

THE IMPACT OF MINDFULNESS PRACTICES ON THE BEHAVIOR,
WELLBEING, AND COGNITION OF PREADOLESCENT STUDENTS

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ABSTRACT

The focus on test results in today's schools creates a classroom environment of fear and stress that schools fail to address. This review seeks to propose the implementation of mindfulness practices in schools to alleviate stress and anxiety and as a result, improve academic performance. Results suggest that mindfulness practice does provide relief from feelings of stress and anxiety by encouraging students to center their attention. Through mindfulness practice, students are better able to self-reflect and as a result build self-esteem and learn valuable traits like empathy. Results also show that behavior problems are minimized and time on-task and academic performance improve with mindfulness practice. Mindfulness provides students with important social and emotional skills in and out of the classroom. Further research is desired in order to compare the different mindfulness techniques and determine which are most effective.

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CHAPTER 1: INTRODUCTION

Introduction

It is no surprise that anxiety and stress are common in U.S. culture. The overwhelming coverage of violent news stories along with high demands from work, maintaining a job, nearly unattainable body image and weight standards, and monetary concerns, all factor into the stress equation. While these are environmental causes, genetics and personality can also affect one's mental and emotional wellbeing (Santangelo, 2012).

School also provides the potential for much stress and anxiety in children through social situations, high stakes tests, and large stacks of homework. A 2010 study by the American Psychological Association found that forty-four percent of children reported school performance as a cause of stress. This emotional state of mind may also become physical through symptoms such as headaches, upset stomach, and difficulty sleeping. While the physiological reaction to stress that a child experiences is often muted during childhood it increases during adolescence (Santangelo, 2012). Even more troubling, parents often fail to recognize stress as an issue in their children's lives. About twenty percent of children in the APA study rated themselves as worrying often but only three percent of parents claimed their children's stress to be extreme (Clay, 2011; Munsey, 2010). Schools also seem unaware of the stressful environment students live in. While schools cause much stress in the daily lives of students, they do little to give children the necessary tools to cope with such feelings.

Schools are also grappling to cope with the increasing amount of students with AD/HD, one of the most prevalent neurobehavioral conditions today. While individuals with AD/HD are usually diagnosed in childhood, symptoms often persist throughout ones adult life. These symptoms include hyperactivity, impulsivity, and inattention. AD/HD symptoms directly affect student learning. Treating AD/HD with psycho-stimulants, the most common treatment today, often produces abuse and dependency (CDC, 2011; NCLD, 2012). Many other students in the classroom also suffer from issues of behavior control and inattention.

Many educators struggle to implement effective techniques for accommodating to the learning needs of students with behavioral and inattention issues as well as create a stress-free learning environment. One emerging approach to dealing with such issues is the practice of mindfulness.

How can mindfulness practices and pedagogy help meet the academic needs of students? Does mindfulness impact the stress and AD/HD symptoms so many students face? What is the significance of implementing mindfulness practices in elementary and middle schools? More specifically, how do various mindfulness practices impact elementary and middle school students' behavior, emotional well-being, and brain efficiency?

Chapter one considers controversial views on mindfulness in the classroom setting. After defining significant words and phrases used in the paper, possible limitations of the research as well as studies on the subject will be

analyzed. Finally, the chapter concludes with a summary of the above information and an overview of chapters two and three.

Rationale

Feelings of anxiety and stress directly impact students' learning experience. Problems with the focusing of attention that many students with AD/HD express also directly impact learning. Creating a comfortable atmosphere in the classroom can help diminish stressful and restless feelings so that students can focus on learning. Can the implementation of mindfulness practice in schools provide a possible means of addressing these issues? If mindfulness practice is to be implemented in schools, educators must be able to justify its significance by providing evidence that the practice of mindfulness has a positive effect on students' learning.

One conflict to the implementation of mindfulness practice in schools is the claim that mindfulness practice is a waste of time and money, as it does not affect students' overall learning and academic achievement, which is commonly measured by students' test scores (Ravitch, 2010). In order to address this conflict, studies on the impact of mindfulness on students' academic achievement will be explored. Because learning is commonly measured by assessing students' test scores, studies that have specifically analyzed the affect of mindfulness on students' test scores will be critiqued. Learning also consists of cognitive and emotional growth, and so the impact of mindfulness on these two aspects of learning will also be analyzed.

Another conflict to implementing mindfulness practice in schools is the idea that meditation, a common form of mindfulness practice, is a religious activity inappropriate for public schools. This debate is dependent on the type of meditation performed. None of the studies critiqued in this review address issues of religion or spirituality so the controversy cannot be fully explored, but it will be considered in the Future Classroom Implications section summarized in Chapter 3.

Historical Background

It is hard to know exactly how long humans have practiced mindfulness techniques, but the first written account of such practice was found in Hindu scriptures dating five thousand years ago. Siddhartha Guatama was known for introducing the mindfulness practice of meditation in Asia around 500 BCE; and from there, different cultures created a variety of different styles of practice.

In the U.S., mindfulness through the practice of meditation gained in popularity among youth in the 1960's and 70's as did yoga the 1980's. During this time, mindfulness practices were viewed almost exclusively as mechanisms for coping with emotional stresses. In the 1970's and 80's, most studies on the subject researched the effects of mindfulness practices on heart rate (Kabat-Zinn, 2003).

In the 1990's, scientists began exploring the medical benefits of mindfulness. In the 1990's, Dr. Candace Pert published research showing scientific connections between the body and mind. Dr. Pert illustrated that receptors in the body do not just receive messages from chemicals, but share the

same molecular vibration as the chemicals they attach to. These receptors and chemicals are not limited to the brain, but are found throughout the body.

