Assessing the Efficacy of an Adapted In-Class Mindfulness-Based Training Program for School-Age Children: A Pilot Study

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Stressed Teens

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Rationale

Many children today, particularly in economically-disadvantaged areas, are struggling in a variety of domains: academically, psychologically and cognitively. For example, 75% of 12th grade public school students in the United States are not doing math at grade level and 60% are not reading at grade level (Children's Defense Fund, 2008). On average in the United States, a public school student is suspended every second and every eleven seconds a high school student drops out of school (Children's Defense Fund, 2008). Mental health problems affect one in every five young people at any given time and only one-third of those that need mental health services are getting them (NIMH, 2009; Wu et al., 2001).

The Mindful Schools program aims to improve students' school-readiness, aptitude, and mental health by teaching children the skill of mindfulness. Mindfulness has been defined as "the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment to moment" (Kabat-Zinn, 2003). Mindfulness can be used to increase the space between a stimulus and one's response to it, enabling improved decision making ability and shifts in long-standing behaviors. Mindfulness was introduced into Western medicine over 30 years ago, and is used in many hundreds of hospitals and teaching settings around the world today.

Research has demonstrated evidence-based mindfulness interventions to be effective for a variety of physical and mental health difficulties in adults (Greeson, 2009; Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004). Over time, it has been adapted for adolescents and younger children to help them cope with the struggles they are currently encountering (Burke, 2010).

Given the aforementioned struggles of children today and the potential of mindfulness to reduce some of these problems, various mindfulness interventions for children have been developed. One such intervention is the Mindful Schools program, which has gathered anecdotal evidence (available at http://www.mindfulschools.org/proof/#anecdotal), informal survey data (available at http://www.mindfulschools.org/proof/#data), and a pilot study, which is discussed in this whitepaper.

Purpose of Study

The pilot study described in this whitepaper sought to assess whether the Mindful Schools program, an in-class mindfulness training intervention, would be related to increased academic

achievement, attention capacities, academic engagement, social relatedness, teacher self-efficacy, and decreased behavior problems among 79 school-age children in 2nd and 3rd grades.

Participants and Intervention

The Mindful Schools program was offered for 5 weeks—3 sessions a week for 15 minutes per session—at Berkley Maynard Academy (an elementary school in Oakland, California) for a total of 3 hours and 45 minutes of in-class training with students and teachers present. The students received training in the following mindfulness-based activities: listening, breathing, movement, walking, eating, seeing, emotions, test taking, activities of daily living, and lessons on the promotion of kindness and caring.

Inherent in all these activities is an emphasis on mindfulness and continually strengthening attention to, and awareness of, the present moment. All students in each participating classroom received the program intervention, but only those students who consented (self and parent/caregiver) completed study measures. The efficacy of this program was measured by a variety of quantitative measures (e.g., child self-report, teacher report on each child, and a child attention task on the computer) at three time points (pre- and post-intervention, and at 3-months post-intervention). It took approximately 20 minutes for each student to complete the measures, and under 5 minutes per student for teachers to complete measures at each data collection point.

Study Measures

Standard Demographics

Ethnicity, age, gender, and grade level in school.

Academic Achievement

Access to children's test scores and course grades through student records.

Attention

Child completed

Attention Network Task-Child Version (ANT-C; e.g., Fan, McCandliss, Sommer, Raz, & Posner, 2002) is a widely used, computer-based reaction time (RT) task with versions for children and adults. It measures three neurologically based forms of attention, as follows: Efficiency of the *alerting network* is examined by changes in RT resulting from a warning signal. Efficiency of the *orienting network* is examined by changes in RT that accompany cues indicating where the target will occur. The efficiency of the *executive control network* is examined by requiring the subject to respond by pressing two keys indicating the direction (left or right) of a central arrow surrounded by congruent, incongruent or neutral flankers. Moderate to high reliabilities are found for all networks.

