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“Your Brain Becomes a Rainbow”: Perceptions and Traits of 4th-Graders in a School-Based Mindfulness Intervention

Julia Keller^a, Eric Ruthruff^b, Patrick Keller^a, Robert Hoy^b, Nicholas Gaspelin^c, and Katherine Bertolini^a

^aSouth Dakota State University, Brookings, South Dakota; ^bUniversity of New Mexico, Albuquerque, New Mexico; ^cCalifornia State University, Davis, California

ABSTRACT

Although mindfulness, or the self-regulation of attention, has been found beneficial in reducing teacher stress and burnout and in increasing students' cognitive and emotional regulatory skills, no study has explored students' attitudes toward meditation practices in depth. This mixed-methods study reports results from a randomized, controlled trial of a 10-week mindfulness intervention in a public school setting with 28 4th-grade students from lower income and ethnic minority backgrounds. Over the course of the intervention, students were asked to respond to writing and drawing prompts about their feelings and attitudes toward mindfulness. At the end of the intervention, the experimental teacher rated students on how often they had practiced mindfulness breathing during class. Qualitative analysis of journal entries yielded personality traits of students who were receptive or resistant to mindfulness training. Practical strategies for identifying and remediating resistant students and for implementing mindfulness interventions in a school setting are discussed.

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Elementary; emotion regulation; interventions; mindfulness; self-regulation

One of the most significant challenges facing interventionists who want to implement mindfulness training in a school-based setting is the subset of children who dislike and resist the practice. “I hate mindful class. I hate mindful class,” wrote one 4th-grader in his journal. He also said that mindfulness was boring on many occasions during mindfulness interventions. Other students, however, are receptive to mindfulness. One 4th-grade boy wrote, “To me, mindfulness breathing means it gives your stress to happiness. When your stress comes, your brain will become a storm, but when you do mindful breathing your brain becomes a rainbow.” What are the perceptions and traits of children who are receptive to mindfulness treatment and children who are not? How can teachers, parents, counselors, and administrators respond intelligently and compassionately to resistant children? The present research addressed these issues.

Self-regulation of attention and emotion is a critical skill for students to master because it allows them to learn efficiently and work well with others. Emotional awareness, arguably the first step toward regulation, is associated with decreases in self-reported somatic complaints, social anxiety, depression, and a tendency to worry or ruminate (Rieffe, Oosterveld, Miers, Terwogt, & Ly, 2008). Mindfulness is one well-established technique for developing the ability to self-regulate attention and emotion. Specifically, mindfulness is the cognitive ability to pay attention to the present moment without judgment or attachment to a desired outcome (Kabat-Zinn, 1994). Studies have consistently demonstrated benefits of mindfulness training, including reduced pain and stress (Majumdar, Grossman, Dietz-Waschkowski, Kersig, & Walach, 2004), improvements in cognitive functioning (Chiesa, Calati, & Serretti, 2011; Tang & Posner, 2009), increases in positive emotion (Davidson

CONTACT Julia Keller  julia.keller@sdstate.edu  Department of Teaching, Learning, and Leadership, South Dakota State University, Wenona 108, Brookings, SD 57007.

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et al., 2003), and the ability to inhibit emotionally charged but irrelevant information (Ortner, Kilner, & Zelazo, 2007). Although school-age children would seem to have the most to gain from learning mindfulness, the vast majority of mindfulness studies have focused on adults.

Schools are an excellent place to teach mindfulness because substantial numbers of children can be taught how to use mindfulness to improve their learning and social skills and to integrate mindfulness into their daily routines. This approach has potential to improve children's academic prospects. A study by Napoli, Krech, and Holley (2005) investigated the impact of mindfulness training on the attentional abilities of 254 1st-, 2nd-, and 3rd-grade students. Students were randomly assigned to the experimental group, who received mindfulness training ($n = 114$), or to the control group, who participated in reading or other quiet activities ($n = 114$). Before and after the mindfulness training, each child was assessed on three established measures: the ADD-H Comprehensive Teacher Rating Scale (ACTeRS; Ullmann, Sletor, & Sprague, 1997), the Test of Everyday Attention for Children (TEA-Ch; Manly et al., 2001), and the Test Anxiety Scale (Sarason, 1978). Results showed substantial differences between those who did and those who did not receive mindfulness training. Paired t tests on the difference scores between pretests and posttests showed statistically significant mindfulness benefits on the TEA-Ch selective attention subscale ($t_{\text{diff}} = 7.94$, $p < .001$), the ACTeRS Social Skills subscale ($t_{\text{diff}} = -7.19$, $p = .001$), and the Test Anxiety Scale ($t_{\text{diff}} = -1.34$, $p = .007$). Although these are some of the proven benefits of mindfulness training in schools, other researchers speculate that mindfulness training could also prepare students for creative activities like brainstorming and journal writing (Fisher, 2006). Mindfulness also might help them see problems in a new light and from multiple perspectives (Napoli et al., 2005).

Mindfulness training also can improve emotion regulation by decreasing maladaptive strategies (e.g., rumination) while increasing tolerance for negative mood states (Corcoran, Farb, Anderson, & Segal, 2010). Emotion regulation improves the likelihood of academic success by enabling students to develop stress-management tools and the self-discipline necessary for academic goal attainment (Waters, Barsky, Ridd, & Allen, 2015). Waters et al. (2015) examined 15 peer-reviewed studies on the effect of school meditation interventions on well-being, social competence, and academic achievement. Two studies ($n = 231$) found that meditation significantly increased standardized test scores. Six of the 15 studies ($n = 762$) examined the impact of meditation on emotion regulation. In three of these studies, meditation significantly improved emotional regulation; in a fourth study (Broderick & Metz, 2009), mindfulness practice significantly reduced negative affect.

Evidence from qualitative research also suggests that meditation improves emotion regulation. Although qualitative research is often considered to be less objective, understanding participants' subjective experience is essential for a comprehensive understanding of the human mind and experience (Varela, 1996). Rosaen and Benn (2006) interviewed 10 7th-graders who had been practicing transcendental meditation for a year. The students reported that they had more self-control and were more aware of their emotions and more flexible in their emotional responses. Champion and Rocco (2009) interviewed 54 elementary students, 19 teachers, and seven parents about a Christian meditation program taught to more than 10,000 students in an Australian Catholic diocese. Eighty percent of the students interviewed reported that meditation had a calming and relaxing effect on them and 36% stated that it had improved their anger management skills.

Although Champion and Rocco (2009) reported a generally positive attitude toward meditation in the student participants, 32% of the teachers reported negativity toward meditation from some students, 32% recounted resistance from students who had difficulty sitting still, and two of the teachers mentioned that some students were bored. Although other studies have also briefly mentioned students' negative attitudes toward meditation (Semple, Reid, & Miller, 2005), no study has explored students' attitudes toward meditation practices in depth.

One promising method that is well regarded but has not yet been used to study student attitudes about mindfulness is journal writing, a type of reflective practice. Journal writing is one method for processing the raw material of experience and making sense of confusing and conflicting thoughts and emotions (Boud, 2001). It is also a form of self-report, or participants' representation of their

mental and emotional perceptions during a therapeutic experience. Although self-reports by children are not usually regarded as fully objective measurements, “only the child is capable of reporting on his or her own internal thoughts and emotions from a subjective perspective, especially with regard to the treatment process and outcomes” (Hamama & Ronen, 2009, p. 92). Denzin and Lincoln (1994) also stated that understanding what was occurring in the minds of students was essential for critical pedagogical research.

The present study

The study goals were to explore whether mindfulness can be effectively integrated into the curriculum and administered in school settings by classroom teachers, and to investigate how children’s conceptualization of mindfulness and its relevance to their lives changes over time. Data collected from teacher surveys, children’s drawings, children’s journal entries, and results from correlational analyses helped us address these goals.

The present study was a mixed-methods, longitudinal study in which data were collected on the developmental growth of attention, working memory, and emotional regulation in children who were low income and minority (89% Hispanic, 11% Black) receiving a mindfulness intervention over a 10-week period (see Figure 1 for a simplified timeline of study events). Race, ethnicity, and socioeconomic status are associated with chronic stress caused by inadequate nutrition, poor living conditions, high unemployment, and high levels of crime and violence. Children who grow up in poverty have greater difficulty regulating their emotions and behavior and are at an increased risk for developing social and emotional difficulties (Evans & English, 2002). To date, only a few studies have explored the effects of mindfulness training on urban, minority populations (Roth & Robbins, 2004).

Method

Participants

Twenty-eight 4th-grade students (64% female) from low-income families in a large urban district in the Southwest United States participated in this study. Informed assent was obtained from all participants and consent forms were signed by their parents.

Measures

After completion of pretests (see Table 1), participants were matched on attention and working memory (WM) scores and randomly assigned to a mindfulness or control condition. All participants completed 27 sessions during their 90-minute reading/writing class. The experimental group ($n = 15$) received instruction in mindfulness practices whereas control students ($n = 13$) sat quietly for 10 minutes/day at the beginning of their literacy class. Before the intervention started, and before random assignment to

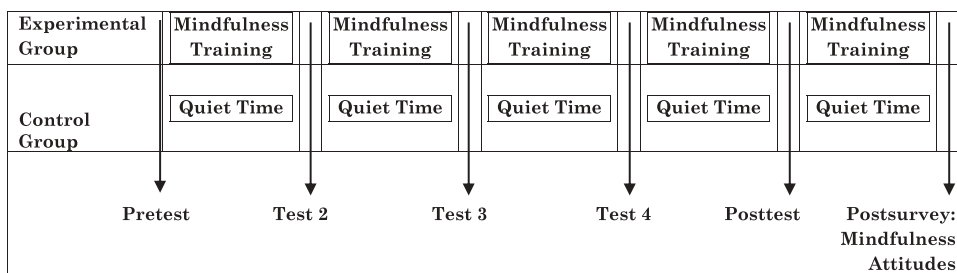


Figure 1. A simplified timeline of study events.