Thought travels as molecules of information from the brain to the body as well as from the body to the brain. Dr. Pert's research helped legitimize the practice of meditation because it showed that physical elements of meditation can affect thought and emotion and mental elements can in turn, influence the body (Descartes, 2003; Khalsa, D. S., 2001).

While the amount of studies on the impact of mindfulness has increased, there has been little research on its impact on children until very recently. 28 out of the 30 studies analyzed in this paper were published in the 2000's. The amount of studies on mindfulness conducted in the 21st century demonstrates that the idea of implementing mindfulness practices in schools in the U.S. is quite new. One of the most infamous proponents of this idea is the U.S. Committee for Stress-Free Schools, which encourages schools to establish transcendental meditation programs into their daily schedules (Maharishi Foundation, 2010).

Definitions

In order to better understand the importance of mindfulness to students, it is valuable to identify the main themes that will be mentioned in the following chapters. *Impact* in terms of "the impact of mindfulness practice" refers to affect. *Preadolescent* students will include those in the elementary and middle school grades. Kabat-Zinn's (2003) definition of *mindfulness* is awareness through intentionally and non-judgmentally paying attention in the present moment. Mindfulness consists of a variety of dimensions, such as the observation of

experiences, intentional awareness, and remaining non-judgmental. This state of mindfulness can be obtained through a number of different practices. The mindfulness practices reviewed in this paper include meditation, transcendental meditation, mindfulness-based stress reduction, cognitive behavioral therapy, mindfulness-based cognitive therapy, mindfulness awareness practice, yoga, and Sahaja yoga. *Meditation* refers to a discourse intended to express reflection and contemplation. Meditation is a state of mental silence through alert awareness in the present and the elimination of unnecessary thought (Harrison, 2004).

Transcendental meditation (TM) promotes deep physical and mental relaxation through sitting meditation (Rosaen & Benn, 2006). *Mindfulness-Based Stress Reduction (MBSR)* is an 8 week mindfulness program created by Jon Kabat-Zinn consisting of Hatha yoga and meditation (Santangelo, 2012). *Cognitive Behavioral Therapy (CBT)* uses psychotherapy to systematically address emotions, behaviors, and cognitions and bring awareness to the present moment. *Mindfulness-Based Cognitive Therapy (MBCT)* therefore, uses CBT methods along with mindfulness to address emotions, behaviors, and cognitions. *Mindfulness Awareness Practices (MAPs)* are exercises that promote more receptive attention to present experiences (Flook et al, 2010). *Yoga* is a set of exercises to promote control of the body and mind. *Sahaja Yoga* is a method of meditation that produces a state of self-realization and awareness.

Emotional intelligence and *emotional awareness* will be used interchangeably in this paper. Their definitions include the ability to look inwardly at oneself as well as viewing ones relationships with others (Grosswald et al,

2008). *Restful alertness* refers to stable levels of relaxation, energy, and focus (Rosaen & Benn, 2006). *Relaxation* is an emotion-focused strategy of regulation of the emotional and physical responses to stress (Lohaus & Klein-heßling, 2001). *Cognition* is the mental process that includes awareness, perception, reasoning, and judgment. *Executive Function (EF)* is the mental process that connects past experience with the present (NCLD.org) *Attention* is a cognitive system consisting of alerting, orienting, and conflict monitoring. Attention is essential in learning and the regulation of thoughts, emotions, and actions (Baijal, 2011). *Attention Deficit/Hyperactivity Disorder (AD/HD)* is a brain-based condition characterized by heightened levels of hyperactivity, impulsivity, and inattention. 1 out of 3 individuals with learning disabilities have AD/HD. AD/HD can be further broken down into hyperactive-impulsive type AD/HD and inattentive type AD/HD (NCLD, 2012). Children with ADHD have issues maintaining prolonged attention, being mindful of goals and plans, and inhibiting a pre-potent response. As a result, inattentive, impulsive, and hyperactive behavior is common. To date, short-term stimulant medication followed by cognitive behavioral treatments are the 2 most common strategies for confronting ADHD (Oord, 2012).

Limitations

This review seeks to inform the discussion on the impact of mindfulness practices on elementary and middle school students' behavior, emotional wellbeing, and brain efficiency. Therefore, one of the major limitations to the scope of this review is that it primarily examines research involving K-8 students. Another limit to this review is that it focuses on students' behavior, emotional

wellbeing, and brain efficiency, so other effects of mindfulness that do not fall under these categories are not analyzed in as much depth. Because mindfulness practices are greatly varied (i.e. meditation, transcendental meditation, mindfulness-based stress reduction, cognitive behavioral therapy, mindfulness-based cognitive therapy, yoga, and Sahaja yoga) and because each practice may have different degrees of effectiveness, the results of the following studies cannot be generalized to any one specific mindfulness practice. The review is further limited to peer-reviewed research published or translated in English.

Summary

This project analyzes the impact of mindfulness practices on students' behavior, emotional wellbeing, and brain efficiency. As students experience more and more stress in their lives, the demand for stress-free school environments also increases. While the 21st century experienced an increase in the amount of research studying the impact of mindfulness in the U.S., there has been little research on its impact on children until very recently. This demonstrates that the idea of implementing mindfulness practices in schools is new to the U.S.

Chapter two will provide an integrative review of professional literature on the effects of mindfulness on student learning. Chapter three will provide a summary of the findings as well as determine effective classroom practices based on the findings.

CHAPTER 2: CRITICAL REVIEW OF THE LITERATURE

Introduction

Chapter one provided background information on mindfulness practices for elementary and middle school students. Mindfulness practice has become a means of alleviating the stress laden and anxiety inducing culture in the U.S. The chapter gave a brief history of mindfulness practices and included significant definitions relevant to the studies that will be explored later in the current chapter. In this chapter, various studies on the impact of mindfulness practice on students are examined and critically reviewed.