Academic Engagement

Child completed

Behavioral and Emotional Engagement vs. Disaffection scale (Skinner, Kindermann, & Furrer, 2009) is a measure of children's active, constructive, focused, enthusiastic participation in the activities of learning. It has subscales that distinguish engagement from disaffection, and behavioral from emotional features. The student report has 27 items, administered either by trained interviewers or by self-report. The scale has acceptable internal consistency (alpha > .70) and converges with the teacher-rated version of the scale.

Relatedness

Child completed

Sense of Relatedness scale (Furrer & Skinner, 2003) is an indicator of children's sense of relatedness or belonging to their parents, teacher, peers, and friends. For the present study, the teacher, peers, and friends subscales were used (12 items total). Each scale contains the same items for each social partner: "I feel accepted," "I feel like someone special," "I feel ignored" (reverse coded), and "I feel unimportant" (reverse coded). The subscales have acceptable internal consistency (alphas > .75).

Social Skills

Teacher completed

Social Skills Rating System (SSRS; Gresham & Elliott, 1990) is an indicator of children's social behaviors. The SSRS is a nationally normed, 34-item assessment tool designed to assess social behaviors related to academic performance, peer acceptance, and teacher-student interactions from multiple perspectives (teacher, parent, and student). The SSRS includes three scales: social skills (cooperation, assertion, and self-control), problem behavior, and academic competence (observed classroom behaviors).

Teacher Self-Efficacy

Teacher completed

Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001) is a global measure of teachers' sense of efficacy in their classroom teaching. It includes three subscales: Efficacy in Student Engagement, Efficacy in Instructional Practices, and Efficacy in Classroom Management. The short form of the measure has 12 items and has high internal consistency (alphas > .85) and strong convergence with the long form of the scale.

Results

Results from the two most significant measures from the test battery, the ANT-C and the SSRS, are discussed in this whitepaper.

ANT-C Results

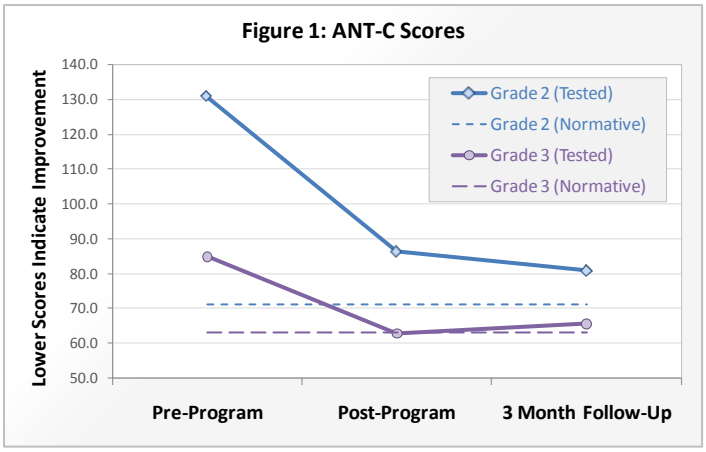
The computerized Attention Network Test child version (ANT-C) measures three aspects of attention, including a child's executive control performance. This is key to decision-making and is correlated with academic success. Before the intervention was administered, children were scoring far below the normative scores for their ages on the ANT-C executive control test. Dramatic improvements in ANT-C executive control scores were seen following the intervention, and were sustained at 3-months post-intervention. The ANT-C results showed that the mindfulness intervention was related to increased executive control amongst a population of participants that were already struggling and below the norm in attention skills.

Table 1: ANT-C Scores

Grade Level	Pre-Program	Post-Program	3-Month Follow-Up
2	130.7	86.3	80.9
3	84.8	62.8	65.5
2 - Norm	71.0	71.0	71.0
3 - Norm	63.0	63.0	63.0

The improvement in ANT-C executive control scores was statistically significant, $F(2,152) = 4.41$, $p < .01$. This overall change was driven by a change from time 1 to time 2 ($p < .01$). Scores stabilized between time 2 and time 3 ($p = .86$). From time 1 to time 2, 54/85 or (64%) of children scored lower (showed improvement) on ANT-C executive control . Thus, the change does not appear to be driven by a small number of highly improved children.

