

Using Mindfulness Meditation to Reduce Academic Anxiety in Struggling Readers

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Abstract: *The current study investigated the hypothesis that implementing a mindfulness intervention could significantly alleviate anxiety caused by a deficit in reading comprehension, as well as improve trait mindfulness and efficacy. Students with reading difficulties enrolled in a corrective reading intervention program served as participants. All participants took pre-assessments to measure level of reading anxiety, efficacy, trait mindfulness, and reading comprehension. They were then randomly divided into two groups—experimental and control. The experimental group practiced a mindfulness meditation intervention adapted from Eline Snel's (2013) *Sitting Still Like a Frog: Mindfulness Exercises for Kids (and Their Parents)*. The control group participated in a control task, *Reading the Room*. Following treatment, pre- and post-treatment assessments were taken to measure any changes in level of reading anxiety, efficacy, and trait mindfulness. Results suggest that mindfulness meditation may have led to a decrease in reading anxiety.*

Handling stress and anxiety can be difficult, especially for children, as they are exposed to multiple stressors every day. These stressors can range from school performance to interpersonal relationships (Garnezy, Masten, & Tellegen, 1984). Therefore, it is imperative they develop coping mechanisms that can help them manage the anxiety experienced when encountering the variety of daily stressors. Unfortunately, many children may not have the means or skills necessary to develop coping mechanisms to handle stress. This stress then manifests into physical and mental symptoms related to anxiety and, in turn, negatively impacts executive functions (Meiklejohn, et al., 2012).

There are many different subtypes of academic anxiety (e.g. math anxiety, test anxiety, reading anxiety, etc.), and each are caused by a unique set of stressors. Understanding how stressors related to reading difficulties can be handled to alleviate anxiety is a rather unexplored area of research. Mindfulness meditation, an effective intervention in this context, has been shown to promote general well-being, relaxation, and attention control, as well as alleviate symptoms of anxiety (including academic anxiety) and depression (Chang, et al., 2004; Ludwig & Kabat-Zinn, 2008; Meiklejohn, et al., 2012; Schonert-Reichl, et al., 2015). Mindfulness meditation interventions have already proven to be successful in schools by helping children become less emotional, reactive, anxious, and depressed. The interventions have also helped children become more social, relaxed, and attentive (Beauchemin, Hutchins, & Patterson 2008; Napoli, Krech, & Holley, 2005; Semple, Reid, & Miller, 2005, Zylowska, et al., 2008) This study tests the hypothesis that implementing a mindfulness meditation intervention could

significantly alleviate anxiety caused by a deficit in reading abilities, as well as improve efficacy, trait mindfulness, and reading skills.

Stress occurs when one becomes aroused by an aversive stimulus. The magnitude of psychological and/or physiological disturbances caused by the aversive stimulus depends on one's perception of control over the situation. It is for this reason some stimuli may cause more stress for one person than it does for others (Kim & Diamond, 2002). Therefore, it is not surprising that encountering stressors is a common tribulation of many school-aged children, and not for others. Some common stressors for school-aged children include family-system disturbances, general childhood stress, academic performance, and interpersonal relationships (Garmezy, et al., 1984; Meiklejohn, et al., 2012). These stressors can be beneficial (i.e. help build resilience) when they are encountered and dealt with in an appropriate manner (i.e. through interventions such as mindfulness meditation), while other stressors can impact learning by putting excessive stress on the cognitive system. This stress can impair functions specific to learning (i.e. executive functions) as well as general functions. Impairments in executive functions are problematic, as components of the system such as working memory, impulse regulation, planning, prioritizing, and task initiation play a critical role in learning. When these functions are impaired, deficits in learning can occur (Meiklejohn, et al., 2012).

Executive function processes rely on many regions in the brain such as the dorsolateral, superomedial, orbitofrontal, and ventromedial prefrontal cortices, anterior cingulate gyrus, basal ganglia and diencephalic structures, the cerebellum, deep white matter tracks, and some parts in the parietal lobe. All these regions are connected to other areas in the brain to subservise executive functioning. To understand how executive functioning is affected by stress, it is important to understand that as stress directly affects one area of the brain, it can indirectly affect others, causing function impairments (Williams, Suchy, & Rau, 2009). For example, as stress rises in duration and/or intensity, it can change or permanently damage some structures within the hippocampus, harming one's learning-and-memory capacity. Other negative changes associated with stress are the damage of synaptic plasticity and neurochemical systems, brain cells undergoing a high rate of necrosis (death of cells), and premature brain aging (Kim & Diamond, 2002). As illustrated, stress can severely impact brain functioning, making it unsurprising that stress variables can be risk factors for mental and physical illnesses (Meiklejohn, et al., 2012).

Anxiety

Both test anxiety and reading anxiety fall under the umbrella of academic anxiety. Due to the lack of research on reading anxiety, we discuss test anxiety as a framework for understanding academic anxiety in general. Test anxiety is a well-known and often studied type of academic anxiety experienced by children in educational settings. While it is natural for students to feel nervous about tests and evaluations in school, some do not have the ability to cope well with these feelings. Their inability to cope with negative feelings about performance, evaluation, and testing, causes stress. Subsequently, this stress triggers test anxiety (Keogh & French, 2000). Test anxiety can impair cognitive functions, which then impairs academic performance.

Test anxiety occurs when two factors are present: worry and emotionality. Worry arises from a student's cognitive concerns about their upcoming performance, whereas emotionality is the reaction to the test. Some emotional reactions include feeling physiologically over-aroused, tense, and/or having bothersome and negative thoughts such as dread, worry, fear, etc. (Hembree, 1988).

