note that in order to protect the privacy and anonymity of the schools that graciously participated in this study, I have purposely only listed the general website link (http://www.greatschools.org). I have not listed the specific webpage link *within* the website, since doing so would then identify the name of the schools that participated in this study and, thus, break confidentiality.

Chapter 4: Results

This quantitative study evaluated the effects of implementing the Inner Explorer MBSEL program in first through fifth grade elementary classrooms. The study was conducted over a 10-week period during the last term of the school year in 2013. Of the four schools that began the study, two schools provided data in all categories (pre, ongoing, and post) and were included in the final analysis. Two schools were excluded from the study, one due to a catastrophic event and the other due to a change in the school district's legal position related to data collection.

Of the two excluded schools, the first one had a student killed and another one seriously injured in the Boston Marathon bombing in April, 2013. The student killed was a participant in the study in one of the third-grade treatment classrooms. This event caused school personnel to focus all teacher and administrative resources on student crisis management activities, thus they were not able to provide continuous or post study data. They did, however, continue to use the program in all treatment classrooms each day throughout the remainder of the school year as a way to support students' emotional well-being. They also requested and began using an additional system in the teacher's lounge so that teachers who were not part of the study could benefit from the daily mindfulness practices. The second school was excluded due to a change in their legal policy related to accessibility of student outcomes data. They chose to continue running the program in the two treatment classrooms through the end of the year, but neither the treatment or control teachers were able to provide data. Although the present study did not collect any student identifiable information, the district's new legal policy prohibited the school from sharing any student data with non-school personnel.

Description of Sample

The final sample for this study consisted of 383 students, in 18 classrooms, in two elementary schools. The following tables (Tables 6 and 7) show the schools' demographic variables, based on the GreatSchools.org rating scale, as well as the total number of students per school, per grade, for the treatment and control groups.

Table 6

School Demographics-Final

Project schools	Race and ethnicity				SES: % of free or reduced lunch	Academic performance
	% H	% W	% B	% O		
School A (IL)	74	18	2	6	68	Rating 6 of 10, average performing
School B (NY)	1	97	0	2	14	Rating 8 of 10, high performing

Note. H = Hispanic. W = White. B = Black. O = Other.

Each school had a unique geographic and ethnic profile. School A is located in a suburban area in Illinois, in the sixth largest district in the state, which includes 21 schools. The school hosts the district's Dual Language (DL) Program, which is conducted entirely in Spanish, and is considered an English as a Second Language (ESL) program. The sample population at School A was 74% Hispanic, 18% White, 2% Black, and 6% other, with 68% of students eligible for free or reduced lunch. School B is located in a rural area in upstate New York, in one of the smallest districts in the state, which includes five schools. The ethnic profile of the sample population at School B was 1% Hispanic, 97% White, and 2% other, with 14% of students eligible for free or reduced lunch.

Table 7

Participants

Project schools	Students by grade					Total students
	1	2	3	4	5	
School A–Treatment	22	47			17	86
School A– Control	24	48			19	91
School B–Treatment	20	39	22	22		103
School B–Control	18	21	45	19		103
Total Treatment (A & B)	42	86	22	22	17	189
Total Control (A & B)	42	69	45	19	19	194

School A had 8 teachers participate in the study. Teachers were randomized by grade level, into treatment and control groups. In both groups there were four classrooms each: 1 first grade, 2 second grade, and 1 fifth grade. There were a total of 177 students from School A, (86 treatment students and 91 control students) who participated in the study. School A reported gender information by classroom, with 76 girls and 101 boys, 45% and 55% respectively.

School B had 10 teachers participate in the study. Teachers were randomized by grade level, into treatment and control groups with 5 teachers in each condition. In the treatment group—which included 1 first grade, 2 second grade, 1 third grade, and 1 fourth grade—there were a total of 103 students. In the control group—which included 1 first grade, 1 second grade, 2 third grade, and 1 fourth grade—there were a total of 103 students. There were 206 student

participants in School B. Gender data were given on a school wide basis and extrapolated by classroom, with 109 girls and 97 boys participating, 53% and 47% respectively. In both schools, all students who had pre and post scores were included in the sample. Students who moved into the district or moved out of the district during the term where excluded from the study.