Effects on Student Behavior

The first section of Chapter two analyzes the effects of mindfulness practice on student behavior. Many of the studies examined self-control, impulse control, and symptoms of Attention Deficit Disorder (ADD) and Attention Deficit Hyper-Activity Disorder (ADHD) before and after mindfulness practice.

Self-control and Impulse Control

Barreiros et al (2011) studied 20 eight-year-old meditating students and found that meditation training increased brain efficiency in attention and impulse control. Singh et al (2007) studied mindfulness training for 3 adolescents with conduct disorders and reported reductions of impulsive behavior and more control of behavior.

The quantitative study of Barreiros et al (2011) compared 20 right-handed regular meditators to 19 non-meditators and found that non-meditators activated more brain regions than meditators in order to achieve the same performance

during an attention task. Subjects were matched for age, years of education, and gender. Regular meditators included those who had at least 3 years of practice for 3 days a week. The group had an average of 8.53 years of practice. There were 8 males and 12 females in the meditating group and 9 males and 10 females in the control group. No participants had diagnosed mental disorders.

Subjects viewed single colored words for one second, three different times: as congruent, neutral, and incongruent. Subjects then attempted to recall the color of the words presented. There were 6 trials of 10 performed. A fMRI adapted Stroop Word-Colour Task (SWCT) measured brain activity. The fMRI requires attention and impulse control through the use of a block design paradigm.

Findings showed that non-meditators displayed greater brain activity than meditators when presented with the incongruent images. Findings of reaction time were statistically significant with $p < 0.001$ measured by the Stroop. The frontal gyrus, middle temporal gyrus, lentiform nucleus, precentral gyrus, and postcentral gyrus were all activated. Behavioral performance was equivalent in both groups. That is, non-meditators activated more brain regions than meditators in order to achieve the same performance during the attention task. Researchers concluded that the ability that individuals have to sustain attention during meditation can be generalized for other attention tasks and that meditation may reduce the need of impulse control.

One strength of Barreiros's study was in transferability because subjects were matched for age, years of education, and gender. Reliability of the study

also increased because the findings of reaction time were statistically significant with $p < 0.001$. One weakness was that there was no triangulation, thereby weakening the credibility of the study. It is also unclear if the attention task used in the study could in fact be generalized to other attention tasks as the researchers suggested.

Singh et al (2007) qualitatively studied mindfulness training with three behaviorally aggressive seventh grade adolescents referred for therapy from school and found that aggressive behavior or bullying decreased during the first 4 weeks of mindfulness training and decreased more substantially during the 25 weeks of mindfulness practice. These subjects included 2 white males and 1 white female. All had multiple disciplinary actions and were at risk of expulsion due to several behaviorally aggressive instances. All 3 subjects had a diagnosis of conduct disorder.

Prospective baseline data was collected with each subject for the 2 weeks before intervention as well as throughout the intervention phases. A therapist met with each subject individually for 15 minutes 3 times a week over the course of 4 weeks. This therapist had mindfulness training and experience working with children and adolescents. *Meditation on the Soles of the Feet* mindfulness technique was taught.

Self-reported data on collateral behaviors was collected by the therapist. After the 4 week period, subjects met with the therapist for 15 minutes once a month for 25 weeks. For all 3 subjects, aggressive behavior or bullying decreased minimally during the first 4 weeks of mindfulness training and

substantially during the 25 weeks of mindfulness practice. Self-reports included the following benefits: relaxing, reduction of impulsive behavior, being in more control of behavior, more focused on task, and more restful sleeping.

A weakness was that the therapist who led the students in the mindfulness technique also collected the data on subjects' behaviors. One strength of the study was that triangulation was utilized to increase credibility. Credibility was strengthened when researchers were explicit in their method of using *Mindfulness on the Soles of the Feet*.

ADD/ADHD

Grosswald et al (2008) study of adolescents with ADHD who practiced transcendental meditation showed that transcendental meditation has a positive effect on ADHD symptoms and working memory. Harrison et al's (2004) study of the effect of Sahaja yoga meditation on children with ADHD and their parents found that Sahaja yoga improved ADHD behavior. Oord et al (2010) studied 8-12 year old children with ADHD and their parents who participated in mindfulness training and found that there was a significant reduction of ADHD behavior in parents and children. Zylowska et al (2007) studied an 8-week mindfulness training program for adults and adolescents with ADHD and reported improvements in ADHD symptoms and attention. Semrud-Clikeman et al (1999) studied an attention training intervention for students with ADHD and found that the intervention may be helpful for such subjects. Finally, Jensen & Kenny (2004) studied the effects of yoga on boys with ADHD and found that yoga is a plausible treatment for such subjects.

The quantitative study of Grosswald et al (2008) involved adolescents with ADHD who practiced transcendental meditation and showed that transcendental meditation improved executive function, emotional control, and working memory. The subjects of Grosswald et al's (2008) study included 32 11-14 year-old students from a private K-12 school for children with language-based learning disabilities. All subjects had a pre-existing diagnoses of ADHD made by a physician or psychologist. As an exploratory study, a pretest-post test design was used with a single cohort. The final cohort was 10 students: nine boys and one girl. Four students were Caucasian and six were African American. Six were diagnosed with inattentive-type ADHD and four with combined-type ADHD. Six students had co morbidities including general anxiety disorder, dysthymia, obsessive compulsive disorder, pervasive developmental disorder, sleep disorders, and tics. Eight students were taking stimulants and three of those were also on other medications (such as mood stabilizers). Half of the students were private-pay, and half were on financial scholarship awarded by the city.