Table 1. Summary of dependent measures.

Measure	Citation	Ability measured	Time points
Automated version of the Operation Span (AOspan)	Unsworth, Heitz, Schrock, & Engle, 2005	Working memory	5
AX Continuous Performance Test (AXCPT)	Cohen, Barch, Carter, & Servan-Schreiber, 1999	Selective attention	5
The Simon task	Simon & Small, 1969	Selective attention	5
The Child and Adolescent Mindfulness Measure (CAMM)	Greco, Baer, & Smith, 2011	Mindfulness attention and awareness	2
The Spence Children's Anxiety Scale (Spence)	Spence, 1998	Identifies anxiety symptoms	3
The Emotion Awareness Questionnaire (EAQ)	Rieffe, Oosterveld, Miers, Meerum Terwogt, & Ly, 2008	Measures emotion awareness	3
The Reading Attitude Inventory (RAI)	Lewis, 1979	Assesses reading attitudes	2

Note. Time points = Times the participants took the measure.

condition, the teacher rated her students from 1 to 4 on average level of attention during instruction, with 4 representing excellent attention. After treatment, the experimental teacher rated how often students had practiced mindfulness breathing during class, from 1 to 4 (1 = *very little or never*, 2 = *sometimes*, 3 = *most of the time*, 4 = *always or almost always*). The first author also independently rated students on frequency of practice while facilitating the class. For the purposes of this report, students who were rated by as a “3” or a “4” are referred to as the *Practicing More* (practiced more frequently; $n = 7$) group; students who were rated by the teacher as a “1” or a “2” but rated as a “3” by the first author are referred to as the *Practicing More with Instructor* (MWI; $n = 3$) group; students who were rated by the teacher and the first author as a “1” or a “2” are referred to as the *Practicing Less* (practiced very little or only sometimes; $n = 5$) group.

Over the course of the intervention, students were asked to respond to writing prompts in their journals for the teacher and the first author to determine their progress in the understanding and application of mindfulness to academic and personal situations. Some of the prompts were generated by the first author and some were generated by the 4th-grade teacher (see the appendix for a list of the writing prompts). The experimental teacher also completed open-ended questions about mindfulness and reading lessons in an online daily survey, as well as a closed-ended question on the daily length of her mindfulness practice.

Mindfulness practices

The components of the intervention were grounded in the work of Saltzman (2004) and on the first author's experience of 17 years as an elementary teacher, 12 years practicing mindfulness, and 6 years of instruction and research in the mindfulness field. The first author facilitated seven of 27 instructional sessions, also providing lesson plans and strategies to the classroom teacher on teaching and integrating mindfulness into her literacy class. The 4th-grade teacher completed a mindfulness-based stress reduction (MBSR) course and taught the remaining 20 lessons.

A variety of mindfulness practices were introduced during the intervention. Breathing with the bell was the most common practice. The teacher taught students to sit up and take 5 to 10 breaths after she rang a bell. She used the bell as a way to transition between activities. Using HeartMath (<http://www.heartmath.com>) interactive hardware/software, we monitored heart rate variability patterns as students practiced breathing mindfully. We gave experimental students their own copy of Amy Saltzman's (2007) *Still, Quiet Place* CD and instructed them to “listen to a guided meditation” once/day, and record their practice on a page they would return to the teacher with a parent's initials. They also listened to this CD in class. Students practiced mindfulness listening with the mind and heart to other students and to the teacher when they were speaking. Mindfulness eating occurred 5 times, with candy or chips that children enjoyed tasting mindfully.

Qualitative data analysis

In a social constructionist framework (Denzin & Lincoln, 1994), it is important to understand how students socially construct their consciousness. Teacher-researchers focus on uncovering student motives, values, and emotions. Grounded in this framework, the first author used an open-coding process to analyze journal entries. With the help of a qualitative software package (Dedoose Version 6.1.9, 2015), the first author carefully read the journals, highlighting excerpts in the text that seemed relevant (Merriam, 2009), and creating codes that reflected her first impression of the excerpt's content. The first author often coded excerpts with more than one emerging theme for understanding the students' experience of mindfulness and their personal characteristics. Then, after creating an initial set of codes, she reread the journals, going through an iterative process where minor codes were eliminated, re-sorting and combining the remaining codes into larger and larger categories, distilling recurring ideas and meaningful patterns from the data, and finally synthesizing the codes/patterns into conceptually unique themes (Averill, 2013). General themes included the following: benefits of mindfulness practice, liked activities, mindfulness definitions or understanding of mindfulness, mindfulness practices, negative feelings toward mindfulness, and negative feelings without mentioning mindfulness. Additionally, member checking, or respondent validation, a technique wherein a researcher increases internal validity by soliciting feedback from key participants in a study, was obtained from the experimental teacher regarding the study findings.

Results

Quantitative results

Results were analyzed to determine whether mindfulness improved self-regulation of attention and emotion, on average. Sets of difference scores on the surveys were calculated by subtracting Time 1 (T1) from Time 5 (T5) and then *t* tests were conducted on each of the measures in Table 1, including group (experimental vs. control) as a between-subjects factor and high versus low practicing as another between-subjects factor. All comparisons were nonsignificant (see Table 2 for group means and Table 3 for means of experimental groups who practiced mindfulness more or less frequently in class as rated by the teacher).

Correlational analyses on the seven posttests and the teacher ratings revealed that the Child and Adolescent Mindfulness Measure (CAMM) and the Emotion Awareness Questionnaire (EAQ; $r = .69$), the CAMM and the Spence Children's Anxiety Scale (Spence; $r = .54$), and the EAQ and Spence ($r = .61$) were highly correlated ($p < .01$). Additionally, the teacher's ratings of student mindfulness practice were positively correlated with the post Reading Attitude Inventory (RAI; $r = .728$, $p < .01$). There was a nonsignificant trend toward a positive relationship between teacher ratings and post-CAMM ($r = .303$, $p > .10$). Thus, diligent mindfulness practice during reading lessons was strongly correlated with an increase in positive attitudes toward reading and it might have also led to an increase in mindfulness (though that trend did not quite reach significance). The teacher's ratings were negatively correlated with the Simon effect ($r = -.564$, $p < .01$), which is thought to reflect attentional Control. Specifically, it is the response time slowing that occurs when the required response is incompatible with an irrelevant stimulus dimension (e.g., the fish is pointing left but is on the right side of the screen). This finding is consistent with the hypothesis that students who practice mindfulness on a regular basis developed greater attentional skills. All other correlations were nonsignificant.

Qualitative results

Early on during the intervention, it became apparent that students were responding to the mindfulness intervention differently. Some were receptive to the training, whereas others were resistant. One of our main study goals was to study which mindfulness practices are most effective for which types of children. During the open coding process, the first author looked for specific personality traits of children who were receptive or resistant to mindfulness training to better understand

Table 2. Summary of group means on difference *t* tests (Time 1 subtracted from Time 5).

Measure	Test	Group	Mean difference score
Automated version of the Operation Span (AOspan)		Experimental	2.80
		Control	2.69
AX Continuous Performance Test (AXCPT)	Response times (RTs)	Experimental	-61 ms
		Control	-77 ms
AX Continuous Performance Test (AXCPT)	Accuracy	Experimental	-.011
		Control	.004
The Simon task	RTs	Experimental	-20 ms
		Control	-4 ms
The Simon task	Accuracy	Experimental	.03
		Control	.01
The Child and Adolescent Mindfulness Measure (CAMM)		Experimental	-4.20
		Control	-1.23
The Spence Children's Anxiety Scale (Spence)		Experimental	-7.67
		Control	-5.62
The Emotion Awareness Questionnaire (EAQ)		Experimental	-6.13
		Control	1.38
The Reading Attitude Inventory (RAI)		Experimental	-2.47
		Control	1.92

Table 3. Summary of group means (practicing more vs. more with instructor and practicing less students).