It is not enough to only understand the underlying mechanisms of test anxiety. It is just as important to understand how test anxiety develops. Two propositions have been made about the

development of test anxiety. The first made by Wine (1971) suggests that test anxiety comes from consistent rumination on disruptive thoughts and feelings that only arise in a testing situation. Rumination is a cognitive process which causes one to focus their attention on a negative past event or stimulus. This self-deprecating thinking prevents the student from sustaining their full attention on the task at-hand. Since many tests can be difficult in nature, a student whose attention is constantly being divided by the task at-hand and intrusive thoughts and feelings will not perform to his/her full potential.

The second proposes that test anxiety is a part of trait anxiety. Trait anxiety is one's tendency to feel fearful, worrisome, or anxious across many different situations. For someone with trait anxiety, a testing situation may be one of many circumstances which causes anxiety. It is important to note that someone with trait anxiety will not always show test anxiety (Keogh & French, 2000; Sarason, 1975).

Test anxiety can also be experienced in different phases of the testing process. The beginning phase where one may experience test anxiety is the "pre-exam phase." In this phase, students anticipate the exam and begin to feel anxious several days before the exam. The next phase is the "confrontation phase." In this phase, students become anxious during the exam. The final phase is the "post-exam phase" where students feel anxious about their results and will remain so until they are posted. Students who have test anxiety may only experience it during one, all, or a combination of these phases. The magnitude of anxiety felt during each phase varies depending on the student, which is why some students are hardly ever bothered by their anxiety, while others feel completely debilitated (Raffety, Smith, & Ptacek, 1997; Stober & Pekrun, 2004; Zeidner, 1998).

No matter what phase(s) of test anxiety a student experiences, they all can impact cognitive abilities. There are several ways in which test anxiety impairs cognition: students may exhibit the global avoidance tendency, show poor cognition, or ruminate, all of which can impede their academic performance. Students who exhibit the global avoidance tendency will quickly complete a test or assessment, sacrificing accuracy, to quickly end the anxiety. These students worry more about the uncomfortable anxiety provoked by the test, rather than their performance (Ashcraft, 2002). Test anxiety can also affect important cognitive functions such as working memory and inferential reasoning skills. In a study by Richards, French, Keogh, & Carter (2000) that used an inferential reasoning task, students were asked to verify necessary and unnecessary inferences. Results indicated that students with high test anxiety took longer to process unnecessary inferences and were less accurate than the control group, regardless of taking more time to complete the task. These results support previous literature suggesting that students with high test anxiety have compromised cognitive functioning.

Just as anxiety can impair cognition, it can also influence rumination, as shown in an exam simulation study conducted by Hollandsworth et al (1979). An exam simulation was created to examine the level of arousal experienced by students with test anxiety as they take exams. Students with both high and low levels of test anxiety were placed in the same simulation. Students with high levels of anxiety labeled their arousal as debilitating, as they were more focused on their arousal and other task-irrelevant thoughts rather than the task at-hand. Similarly, Ashcraft and Kirk (2001) found that students with high test anxiety had difficulty performing on a working memory task of letter memorization because they were not focused on the task at-hand, but rather on intrusive thoughts and worries they had regarding the task. These results support Hollandsworth, et al.'s findings that students with moderate to severe test anxiety are more likely to ruminate on

negative thoughts, thus, impeding their ability to learn or recall information and putting them at risk for compromised academic performance.

READING DIFFICULTIES

Akin to testing and evaluation, reading difficulties are a possible stressor a student may encounter. Three types of reading difficulties have been identified by researchers: language comprehension, phonological deficit, and fluency/naming speed (Moats & Tolman, 2009). Language comprehension difficulties are characterized by weak vocabulary skills, general learning disorders, trouble with abstract reasoning, and logical thinking difficulties. Phonological deficits occur when a child has difficulty processing oral language (Moats & Tolman, 2009). Fluency/naming speed difficulties are characterized by slow and inaccurate recognition of printed words (Zimmerman, 2013; Zimmerman, Rasinski, & Melewski, 2013). Each reading difficulty can be individual and distinct or overlap with one or both of the other two (Moats & Tolman, 2009). Children with any one of these reading difficulties often suffer from low self-esteem and experience more anxiety and depression than children who do not (Mendelson et al., 2010). Not only must these children now overcome their learning difficulties, but they must also learn to overcome other emotional problems as well.

Children with reading difficulties often see their difficulty as a failure and in turn, have a low sense of self-efficacy, one of the key cognitive and motivational variables in reading and writing. These children may be performing better than they think, as it is typical of low efficacious children to feel more stress and anxiety during reading tasks, interpreting their difficulties as being not skilled enough to perform well (Schunk & Zimmerman, 2007). Studies show these children tend to give up more quickly, avoid being on task by engaging in various off-task activities, or will avoid the task altogether (Baker & Wigfield, 1999; Chapman and Tunmer, 2003; Pajares, 1996; Schunk & Swartz, 1993; Zimmerman, 2000). Having a low sense of self-efficacy can also be detrimental as efficacy is closely associated with strategy use and implementation, as well as strategic learning behavior (Tunmer and Champman, 2002). For example, a student with a high sense of self-efficacy will read a challenging book, as they know they can do so. This child will be persistent and effortful in completing this task. A child with a low sense of self-efficacy will avoid reading challenging material because they do not believe they have the necessary skills to do so. This child will avoid the book altogether or will attempt the task but quit after a short while. As demonstrated, self-efficacy can influence choice of activities, effort, persistence, and achievement. Thus, it is important that children are efficacious about their abilities, as it can affect academic performance through the self-fulfilling prophecy (Bandura, 1997; Schunk 2001; Schunk & Zimmerman, 2007).