11-14 year old students were taught transcendental meditation and practiced it twice a day in school. The practice of the technique of TM involved two components: a "mantra" to facilitate the process of settling the mind and a precise technique for using the sound. Together, the meditator experiences quieter aspects of awareness. The technique was taught by certified TM teachers. The course involved one meeting of individual instruction followed by a meeting each day for the next three days. Each meeting was approximately one hour each day. After the initial 2 weeks of the study, the TM teacher met with

students individually an average of three times. During these meetings the teacher used a standard procedure for meditation. The TM occurred in a group at the beginning of their first class in school and the beginning of the last period in the afternoon each school day and were led by school faculty instructed in the technique. Post testing was administered 3 months after the study where a General Executive Composite was used.

There was an improvement from pretest to posttest in executive function $F(1,9) = 5.5, p = .022$ and in working memory $F(1,9) = 13.7, p = .0025$. The most statistically significant finding was an increase in emotional control $F(1,9) = 23.7, p < .00001$. These findings show that transcendental meditation has a positive effect on working memory and emotional control for students with ADHD.

Reliability of the study increased when TM was practiced both at the beginning of the school day and the end of the school day. Reliability further increased because the findings for emotional control were extremely statistically significant with $p < 0.00001$. The external validity of the study was weakened because of the final cohort of 10 students only one was female. External validity was also weakened because 8 out of the 10 students were taking stimulants and three of those were also on other medications. Internal validity was also weak because the meditation only took place 7 days.

The quantitative study of Harrison et al (2008) measured the effect of Sahaja yoga meditation on children with ADHD and their parents and found that Sahaja yoga improved ADHD behavior and self-esteem and decreased anxiety. Subjects for the Harrison et al (2008) study were recruited through a publicized

newspaper article and lecture on Shajara Yoga Meditation that was open to parents of school-age children with ADHD. 48 children of 41 boys and 7 girls met the criteria for inclusion in the program. 31 of the subjects were receiving medication, 14 were not, and medication information was not provided for the other 3 children. 95% of the subjects were white.

Children and their parents participated in a 6-week program of Sahaja Yoga Meditation (SYM) twice a week along with regular meditation at home. SYM was introduced as a non-drug alternative to intervention for ADHD. Pre- and post-treatment assessments included rating symptoms of ADHD, self-esteem and child–parent relationship quality by parents. The 6-week treatment program consisted of 90-minute clinics twice a week. They were held in large meeting rooms at the hospital. The first 3 weeks consisted of guided 5-15 minute meditation sessions. Instructors directed participants to become aware of a state of thoughtless awareness within themselves by becoming silent and focusing their attention inside. Subjects were asked to meditate at home regularly and make records in a diary that was checked each week. The measure chosen for the study presents behavioral descriptors: excitable/impulsive; fails to finish things/short attention span) that parents rate on a 4-point scale (0 = not at all, 1 = just a little, 2 = pretty much, 3 = very much). There was also one overall question: How serious a problem do you think the child has at this time? (0 = none, 1 = minor, 2 = moderate, 3 = severe). These 11 items achieved a high level of internal reliability. Coefficient alphas ranged from .74 to .86. Ratings on the 11 items were summed to give a total score for ADHD symptoms at each

assessment point (possible range 0–33). An abbreviated version of Burnett's (1994) 40-item self-evaluation and self-description measure was used to assess child self-esteem.

Child self-reported questionnaires, parent questionnaires, and child interviews were used to assess perceptions of the program. Assessments were conducted at recruitment during week one, in the middle of the program at week 3, and at the end at week 3.

Results showed improvements in children's ADHD behavior, self-esteem and relationship quality. Children described better sleep patterns and less anxiety in the home. They reported that they were more able to concentrate and there were less incidents of conflict at school. A marked improvement in ADHD symptoms was measured on the Conners Parent–Teacher Questionnaire: Mean scores decreased from pre-test (22.54) to post-test (14.62) with standard deviations of 4.61 and 5.15, respectively. The average mean decrease in reported ADHD symptoms was 7.91 points (SD=4.91), representing an improvement rate of 35%. Statistical analysis using paired samples t-test showed that the difference in pre- and post-treatment scores were significant ($t=8.23$, $p<.001$).

There was a threat to the internal validity of the study as there was no guarantee that subjects were practicing SYM in the home because the practice was not observed, but only evaluated based on personal diary reflections. There was also a threat to the external validity because subjects were recruited through a publicized newspaper article and lecture on Shajara Yoga Meditation that was

open to parents of school-age children with ADHD. This means that subjects were limited to those individuals who read the newspaper article. External validity was further threatened because the 95% of the subjects were white. Finally, 31 of the subjects were receiving medication and 14 were not medicated, so the external validity was once again weakened.

Oord et al (2010) qualitatively studied 8-12 year old children with ADHD who participated in mindfulness training and found that there was a significant reduction of ADHD behavior in children and the children's parents. Subjects included eight to twelve year old children with ADHD as well as their parents. Psychologists, pediatricians, and general practitioners referred children for ADHD diagnosis and treatment to a children's outpatient mental health care. Criteria for subjects in the study included an IQ \geq 80, an age range of 8-12 years old, and a diagnosis of ADHD according to the Anxiety Disorder Interview Schedule for Children (ADIS-C). A within-group waitlist was also implemented. The DBDRS assessed ADHD symptoms using 42 items and 4 subscales of inattention, hyperactivity/impulsivity, ODD, and CD. Higher scales indicate higher levels of parenting stress. The PS (parenting scale) measured ineffective discipline styles on 3 subscales of laxness, verbosity, and overreactivity. Mindful attention and awareness of parents was measured with MAAS containing 15 items and a 7 point scale. ARS was completed by parents. It was based on 18 DSM-IV criteria for ADHD. It contained 46 items and a 4 point scale. Treatment was conducted in groups of 4-6 children and parents over 8 weekly 90 minute sessions.