Figure 1: ANT-C Scores



There was no prediction of time 2 ANT-C executive control scores from time 1. That is, neither the poorest nor the best ANT-C executive control performers at time 1 improved most; instead, the children generally showed improvement over time period regardless of time 1 ANT-C score. The changes observed can be compared to ANT-C executive control norms (in milliseconds) for children aged 6, 7, and 8 years of age (Rueda et al., 2004):

Age 6: mean = 115; std dev = 80.
Age 7: mean = 63; std dev = 83.
Age 8: mean = 71; std dev = 71.

Comparing grade 2 study participants to those originally normed on the ANT-C, we found that they were performing considerably below the norm at time 1 but improved considerably by

time 2, such that their executive control scores moved close to the norm for this age group (7 years).

Comparing grade 3 study participants to those originally normed on ANT-C executive control, we found that they were performing below the norm at time 1, but completely caught up to the normative average for this age group (8 years) by time 2.

SSRS Results

Overall, children's social skills, per teacher report, improved significantly over the course of the intervention and were sustained 3-months post-intervention.

There was a marginally significant improvement in teacher-rated social skills across both grades, $F(2,148) = 2.41$, $p < .09$. This overall change was driven by a change from time 1 to time 2 ($p < .05$). Scores stabilized between time 2 and time 3 ($p = .75$).

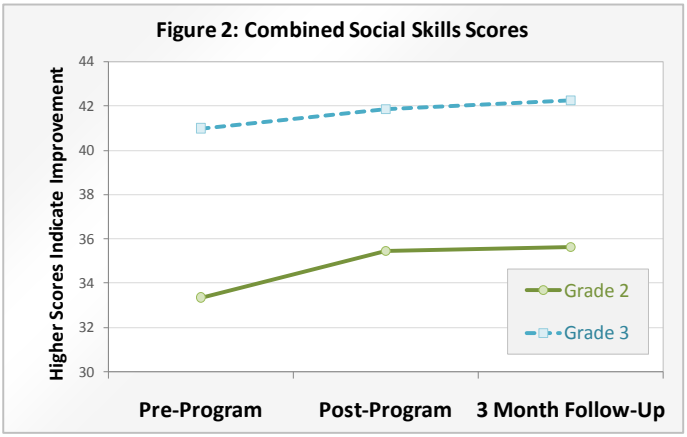


Table 2: Social Skills Scores

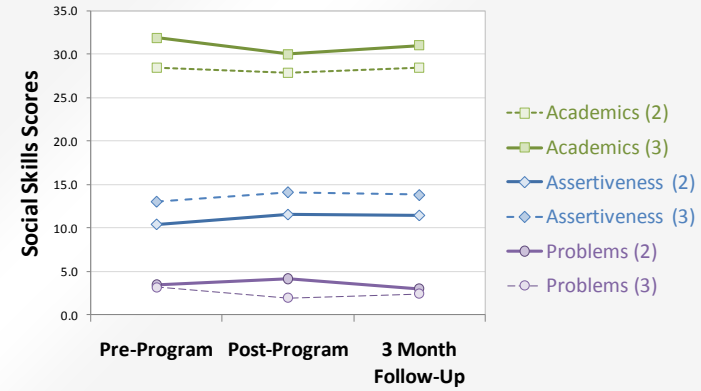
SSRS by Subscale, (Grade Level)	Pre-Program	Post-Program	3-Month Follow-Up
Assertiveness (2) [Higher is better]	10.4	11.6	11.5
Assertiveness (3) [Higher is better]	13.1	14.1	13.8
Internalizing Problem Behaviors (2) [Lower is better]	3.4	4.2	3.0
Internalizing Problem Behaviors (3) [Lower is better]	3.2	1.9	2.4
Academic Competence (2) [Higher is better]	28.5	27.8	28.4
Academic Competence (3) [Higher is better]	31.9	30.0	31.0
Combined (2) [Higher is better]	33.4	35.5	35.6
Combined (3) [Higher is better]	41.0	41.9	42.3