Measure	Test	Group	Mean
Automated version of the Operation Span (AOspan)		Practicing More	5.43
		MWI and Practicing Less	0.50
AX Continuous Performance Test (AXCPT)	Response times (RTs)	Practicing More	-.58 ms
		MWI and Practicing Less	-.63 ms
AX Continuous Performance Test (AXCPT)	Accuracy	Practicing More	0.002
		MWI and Practicing Less	-.024
The Simon task	RTs	Practicing More	-0.24
		MWI and Practicing Less	-0.16
The Simon task	Accuracy	Practicing More	0.05
		MWI and Practicing Less	0.008
The Child and Adolescent Mindfulness Measure (CAMM)		Practicing More	-2.0
		MWI and Practicing Less	-6.13
The Spence Children's Anxiety Scale (Spence)		Practicing More	-6.86
		MWI and Practicing Less	-8.38
The Emotion Awareness Questionnaire (EAQ)		Practicing More	-3.71
		MWI and Practicing Less	-8.25
The Reading Attitude Inventory (RAI)		Practicing More	-0.71
		MWI and Practicing Less	-4.0

Note. After treatment, the experimental teacher rated how often students had practiced MF breathing during class from 1 to 4 (1 = Very little or Never, 2 = Sometimes, 3 = Most of the time, 4 = Always or Almost Always). The first author also independently rated students on frequency of practice while facilitating the class. For the purposes of this report, students who were rated by both as a "3" or a "4" are referred to as the *Practicing More* (practiced more frequently; $n = 7$) group; students who were rated by the teacher as a "1" or a "2," but rated as a "3" by the first author are referred to as the *Practicing More with Instructor* (MWI; $n = 3$) group; students who were rated by both the teacher and the first author as a "1" or a "2" are referred to as the *Practicing Less* (practiced very little or only sometimes; $n = 5$) group.

possible reasons for their differing attitudes. During the course of the intervention, the teacher and the first author asked students to answer specific writing prompts about their feelings and thoughts regarding mindfulness (see the appendix). Students' answers to these prompts, along with their drawings, provided the main source for the qualitative analysis. To avoid single-source bias and increase internal validity, triangulation (comparing and cross-checking data collected at different times or places; Merriam, 2009) of multiple sources of data (children's drawings, journal excerpts, cognitive and self-report measures, the teacher's online surveys, and teacher observations) is provided when relevant. The participants' names have been changed to maintain confidentiality. The students' original spelling has been preserved (with bracketed corrections) when excerpts are cited.

Children's drawings

Children's drawings are a window into their inner lives, revealing their emotions, perceptions, and conceptions of the world (Hamama & Ronen, 2009). Drawings reflect a child's unconscious perceptions and feelings (Faroki & Hashemi, 2011), whereas their writing reflects their explicit, conscious thoughts and feelings. Hopperstad (2010) discussed the interpretation of visual features in drawings to derive ideational, interpersonal, and textual meaning from them. Ideational meaning is what an image communicates about a specific phenomenon. In Figure 2, the students were asked at the close of the intervention to "draw a picture of yourself practicing mindfulness." Thus, these drawings represent the children's conceptions of mindfulness practice. They are also analytical in nature, in that students included elements important to mindfulness, such as a visual representation of breath. The interpersonal meaning of an image can be found in the gaze of the illustrated person—is it looking directly or indirectly at its potential viewers? In the majority of the mindfulness drawings, the students (7/13) have their eyes closed or are in profile, relating to us in a more open and relaxed manner, also communicating the importance of closed eyes and/or relaxation. The eyes of the remaining six students are open, demanding a higher level of interaction with the viewer. Textual meaning can be derived from the use of graphic lines for framing separate components of the image. For example, Sophia used lines to separate different words that she associated with mindfulness practice—"feelings mad sad happy, calming down, breath, participate."

Emotional attitudes toward the phenomenon in question can also be seen in drawings (Hamama & Ronen, 2009). In six of 13 of the participants' drawings, the figures are smiling, indicating feelings of happiness during mindfulness practice. Ethan and Aman's straight or slightly downturned mouths may indicate anxiety or uncertainty, and Emilio's bared-teeth expression may indicate stress (Sturmer, Rothbaum, Visintainer, & Wolfer, 1980). Fluent lines in a drawing demonstrate confidence, whereas one with many erasures—as in Ethan's drawing—may show anxiety (Hamama & Ronen, 2009). The students' drawings demonstrated the important elements of mindfulness practice—a round, open mouth (four of 13 students), closed eyes (six of 13), listening to a CD or music (two of 13), sitting cross-legged (five of 13), lying down (one of 13), and focusing on the breath (five of 13). In seeking to understand more about why some children were more or less receptive to the mindfulness treatment, we can learn a lot about their emotional attitudes and perceptions from their drawings. The drawings of the students in the *Practicing More* group and the MWI group—with the exception of Ethan and Aman, whose drawings indicated some anxiety—all have smiling, happy faces. The students in the *Practicing Less* group—with the interesting exception of Sebastian—are not smiling.

Experimental group themes in journal entries. The most saturated themes within each of the subgroups are discussed in detail below. Figures 5–7 show the themes that are important in understanding each of the subgroups: *Practicing More*, MWI, and *Practicing Less*.

Practicing More group themes. Next, we analyzed the themes for those who practiced mindfulness more diligently during the intervention. Importance of a theme to each subgroup can be seen in the percentage of excerpts that each group contributed to the theme. For example, the *Practicing More* group ($n = 7$) represented 47% of the experimental group ($n = 15$); in Figure 4, any theme where the *Practicing More* group contributed more than 47% of the excerpts indicated the theme's importance to some or all of the members of that group. This means that students did more than just provide a simple answer to the question while answering the journal prompts; they wrote more than students in other groups on these themes: mindfulness as suppressing bad thoughts (eight of 13 excerpts), mindfulness as beneficial (101 of 182), helps with negative emotions (18 of 34), mindfulness and positive feelings (63 of 104), and mindfulness as breathing (32 of 55). Abigail's excerpt showed that mindfulness breathing is an important part of her life. "If you breath [breathe] you get to feel better if your [you're] mad, sad, or happy. Well if your [you're] happy then you can breath [breathe] every single minute or second or every day."














	Violeta		
	Kevin		
	Ethan		
	Abigail		
	Ashley		Aman
			
	Sofia		Madison
			
Practicing More		Practicing More with Instructor	
		Practicing Less	

Figure 2. Children's drawings of themselves practicing mindfulness. *Note.* Two of the children (Emma and Jacinta) did not draw a picture.

Three themes in **Figure 3** demonstrate the *Practicing More* group's positive attitudes toward school: like being good (eight of eight excerpts), like schoolwork or learning (12 of 13 excerpts), and like teacher (four of five excerpts). In four excerpts, Jacinta revealed that she liked being perceived as "good." "I would call myself good because people call me respectful, responsible, and safe. My teacher [teacher] always tells me that I listen and I'm a good student." In 12 excerpts, the *Practicing More* group stated that they liked reading, listening, and learning. Kevin said that he liked reading because he got to learn and it made him smart.

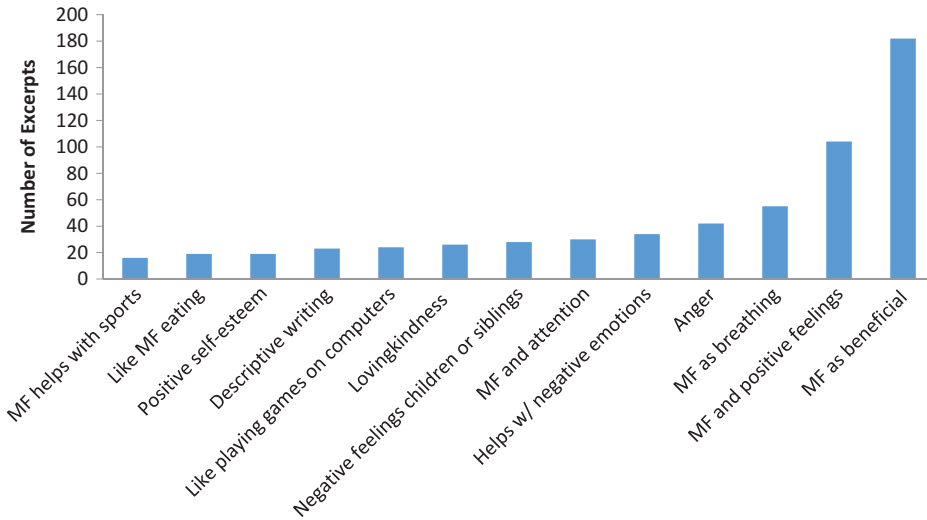


Figure 3. Predominant themes (over 15 excerpts). Note. MF = mindfulness.

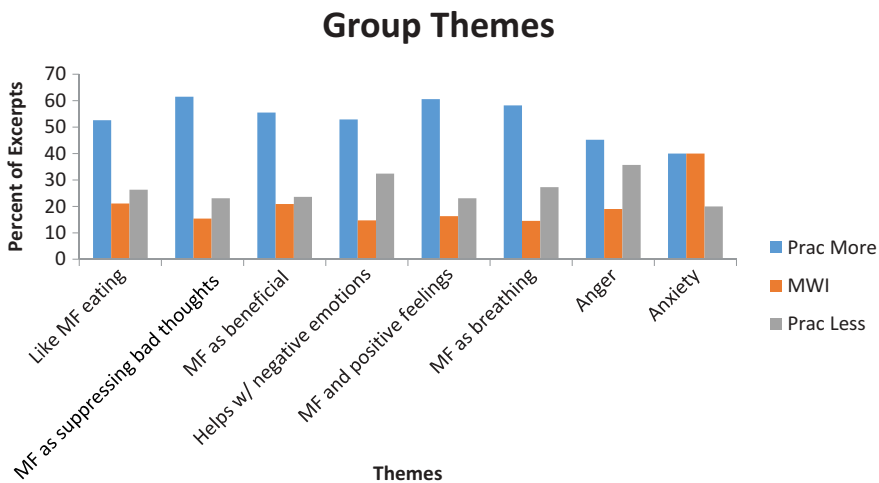


Figure 4. Themes found in the journal excerpts of all of the students in the experimental group. Note. MF = mindfulness.

Violeta expressed that she liked learning about “all kinds of stuff,” like math, science, reading, and writing. And in four excerpts, the *Practicing More* group wrote that they liked their teachers.