Findings showed a significant reduction of ADHD behavior in the parents and children from pretest to posttest. There was also an increase of mindful awareness and a decrease in parental stress and overreactivity from pretest to posttest. There was a reduction in inattention $ES=.80$, large ES and hyperactivity symptoms $ES=.56$, medium ES.

One strength of the study is that a semi-structured diagnostic interview was performed by a trained clinical psychologist with reported “adequate” reliability and validity. Credibility was strengthened because researchers attempted to control the effects of time and repeated measurements by implementing a within-group waitlist. The study’s transferability was also strengthened when researchers were overt about limiting the subjects of the study to those with a certain range of IQ’s (≥ 80).

The quantitative study of Zylowska et al (2007) analyzed an 8-week mindfulness training program for adults and adolescents with ADHD and reported improvements in ADHD symptoms and attention, and a decrease in symptoms of anxiety and depression. The program included twenty-four adults and eight adolescents with ADHD. Subjects were recruited to the study through clinical ADHD and research programs as well as local advertising. Interested participants were then screened over the telephone. All subjects had to be at least fifteen years old and previously diagnosed with ADHD.

ADHD diagnoses of subjects were determined by semi-structured clinical interview assessments from a research clinician and a further review with a senior diagnostician. For a diagnosis of ADHD in the study, subjects had to have

impairments in at least two functioning areas. Individuals who had one impairment were also included in the study under the label “probable ADHD”.

The mindfulness training program included 2.5 hour evening sessions once a week along with at-home practice every day. At-home practice included mindful awareness in daily living exercises.

Pre- and posttest assessments consisted of self-reported ADHD scales, depression and anxiety symptoms, and cognitive tests. The ADHD Rating Scale IV was used to assess ADHD symptoms in adults and the SNAP-IV scale was used for adolescents. Attention Network Test (ANT) assessed alerting, orienting, and conflict attention using a computerized test.

Pre-post improvements in ADHD symptoms were reported by participants as well as improvements in test performance on attention tasks. There were reported decreases in symptoms of anxiety ($T_1=7.2$, $SD=3.1$) and depression ($T_1=14.9$, $SD=11.1$). 78% of subjects reported at least a 30% decrease in ADHD symptoms. $P<.01$ for inattentiveness and combined inattentiveness and hyperactivity.

A major weakness of the study is the lack of clarity of the findings. P values were expressed using $<$, leading the reader to believe that it is possible that the findings may have a probability of 99% based on chance. The findings were not statistically significant. The external validity of this study was strengthened when the subjects were recruited through clinical ADHD and research programs as well as local advertising. The combination of the specialized research program and local advertising may have created a more

diverse set of subjects. Internal validity increased when ADHD diagnoses of subjects was determined by an assessment from a research clinician and a further review with a senior diagnostician. Researchers also specified that a diagnosis of ADHD had to include impairments in at least two functioning areas. Individuals who had one impairment were given the label “probable ADHD” for the study. These specifications also increased the study’s internal validity.

Semrud-Clikeman et al (1999) qualitatively studied an attention training intervention for 33 students with ADHD and found that the intervention may improve visual and auditory attention for such subjects. Subjects included 33 children who were selected by teachers and parents for having problems with attention and completing problems. A multimodal and multi-informant method was used for diagnosis of ADHD based on *DSM-IV* criteria. 21 of the 33 subjects were split into 2 groups- one with ADHD and one without ADHD, both of which participated in the 18-week intervention and 12 were in an ADHD control group. The ADHD control group did not participate in the initial intervention but did participate in the experiment pre- and posttesting.

Subjects were assessed on both visual and auditory attention in a pretest and posttest. The experiment was 18-weeks long and consisted of attention and problem-solving training. In this training, subjects in all three groups were retested on visual and auditory tasks. Subjects in both the control ADHD group and experimental ADHD group showed significantly poorer performance on the initial visual attention task. Subjects in the ADHD experimental group showed commensurate performance in the visual attention task to the non-ADHD control

group where as the ADHD control group did not exhibit improvement. Post-test scores showed that both the experimental ADHD group and control ADHD group had poorer auditory attention in comparison to the non-ADHD control group. But, the ADHD experimental group showed improved auditory attention whereas neither of the other 2 control groups improved.

A strength in the credibility of this study was that there was a set *DSM-IV* criteria for determining ADHD in subjects. A weakness of this study is that researchers did not include the criteria for selecting subjects for the non-ADHD control group. It is unclear if the same *DSM-IV* was used, thereby decreasing the transferability.

The quantitative Jensen & Kenny (2004) study analyzed the effects of yoga on boys with ADHD and found that yoga may be beneficial in stabilizing emotions and reducing impulsive behavior in medicated boys with ADHD. Subjects in the study included 19 boys with ADHD diagnoses. Diagnoses were determined by specialist pediatricians. Subjects were taking medication at the time of the experiment. 11 subjects were randomly assigned to a yoga group consisting of 20 sessions and 8 subjects to a control group who participated in cooperative activities.

The subjects attended an average of 13 classes out of the 20 provided and practiced 14-116 days. Mean days practiced was 54.70 with a standard deviation of 40.95. The yoga intervention consisted of respiratory, postural, relaxation, and concentration training. Overall, there were no significant differences between pre- and post-test scores for the control or experimental

group. Researchers suggest that this may be due to the fact that teachers assessed subjects that were on ADHD medication and at school.