As discussed previously, academic performance is also compromised as students with low efficacy typically show signs of stress and anxiety in reading situations. Students may feel worried about being asked to read in the future, failing a difficult reading task, or not performing to the standards of their peers. Recall, this worry is one of the two components of test anxiety (Gentile & McMillan, 1987). It interacts with poor word knowledge and is associated with poorer performance as explained in a study by Everson, Smoldaka, & Tobias (1992), who found that when reading difficulties and components of test anxiety interact, a child will become stressed and show symptoms of test anxiety.

Treating Academic Anxiety

How can we help students who struggle with academic anxiety? Several approaches have been proposed. The first is a suggestion made by Wine (1971), who stresses students must

understand the importance of how to delegate task time. Instead of devoting time to intrusive and negative thoughts associated with academic anxiety, students need to learn to inhibit this irrelevant thinking and focus on the task at-hand. Another suggestion comes from Hembree (1988) who proposes using cognitive-behavioral treatments. These treatments can be in any form, so long as they teach the student how to focus their attention on reducing worry and emotionality. A final suggestion is made by Goonan (2003), who believes relaxation is the key to alleviating anxiety. Since anxiety has physiological correlations, relaxation exercises such as visualization, muscle relaxation, and other methods that target physiological sensations that accompany anxiety, can allow students to explore techniques and use the one(s) that work best to help reduce the specific arousal(s) they feel. Although it may seem difficult to find the time to practice all these techniques, there is one intervention that encompasses all of these techniques—mindfulness meditation.

MINDFULNESS MEDIATION

A promising stress-reducing intervention, mindfulness meditation, has been shown to focus attention, relax the body, promote inhibition, and alleviate symptoms of anxiety and depression. To understand what mindfulness is and how it works, one of the leading researchers of mindfulness, Jon Kabat-Zinn (2003), developed an “operational working definition of mindfulness: the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” (p. 145). While mindfulness research is relatively new, with the first article published by Kabat-Zinn in 1982, this meditation technique has been around for over 2,500 years. Having roots in Theravada Buddhism, it’s existence today is secular and universal, making it accessible to anyone (Kabat-Zinn, 1982; Kabat-Zinn, 2003, Kabat-Zinn, Lipworth, & Burney, 1985).

One of the primary goals of mindfulness meditation is to develop an insight into daily phenomena through the practice of “bare attention” or “detached observation.” These two terms are what Buddhists describe as the moment-to-moment effort to thoroughly understand a phenomenon without judgement or distortion. To do this, one must be able to detach him/herself from the moment and focus his/her attention on phenomena such as internal and external sensations, thoughts, and emotions (Kabat-Zinn, et al., 1985). This focus serves as the attentional “anchor” for practice. During practice, one may find their mind wandering from the “anchor.” At that time, the individual brings their attention back to the “anchor,” acknowledges the distractions, and allows them to pass without judgement or rumination (Meiklejohn, et al., 2012). The distracting phenomena are to be acknowledged for what they are and not as a direct reflection of oneself (Zoogman, Goldberg, Hoyt, & Miller, 2015). A proper meditation should allow one to completely register the full moment without distortion or judgement (Kabat-Zinn, et al., 1985).

As one practices mindfulness, they will begin to see an array of self-improvements including increases in self-efficacy, self-esteem, motivation, clarity, awareness, and stability of attention. Additionally, one will see reductions in reactivity to the body’s physiological stress responses, anxiety, depression, negative states of mind, hostility, mood disturbances, and perception of pain (Chang, et al., 2004; Ludwig & Kabat-Zinn, 2008; Meiklejohn, et al., 2012; Samuelson, Carmody, Kabat-Zinn, & Bratt, 2007; Schonert-Reichl, et al., 2015). Another benefit of mindfulness meditation is the inhibition of rumination, which comes from the practice of sustaining attention for long periods of time (Mendelson, et al., 2010). This benefit is particularly noteworthy as rumination plays a large role in the development and maintenance of anxiety. These benefits of mindfulness have been shown in numerous settings including low socioeconomic status

(SES) communities, clinics, prisons, and schools (Ludwig & Kabat-Zinn, 2008; Meiklejohn, et al., 2012; Roth & Stanley, 2002; Samuelson, et al., 2007).

SUCCESS OF MINDFULNESS PRACTICES IN SCHOOLS

Mindfulness meditation has shown to be a promising intervention in school settings, especially when it comes to alleviating anxiety influenced by learning difficulties (Meiklejohn, et al., 2012; Schonert-Reichl, et al., 2015). For example, Beauchemin, et al. (2008) found that adolescents ages 13-18 who were enrolled in a private school for students with learning disabilities (defined in this study by comprised academic performance) reported feeling less state and trait anxiety after participating in mindfulness meditation. Additionally, improvements in social skills, problem behaviors, and academics were noted by teachers. The meditation exercises used in the study were adapted from Kabat-Zinn's (1994) audio recordings *Wherever You Go There You Are*. Students practiced meditating 5-10 minutes each day, five days a week, for five weeks. While meditating, students were instructed to focus on their breath and observe any thoughts or feelings they were experiencing. If students became distracted (i.e. becoming too engaged with thoughts and/or feelings), they were instructed to acknowledge these thoughts and/or feelings in a non-judgmental way and allow them to pass.