MBSEL Effect on Student Academic Performance

Academic performance was analyzed separately for each of the two schools since they employed different grading practices. In addition, School A used two different grading practices one for first-grade students and one for second- through fifth-grade students. The data sets from School A and School B were reviewed to determine which statistical tests would be most suitable. In considering ANCOVA, each data set was analyzed to assess the assumptions of sample size, normality, linearity, equality of variance, and homogeneity of regression slopes. While School A satisfied all the assumptions, School B satisfied all but homogeneity of regression, therefore ANCOVA was invalidated. As a result, independent samples *t*-test was selected as the statistical method for analysis.

The effect of mindfulness practices on students' grades was analyzed in three ways. First, an independent samples *t*-test was conducted to compare the changes in grade point averages (GPAs) for the mindfulness treatment and control groups in each school (See Table 8).

Table 8

School A & B: Independent Samples t-Test Comparing GPA Changes by Treatment & Control Groups

	n	*M*	*SD*	*t*	*p*-value	d
School-A 1st grade Treatment	22	.171	.312			
School-A 1st grade Control	24	.115	.165			
School-A 2nd- 5th grade Treatment	64	2.80	3.13			
School-A 2nd- 5th grade Control	67	.045	2.61	5.48	< .001	.96
School-B All grades Treatment	103	.038	.065			
School-B All grades Control	103	.010	.126	1.91	.058	.27

In school A, for first-grade students, (n = 46), with a grading scale of 1-3, there was no significant effect, most likely due to a small sample size of two classrooms, and the potential for only a 2-point difference in the grading scale. However, for second- and fifth-grade students (n = 131), with a grading scale of 1-100, there was a significant difference in GPAs between the treatment (N = 64, M = 2.80, SD = 3.13), and control (N = 67, M = .045, SD = 2.61) groups; $t(129) = 5.48$, $p < .001$ (two-tailed), 95% CI [1.76, 3.75], d = .96. In school B, for first- through fourth-grade students, (n = 206), on a grading scale of 1-4, there was a near significant mindfulness intervention effect on GPAs between the treatment (N = 103, M = .038, SD = .065) and control (N = 103, M = .010, SD = .126) group; $t(204) = 1.91$, p = .058 (two-tailed), 95% CI [-.001, .054], d = .27. These results suggest that mindfulness practices can positively impact grades across all subjects.

Next, by-subject independent samples *t*-tests and effect size calculations (using Bonferroni's correction) were conducted to determine which academic subjects were influenced

by the MBSEL program. Effect sizes were calculated using Cohen's *d* (J. Cohen, 1988). Tables 9 and 10 present a by-subject comparison of the mean grade changes, standard deviations, *p*-values and Cohen's *d*, for students in the treatment and control groups in School A and School B respectively.

Table 9

School A: Independent Samples t-Test Comparing Subject Grades Changes for Treatment & Control Groups

	n	*M*	*SD*	*t*	*p*-value	*d*
Reading- Treatment	64	4.64	6.61			
Reading Control	67	2.51	8.42	1.61	.110	
Writing Treatment	64	2.58	6.44			
Writing Control	67	2.08	6.98	.429	.669	
Spelling Treatment	64	-.188	6.50			
Spelling Control	67	-.701	4.01	.547	.585	
Math Treatment	64	.953	3.10			
Math Control	67	-2.66	4.81	5.08	<.001	.89
Science Treatment	64	4.25	6.95			
Science Control	67	-.209	5.26	4.15	<.001	.72
Social Studies Treatment	64	4.56	5.49			
Social Studies Control	67	-.746	5.09	5.75	<.001	1.00

In School A, with over 74% Hispanic students, using a grading scale of 1-100, there was a significant difference in the change of math grades for treatment ($N = 64$, $M = .953$, $SD = 3.10$) and control ($N = 67$, $M = -2.66$, $SD = 4.81$) groups; $t(129) = 5.08$, $p < .001$ (two-tailed), 99% *CI* [2.20, 5.01], $d = .89$. There was a significant difference in the change of science grades for

treatment (N = 64, M = 4.25, SD = 6.95) and control (N = 67, M = -.209, SD = 5.26) groups; $t(129) = 4.15$, $p < .001$ (two-tailed), 99% *CI*. [2.33, 6.58], $d = .72$. Finally, there was a significant difference in the change of social studies grades for treatment (N = 64, M = 4.56, SD = 5.49) and control (N = 67, M = -.746, SD = 5.09) groups; $t(129) = 5.746$, $p < .001$ (two-tailed), 99% *CI* [3.48, 7.14], $d = 1.00$. These by-subject effect sizes, represented by Cohen's d-values, suggest that in School A, mindfulness practices positively impacted math, science, and social studies grades by 29%, 24%, and 30% respectively. There was no significant effect for the other three subjects, reading, writing, and spelling.