Conners' Parent and Teacher Rating Scales-Revised (CRS) with internal consistency of .75 to .90, the Test of Variables of Attention, and the Motion Logger Actigraph were used to assess subjects in the pre- and post-interventions. ANOVA was used to analyze data from the experiment.

The Conner's Global Emotional Lability was one of the subscales of the Conners' Parents Rating Scales (CPRS) that showed somewhat significant group by time interactions. The intervention group showed greater gains from pre to post test ($F=8.683$, $p=.009$). The Conners' Oppositional Scale ($F=4.649$, $p=.047$) and Conners Global Restless/Impulsive ($F=2.165$, $p=.160$) were not statistically significant.

Although there were greater improvements on the CTRS Global Emotional Lability subscale for subjects in the experimental yoga group who also engaged in extra practice in the home, results from the Motion Logger Actigraph were not conclusive. There was no significant improvement on TOVA Response Time Variability.

The study suggests that yoga may have the potential to be beneficial for boys with ADHD who take regular medication, but results are not convincing, as the overall data is not statistically significant. This lack of reliability is the greatest weakness of the study. Another weakness is in the study's internal validity, as there is a lack of detail of what exactly "cooperative activities" meant for the subjects in the control group. Perhaps more effective would be a control that did

not participate in any activities, as partaking in cooperative activities may in fact, impact subjects' experience. Other weaknesses of the quantitative study include the small sample size and the lack of controlled monitoring of the yoga intervention in the home. The use of Conners Teacher Rating Scales is also objective, as each teacher has a different idea of the appropriateness of certain behaviors. Furthermore, the number of sessions subjects attended included a wide range of 5-19 sessions. Most other studies measuring the impact of yoga on children involved lengthier programs and did prove to show significant results. A strength of the study is the increase of external validity and objectivity due to the overtness of researchers in concluding that yoga may be beneficial for boys with ADHD who do take regular medication but results could not be generalizable to the population of unmedicated boys with ADHD.

Emotional Wellbeing

The second section of Chapter two analyzes the role of emotional response in mindfulness practices. Many of the studies examined self-esteem, self-awareness, socio-emotional growth, and anxiety and stress after mindfulness practice.

Self-awareness, Self-esteem, and Social-emotional Growth

Stueck & Gloeckner's (2005) study of yoga for children reported that yoga may decrease aggression and feelings of helplessness in school. Lohaus & Klein-heßling (2001) and Powell et al (2008) both studied children's relaxation trainings. Subjects for Lohaus & Klein-heßling (2001) included nine to thirteen year olds who reported increases in positive mood and physical wellbeing. The

relaxation intervention studied by Powell et al (2008) focused on eight to eleven year old children and reported improvements in self-confidence, communication, and contributions in the class. Rosaen & Benn (2006) studied 7th graders who participated in transcendental meditation and found several results including an increase in restful alertness affecting the focusing of attention; more controlled behavior, keeping on task, facilitating social-emotional growth, increased academic performance, and flexibility in emotional response. Ciarrochi et al (2010) studied 10th grade students who practiced mindfulness and found that mindfulness increased attention, emotional awareness, and experiential acceptance. Sibinga et al (2011) studied a mindfulness-based stress reduction program for adolescents and found that mindfulness practice can help reduce stress and create a heightened self-awareness. Slovacek et al (2003) studied a yoga program in an inner-city elementary school and found that yoga may affect students' self-perceptions.

Stueck & Gloeckner's (2005) quantitative study of yoga for 5th grade students with anxiety reported that yoga may decrease aggression and feelings of helplessness in school. Subjects in the study included 48 fifth grade students eleven to twelve years old who showed abnormal levels of anxiety according to the Wiczerkowski questionnaire. The Training of Relaxation with Elements of Yoga for Children (TorweY-C) was implemented to teach children self-regulated strategies to reduce stress and maintain a healthy attitude when faced with stressors in everyday life. The TorweY-C consisted of fifteen sessions of one hour. Relaxation training and data collection was evaluated at Leipzig University

between 1994 and 1998. Each session involved three stages. The first was relaxation through breathing techniques and body concentration. The second was participation in 23 different yoga exercises as well as the opportunity for subjects to create and teach a unique yoga exercise. The third and final segment included sensory or imagery techniques. This final segment is meant to transition from sensual-motor action regulation to cognitive-behavioral and imaginative self-regulation. Several techniques are used including massage, meditation, sensory activities using touch and smell, interactive exercises, and imagery.

Process variables and two sets of effect variables were measured. Process variables included psychological and physiological variables during the study. Effect variables included those variables before, immediately after, and 3 months after the study.

There were not very significant differences ($p \leq .05$) shown in Pre-Post 1 comparison including a decrease in aggression and helplessness in school, increase in static balance ability, and a decrease in physical complaints and psychophysical behavior under stress (measured by the Stress Relaxation Test). Self-efficacy could not be verified statistically ($p > .10$). Parent interviews reported children being “more calm and more balanced” (71.4%) and less impulsive, aggressive and hot-tempered (38.1%). The interviews also reported that subjects were more concentrated (38.1%) and with less complaints (38.1%).

One major weakness of the study is that researchers did not say how subjects were selected, a threat to internal validity. Internal validity was further threatened when researchers failed to mention the percentage of subjects who

were less impulsive or identify the methods used to determine the p values. A further weakness is that results were summarized and some data was absent in the study, threatening the study's objectivity. This objectivity may have been strengthened; however, by the inclusion of a section with "further results that could not be tested by inference statistics". Another strength of the study was that the developmental period of TorweY-C was evaluated over a substantial time period: from 1994 to 1998, increasing reliability. Another strength was that process variables included both psychological and physiological variables. Effect variables were included as those variables before, immediately after, and three months after the study.