Utilizing another intervention adapted from Kabat-Zinn's (1990) *Mindfulness-Based Stress Reduction Program* and Segal, Williams, and Teasdale's (2002) *Mindfulness-Based Cognitive Therapy*, Semple, Lee, Rosa, & Miller (2009), found that students between the ages of seven and eight who participated in a mindfulness-based intervention program showed an increase in academic performance, as well as reductions in anxiety and behavior problems. The sessions in the program were kept brief, being delivered once a week, for 45 minutes, over a six-week period. Before every session, each child wrote down their biggest worry of the day and placed it in the "Worry Warts Wastebasket." Next, students participated in warm-up breathing exercises. The exercises were followed by the main activity of the day—focusing attention on bodily sensations and perceptions. Afterwards, students did another breathing exercise to conclude the session. Before regular class time resumed, students were given the opportunity to take back the paper from the wastebasket; interestingly, no one did. The authors suggest this indicated that after participating in the intervention program, the children felt free of that day's worries.

Along with reductions in anxiety and improvements in social skills and problem behaviors, a study by Napoli et al. (2005) found that mindfulness meditation can also help improve teacher-rated attention and objective measures of selective attention. Their study focused on the benefits of a specific mindfulness training program, "The Attention Academy Program." This program is aimed toward youth between the ages of six and eleven. Its structure is kid-friendly, having participants practice mindfulness meditation once a week, every other week, for 24 weeks. During the program, students participated in sessions that lasted 45 minutes each and covered various meditation techniques including breathing exercises, body-scan visualization applications, and body movement tasks. All sessions prompted the students to focus on being in the moment.

The results of the studies reviewed indicate that mindfulness meditation is an effective intervention for alleviating the anxiety that students often experience in academic situations. Therefore, it is quite possible that mindfulness meditation may be an efficacious intervention for the anxiety brought on by the reading difficulties experienced by many students.

CURRENT STUDY

We hypothesize that implementing a mindfulness intervention will significantly alleviate anxiety caused by a deficit in reading abilities, as well as increase a student's efficacy, trait mindfulness, and reading skills. To date, there is little empirical research available that discusses the specific effect(s) of a mindfulness meditation intervention on reading anxiety. The lack of research could be explained by the newness of mindfulness meditation research in this area (Burke, 2010). However, due to the previous success of mindfulness interventions helping to alleviate academic anxiety in schools, we hypothesize this type of intervention might alleviate reading anxiety. (Beauchemin, et al., 2008; Meiklejohn, et al., 2012; Mendelson et al., 2010; Napoli, et al., 2005; Schonert-Reichl, et al., 2015; Semple, et al., 2009; Zoogman, et al., 2015). Additionally, we hypothesize that results will yield an increase in efficacy for the mindfulness group. Recall, self-efficacy is one of the cognitive and motivational variables important to achievement in reading and writing. Even though previous research is mixed when it comes to mindfulness meditation improving self-efficacy, we believe the combined reading and mindfulness intervention implemented in this study will facilitate an increase in reading self-efficacy (Alexander, 2012; Caldwell, Harrison, Adams, Quin, & Greeson, 2010; Chang, et al., 2004; Van Aalderen, et al., 2012). We also hypothesize an increase in trait mindfulness. Should mindfulness truly be influencing the dependent variables, an increase in a student's trait mindfulness should also be present. Finally, we hypothesize an increase in reading abilities, as mindfulness has been shown to positively influence attention, awareness, motivation, and inhibit stress and other physiological responses, all of which effect a student's academic performance (Chang, et al., 2004; Ludwig & Kabat-Zinn, 2008; Meiklejohn, et al., 2012; Samuelson, et al., 2007; Schonert-Reichl, et al., 2015). Should mindfulness truly influence improvements in these areas which affect learning, participants should perform better academically after the intervention than before.

METHOD

PARTICIPANTS

The participants (39 students; 25 males and 14 females) in this study were students enrolled in a five-week reading camp for students in grades K-8 sponsored by a large Midwestern university. Each student in the camp is recommended by their classroom teacher, parents, or both, as they identified that the student is struggling in at least one of the following areas: comprehension, wordy accuracy (phonics and spelling), fluency, vocabulary, or utilization of written language. Most of the students enrolled in the camp have difficulty in more than one area. Due to the uniqueness of each child's difficulty or difficulties, the program's aim is to improve achievement in literacy through an individual, research-based intervention. Interventions are planned and executed by 13 graduate students who are enrolled in graduate course: Clinical Practicum in Corrective Reading. They are supervised by two faculty instructors who oversee the graduate course and reading camp program. The camp met Monday through Thursday for approximately one hour and 25 minutes per day (9:40AM- 11:05AM).

The range of grades completed of participants were K-6, with a median school year completed of 2nd grade. All participants were from the surrounding area in which the study took place. Participants were randomly assigned to either a wait-list control or experimental group, the control group contained 11 males and 7 females. For this group, the range of school year completed was K-6 with the median being 3rd grade. As for the experimental group, 14 males and 7 females were randomly assigned to this condition (See Table 1). In this group, the range of school year completed was 1-5 with the median being 2nd grade.

Table 1
Gender and Grade Breakdown of Participants

Grade Completed <i>N</i>	Group x Gender
K = 2	Control = 2 Boys
1 = 10	Control = 4 Boys; 1 Girl Experimental = 2 Boys; 3 Girls
2 = 9	Control = 2 Boys Experimental = 6 Boys; 1 Girl
3 = 6	Experimental = 5 Boys; 1 Girl
4 = 6	Control = 2 Boys; 4 Girls
5 = 4	Control = 1 Girl Experimental = 2 Boys; 1 Girl
6 = 2	Control = 1 Boy; 1 Girl

MATERIALS

Assessment materials used were The Reading Anxiety Scale, Motivation for Reading Questionnaire (Revised), the Child and Adolescent Mindfulness Measure (CAMM) (See Appendix 1), and a combined reading ability and comprehension assessment developed by the faculty and students of the camp. The graduate student supervisors assisted students with completing the questionnaires.