Table 10

School B: Independent Samples t-Test Comparing Subject Grade Change Scores for Treatment & Control Groups

	n	*M*	*SD*	*t*	*p*-value	*d*
Reading-Treatment	103	.031	.146			
Reading Control	103	.013	.170	.815	.416	
Writing Treatment	103	.034	.181			
Writing Control	103	.021	.245	.427	.670	
Verbal Comm. Treatment	103	.027	.129			
Verbal Comm. Control	103	-.002	.177	.1.37	.173	
Math Treatment	103	.053	.184			
Math Control	103	-.060	.250	3.70	< .001	.52
Science Treatment	103	.036	.137			
Science Control	103	.003	.218	1.28	.203	
Social Studies Treatment	103	.034	5.49			
Social Studies Control	103	.079	5.09	-1.31	.190	

Note. Comm. = Communication.

In School B, with 97% White students, using a grading scale of 1 to 4, there was a significant difference in the change of math grades for treatment (N = 103, M =. 053, SD = .184) and control (N = 103, M = -.060, SD = .250) groups; $t(204)$ =3.70, p < .001(two-tailed), 99% CI [.053, .174], d = .52. Interestingly, while not significant, verbal communication and science grades appear to be directionally improved by the intervention, whereas social studies grades appear to be directionally reduced. There were also no significant effects in the remaining two subjects—reading and writing. These results suggest that in School B, a daily mindfulness program can improve elementary students' grades in math by 18%

The third analysis of student grades was conducted with a series of ANCOVAs to control for the dependent variables including gender, special education, IEP (non special education) and ADHD designations, provided by School A. As noted earlier, School A had an ANCOVA validated data set. As expected, there was no gender effect (Raes et al., 2013; van de Weijer-Bergsma, 2012), and there were only 2 students with IEPs not linked to special education; therefore, the sample size was too small for a separate IEP analysis. However, there was a significant effect of the mindfulness intervention for special education students, n = 19, in GPA performance. Additionally, after applying Bonferroni's correction, significant by-subject effects remained for special education students in reading and for ADHD students, n = 7, in math (See Tables 11 and 12).

Table 11

School A: Analysis of Covariance for Special Education Students, Quarterly GPA and Reading Grades for Treatment & Control Groups

Source	*SS*	*df*	*MS*	*F*	*p*	*d*
Pre-scores-GPA	2623.445	1	2623.445	434.214	.000	
T or C-GPA	36.797	1	36.797	6.090	.015	.28
Error	761.269	126	6.042			
Total	1137106.528	131				
Pre-scores-Reading	3210.052	1	3210.052	105.125	.000	
T or C-Reading	651.554	1	651.554	21.338	.000	.45
Error	3847.482	126	30.536			
Total	1151084.000	131				

Note. T = Treatment. C = Control.

Special education students who participated in the daily mindfulness intervention performed significantly better in grades overall, as measured by quarterly GPA, $F(1, 126) = 6.090$, $p = .015$, as well as in reading, $F(1, 126) = 21.34$, $p < .001$. While nonsignificant, special education students also had directional improvements in writing, $F(1, 126) = 4.40$, $p = .038$, and in math, $F(1, 126) = 4.92$, $p = .028$. These results suggest that the daily mindfulness intervention can improve special education students' quarterly GPAs by 20% and their reading grades by 30.2%

Table 12

School A: Analysis of Covariance for ADHD Students, Math Grades for Treatment & Control Groups

Source	*SS*	*df*	*MS*	*F*	*p*	*d*
Pre-scores-Math	4002.300	1	4002.300	269.915	.000	
T or C-Math	199.465	1	199.465	13.452	.000	1.06
Error	1868.328	126	14.828			
Total	1131789.000	131				

Note. T = Treatment. C = Control.

ADHD students, $n = 7$, performed significantly better in math $F(1, 126) = 13.452$, $p < .001$. Considering Cohen's effect size values, this study suggests that a 10-week daily mindfulness practice has a large positive effect on ADHD students' performance in math.