Positive self-esteem

The *Practicing More* group also thought of themselves as good students (eight excerpts) and as smart (six excerpts). Abigail said she would call herself smart and her teacher said she was smart. Their teacher’s good opinion of them was important to this group and it was also important for them to do well in school. Jacinta wrote, “I am a leader because I am a good student. I would make good grades.... Just to let you know I made (honor roll).” Ethan was the only member of

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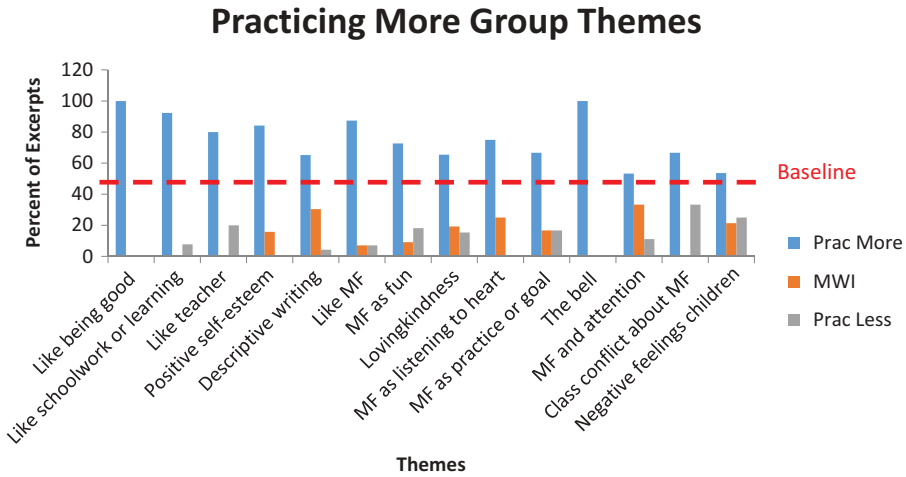


Figure 5. Themes found in the journal excerpts of the students in the practicing more group. *Note.* The practicing more group represented 47% of the experimental group, so in this table, any theme where the practicing more group contributed over 47% of the excerpts (“baseline” is at 47%) indicates the theme’s importance to this group. MF = mindfulness.

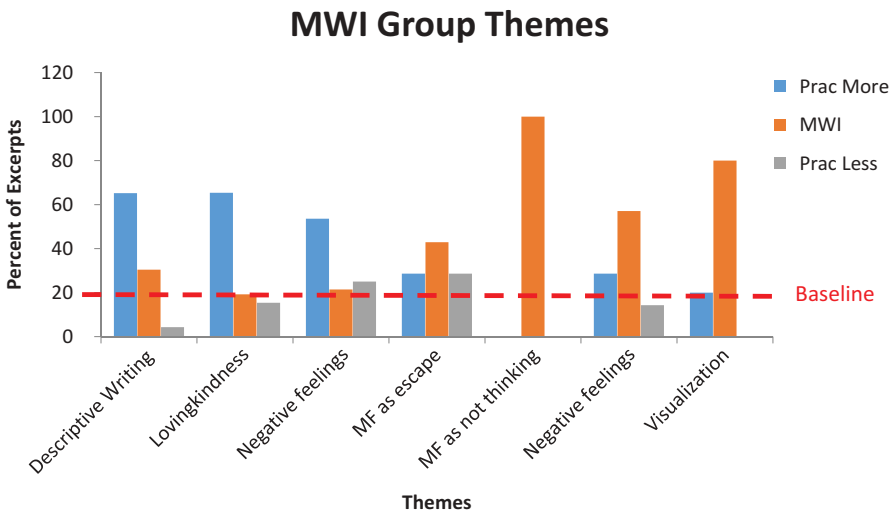


Figure 6. Themes found in the journal excerpts of the students in the more with instructor (MWI) group. *Note.* The MWI group represented 20% of the experimental group, so in this table, any theme where the MWI group contributed over 20% of the excerpts (“baseline” is at 20%) indicates the theme’s importance to this group. MF = mindfulness.

this group who was not as confident of himself, “I guess I am good. I guess I am smart. I guess I am a leader.” His image of himself practicing mindfulness also looked worried and was filled with erasure lines. Santino, in the *Practicing Less* group, wrote that Ethan was one of his friends with whom he played sports and video games. Ethan, a quiet and shy boy, may have found it difficult to be a good student when his friends were acting out in class. But overall, the *Practicing More* students seemed to have a more positive self-image.

Practicing Less Group Themes

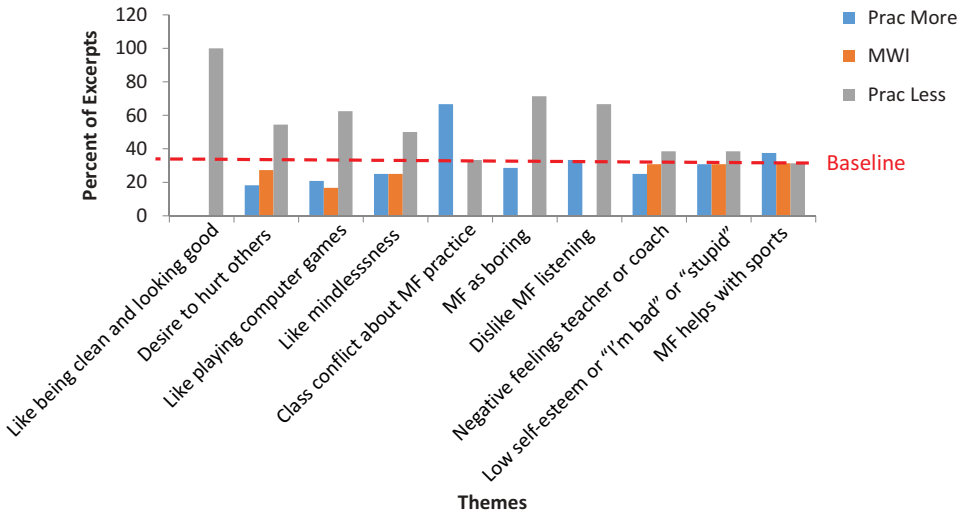


Figure 7. Themes found in the journal excerpts of the students in the practicing less group. *Note.* The practicing less group represented 33% of the experimental group, so, in this table, any theme where the practicing less group contributed over 33% of the excerpts (“baseline” is at 33%) indicates the theme’s importance to this group. MF = mindfulness.

Like mindfulness and mindfulness as fun

In addition to positive attitudes about school, the *Practicing More* group also had more positive feelings about mindfulness. In response to the prompt, “Do you prefer to be mindful or mindless?” five of six of the *Practicing More* students said they preferred being mindful because it made them happy and relaxed. Ethan was the only exception, “I prefer [prefer] mindless. It makes me calm, happy and relaxed becans [because] for baseball you have to be mindless and I love baseball, baseball is my favorite sport.” The level of enthusiasm for mindfulness as fun was highest in the *Practicing More* group. “Mindful is just haveing (having) fun!” wrote Ashley. “I do like it because I [it] is calming, fun, and it tast [tasted] good some of the time. I love it” (Violeta).

Lovingkindness, compassion, being nice

The practice of sending well wishes to others (lovingkindness meditation) is an important part of mindfulness training that has been linked to increases in social connectedness and decreases in social isolation (Hutcherson, Seppala, & Gross, 2008). However, it is difficult to teach lovingkindness practices to a group of children who do not yet feel safe with each other, so we only taught one lesson and gave one writing prompt on this topic. Yet the students, especially the *Practicing More* group, wrote 26 excerpts demonstrating an awareness/desire to be kind, compassionate, being good (to others), or nice. Violeta wrote about loving other people five times and her definition of *mindfulness* was “that your mind is calm with goodness.” In an individual prompt, the first author asked her to draw the picture in her head that she saw when she practiced. She drew a figure with a heart-shaped face and stick arms spread open wide in an embrace of the world. The significance of the heart can also be found in Violeta’s excerpts in the theme *mindfulness as expressing or “feeling” or “listening to the heart.”* When she wrote about hugging her mom, Violeta said, “I nodest [notice] whomth [warmth] in my hart [heart].” Noticing and expressing emotion was an essential element of mindfulness for this girl, who often got into conflicts with other children. At the end of the intervention, Violeta wrote that mindfulness was about deep breathing and expressing feelings when mad or when eating.

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Mindfulness as practice or goal or doing it “right”

In addition to being conscientious students, the *Practicing More* group was also conscientious about mindfulness practice. They were the only ones who used the word *practice* in relation to mindfulness breathing. “I am going to practice because I think I need to get good at it” (Ashley). They also expressed the desire to improve at it. “When you have a class that dose (does) mindful breathing you have to do it every day and when you practice it you get better and better” (Abigail). The bell, referred to as “the breathing bell” 19 times by the teacher in her daily survey, was the students’ most frequent opportunity for improving their practice, but only the students in the *Practicing More* group talked about the bell. Ashley mentioned it five times, “I can ring the bell to make me feel happy.”

The *Practicing More* students were also the most attentive students in class. Rated by their teacher on attentiveness during instruction (1–4, with 4 being the most attentive) before the intervention started (the correlation between the teacher’s attention ratings and mindfulness practice ratings was $.737, p = .01$), all of the *Practicing More* students were given a “3” or a “4.” Although all of the students wrote about mindfulness and attention, concentration or focus, 16 of 30 excerpts in this category came from the *Practicing More* group. “Mindfulness is to concentrate on what’s around and inside you,” wrote Jacinta, who used the word *concentrate* four times, and also said that mindfulness was letting go of other thoughts and that it might help her do better on tests. The *Practicing More* group also recognized that it was easier to concentrate in a quiet room, and they were more likely to answer the question, “When is a good time to practice?” by saying they would practice at home as well as at school. Ashley answered this prompt with the excerpt, “Befor [before] work. Befor school. Befor you go to bed. Befor you go outside. Befor anything is good.”