THE READING ANXIETY SCALE

The Reading Anxiety Scale developed by Zbornik and Wallbrown (1991) measures the varying levels of anxiety students feel towards reading. The scale for this study was modified by taking the original 44 questions and reducing them to 14. This modification was done through a process of checking face validity and removing questions with a loading factor smaller than .41. Additionally, some words from the original statements were changed to an uncomplicated synonym. This was done so all participants, regardless of age or reading ability, could comprehend all statements. As for response options, the original 5-point Likert Scale ranging from “1- Not Like Me” to “5- Exactly Like Me” was used.

THE MOTIVATION FOR READING QUESTIONNAIRE (REVISED)

The Motivation for Reading Questionnaire (Revised) developed by Wigfield and Guthrie (1997) is an assessment of reading efficacy. The questions were not reworded in this questionnaire. As for response options, the original Likert Scale of “1-Very Different from Me” to “4- A Lot Like Me” was adjusted to a to “1- Not Like Me” to “5- Exactly Like Me.” Adjustments were made to keep response options consistent between the three assessments.

The Child and Adolescent Mindfulness Measure (CAMM)

The Child and Adolescent Mindfulness Measure (CAMM), developed by Greco, Baer, & Smith (2011), is an assessment of trait mindfulness. The questions were not reworded in this questionnaire. Responses to the assessment were recorded using a Likert Scale that was adjusted from the original scale of “0- Never True” to “4- Always True” to a scale that ranged from “1- Almost Never” to “5- Almost Always.” Similar to the other assessments, adjustments were made to keep response options consistent.

Reading Assessment

The reading assessment given to students was compiled by the instructors of Camp Read-A-Lot. The first sub-assessment was the San Diego Quick Reading Assessment (SDQA; LaPray & Ross, 1969). The SDQA measures a student’s recognition of words out of context. This SDQA consists of 8 graded word lists from Pre-K to 7th Grade. The words within each list are of about equal difficulty. Each grade level list contains 10 words in isolation. Words are displayed with no context clues; thus the examiner is able assess a students’ ability to decode words, without relying on context clues. Testing typically begins two or three levels below their actual grade level. This assessment was administered because proficient readers typically read accurately both in and out of context (LaPray & Ross, 1969). Students received a numerical score which corresponded to the grade level at which they read. The highest possible score for this section was a 6, translating to a 6th grade reading level. Next was the Reading Attitude Survey (Johns & Lenski, 1997) which determined a child’s general interest and attitude toward reading. The maximum points available for this sub-assessment was 42. Following those sub-assessments students gave a writing sample in which they answered the prompt, “Write about a perfect day or a time when you had lots of fun.” The maximum points available for this sub-assessment was 16. Next was the Gentry Spelling Grade Level Placement Test (Gentry, 1997). This assessment determines a student’s spelling grade level. We included the Gentry Spelling Grade Level Placement Test because early spelling ability is a robust predictor of later literacy skills (Ellis & Cataldo, 1990; Trieman et al, 2019) The maximum points available for this sub-assessment was 20. The final sub-assessment administered was the Rigby Phonemic Awareness Assessment (Rigby, 2001) which determines a student’s ability to hear and articulate individual sounds of spoken words. The maximum points available for this sub-assessment was 96.

Guided Mindfulness Meditation

Guided mindfulness meditation exercises came from the book, *Sitting Still Like a Frog: Mindfulness Exercises for Kids (and Their Parents)*. The author, Eline Snel, is a licensed therapist who developed the children’s mindfulness program, Mindfulness Matters. Mindfulness Matters is based on Jon Kabat-Zinn’s eight-week Mindfulness-Based Stress Reduction (MBSR) program for adults (Snel, 2013). Kabat-Zinn’s program has been extremely successful in demonstrating that mindfulness can, and is not limited to: reducing anxiety, stress, depression, perception of pain, and mood disturbances, as well as increasing positive states of mind and self-esteem (Chang, et al., 2004; Ludwig & Kabat-Zinn, 2008; Samuelson, et al., 2007). To ensure her program was effective like Kabat-Zinn’s, Snel pilot tested her program at five different schools with a total of 300 children (ages five and up) and 12 teachers. Results showed that the children become more kind, confident, and less judgmental. The teachers also noticed a calmer atmosphere in the classroom that included better concentration and more openness (Snel, 2013).

The book included a CD of the guided exercises. The exercises are voiced in English by Myla Kabat-Zinn. There are 11 exercises included in the book and CD. We selected the first four exercises as they were the most general in the book and designed for children ages 5-12 years of age. Exercises used were: *Sitting Still Like a Frog*, *The Little Frog*, *Attention to the Breath*, and *The Spaghetti Test*. The *Sitting Still Like a Frog* exercise served as an introduction to mindfulness. The goal of this exercise was to help children learn to improve their concentration skills, become less impulsive, develop a sense of control, and practice nonjudgmental acceptance of internal phenomena. *The Little Frog* exercise was a shortened version of *Sitting Still Like a Frog*. The *Attention to the Breath* exercise taught listeners how to focus and shift their attention. *The Spaghetti Test* taught listeners how to become aware of every part of their body. Through this exercise, one practiced entering a calm state and developing an understanding of how to recognize and understand different signals sent from the body.

PROCEDURE

The week before the reading camp began, teachers participated in five daily training sessions led by the second author (trained in the 8-week mindfulness-based stress reduction technique), that each lasted 30 minutes. In these sessions, teachers learned about what mindfulness is and how it works, as well as benefits of the practice as demonstrated by previous research. The teachers also listened to and practiced administering the guided mindfulness sessions.