MBSEL Effect on Teaching Operations

Program impact on teaching operations data as well as teacher stress and mindfulness data were combined from both schools and analyzed together. There was little to no impact of the mindfulness-based intervention on day-to-day teaching operations for participating classrooms in both schools, as shown in Table 8. School A had 45 available days and School B had 44 available days to run the program, excluding holidays, field trips, and teacher institute days. Out of an average of 42.2 school days that the intervention was run (the range was 40 to 45 days), participating teachers implemented the program 95.5% of available days, after 1 hour of training, which included 30 minutes to review the research protocol. On days the program was

implemented, both teachers and students had the opportunity to learn together, with students participating 100% of the time and teachers participating 97.4% of the time. These results are consistent with the pilot study, showing the program can be run every day and that teachers consistently make the choice to participate in the mindfulness practices along with their students.

Table 13

School A & B: Impact on Teaching Operations

Teacher	Available days	Days ran program	%	Days teacher participated	%	Days maintained curriculum	%
School A-1	45	42	93.3	42	100	42	100
School A-2	45	43	95.6	41	95.3	43	100
School A-3	45	45	100	41	91.1	44	98
School A-4	45	42	93.3	42	100	41	98
School B-1	44	43	97.7	42	97.7	43	100
School B-2	44	40	90.9	40	100	39	98
School B-3	44	44	100	44	100	44	98
School B-4	44	41	93.2	40	97.6	40	100
School B-5	44	42	95.5	40	95.2	42	98
Total (ave.)	44.4	42.2	95.5	41.3	97.4	42	99

Note. ave. = average.

Of particular importance, concerning the program's feasibility and fidelity, was that all teachers reported no issues with the program. Teachers also indicated every day on the daily tracker that they had been able to accomplish their planned curriculum 99% of the time (the range was 98% to 100%). These results suggest that the intervention had almost no adverse

impact on day-to-day classroom activities. Furthermore, the information provided by participating teachers in the feedback survey indicates that teachers were interested to start the MBSEL program at the beginning of the subsequent academic cycle and run it throughout the school year.

MBSEL Effect on Teachers Mindfulness and Stress

Teachers completed the MAAS survey to assess trait mindfulness and PSS survey to assess perceived stress prior to program launch as the pre condition and again at the end of the school year as the post condition. All 18 teachers returned the surveys prior to the start of the study. One week prior to the end of the school year, the researcher sent an e-mail to each teacher with the surveys attached. They were instructed to e-mail the completed survey back, or to return in to the administrative office within 10 days. Of the 18 participating teachers, 16 completed the surveys and sent them to the researcher, directly, or through the administrative office, and were included in the final sample.

The teacher mindfulness and teacher stress surveys were analyzed by conducting an Independent Samples *t*-test for each data set (See Table 14). The MBSEL program had a significant positive effect on changes to teacher trait mindfulness as measured by pre-post MAAS responses for treatment ($N = 9$, $M = 13.11$, $SD = 6.33$) and control ($N = 7$, $M = -2.29$, $SD = 5.28$) groups; $t(14) = 5.17$, $p < .001$(two-tailed), 99% *CI* [9.01, 21.78], $d = 2.64$. There was also a significant reduction in teachers perceived stress as measured by pre-post PSS responses for treatment ($N = 9$, $M = -6.11$, $SD = 3.79$) and control ($N = 7$, $M = 0.00$, $SD = 1.91$) groups; $t(14) = -3.88$, $p < .001$ (two-tailed), 99% *CI* [-9.49, -2.73], $d = 2.04$. The effect size values suggest a 47% improvement in level of mindfulness and a 43% reduction in teacher stress.

Table 14

Teachers: Independent Samples t-Test Comparing MAAS & PSS Change Scores by Treatment & Control Groups

	n	*M*	*SD*	*t*	*p*-value	*d*
MAAS Treatment	9	13.11	6.33			
MAAS Control	7	-2.29	5.28	5.48	< .001	2.64
PSS Treatment	9	-6.11	3.79			
PSS Control	7	0.00	1.91	1.91	< .001	2.04

Results Summary

This study was conducted to evaluate the effects of implementing the Inner Explorer Program, a daily MBSEL intervention, in ethnically and academically diverse first- through fifth-grade classrooms. Each of the three study hypotheses was confirmed. First, the 10-minute-per-day, audio-guided program positively impact elementary students grades in both schools and in several subject areas, as well as with the subpopulations of special education and ADHD students. Second, existing classroom teachers were able to consistently run the program every day during normal transition times, while maintaining existing curriculum plans and with very little training. Finally, teachers who participated in the program did become more mindful, as measured by the MAAS and experience less perceived stress as measured by the PSS.