In the quantitative study of Lohaus & Klein-heßling (2001), sixty-four fourth and sixth grade students between nine and thirteen years were selected from a comprehensive school in Marburg, Germany. Researchers claim that "in order to prevent attrition during the training", they offered subjects a financial reward (Lohaus & Klein-heßling, 2001). The school was selected because comprehensive schools are comprised of students of varying performance levels and therefore more representative of the whole population of students in that age group. There were thirty-two boys and thirty-two girls that were randomly assigned to one of three experimental conditions: progressive muscle relaxation, imagery-based relaxation or a control group. Groups were stratified for gender and grade. There were five training sessions in each condition, each conducted in a standardized manner. In each session, heart rate (HR), skin conductance level (SCL), and skin temperature (ST) were measured continuously for a

baseline of 5 minutes, a relaxation training period of 8-minutes, and a 5-minute follow-up. Subjective ratings of mood and physical well-being were also collected intermittently using a series of rating scales. The study was conducted during students' free time.

The statistical analysis of the effects of relaxation include the last four training sessions, but exclude the preliminary session as a measure to allow subjects to adjust to the equipment. Two three-way ANOVA with two repeated measures were used to analyze the psychological and physical well-being data. Lohaus & Klein-heßling refer to relaxation as an emotion-focused strategy of regulation of the emotional and physical responses to stress. A physiological pattern indicating relaxation was most clearly associated with the imagery-based relaxation approach. This was evident through decreased HR and SCL (ST remained unchanged) as both heart rate decreased ($p < .01$) and SCL decreased ($p < .01$) for the imagery-based relaxation condition. Progressive muscle relaxation led to an increase in HR during the training. Children's ratings of positive mood and physical wellbeing increased during baseline and training periods ($p < .01$). However, these results ($p < .01$) are not incredibly statistically significant.

Strengths of this study included the facts that subjects were randomly assigned to the three different experimental conditions and groups were stratified for gender and grade. Internal validity was maximized when researchers standardized each of the five training sessions conducted. Part of this standardization included audio instructions that were played for the subjects. Another strength was that the statistical analysis excluded the very first training

session to attempt to allow subjects to adjust to the equipment, further maximizing internal validity. External validity increased when the selection of the school was more representative of the whole population of students in that age group because of its composition of students of different performance levels. A final strength is in the reliability of the study with the use of two three-way ANOVA with two repeated measures to analyze data.

A weakness of this study was that researchers offered subjects a financial reward for participating in the study. This coercion may have caused subjects to express more motivation in participating in the study in response to the treatment.

In the qualitative study of Powell et al (2008), a relaxation intervention was performed with 8-11 year old children with reported improvements in self-confidence, communication, and contributions in the class. 126 8 to 11 year old children with identified emotional and behavioral difficulties and at risk of exclusion were invited by the head teacher to participate in the program with parental consent. 107 children did receive parental consent and completed all measures of the study. 54 children were allocated into the control group and 53 into the intervention group by the head teacher.

Researchers used an intervention involving massage, yoga and breath work. A pre-test and post-test questionnaires were completed by the teachers of the subjects in the study. A researcher also observed sessions.

Findings showed children in the intervention group had improvements in self-confidence, social confidence, communication and contribution in the class.

Children in the intervention group were noted by teachers to use skills learned on the Self-discovery Programme during the school day.

One weakness of this study is that the head teacher selected 126 students to participate in the study. It does not say what measures the teacher used to select this sample; only that the 107 children out of the 126 that participated in the study had identified emotional and behavioral difficulties and were at risk of exclusion. It is also noted in the study that the head teacher determined the samples for the control and intervention groups without details of how procedure took place. The study's credibility was threatened by the weak details of the procedures.

Rosaen & Benn (2006) qualitatively studied 10 7th graders who participated in transcendental meditation and found that TM induced a state of relaxation in subjects that increased emotional intelligence. The subjects consisted of ten African-American seventh grade students ages 12-14 from a Detroit charter school who had practiced transcendental meditation for at least one year. As defined in Chapter 1, *transcendental meditation* (TM) is a sitting meditation technique that promotes deep physical and mental relaxation. Five the 7th grade subjects were female and five were male. Students at this school had been taught TM the year before, in sixth grade during the first and last 10 minutes of each school day for the last 12 months of school. These students who still practiced TM were separated by gender. Five subjects were then selected at random from each gender cohort. Data collection consisted of two thirty-minute sessions immediately after morning meditation on two different days. In the first

session, subjects completed an art project, writing assignment, and questionnaire in small groups. In the second session, the researcher met with each student for a semi-structured nine-item interview. The interview responses became the primary source of data in the analysis of the study.

One author transcribed and analyzed the interviews through a process of open coding. Using a qualitative research software program, Atlas-ti, coded student responses were grouped associatively to allow patterns to emerge. A second researcher consulted with the first to verify the validity and reliability of the themes.

Students reported an increased state of relaxed alertness that consisted of more energy, calmness, concentration, and focus. After meditation, one subject reported that the relaxation improved her ability to listen to other people and to make friends. Students also reported greater emotional intelligence. This included reports of increased self-control, empathy, tolerance, forbearance with adult requests, and diminished anger and frustration.

Most of the students believed meditation had also improved their academic performance. Researchers proposed that the inner calmness produced by meditation enabled students to listen better both inwardly and outwardly, resulting in an increased capacity to connect to their internal states. This improves emotional intelligence and provides the opportunity for building greater self-control and greater response flexibility in challenging situations. This, in turn, may improve both academic skills and subjective well-being for adolescent meditators.