After daily training sessions, teachers read through every incoming student's folder which contained details such as gender, age, and grade level, and information about a child's specific reading difficulty or difficulties. The teachers then worked together to assign each student to a teacher, with no teacher receiving more than four students. It was important to assign students to teachers that had the specific skills needed to help the child succeed (e.g. one of the teachers worked as a third-grade teacher in a neighboring school district and took only third grade students due to her expertise). After assigning students, the teachers then distributed themselves amongst four classrooms. Each classroom had three teachers, except for one which had four teachers. After teachers made their placements, two classrooms were then randomly assigned to the experimental group (Mindfulness Meditation Training or MMT), while the other two were assigned to the wait-list control group. Assignments to the groups were made by the experimenters who were blind as to which teachers and students were in each classroom.

When the reading camp began the following week, consent was obtained from teachers and guardians of the participants. Assent was then collected from participants. Once a student and their guardian agreed to participate, pre-assessments in The Reading Anxiety Scale, Motivation for Reading Questionnaire (Revised), the Child and Adolescent Mindfulness Measure (CAMM), and the combined reading ability and comprehension assessment were distributed. The assessments were distributed independently to each child by their respective teacher. The teachers read aloud each statement/question and response options, the participants responded using the options provided, and teachers recorded the participants' answers.

After collecting pre-assessments, students in the MMT group participated in mindfulness meditation led by their specific teacher. The first mindfulness session was *Sitting Still Like a Frog*. This was the only time students heard this session as it served as an introduction to mindfulness. The next sessions varied between *The Little Frog*, *Attention to the Breath*, and *The Spaghetti Test*. These sessions were organized in a pattern to ensure the participants did not lose interest in the mindfulness meditation (See Table 2). During this time, students in the control group participated in a control task, Reading the Room. In this task, students walked around the classroom and read

aloud poems and songs that were hung on the walls. Both the mindfulness meditation and control sessions occurred at the beginning of the day and lasted approximately ten minutes (9:40- 9:50 AM). At the conclusion of the fourth week, post-assessments were administered using the same protocol as pre-assessments.

Table 2
Experimental Mindfulness Schedule

<u>Day</u>	<u>Week 1</u>	<u>Week 2</u>	<u>Week 3</u>	<u>Week 4</u>	<u>Week 5</u>
Monday	Pre- Test Measures	Attention to the Breath		The Spaghetti Test	Student-Instructor Choice
Tuesday	Pre- Test Measures	The Little Frog		The Little Frog	Student-Instructor Choice
Wednesday	Sitting Still Like a Frog	Attention to the Breath	Attention to the Breath	Attention to the Breath	Student-Instructor Choice
Thursday	The Little Frog	The Little Frog	The Spaghetti Test	Post-Test Measures	Student-Instructor Choice

During the fifth week, the control group practiced mindfulness meditation. The order of daily mindfulness exercises was as follows: *Sitting Still Like a Frog*, *The Little Frog*, *Attention to the Breath*, *The Spaghetti Test*. During this time, the MMT group still participated in mindfulness meditation, but were permitted to choose whichever exercise they wanted. At the conclusion of the fifth week, the control group received information about mindfulness meditation and materials to take home and utilize.

Following the conclusion of camp, teacher feedback forms were distributed (see Appendix 1), and analyses were run on the data collected to determine if there are any significant findings on the effects of mindfulness on students’ reading anxiety, efficacy, trait mindfulness, and reading abilities.

RESULTS

Table 3. presents the means and standard deviations of those participants who completed each sub-assessment or sub-test in its entirety in both the pre- and post-test. Figure 1 presents pre-test and post-test levels of reading anxiety for both the control and experimental groups. A repeated measures ANOVA comparing the groups’ levels of reading anxiety at pre-test and post-test indicated a significant main effect of time (pre- to post-), $F(1,36) = 5.64, p = .02, MSe = .24$. There was no group by time interaction, $F(1, 36) = 1.67, p = .21, MSe = .24$. Although there was not a group by time interaction, pairwise comparisons revealed a difference in the experimental group participants’ reading anxiety from pre-test to post-test, suggesting reading anxiety decreased significantly in the experimental group [$M = .41, SD = .70; F(1,36) = 7.51, p .009, \eta_p^2 = .17$]. The

control group participants also saw a decrease in reading anxiety, but the change was smaller and not significant ($M = .12$, $SD = .66$, $F < 1$, $\eta_p^2 = .02$). While the results of the pairwise comparisons cannot certainly say the mindfulness intervention caused a significant decrease in reading anxiety, it does suggest that the mindfulness intervention influenced the main effect of time as shown in the results of the repeated measures ANOVA.

Figure 1

Levels of reading anxiety. This figure illustrates the change from pre-test to post-test in anxiety between the control and experimental (mindfulness) group.