Chapter 5: Discussion

While all three hypotheses were confirmed, the study also provided preliminary evidence that the automated MBSEL program may offer students and teachers a simple method to sustain a daily mindfulness practice throughout the school year. The program provided a consistent dose of 10 minutes a day, as well as high fidelity of operation from classroom to classroom through the use of technology, without requiring any change to the existing curriculum. These factors may offer researchers an avenue to more rigorously assess the program impact on student and teacher outcomes over a longer period of time, all without requiring extensive training, scheduling, or cost.

Academic Performance

The current study demonstrated positive academic outcomes in both schools for elementary students in first through fifth grade. Students in the treatment condition experienced an improvement in their quarterly GPAs compared to students in the control condition. Students in the treatment condition also experienced by-subject grade improvements in math, science, and social studies in School A, and in math in School B, compared to students in the control condition. Additionally, a subset of special education students in School A, who were in the treatment condition, experienced an improvement in their quarterly GPA as well as in their reading scores, compared to students in the control condition. Finally, ADHD students from School A, who participated in the mindfulness intervention, experienced an improvement in their math grades compared to students in the control condition.

These results are important because they show that in spite of vast differences in geographic location, grading practices and student demographic variables, particularly language, ethnicity, special needs designation, poverty, and age, that elementary students can improve their

academic performance by participating in a daily mindfulness practice. The results also confirm and extend the results from the Pilot-1 study, which showed improved GPA performance as well as by-subject improvements in reading and science for third-grade students. Together, the current study and the Pilot-1 study, with over 500 elementary students in four ethnically diverse schools, show that the MBSEL program can be used as a universal program for first- through fifth-grade students to positively impact grade performance. Mindfulness practices may prime the brain in a way that fosters an increased capacity to learn.

Interestingly, within these two studies, four of the seven academic subjects were significantly impacted by the mindfulness practices, including reading, math, science, and social studies. Together, these findings are encouraging because they show that after only 10 weeks of practice, elementary students exhibited enough changes in performance, across several subject areas, to be reflected in a statistically significant improvement in quarterly grade outcomes. In addition, math was impacted in both schools in the current study, yet it is not clear why this occurred. Math is notably based on logic and the application of formulas; therefore, it could be that mindfulness optimizes working memory capacity in a way that allows for improved logic processing.

These preliminary findings are further bolstered in that there were no reported negative effects in any of the participating schools for any students. The study also confirmed teachers' ability to run the program 99% of the time without changing the planned curriculum.

Achievement Gap

The achievement gap in education is used to describe the disparity in student academic performance between groups. The gap is the difference in performance on key educational measures including grades, test scores, and graduation rates. A primary goal of the No Child Left

Behind Act, was to close the achievement gap. The majority of efforts have been on the achievement differences in four subgroups, including between minority students and their White counterparts, between students from low- and high-income families, between special needs and general education students, and most recently between U.S. students and students from other nations. As an example, the National Center for Education Statistics results show that from 1973 through 2012, Black and Hispanic students continue to trail White students on NAEP reading and math assessments by an average of 20 points (NCES, 2012). Additionally, new research suggests that poverty has a significant negative effect on cognitive function (Mani, Mullainathan, Shafir, & Zhao, 2013) and may be a factor in these performance differences.

The Inner Explorer Program researched in this study may offer a new approach to help shift the differential performance between these groups. In the current study, students in School A, which included 74% Hispanic students who participated in the Inner Explorer Program, outperformed their peers in the control condition. This nascent finding may be particularly relevant in underserved and struggling communities. The possibility exists to shrink the achievement gap in minority populations, in key subject areas.

In addition, despite a small sample size, Special Education students (n = 19) who participated in the Inner Explorer Program performed significantly better in reading, and ADHD students (n = 7), performed significantly better in math. These results build on the extensive research in clinical and at-risk student populations, which have shown that mindfulness interventions can facilitate improved academic performance, as well as decreased anxiety, stress and negative self-assessment, reduced clinical symptoms, and increased attention, cognitive function, and self-esteem (Biegel et al., 2009; Bogels, Hoogstad, van Dun, de Schutter, & Restifo. 2008; Klatt, Harpster, Browne, White, & Case-Smith, 2013; Zylowska, 2008).