The *assertiveness* subscale measures initiating behaviors, such as asking others for information, introducing oneself, and responding to the actions of others. The significant improvement in teacher-rated social skills across both grades (above) was primarily driven by improvements in

assertiveness skills, F(2,148) = 5.32, p < .006. This overall change was driven by a change from time 1 to time 2 (p < .01). Scores stabilized between time 2 and time 3 (p = .59).

The *internalizing problem behaviors* subscale measures behaviors indicating sadness, anxiety, loneliness, and poor self-esteem. There was a significant improvement in teacher-rated problem behaviors in grade 2 children only, F(2,146) = 7.10, p < .001. Scores did not change from time 1 to time 2 (p = .55), but improved significantly from time 2 to time 3 (p < .004).

Figure 3: Individual Social Skills Scores



Note: A higher score is better for the Academics and Assertiveness subscales, while a lower score is better for the Problems subscale.

The *academic competence* subscale measures reading and mathematics performance, motivation, parental support, and general cognitive functioning. There was a significant improvement in teacher-rated academic competence of children in both grades, F(2,140) = 5.16, p < .007. Scores did not change from time 1 to time 2 (p = .31), but improved significantly from time 2 to time 3 (p < .026). In terms of real-world interpretation, all the score changes reported here are within the normal range for children of this age at both beginning and end. Therefore, the children simply became better classroom citizens but did not move from, for example, sub-normal to normal ranges in functioning.

Study Limitations and Future Research

This pilot study has shown preliminary support for the efficacy of the Mindful Schools program intervention among 2nd and 3rd grade children. Preliminary results show that children at Berkley Maynard Elementary School improved in attention and teacher-rated social skills. The mindfulness-based intervention was well tolerated among this population, with no observed or reported adverse effects.

Given the nascent stage of mindfulness research among children, there are a number of observations from this pilot project that can potentially inform future research in the field of mindfulness for youth. A control school would have aided to clearly quantify the degree to which the findings in this study were directly a product of the Mindful Schools intervention. A control school was planned, but unfortunately, had to drop out. An active control group would be most beneficial in a future study.

Due to limited resources, this pilot study had a relatively brief 3-month follow-up. A longer follow-up period would further assess the sustainability of a mindfulness-based intervention. Additionally, statistical significance and generalizability of the findings could be improved by

increasing the number of participants in the study; this could be accomplished by including all of the grades in a school and increasing the number of participating schools.

When working with children who might have academic difficulties, it is important to keep in mind factors that might affect research quality. For example, even if measures are normed by age, test participants might still have difficulty completing the measure battery. This occurred in the present study through the use of the *Behavioral and Emotional Engagement vs. Disaffection* and the *Sense of Relatedness Scales.* When administering self-reported paper-and-pencil measures, it is critical to consider the time demands on all participants (students and teachers). Additionally, it is important to keep in mind children's developmental abilities when selecting assessments.

Aside from obtaining necessary approval from the Institutional Review Board (IRB) it is critical to get support from school administration and staff when engaging in school-based research. For example, the mere presence of a researcher may be disruptive to classroom conduct. Setting appropriate expectations with respect to the time that school staff and children may need to provide, as well as the potential benefits the school might receive, can help when beginning a school-based research project.

As the field of mindfulness in education matures, more stringent research methods must be employed to improve the internal validity, replicability, and generalizability of findings. Future research from Mindful Schools will be addressing these noted limitations and increasing the rigor by which the intervention is assessed. However, evidence from this pilot study and other similar studies demonstrates that mindfulness may have a multitude of beneficial outcomes for children.

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Contact Information

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