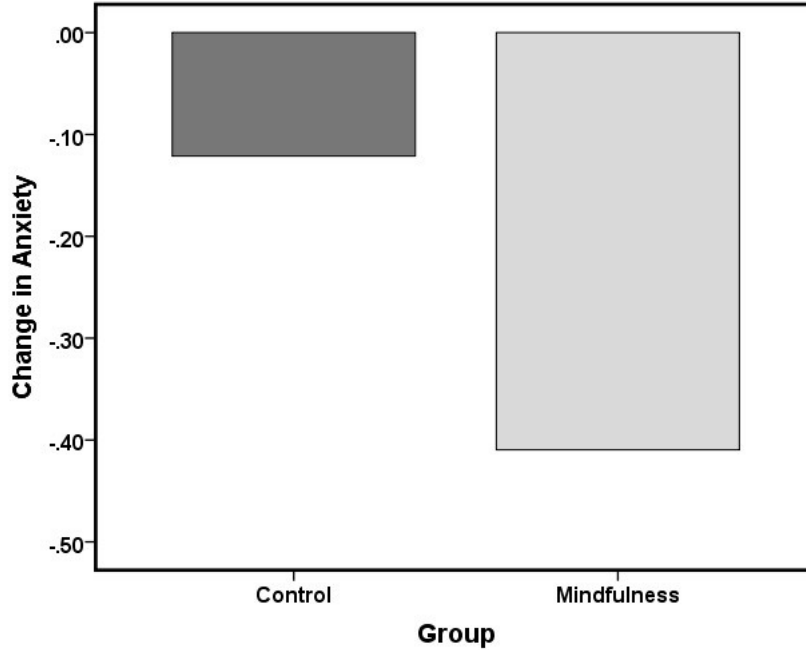


Table 3

Means and Standard Deviations of Variables

	<u>Reading Anxiety</u>		<u>Trait Mindfulness</u>		<u>Efficacy</u>		<u>Reading Abilities</u>		<u>Reading Attitudes</u>		<u>Writing Assessment</u>		<u>Spelling Assessment</u>		<u>Phonemic Awareness</u>	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Control	2.30 (.79)	2.18 (.74)	2.39 (.68)	2.48 (.61)	3.00 (.71)	3.31 (.71)	2.36 (.85)	2.51 (.72)	20.00 (9.85)	22.17 (9.01)	7.94 (3.19)	10.29 (3.44)	2.67 (1.11)	3.00 (1.25)	69.70 (20.55)	63.00 (27.68)
Experimental	2.60 (.82)	2.19 (.77)	2.59 (.77)	2.56 (.66)	3.37 (.92)	3.57 (.88)	3.10 (.22)	3.23 (.64)	24.05 (9.21)	29.16 (7.59)	8.27 (3.57)	10.52 (3.42)	2.61 (1.24)	2.78 (1.35)	83.86 (6.79)	86.00 (12.04)

TRAIT MINDFULNESS

A repeated measures ANOVA comparing the groups' trait mindfulness at pre-test and post-test indicated a non-significant main effect of time (pre- to post-), $F(1,35) = .05$, $p = .83$, $MSe = .26$. There was no group by time interaction, $F(1, 35) = .23$, $p = .64$, $MSe = .26$.

EFFICACY

A repeated measures ANOVA comparing the groups' efficacy at pre-test and post-test indicated a non-significant main effect of time (pre- to post-), $F(1,36) = .25, p = .08, MSe = .412$. There was no group by time interaction, $F(1, 36) = .18, p = .67, MSe = .412$.

READING ABILITIES

A repeated measures ANOVA was not conducted as post-test measures for reading abilities were mostly incomplete, as teachers did not retest students on sub-tests of skills if a student showed mastery. A student showed mastery on these measures if they missed only one or zero points for that subtest. Thirteen of the 18 students (72%) in the control condition demonstrated mastery and 17 of the 21 students (81%) in the experimental condition demonstrated mastery.

SECONDARY ANALYSES

To compare the reading skills of the participants from pre- to post-test, paired samples *t*-tests examined participants' reading attitudes, writing skills, spelling abilities, and phonemic awareness.

A repeated measures ANOVA comparing the groups' reading attitudes at pre-test and post-test indicated a significant main effect of time (pre- to post-), $F(1,29) = 11.81, p = .002, MSe = 16.47$. This suggests a significant improvement in reading attitudes. There was no group by time interaction, $F(1, 29) = 1.93, p = .18, MSe = 16.47$.

A repeated measures ANOVA comparing the groups' writing abilities at pre-test and post-test indicated a significant main effect of time (pre- to post-), $F(1,35) = .34.66, p = .000, MSe = 2.81$. This suggests a significant improvement in writing abilities. There was no group by time interaction, $F(1, 35) = .02, p = .90, MSe = 2.81$.

A repeated measures ANOVA comparing the groups' spelling abilities at pre-test and post-test indicated a significant main effect of time (pre- to post-), $F(1,31) = 8.10, p = .008, MSe = .126$. This suggests a significant improvement in spelling abilities. There was no group by time interaction, $F(1, 31) = 8.10, p = .35, MSe = .126$.

A repeated measures ANOVA comparing the groups' phonemic awareness at pre-test and post-test indicated a significant main effect of time (pre- to post-), $F(1,15) = .25, p = .62, MSe = 172.57$. This suggests that phonemic awareness did not improve. There was no group by time interaction, $F(1, 15) = .93, p = .35, MSe = 172.57$.

Note: A repeated measures ANOVA was not conducted as post-test measures for reading abilities were mostly incomplete, as teachers did not retest students on sub-tests of assessments if a student showed mastery.

DISCUSSION

The present study examined the effect of a mindfulness meditation intervention on reading anxiety, efficacy, trait mindfulness, and reading abilities of children with reading difficulties. Whereas much of the research on mindfulness interventions has shown mindfulness to improve many of these variables, few articles have chosen to focus specifically on reading anxiety. Thus, this investigation adds to the current body of literature on mindfulness meditation.

The results support the conclusion that the mindfulness meditation intervention may have aided in alleviating reading anxiety. Additionally, results show that while there were improvements in reading abilities, there was not sufficient evidence to support the increase was

due to the mindfulness intervention. Instead, what can be inferred is that the intervention set forth by the reading camp did affect these variables, which was the goal of the camp. Lastly, no improvement in efficacy or trait mindfulness occurred.