Further, students in both schools experienced compelling improvements in math, 29% and 18% respectively, and specifically in School A, in science, by 24%. These findings may be particularly salient, as U.S. students are struggling to compete with their global counterparts in these complex subject areas. In fact, there is a growing national focus on an initiative in education called Science, Technology, Engineering, and Mathematics (STEM) due to the influence these subjects have on the skills required to perform many jobs in our current and projected future economy. Organizations like the STEM Education Coalition highlight the critical role they believe these subjects play in the U.S. economy. In fact, President Obama announced a national STEM campaign in December, 2012, with the goal of increasing undergraduate degrees in this area by 1 million over the next decade (Feder, 2012). The current study and the pilot study show noteworthy improvements in math and science performance.

Sustainability

The academic improvements reported in this study are comparable to longer-term interventions of school-based academic and SEL programs (DuBois, 2002; Durlak et al., 2011). In fact, in a meta-analysis of 213 school-based SEL interventions, conducted with over 270,000 k-12th grade students, Durlak et al. (2011) found an 11% improvement in academic performance, in the programs that reported academic information. While programs that demonstrate improved academic success gain the attention and support of educators preliminarily, many such programs are not sustainable, and the gains reported are reduced in magnitude over time (DuBois, 2002; Durlak, et al., 2011). The biggest factor in the long-term failure of many programs appears to be program sustainability. Yet this is the very factor, a consistent formal practice, that is a primary driver of improved outcomes in mindfulness programs (Biegel et al., 2009; Kabat-Zinn, 2003; Weare, in press).

Many SEL and MBSEL programs, because they are not tied to a specific subject area and because they often disrupt the normal curriculum flow, are not sustainable. Generally, these programs are implemented over a set period of time, for instance 30 to 45 minutes once a week for 8 weeks. In some cases, they are integrated into the curriculum, where teachers are instructed to spend 20 minutes or more once per week for the entire school year. In the first case, a portion of the normal school curriculum is changed to accommodate the program.

For instance the training replaces gym class, or study period or health class. During the training, the classroom teacher, who may have been trained to facilitate the program, or an outside trainer, covers the curriculum material and the students participate in the lessons. In this example, once the 8-week class is over, the students and teacher transition back to what they used to do during that time slot. This was the case in every MBSEL program reviewed in Chapter 2. While students may benefit from education intervention for a short period after the program ends, any gains are typically lost over time (Durlak et al., 2011).

The second approach is to integrate the new program within the existing school curriculum. Some SEL programs and a few MBSEL programs foster this by both launching a school-wide initiative where all teachers, students and school administration are trained the curriculum, which is often an 8 to 12 week intervention. They are also provided a series of mini-lessons that can be delivered during normal transition times, or can be delivered briefly as the opportunities present throughout the school day. For instance, a conflict on the playground might be an opportunity to cover a conflict resolution segment. A disruptive class might be an opportunity to practice a 3-minute breathing exercise (Schonert-Reichl & Lawlor, 2010).

While there is growing recognition, specifically with mindfulness interventions, that the repeated practice is a critical ingredient for successful outcomes, the challenge is that teachers

are not always comfortable or prepared to continue with these mini lessons after the intervention has ended (Wisner, Jones, & Gwin, 2010; Van de Weijer-Bergsma et al., 2012). Additionally, it is difficult to disentangle the impact of dose and teacher effect on student outcomes. With the current regulatory environment and time constraints, many classroom teachers are unable to become proficient in a new initiative and to deliver it with fidelity. In the field of mindfulness, this is even more critical, as many experts believe that a mindfulness program must be taught with fidelity to be successful (Crane et al., 2011; Dimidjian-Linehan, 2003; Kabat-Zinn, 2003).

The Inner Explorer MBSEL program researched in this study may help to overcome the issue of sustainability and fidelity of operation. The program offers a consistent dose of 10 minutes per day, with high fidelity from classroom to classroom through the audio-guided exercises. It can be used every school day, every year in all classrooms. A short (10 minute), technology driven intervention is supported by an increasing base of research showing positive outcomes associated with brief and/or remote interventions, similar to more traditional MBSR programs (Krusche, Cyhlarova, King, & Williams, 2012; Moore et al., 2012). These results demonstrate the plausibility of schools running the program each day with very little training and with no change to the existing curriculum.