In summary, students in the *Practicing More* group reported more benefits from mindfulness practice, they liked being good, and they liked their teacher and learning. They saw themselves as “good” and “smart.” They liked mindfulness and saw it as “fun.” They had a desire to be kind or nice. Their excerpts demonstrated a more advanced understanding of mindfulness meditation—the perception of mindfulness as something that can be improved with daily practice given the right conditions (e.g., group support, quiet environment). There was also more evidence of parental support with this group. Five out of seven *Practicing More* students completed at least one home practice sheet (7 days of listening to the mindfulness CD and completing a mindfulness practice like tying their shoes) signed by their parents. Abigail, who expressed a fear of being alone at home and who had a high level of separation anxiety on the Spence pretest, completed two home practice sheets (15 days of home practice) and wrote that she did not practice at home by herself because her dad did it with her and helped her concentrate.

Although the *Practicing More* students were more compliant and conscientious—they were easier for the teacher to manage—it is not true that they did not “need” mindfulness as much as other students. Jacinta and Violeta showed high levels of stress in their heart rate variability on the HeartMath program. Jacinta’s desire to do well in school may have caused her additional stress. She wrote in her journal that she got angry when she studied hard and got a bad score. When responding to the Spence statement, “I worry that I will do badly at my schoolwork,” Kevin and Violeta answered “Always.” They talked about being the target of school bullies and wrote 86 excerpts on experiencing negative feelings like anger, anxiety, sadness, frustration, loneliness, and expressed negative feelings about school, teachers, and schoolwork. They also demonstrated a greater awareness that mindfulness can help with negative emotions.

MWI group themes. The MWI group ($n = 3$) represented 20% of the mindfulness class, so themes in Figures 4 and 6 with 19% to 20% or more excerpts from this group represent important themes to some or all of these students: mindfulness as escape, mindfulness as not thinking, negative feelings, and visualization, are described in more detail below.

There are four themes with more excerpts from the MWI group than from the other two groups (see Figure 6). In the first one, mindfulness as escape (three of seven excerpts), Emma wrote that mindfulness breathing could take her away from the bad things that were happening. Madison

wrote, “To do mindfulness all you have to do is calm down have a blank mind. Think somewhere really pretty and breath [breathe].” This concept of mindfulness as not thinking or a blank mind (two of two excerpts) was only expressed by the MWI group. In response to the initial prompt, Emma said that mindfulness is not thinking about anything, and that having no thoughts would be hard. Aman did not think mindfulness was having a blank mind, but preferred being mindless “because when people mack [make] fun of me and it happens a lot it good to keep a blank mind, so you don’t [don’t] lissen [listen] to them.”

Negative feelings toward school

Four out of seven of the excerpts in this theme came from the MWI group. Aman, who wrote that people made fun of him a lot, also wrote that he really wanted to go home and that he wished school wasn’t even invented. Emma wrote the other three excerpts, expressing a strong dislike of the school:

What would make me fell [feel] better today is to move and never come to this school. I also want to move away because of kids and all the bad stuff they do. I want to try to stay away from all of the badniss [badness].

Visualization

Madison used visualization when she was breathing to help her concentrate and escape from the world, “If you set your mind to it everything around you disapears [disappears]. Then your [you’re] in that happy place of your dream.” In [Figure 2](#), Madison drew herself thinking of trees and clouds while listening to music. When I asked Aman if he saw a picture in his head when he concentrated on his breath and, if so, what it was, Aman answered “yes” and drew a stick figure sitting cross-legged on a cloud with a smile on his face.

Aman showed an ability to concentrate in class and a precision in describing his feelings that did not appear in his writing, a skill that was difficult for him. In his picture, he was the only one that drew himself using a *mudra*, a finger position used in meditation where the index finger and thumb are pressed together. His teacher gave him a “1” on attentiveness during instruction and he wrote that he didn’t listen that much. He showed high levels of stress in HeartMath, had a high anxiety score on the Spence pretest (51), and wrote that “I am afraid of everything.” The drawing of his face in [Figure 2](#) with the large eyes and straight mouth looks somewhat anxious and uncertain.

Madison was often defiant and restless in class. In response to the question of whether she thought of herself as a good student, she wrote that she was not good or bad. “I be good when I want and bad when I get mad.” She often verbalized that she had problems with “anger management,” because a family member had died recently. When writing about anger, she said it was hard to control it, “I hope I can control [control] it better.” She was rated as a “1” by her teacher in attentiveness and for practicing mindfulness in class. She had the highest anxiety score on the Spence pretest in class and also the highest amount of positive change in anxiety and emotional awareness. She and Aman completed one sheet (7 days) of home practice.

Madison had a great influence on Emma’s behavior, writing on one occasion that she helps her friend Emma to be quiet. She and Emma were described by the teacher as having off-task or negative behavior one time. The first author observed that Emma often copied the behavior of Madison. Emma wrote, “Most of the time I am good and most of the time I am bad.” There is no evidence of parental support (mindfulness practice) for Emma, but she used mindfulness breathing to calm herself down and keep herself from fighting.

In summary, MWI themes were high anxiety, anger, and negative feelings toward other children and school, where they felt harassed or threatened. These imaginative and kind-hearted students used visualization and a blank mind to escape from their problems. Perhaps their high levels of stress and sensitivity made it more difficult for them to concentrate on a daily level, and so they were less responsive to the classroom teacher because she did not have a lot of experience teaching/practicing mindfulness. Other students with similar traits may be receptive to mindfulness, but their teachers will need more training to effectively respond to them.

Practicing Less group themes. The *Practicing Less* group ($n = 5$) represented 33% of the mindfulness class. Themes in Figures 4 and 5 with approximately 33% or more excerpts from this group are: helps with negative emotions, anger, and class conflict about mindfulness practice. Below are the themes for which the *Practicing Less* group had the highest percentage of excerpts (see Figures 7).

Like being clean or looking good

This theme was unique to the *Practicing Less* group, and especially to Diego, who wrote that he was afraid of having toothpaste on his lip when he went to school and that he wished his clothes were different. In answer to an individual prompt about if it was important to look good, Diego responded yes, “so you don’t look ugly.” One of Sebastian’s unpleasant events was when his shoes got dirty. His feelings and thoughts after this happened were, “My stomach feels funny. I’m sad. I want to punch someone.”

Desire to hurt others

Although this theme was not unique to the *Practicing Less* group, they contributed six of 11 excerpts here. Sebastian did not use mindfulness to calm down after his shoes got dirty. When answering a prompt about how he felt now about the unpleasant event, he wrote that he still felt like punching someone. Santino wanted to punch someone when they were talking about him, and Victoria felt like hitting someone when she woke up tired. In the theme *negative feelings kid or siblings*, the *Practicing Less* group contributed seven of 28 excerpts, but bullying is not mentioned by them. Santino, who wrote four of the excerpts, wrote about being angry when his sister told on him “for no reason” and “when the guys yell at me.”

Like playing games on the computer

This was one of the most important themes to the *Practicing Less* group. Although five of 24 excerpts in this theme were from the *Practicing More* group, the computer games they talked about were the educational math games they played in class. The *Practicing Less* group also liked these games, but they mostly referenced video games. When asked to describe a moment in which he experienced lovingkindness, Emilio answered by writing that he played Mortal Kombat. “I want to play my games.” Santino’s journal had four references to video games. “I noticed when I play video games it is exciting. I think that video games are cool. I wish I was playing video games right now.” Sebastian wrote about video games four times, noticing happy feelings when he was playing, wishing he was playing games “right now,” and stating that he could get out of a bad mood by playing his game. Diego (with three excerpts) wrote that playing video games would make him happy because he had not played video games in 4 days.

Mindfulness as boring

In an effort to increase students’ awareness of the emotions and thoughts surrounding boredom, and also to express support for their current experience, we asked students to describe what the word *boring* meant to them in their journals. Being restless or unable to sit still, which the first author observed in Sebastian and Diego when she was teaching them how to use the HeartMath program, may have been one reason that some students found mindfulness boring. Sebastian disliked mindfulness more than any of the other students. In his journal, he wrote that “mindfulness” was his unpleasant event. “I hate this, I feel weird in my head, I feel like punching someone.” He was also very vocal during class about his feelings of boredom. He wrote, “Boring means to me like I don’t like it. It’s dumb that’s what I think it means to me. It also means to not want to be there and stuff like that.”

Some of the students may have written that mindfulness was boring because others around them were saying or writing this. On the last day of the intervention, all of the students sat together in the library drawing pictures and defining mindfulness. Kevin (*Practicing More* group) wrote that mindfulness class is “relaxing and breathing it is boring but I do like it not that much.” This contradicts all of his other journal entries, where he said that he liked mindfulness class, “It is my favorite.” Three of the boys sitting around him also wrote that mindfulness was boring.