The most important finding in this study was the change in reading anxiety. Recall that the reading anxiety measure revealed a main effect of time (pre-test to post-test). Subsequent analyses proposed that mindfulness meditation may have influenced this main effect of time as the mindfulness group had a greater decrease in reading anxiety than the control group, suggesting that mindfulness meditation may have influenced a decrease in reading anxiety. While the mindfulness group, on average, was more anxious before the intervention, any pre-intervention variance between the two groups is coincidental as the participants were randomly assigned to each group. Future studies with more participants would likely not see such an initial difference between groups in pre-intervention reading anxiety. Regardless, this result aligns with previous studies of mindfulness and its effects on children's anxiety in a school setting. (Beauchemin, et al., 2008; Meiklejohn, et al., 2012; Napoli, et al., 2005; Schonert-Reichl, et al., 2015; Semple, et al., 2009).

Trait mindfulness was not affected by the mindfulness intervention. However, this is not surprising as previous research that examines the effect of mindfulness meditation on trait mindfulness is mixed. For example, some research such as that by Van de Weijer-Bergsma, et al., (2012) found that children diagnosed with Attention Deficit Hyperactivity Disorder who practiced mindfulness in their behavioral training program did not show an improvement in trait mindfulness. However, other studies have shown that mindfulness can influence an increase in trait mindfulness in teen and adult populations (Kiken, Garland, Bluth, Palsson, & Gaylord, 2015; Shapiro, Brown, Thoresen, & Plante, 2011). In this study, the difficult nature of having to interpret one's own ideas about themselves and their actions may have created a challenge for the young students to accurately answer the questions. However, it is possible that students could comprehend and accurately answer all questions, and trait mindfulness did not improve.

Efficacy, like trait mindfulness, did not improve. Previous research with young students and adults who practiced mindfulness showed that efficacy was sometimes increased with practice, but this result is inconsistent as other studies have shown otherwise (Alexander, et al., 2012; Caldwell, et al, 2010; Chang, et al., 2004; Van Aalderen, 2012). Efficacy may not have been accurately assessed as the amount of data collected on efficacy was limited. The Motivation for Reading Questionnaire (Revised) only included three questions, which produced a finite amount of data. Another additional factor which may have influenced results was that children had to make predictions about their own future academic performance as well as their performance compared to classmates. This introspection may have been difficult for young students, which may explain the lack of improvement yielded by results. However, it may also remain possible that the children could comprehend and accurately answer the questions, and efficacy simply did not improve.

A secondary analysis of reading abilities showed that reading attitudes, writing abilities, spelling abilities, and phonemic awareness improved. Although there were significant improvements made in these areas, there was no group interaction, meaning the intervention set forth by the reading camp is most likely the underlying influence of these improvements, not mindfulness meditation. While not supporting the hypothesis of this study, the results are meaningful and show that the reading camp had successfully implemented a practical and successful intervention for students.

FUTURE DIRECTIONS

In the replication of this study, a non-active control group, meaning a group that does not participate in either mindfulness or the reading camp (or another reading intervention program), should be included in the design. This group will allow researchers to determine which variables were specifically affected by the mindfulness meditation intervention, and which were only affected by the reading intervention.

Additionally, teacher feedback forms indicated that certain mindfulness instructors did not feel as motivated as other instructors and that some were uncomfortable administering the mindfulness intervention. (For some teachers in the mindfulness group, they were first introduced to the practice the week prior to the beginning of camp.) Thus, it may be of interest to utilize a group of mindfulness instructors who are familiar and dedicated to the practice to lead students. Other teachers who were not assigned to the mindfulness group were familiar with the practice and believed that their skills and knowledge in the area would have been best utilized in leading the mindfulness sessions.

A final future direction would be to broaden the sample size. The sample of this study was limited in number, and thus, limited in power. An increased sample size will provide more power to analyses and may possibly indicate more definitively whether mindfulness directly influenced a decrease in reading anxiety.

IMPLICATIONS

The aim of this study was to determine if a mindfulness meditation intervention could alleviate reading anxiety and improve efficacy, trait mindfulness, and reading abilities of children with reading difficulties. This study aligns with previous literature that supports the use of a mindfulness meditation to help alleviate academic anxiety. Recall that anxiety can play a large role in poor academic performance, as it can influence students to quickly (and often inaccurately) complete assignments to avoid feelings of anxiety, impair executive functions, and influence rumination on task-unrelated thoughts. As discussed previously, a mindfulness intervention can improve these areas through relaxation, inhibition, and increased attention and awareness.

LIMITATIONS

Although we did our best to conduct this study with the greatest amount of rigor, like all studies, there were some limitations that likely impaired our ability to detect effects and may have limited the rigor of our experiment. The first of these we mentioned in the Future Directions section: small sample size. Camp Read-A-Lot is designed to provide the students as much individual attention as possible and thus the camp is limited in capacity. We believe that a larger sample may reveal affects and interactions not found in the current study. We now have at least some grounds for estimating effect sizes and this can be used in future research to estimate necessary sample sizes.

As second limitation is that the amount of reading activity time differed between the two groups. Recall that in the experimental condition the mindfulness intervention occurred in the first 10 minutes of the day at camp. While the students in the experimental condition practiced mindfulness the students in the control condition were engaged in the Reading the Room activity. The Reading the Room activity might have provided the control group additional reading instruction and thus minimized the differences in reading ability between the groups at the conclusion of the camp.

CONCLUSION

This study adds to the growing amount of literature that supports the use of mindfulness meditation to alleviate reading anxiety and promote academic success for students in school settings. Additionally, it supports the interventions implemented by Camp Read-A-Lot. It is our hope that this study encourages other researchers to become interested in investigating the effects of a mindfulness meditation intervention on reading anxiety and conduct further research to help us understand what we can do to help these struggling readers.

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