While the current study was conducted for only 10 weeks, the program has the potential to be conducted throughout an entire school year. A longitudinal study could be conducted to determine the impact on performance, behavior, and student and teacher well-being over multiple years. This may predict the cumulative effect of a daily mindfulness practice on measurable cognitive outcomes, linking practice time to shifts in brain structure and function that support learning (Davidson et al., 2003; Posner & Rothbart, 2005).

Teachers Outcomes

Effective teaching is a critical ingredient in student academic performance, and thus is a priority in the education policy debate (Jennings, 2011; Wilson et al., 2008). Teachers are expected to be knowledgeable in academic subject areas, as well as to facilitate a classroom climate that is conducive to learning. While often not part of the job description or performance evaluation, teachers are increasingly faced with navigating the societal factors that impact student development outside of the core curriculum. These factors include students' emotional and behavioral regulation, character development and community engagement (Jennings, Snowberg, Coccia, & Greenberg, 2011; Rose & Gallup, 2000). However, the increasing demands have not been matched with training and resources to augment teachers' skills.

Several promising studies have provided preliminary evidence that mindfulness training for teachers, results in reduced stress and burnout, and improved classroom organization, attention, working memory and self-compassion (Flook**,** Goldberg, Pinger, Bonus, & Davidson, 2013; Jennings, 2011; Roeser et al., 2013). Additionally, mindfulness training for teachers has been linked to improvements in student behaviors, including greater compliance with teacher instructions and fewer challenging behaviors (Singh et al., 2013).

The current study showed that the Inner Explorer Program was effective at increasing teachers' mindfulness as well as reducing teacher stress, with medium to large effect sizes. These effect sizes are comparable to those achieved in programs designed specifically for teachers (Flook et al., 2013; Jennings et al. 2011). The Inner Explorer Program was designed with language and examples suitable for children. One possible explanation for the results, particularly related to perceived stress, is that the teachers simply took the time each day to relax. Another possible explanation is that the mindfulness instructions on the audio-guided program,

served as reminder for the teachers to explore their inner experiences, and thus the language itself was not a factor in the experience. It would be interesting to compare teacher outcomes with the elementary, middle and high school versions on this program to determine if the language and pacing is a factor in the results

Teachers participated in the program daily, with their students 97.4% of the time and reported they enjoyed the program and could easily fit it into the normal school day. The simplicity of operation and the daily approach may offer teachers a simple way to build the skills and competencies associated with mindfulness. Longer studies are needed to disentangle these results.

Delimitations and Limitations

This study was delimited to traditional public elementary school and did not include private elementary schools. The researcher purposefully limited the scope of this study in this way because public elementary schools all follow similar federal guidelines of testing and reporting student data. Additionally, of all elementary schools in the U.S., over 90% are public schools; therefore, the external validity of such a study is increased.

The study included only treatment and wait-list control groups, without an active control for two reasons. First, the most likely active control condition would be an audio-guided relaxation program. There does not appear to be a relaxation program that offers 90 days of unique content. Therefore, one could attribute any positive results of the MBSEL intervention to student boredom in the active control content. Several studies reviewed in this paper included quiet reading time as the active control. An audio book may be another active control condition to explore in future studies, although it may be more difficult to integrate that activity into normal transition times, as the MBSEL intervention is designed to accomplish. For instance, if

the 10-minute timeframe concludes in the middle of a chapter, students may insist on finishing the section. Therefore, it adds complexity for the teachers, in that it may be difficult for them to control the time allocated and, thus, would confound any results obtained. Second, an active control would add significant cost, more than double that of the original study, because equipment and program content would need to be purchased for every classroom, not just the treatment classrooms.

MBSEL research conducted in regular public school classrooms is still in its infancy. There are several limitations in this study that should be explored. First, while the study was randomized from a group of volunteers, there still may have been self-selection bias that impacted the academic results. For instance, the teachers who were randomized into the intervention condition may have graded their students more favorably, and/or the teachers randomized into the control condition may have graded more negatively. While quarterly grades are a compilation of individual grades for homework assignments, class participation, project work, quizzes, and tests throughout the quarter, it is possible that bias influenced some of the grading. Future studies could match standardized test scores, which are given in reading, math, and science, to the quarterly grades in those subjects, to assess if student performance is consistent for each subject. For instance if quarterly math grades show a significant effect, it would be expected that scores on the standardized math test would also show a significant effect.