Dislike mindfulness listening

One reason that students described mindfulness class as boring was that they disliked mindfulness listening. The first author introduced mindfulness listening as giving full attention to sounds like the ringing of the bell. “Listen until the sound stops, and when it stops, raise your hand. What is it like to just listen?” The classroom teacher also had students practice listening skills by watching a video of “soothing Chinese music” and two “beautiful music videos.” Then, in another lesson, the first author defined *mindfulness listening* as Saltzman (2004) did, “Listening to whoever is speaking with your full attention, with your ears, your mind, and your heart” (p. 47). Following suit, the teacher began to review “guidelines” for mindfulness listening much like other behaviors taught in positive behavior support (PBS)—by reviewing them at the beginning of each class period. The first author observed the teacher using the words “mindfulness listening” in class when she wanted students to stop talking (a pleasurable experience) and start listening to instruction (a boring experience). Three students said they would not practice it because it was boring. “No,” wrote Emilio (*Practicing Less* group), “because it is boring [boring] and it sucks.”

With the exception of Sebastian (who received a “3”), all of the *Practicing Less* students received a “1” rating from their teacher on attentiveness during instruction. They were not motivated or conscientious students and responded to the teacher’s discipline with extreme negativity. They were frequently described as “off-task” during mindfulness practice and often said that mindfulness was boring. They disliked mindfulness listening, perhaps because it became a classroom management prompt that meant to stop talking and listen to the teacher. They may have disliked mindfulness because they associated it with “being quiet” when they wanted to talk to their friends. They, more than the other groups, expressed a desire to punch or hit other kids, but they did not mention being bullied. They had more feelings of anger toward the teacher than toward the other groups. They did not describe themselves as good students or smart, except for Diego, who said he was a “little smart.” They liked playing video games because they were “cool” and “exciting.” They liked sports and responded positively to the lesson on mindfulness and the Lakers, writing that mindfulness helps with playing sports by increasing concentration and calmness. Although this group often strongly expressed dissatisfaction or displeasure with mindfulness class, they also wrote 43 excerpts on the benefits of mindfulness practice.

Discussion

Below we will first summarize the quantitative and qualitative results. Then, we will use these findings to provide several recommendations for future mindfulness interventions in school settings.

Quantitative results: Emotion regulation and academic performance

Two of the study goals were to investigate the impact of mindfulness training on emotion regulation and academic performance in children. Our quantitative results suggest that, based on teacher ratings, students who consistently practice mindfulness breathing are more mindful, have more positive attitudes toward academic subjects, and are better able to regulate their attention.

Our quantitative results also showed high correlations between the CAMM, the EAQ, and the child anxiety measure (Spence), suggesting a relationship between high levels of mindfulness, emotional awareness, and anxiety. In other words, higher levels of mindfulness and emotional awareness were consistent with a greater awareness of anxiety during a very stressful and busy time—the last quarter of the school year. Mindfulness class was cancelled 18 times out of a possible 45 sessions. Although mindfulness has been shown to be a potent intervention, wherein a single 10- to 20-minute session can affect cognitive processing (Ostafin & Kassman, 2012; Wenk-Sormaz, 2005), and participants in the present study practiced mindfulness for far more than a single 20-minute session, it may be helpful to other educators and researchers to consider the timing of their mindfulness intervention in a public school setting—earlier in the school year might be better. On 14

of these missed days, mindfulness class was cancelled because students had to take a state standardized test. These test sessions took the entire day and children also had to miss recess and eat lunch in their classrooms. Mean difference scores on the Reading Attitude Inventory (RAI ; posttest minus pretest) across all students was $-.43$ ($p > .05$). Students disliked reading more after intensive standardized state testing than before. Student scores on the district standardized reading test also indicated test burnout; mean scores decreased from pretest to posttest ($p > .05$; experimental $M_{diff} = -5$; control $M_{diff} = -3$). These results indicate that students' positive attitudes toward school and their subsequent academic performance may have decreased because they became more aware of their stress in that environment.

Qualitative results

We confirmed that some students are not receptive to mindfulness training. This occurred even though the consent process eliminated children and parents who were not interested in participating. Mindfulness interventions do not work well on students who are nonreceptive. Also, these students can "poison the well" and impair mindfulness learning in those students who are receptive.

Analysis of journal excerpts revealed differing themes from children who were receptive and those who were resistant to the treatment. These themes provided clues as to the children's attitudes and perceptions toward mindfulness. Themes important to the whole group were mindfulness as suppressing bad thoughts, mindfulness as beneficial, helps with negative emotions, and mindfulness as breathing. All of the students liked mindfulness eating and all of the students expressed *anger* as a theme.

Themes that were predominant in the Practicing More group were like being good, like school-work or learning, like teacher, like mindfulness, positive self-esteem, lovingkindness, compassion, being good or nice. They seemed to have more positive attitudes toward school, themselves, and others. They also defined mindfulness as expressing or "feeling" or listening to the heart, as a practice or goal or doing it "right," as fun, and as being/feeling quiet. However, they felt bullied by others, as indicated in the theme *negative feelings children or siblings* and they were not happy that the *Practicing Less* group were often disruptive during mindfulness training, as indicated in the theme *class conflict about mindfulness practice*.

Themes that were predominant to the MWI group were the use of mindfulness as escape from the stresses of their life, including their negative feelings toward school. These students also tended to use visualization while meditating and may have found mindfulness hard because they thought of it as not thinking or a blank mind.

Themes predominant to the *Practicing Less* group were negative feelings toward themselves and others, including a desire to hurt others, negative feelings toward teacher or coach, and low self-esteem or "I'm bad" or "stupid." They also had negative feelings toward mindfulness, including mindfulness as boring, like mindlessness, and dislike mindfulness listening. They like being clean and looking good and playing games on computers.

In summary, the whole group found positive benefits of mindfulness training—it helped with negative emotions and increased positive feelings. The *Practicing More* group seemed to enjoy school or learning more, liked being kind to others, were more responsive to the teacher, and were disturbed by the other children's negative attitudes toward mindfulness. The MWI group had more negative feelings toward school, wanted to use mindfulness as an escape from negative feelings and situations, and used visualization during mindfulness practice. The *Practicing Less* group had more negative feelings toward mindfulness and themselves, but, after a lesson on how the Lakers used mindfulness to prepare for games, these resistant students also recognized that mindfulness could help with sports. This group also liked playing video games.

Study limitations

First, the relatively small sample size and the primary reliance on qualitative data analysis may limit generalization of the results. Second, we cannot rule out that participants may have been subject to demand characteristics. Although we encouraged them to talk and write about their negative experiences, students may have written things they thought they were “supposed” to write. Finally, because the first author was an instructor and the data analyst, bias may have entered into the analysis. However, we found strong patterns in the data that indicate traits of students who are resistant to mindfulness and those of students who are receptive. An important goal for future research is to verify that these traits generalize to larger samples with different socioeconomic and personality characteristics.

Directions for future research

Given the consistent trends toward personality differences between students who are receptive and students who are nonreceptive found in the journal entries, it would be valuable to follow up on this finding by using pre- and posttest measures on Big Five traits (openness, conscientiousness, extraversion, agreeableness, and neuroticism; Giluk, 2009), sensation seeking, animosity, video game addiction, and boredom. In addition, it would be useful to conduct formalized observations of students in a classroom mindfulness intervention using checklists of the aforementioned traits. Do the formal observations correlate with the self-report measures?

Another important direction for future research is investigating means of increasing motivation and receptiveness toward mindfulness. In particular, do game-based mindfulness interventions ameliorate chronic boredom and animosity and increase arousal in sensation-seeking children? Action video games are already being designed that use biometric information (e.g., heart rate variability) to manipulate a player’s emotional state to enhance feelings of horror. For example, in *Please Biofeed the Zombies* (Dekker & Champion, 2007), a player’s heart rate affects their avatar’s speed, increases or decreases background music volume, and triggers game effects like screen filters—red for a fast heartbeat, white for calmness. There are also advantages for controlling excitement levels in this game. Players can see through walls and become invisible if they are able to lower their galvanic skin response. Although game developers may exploit biometrics to increase game sales, thoughtful researchers could design games that sensation-seeking individuals find exciting while simultaneously motivating them to learn how to regulate their energy levels using mindfulness practices.

Practical applications

Studies of mindfulness training with children have demonstrated certain benefits of mindfulness, including the increase of attention and emotion regulation skills. Because schools are under enormous pressure to increase standardized test scores and demonstrate academic proficiency in all of their students, mindfulness training offers a solution that can increase student performance while simultaneously lowering stress levels for students. This study offers the following applications for parents, counselors, and educators.

Use traits to identify resistant students

The five factor personality model (Big Five; Giluk, 2009) can be used to identify, understand, and treat students who are consistently resistant and disruptive during classroom mindfulness practice. Students who are disruptive because they find it difficult to sit still may need to have more mindfulness movement incorporated into the routine. Some students may enjoy losing self-awareness more than gaining it (e.g., the students in our study who preferred “mindlessness”), so lessons on the relationship between flow and mindfulness can be taught. *Flow* is defined as an altered state of consciousness that spontaneously arises when absorbed in a challenging, but enjoyable, activity like

playing sports or computer games (Czikszentmihalyi, 1992). Because mindfulness involves the maintenance of moment-to-moment awareness, it may not occur simultaneously with flow, but mindfulness may make it more possible—by cleaning out mental chatter and developing concentration skills—to enter flow states (Sheldon, Prentice, & Halusic, 2014).

Explore game-based treatments

Students who demonstrate reactant boredom, a type of boredom that is highly unpleasant and is connected with a strong motivation to escape the perceived cause of the boredom (Goetz et al., 2014) should be taken out of the classroom and treated separately. If these students also exhibit the trait of sensation seeking and enjoy playing video games, it may be worthwhile to explore a game-based mindfulness treatment. Bowman and Tamborini (2012) induced boredom or stress in participants before they took mood measures and then had them play a computer game for a few minutes before completing another set of mood measures. The researchers found that computer games positively affected mood repair more in bored participants than in stressed participants. They hypothesized that this was because the games increased arousal and interfered with rumination.

McGonigal (2011) suggested that we use what we know about game design to improve our daily lives and solve real-world problems. She gave an example of an alternate reality game called *Chore Wars*, where players create quests based on household chores and play with roommates or family members. Participants create avatars who gain experience points, virtual treasure, avatar power-ups, and real-world awards (e.g., additional allowance for children) by completing chores—the more unpleasant the chore, the more points are earned. This game could be adapted by a counselor or resource teacher to motivate a student to complete difficult chores in school (e.g., completing math problems, not calling out in class). The student could customize the adventure, and mindfulness practices could be integrated into the game as another way to earn points.

Journey to Wild Divine (www.wilddivine.com) is a computer game that uses electronic equipment to provide feedback to players on their skin conductance level and heart rate variability. Players have to learn how to regulate their energy levels to navigate through areas of the game world and overcome certain challenges. For example, to lower an arrow until it is pointing directly at the bullseye, a player has to calm her energy down by taking long, slow breaths. However, if the arrow moves too far down and needs to be raised, the player has to raise her energy by breathing quickly. This game may be an effective way for some resistant students to learn mindfulness practices, but it lacks the fast-paced excitement that sensation-seeking children may be craving.

School-wide implementation

To effectively support the implementation of mindfulness, a school-wide commitment to a daily 10- to 15-minute breathing practice is advised. During this time, phones could be diverted, support staff should participate, and visitors should be kept in the office so that classes can meditate without interruption. Mindfulness practice would need to continue even during standardized testing; in fact, this is a time when students need it the most. Mindfulness training could be extended on a weekly basis to include a time when teachers nonjudgmentally support children's expression of their thoughts and feelings through writing, discussion groups, or artistic expression. This opportunity for reflective abstraction may help to reverse the steady decline in creative thinking caused in part by the standardized testing movement that has sterilized the classroom with the drill exercises of rote learning and eliminated many opportunities for releasing creative energy at school (Kim, 2011).

Mindfulness can be integrated into the curriculum

Another implication of this study is that mindfulness serves as a protective factor, helping students who practice mindfulness to preserve or improve positive attitudes toward academics. Scores on the RAI were highly correlated with the teacher's ratings of student mindfulness practice and demonstrated that students who practiced more maintained or improved their attitudes toward reading (*Practicing More* $M_{diff} = -.71$, More with instruction and *Practicing Less* group $M_{diff} = -4.0$). Another

implication is that it is important to teach students strategies for calming themselves down and increasing their self-confidence while they are in the process of learning. Some of the most effective lessons in the intervention incorporated reading, writing, and mindfulness awareness of emotions (e.g., reading and writing about children's literature devoted to the topic of anger). The detailed descriptions and strong voice in their journal excerpts demonstrated that writing and mindfulness skills can be developed simultaneously. The lesson on mindfulness and the Lakers also showed the importance of choosing reading materials that are appropriate for a number of reasons beyond the necessary one of correct reading level; reading passages need to stimulate intellectual and emotional growth. The Lakers article was especially relevant because it demonstrated to students that men—and not just the women teachers at their school—also practiced mindfulness. In the case of the Lakers, they practiced mindfulness to become better athletes. This is another implication of the study—it is important for mindfulness instructors to find role models of both sexes who practice mindfulness and who are respected and well liked by the students.

Provide strong incentives for teachers to undergo mindfulness training

Teacher implementation of mindfulness is critically important to the success of mindfulness research in schools. Instructors who have very limited experience with mindfulness practice can bring an attitude of judgment into their teaching (e.g., “It is not okay to say that mindfulness is boring”), thereby creating negative attitudes toward mindfulness in their students. It is important to model mindfulness instructional techniques, observe mindfulness instruction, and offer constructive feedback. It is also necessary to help teachers understand the similarities and differences between mindfulness training and behavioral support programs like PBS. Modeling of mindfulness instruction was provided in this study, and the teacher completed a basic mindfulness course. Limited training might not have been enough. Future studies should require mindfulness teachers to complete a comprehensive course that includes instruction in establishing a personal mindfulness practice, modeling of teaching methods, supervision of one-on-one mindfulness sessions with children, and weekly observations and evaluations of classroom sessions.

Conclusion

In conclusion, we found that some students were receptive to mindfulness whereas others were resistant, confirming previous findings. Children receptive to mindfulness treatment exhibited the traits of openness to experience, agreeableness, conscientiousness, and conformity to the teacher's ideas and expectations. Resistant children exhibited traits of boredom, sensation seeking, animosity, and conformity to peer pressure. We described possible ways of dealing with resistant children, including incorporating more movement into mindfulness training and using game-based treatments.

Even though some children who have a high need for emotion regulatory training may be extremely resistant and disruptive during classroom-based mindfulness treatments, teaching mindfulness can still be a positive experience for students. After the study had concluded, the experimental teacher (not a member of the research team) in this study wrote:

I am still convinced that mindfulness is beneficial to students. In hindsight, these are a couple of things I would do differently: 1) Teaching a lesson and practicing the breathing requires a minimum of 30 to 45 minutes per day. 2) The most difficult students to reach would benefit from one-on-one practice. (L. Esparza, personal communication, 24 July 2015)

It is also important to note that though some of the children were mostly resistant to mindfulness, they also said positive things about mindfulness and found some benefit from the intervention. All of the students in this study wrote about the benefits of mindfulness—that it helps with negative emotions like anger and fear and that it brings positive feelings of happiness, peace, and relaxation. Additionally, the last drawing and words of Sebastian—the most resistant and disruptive participant—offer a ray of hope that mindfulness can be still be an effective intervention for these students. On the last day of the intervention, Sebastian drew a picture of himself practicing mindfulness. In it, he is lying on the ground, his hands

behind his head, a smile on his face. In answer to the prompt, “Tell your parents what mindfulness is,” he wrote this response: “It’s breathing very slow and paying attention to your breath. And really [really] coming [calming] down. It’s also giving peace.”

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References

- Averill, J. B. (2013). *Content synopsis for basic qualitative inquiry*. Albuquerque, NM: New Mexico Center for the Advancement of Research Engagement and Science.
- Boud, D. (2001). Using journal writing to enhance reflective practice. *New Directions for Adult and Continuing Education*, 90, 9–18. doi:10.1002/ace.16
- Bowman, N. D., & Tamborini, R. (2012). Task demand and mood repair: The intervention potential of computer games. *New Media and Society*, 14(8), 1339–1357. doi:10.1177/1461444812450426
- Broderick, P. C., & Metz, S. (2009). Learning to BREATHE: A pilot trial of a mindfulness curriculum for adolescents. *Advances in School Mental Health Promotion*, 2(1), 35–46. doi:10.1080/1754730x.2009.9715696
- Campion, J., & Rocco, S. (2009). Minding the mind: The effects and potential of a school-based meditation program for mental health promotion. *Advances in School Mental Health Promotion*, 2(1), 47–55. doi:10.1080/1754730x.2009.9715697
- Chiesa, A., Calati, R., & Serretti, A. (2011). Does mindfulness training improve cognitive abilities? A systematic review of neuropsychological findings. *Clinical Psychology Review*, 31(3), 449–464. doi:10.1016/j.cpr.2010.11.003
- Cohen, J. D., Barch, D. M., Carter, C., & Servan-Schreiber, D. (1999). Context-processing deficits in schizophrenia: Converging evidence from three theoretically motivated cognitive tasks. *Journal of Abnormal Psychology*, 108(1), 120–133. doi:10.1037/0021-843X.108.1.120
- Corcoran, K. M., Farb, N., Anderson, A., & Segal, Z. V. (2010). Mindfulness and emotion regulation: Outcomes and possible mediating mechanisms. In A. M. King, & D. M. Sloan (Eds.), *Emotion regulation and psychopathology: A transdiagnostic approach to etiology and treatment* (pp. 339–355). New York, NY: Guilford Press.
- Czikszentmihalyi, M. (1992). *Flow: The psychology of happiness*. London, England: HMSO.
- Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F., ... Sheridan, J. F. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, 65(4), 564–570. doi:10.1097/01.PSY.0000077505.67574.E3
- Dedoose Version 6.1.9, web application for managing, analyzing, and presenting qualitative and mixed method research data. (2015). Los Angeles, CA: SocioCultural Research Consultants, LLC. Retrieved from www.dedoose.com
- Dekker, A., ... Champion, E. (2007, September). *Please biofeed the zombies: Enhancing the gameplay and display of a horror game using biofeedback*. Paper presented at the Digital Games Research Association (DiGRA) 2007 International Conference, Tokyo, Japan. Retrieved from http://www.cs.tufts.edu/~jacob/250pbi/Please_biofeed_the_zombies.pdf
- Denzin, N. K., & Lincoln, Y. S. (1994). *The Sage handbook of qualitative research*. Thousand Oaks, CA: Sage.
- Evans, G. W., & English, K. (2002). The environment of poverty: Multiple stressor exposure, psychophysiological stress, and socioemotional adjustment. *Child Development*, 73(4), 1238–1248. doi:10.1111/cdev.2002.73.issue-4
- Faroki, M., & Hashemi, M. (2011). The analysis of children’s drawings: Social, emotional, physical aspects. *Procedia: Social and Behavioral Sciences*, 30, 2219–2224.
- Fisher, R. (2006). Still thinking: The case for meditation with children. *Thinking Skills and Creativity*, 1(2), 146–151. doi:10.1016/j.paid.2009.06.026
- Giluk, T. L. (2009). Mindfulness, Big Five personality, and affect: A meta-analysis. *Personality and Individual Differences*, 47(8), 805–811. doi:10.1016/j.paid.2009.06.026
- Goetz, T., Frenzel, A. C., Hall, N. C., Nett, U. E., Pekrun, R., & Lipnevich, A. A. (2014). Types of boredom: An experience sampling approach. *Motivation and Emotion*, 38(3), 401–419. doi:10.1007/s11031-013-9385-y
- Greco, L. A., Baer, R. A., & Smith, G. T. (2011). Assessing mindfulness in children and adolescents: Development and validation of the Child and Adolescent Mindfulness Measure (CAMM). *Psychological Assessment*, 23(3), 606–614. doi:10.1037/a0022819