Second, participating students' academic performance did not significantly increase across all subjects measured. In particular, mathematics, science, and social studies grades improved significantly in School A, while reading, writing, and spelling grades did not change significantly. In School B, math grades were significantly improved, yet reading, writing verbal communication and science were not. One possible explanation is that the 4-point grading scale

in School B may not have provided enough granularity to detect by-subject improvements. Another possible explanation is the students in School A, due to ethnic and socioeconomic factors, may have benefitted more from the mindfulness intervention, and experienced more significant improvements in academic performance as a result. Research suggests the benefits of improved attention regulation, through mindfulness practices, are not topic or task dependent, but are process dependent and endure across a variety of mental functions (Desbordes et al., 2012; Slagter, Davidson, & Lutz, 2011). It is possible that all subject areas could be influenced with longer intervention times. Future research could use this intervention design to assess student performance throughout an entire school year.

Interestingly, one subject, math, was consistently impacted with students at both schools, with a medium effect sizes. It is not clear how mindfulness practices affect the different subject areas, especially math performance. A factor in the reported outcomes could be the time of day when the program was run. For instance, if a classroom offered the Inner Explorer Program right before math, those students may be primed to pay attention to that lesson. The current study did not collect information related to what subject followed the MBSEL intervention each day. Future studies could exam how the proximity of the training to the subject area influenced students' readiness to learn.

Third, even wider student populations in diverse communities and larger sample sizes per grade need to be included in future assessments of MBSEL interventions, including urban schools with African American students. The school fitting that profile was unable to complete the study, so it is unclear how the MBSEL intervention will impact that specific population. Students in grades 1 through 5 participated in the study, yet a by-grade analysis did not provide any significant results, which may have been related to the small by-grade sample size, as well as

variations in grading practices between the two schools. Qualitative feedback provided by the teachers at the end of study indicated that fifth-grade students found some of the language in the program to be too juvenile for them. Teachers also indicated that first graders found some of the language beyond their comprehension. These qualitative findings can be further evaluated in a larger study that includes more classrooms per grade level. It may be that younger students need a variation to the program that provides slightly simpler instruction, more repetition and shorter (less than 10 minutes) exercises, while the older students may benefit from more complex and varied instruction as well as slightly longer exercises (more than 10 minutes). It may be particularly fruitful to explore what kind of mindfulness-based interventions are most effective for student populations differing in age, gender, socioeconomic status, and ethnicity. Only careful follow-up research using randomized control trials and employing reliable outcome measures and more comprehensive analysis techniques, such as hierarchical linear modeling, will be able to determine with more certainty the flow of causality involved in the present findings.

Finally, it is yet unclear what the longer-term effect of mindfulness trainings is on students' performance and classroom operations. Follow-up studies should examine students' participation in MBSEL programs over multiple years to measure the long-term efficacy of mindfulness interventions, using objective measures like standardized test scores, grade retention rates, and neurocognitive task performance (Slagter et al., 2007). Also, this automated daily program could supplement more intensive SEL and MBSEL programs, for instance, those running once or twice a week for 6- to 10-week cycles. The 10-minute-per-day program could help students develop the habit of being mindful, while the more intensive weekly programs could provide additional context to help students deepen their practice.

Conclusion

Participating in the Inner Explorer Program allowed students to improve their GPA, as well as their academic performance in key subject areas including math, science, and social studies. If implemented consistently and sustainably throughout a school year, such an intervention could provide a platform for students—as well as teachers—to develop the habit of being mindful in a simple, time-efficient, and cost-effective way. Schools and districts may be able to implement the program with existing staff, within the existing curriculum, and throughout all classrooms in the district, enabling any teacher, including substitute teachers, to bring mindfulness into classrooms simply by turning on a sound device and pressing *Play*.

The task ahead is to use the intervention template outlined in this paper to research variations in program content, student populations, and program length. Ultimately, it is an empirical question whether the present findings translate to other school settings. Yet the usefulness of the MBSEL program outlined in this study is beyond its capacity to be transposed directly into different settings. It represents the potential, through careful and scientific research, to help generate a more complete understanding of feasible and theoretically valid methods of finally changing the trajectory of public education performance, and of improving the lives of millions of children in the United States and elsewhere.