- Hamama, L., & Ronen, T. (2009). Children's drawings as a self-report measurement. *Child and Family Social Work, 14*(1), 90–102. doi:10.1111/j.1365-2206.2008.00585.x
- Hopperstad, M. H. (2010). Studying meaning in children's drawings. *Journal of Early Childhood Literacy, 10*(4), 430–452. doi:10.1177/1468798410383251
- Hutcherson, C. A., Seppala, E. M., & Gross, J. J. (2008). Loving-kindness meditation increases social connectedness. *Emotion, 8*(5), 720–724. doi:10.1037/a0013237
- Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. New York, NY: Hyperion.
- Kim, K. H. (2011). The creativity crisis: The decrease in creative thinking scores on the Torrance Tests of Creative Thinking. *Creativity Research Journal, 23*(4), 285–295. doi:10.1080/10400419.2011.627805
- Lewis, J. (1979). A reading attitude inventory for elementary school pupils. *Educational and Psychological Measurement, 39*(2), 511–513. doi:10.1177/001316447903900236
- Majumdar, M., Grossman, P., Dietz-Waschkowski, B., Kersig, S., & Walach, H. (2004). Does mindfulness meditation contribute to health? Outcome evaluation of a German sample. *Journal of Alternative and Complementary Medicine, 8*(6), 719–730. doi:10.1089/10755530260511720
- Manly, T., Anderson, V., Nimmo-Smith, I., Turner, A., Watson, P., & Robertson, I. H. (2001). The differential assessment of children's attention: The test of everyday attention for children (TEA-Ch), Normative Sample and ADHD Performance. *Journal of Child Psychology and Psychiatry, 42*(8), 1065–1081. doi:10.1111/1469-7610.00806
- McGonigal, J. (2011). *Reality is broken*. New York, NY: Penguin Press.
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.
- Napoli, M., Krech, P. R., & Holley, L. C. (2005). Mindfulness training for elementary school students: The Attention Academy. *Journal of Applied School Psychology, 21*(1), 99–125. doi:10.1300/J370v21n01_05
- Ortner, C. N. M., Kilner, S. J., & Zelazo, P. D. (2007). Mindfulness meditation and reduced emotional interference on a cognitive task. *Motivation and Emotion, 31*, 271–283. doi:10.1007/s11031-007-9076-7
- Ostafin, B. D., & Kassman, K. T. (2012). Stepping out of history: Mindfulness improves insight problem solving. *Consciousness and Cognition, 21*(2), 1031–1036. doi:10.1016/j.concog.2012.02.014
- Rieffe, C., Oosterveld, P., Miers, A. C., Terwogt, M. M., & Ly, V. (2008). Emotion awareness and internalizing symptoms in children and adolescents: The Emotion Awareness Questionnaire Revised. *Personality and Individual Differences, 45*(8), 756–761. doi:10.1016/j.paid.2008.08.001
- Rosaia, C., & Benn, R. (2006). The experience of Transcendental Meditation in middle school students: A qualitative report. *Explore: The Journal of Science and Healing, 2*(5), 422–425. doi:10.1016/j.explore.2006.06.001
- Roth, B., & Robbins, D. (2004). Mindfulness-based stress reduction and health-related quality of life: Findings from a bilingual inner-city patient population. *Psychosomatic Medicine, 66*(1), 113–123. doi:10.1097/01.PSY.0000097337.00754.09
- Saltzman, A. (2004). *Practices for children and adolescents to discover peace and happiness*. Author.
- Saltzman, A. (Producer). (2007). *Still quiet place: Mindfulness for young children* [CD].
- Sarason, I. G. (1978). Test Anxiety Scale: Concept and research. In C. D. Spielberger & I. E. Sarason (Eds.), *Stress and anxiety* (p. 5–44). New York, NY: Hemisphere Publishing.
- Semple, R. J., Reid, E. F. G., & Miller, L. (2005). Treating anxiety with mindfulness: An open trial of mindfulness training for anxious children. *Journal of Cognitive Psychotherapy, 19*(4), 375–392. doi:10.1891/jcop.2005.19.4.379
- Sheldon, K. M., Prentice, M., & Halusic, M. (2014). The experiential incompatibility of mindfulness and flow absorption. *Social Psychological and Personality Science, 6*(3), 276–283. doi:10.1177/1948550614555028
- Simon, J. R., & Small, A. M. (1969). Processing auditory information: Interference from an irrelevant cue. *Journal of Applied Psychology, 53*(5), 433–435. doi:10.1037/h0028034
- Spence, S. H. (1998). A measure of anxiety symptoms among children. *Behaviour Research and Therapy, 36*(5), 545–566. doi:10.1016/S0005-7967(98)00034-5
- Sturner, R. A., Rothbaum, F., Visintainer, M., & Wolfer, J. (1980). The effects of stress on children's human figure drawings. *Journal of Clinical Psychology, 36*(1), 324–331. doi:10.1002/1097-4679(198001)
- Tang, Y., & Posner, M. L. (2009). Attention training and attention state training. *Trends in Cognitive Science, 13*(5), 222–227. doi:10.1016/j.tics.2009.01.009
- Ullmann, R. K., Sleator, E. K., & Sprague, R. L. (1997). *ADD-II Comprehensive Teacher Rating Scale (ACTeRS)*. Champaign, IL: MetriTech.
- Unsworth, N., Heitz, R. P., Schrock, J. C., & Engle, R. W. (2005). An automated version of the operation span task. *Behavior Research Methods, 37*(3), 498–505. doi:10.3758/BF03192720
- Varela, F. J. (1996). Neurophenomenology: A methodological remedy for the hard problem. *Journal of Consciousness Studies, 3*(4), 330–349.
- Waters, L., Barsky, A., Ridd, A., & Allen, K. (2015). Contemplative education: A systematic, evidence-based review of the effect of meditation interventions in schools. *Educational Psychology Review, 27*, 103–134. doi:10.1007/s10648-014-9258-2
- Wenk-Sormaz, H. (2005). Meditation can reduce habitual responding. *Alternative Therapies in Health and Medicine, 11*(2), 42–58.

Appendix. Writing prompts (appear in the order presented in the intervention)

*Prompts generated by the classroom teacher

What is mindfulness?

1. Are you a leader in this class or a follower? Or maybe you don't lead or follow—you just do your own thing?
2. Would you call yourself a "good" student? Or one who is "not so good"? Or maybe you're not "good" or "bad"?
3. Would you call yourself a "smart" student? Or one who is "not smart"? Or maybe you're not "smart" or "not smart"?
4. Look at your answers to your questions. Do you want to be different sometimes? What would you be like if you could be different?

*What are your feelings about mindful eating? Did you like it? Why or why not?

*Why is mindful listening important? Are you going to practice? Why or why not?

*Write a paragraph describing what would make you feel happy right now.

*Describe what the word "boring" means to you.

*Think of the word "lovingkindness." What does it mean to you? Describe a moment where you experienced "lovingkindness."

Pleasant Event

1. What was the event?
2. What did you notice in your body?
3. What feelings (emotions) did you notice?
4. What thoughts did you notice?
5. What do you notice in your body? What feelings and thoughts do you notice now, as you write about the event?

*Think about mindfulness breathing to others. Write down your thoughts and feelings about the experience.

*Think about your favorite group activity. Write 1–3 paragraphs describing why you like that activity.

*What is your favorite sport to do? Say why or why not you like the sport.

*Describe the pleasant experiences you have during mindful class.

*Describe what choices you can make to turn negative feelings into happy feelings.

*Describe some things that make you angry. Write how mindfulness breathing can help you deal with angry emotions.

*What can you do when the "grouchies" take hold? How can you help yourself get out of a bad mood?

Mindfulness and the Lakers

1. What do you think being "in the zone" means?
2. How does mindfulness help basketball players?
3. How can mindfulness help you play sports?
4. How can you be a mindfulness warrior?

Unpleasant Event

1. What was the event?
2. What did you notice in your body?
3. What feelings (emotions) did you notice?
4. What thoughts did you notice?
5. What do you notice in your body? What feelings and thoughts do you notice now, as you write about the event?

*When you think of "gossip" do you get a kind or unkind feeling? Describe an experience where gossip has helped or hurt you.

*Do you prefer to be mindful or mindless? Describe how and why it makes you feel happy, calm, and relaxed.

*Think about some optimistic thoughts regarding your 4th-grade learning experience. Describe them in a paragraph.

*Optimistic/Pessimistic Thoughts

1. Problem
 2. Optimistic thought bubble
 3. Pessimistic thought bubble
 1. Tell your parents what mindfulness is. Write three sentences.
 2. When is a good time to practice mindfulness?
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