One strength of the study's credibility is that one researcher analyzed data from the 1st meditation session and a different researcher compiled the results from the 2nd session. Reliability of the grouping of data was verified by the 2nd researcher. A weakness of the study's credibility and confirmability is that the interview questions that were used in the 2nd assessment were not made public in the study. Although a note from the author indicated that the questions are available on request, they were not readily available study. Another weakness in the study's credibility is the fact that it is difficult to separate the subjects' perceptions of increased self-reflection due to meditation with feelings that would occur naturally as adolescents develop, despite practicing meditation. However; researchers did present this bias in the study.

Ciarrochi et al (2010) quantitatively studied the effect of Acting with Awareness (AWA) mindfulness on 776 10th and 11th grade students and found that mindfulness was linked to prosocial tendencies and increased overall wellbeing. Subjects were selected from 5 different Catholic high schools in New South Wales, Australia. 386 of the subjects were female and 388 were male.

The Positive and Negative Affect Schedule was used to assess fear, sadness, hostility, and joviality/positive affect. Students rated the statements from 1 (not at all) to 5 (extremely). Likelihood to engage in uninhibited behaviors was measured by a 12-item revision of the Psychoticism (P) scale for youth. Subjects responded 1 to 5 on a 10-item International Personality Item Pool scale (IPIP) that assessed neuroticism, extraversion, openness, agreeableness, and conscientiousness. 12 items from the Toronto Alexithymia Scale assessed skill at

identifying and describing feelings based on a 5 point scale. A 17-item Avoidance and Fusion Questionnaire measured psychological inflexibility. Awareness of internal stimuli was assessed using 20 items from the Child and Adolescent Mindfulness Measure (CAMM-20). The CAMM-20 was split into two subfactors of Observing and Acting with Awareness (AWA). Observing items focused on attending to internal and external stimuli and AWA items focused on the engagement of an activity with undivided attention. The AWA successfully predicted the development of wellbeing over a period of 1 year.

Analysis were conducted using parametric and nonparametric statistics. Corrected t-tests (.0125) showed no significant differences in the pre and posttests for fear, hostility, or sadness but positive affect (joviality) did prove to be somewhat statistically significant as $p < .01$ ($Mt1=3.93$; $Mt2=4.03$).

One strength of this study is that the subscales used had adequate internal consistency, discriminate validity, and criterion-related validity according to (Watson & Clark, 1994). 1-5 IPIP was also shown to have internal validity. Reliability was .89. Another strength is that an exploratory factor analysis (EFA) was conducted for females and males each separately to identify if the CAMM-20 could be treated as a single factor.

A weakness of the study is that questions like “Should people always try not to be rude?” assessed judgment and values more than mindfulness. Ideas of awareness and acceptance may be difficult to measure in this type of assessment. Also, if an individual does indeed lack self-awareness, they would be unaware of their unawareness.

The qualitative study of Sibinga et al (2011) analyzed the effects of mindfulness-based stress reduction (MBSR) on 13-21 year olds and found that mindfulness practice can help reduce stress and create a heightened self-awareness. Subjects were recruited from John Hopkins Hospitals pediatric and adolescent outpatient clinics in East Baltimore, one of the poorest neighborhoods in the city. The large majority of patients at the clinic live in poverty and 51% of subjects' parents from the intervention group were unemployed. 85% of patients were on Medicaid. Subjects received \$10-30 gift certificates after MBSR sessions and interviews.

The MBSR program was 8 weeks long and consisted of instructional material related to mindfulness, practice of mindfulness, yoga, and body scan, and group discussions about daily mindfulness applications. The standard program's logistics and language was adapted for urban youth. Subjects were provided tokens and vouchers for public transportation and taxis, given reminder phone calls, and modified durations of class. The language used to describe the content and activities of the class was more concrete and simplified.

10 subjects from the intervention group were selected to answer questions in a 1-hour semi-structured interview. Ethnographic field guides guided audio-taped interviews. All subjects who participated in the interview were African American, 8 were female, and 2 were male. The ethnic and gender makeup of the interview sample was comparable to the intervention sample. 4 of the interview subjects had been infected with HIV at birth. All interview subjects said they live with significant stress levels. The most common type of stress was

academic related, as many worried about getting good enough grades to pass high school after seeing many of their friends drop out or fail. Interpersonal school interactions included frequent verbal conflicts. Several subjects interviewed described stress from being around drug-related violence in their communities and schools.

Interviews showed that all subjects experienced changed perspectives after MBSR, although the degrees of intensity of these changes were considerably different among subjects. Many were able to avoid interpersonal conflicts, stay more focused, perform better in school, exercising or taking necessary medication. Most subjects experienced less daily judgment and negativity as well as increased ability to concentrate on schoolwork. A few subjects experienced major changes in perspective including a new sense of self and relationship to life.

A weakness of the credibility of the study was the lack of explanation of the criteria used to select the subjects from the intervention group to participate in the ethnographic interviews. Credibility was further strengthened when researchers accommodated the MBSR program to better fit subjects needs and reported the accommodations in the study.

Slovacek et al (2003) qualitatively studied the effects of a Yoga curriculum on 405 3rd-8th grade students from an inner-city K-8 charter school in Los Angeles and found that yoga affected subjects' self perceptions. 62% of students at the school were Hispanic and 36% were African American. 18 teachers completed questionnaires about the effects of yoga on students. Pre- and post-

questionnaires were given to 310 subjects to rate student attitudes. The Yoga Ed curriculum is privately funded and was established in 1998. Subjects in K-6 participated in 60 minutes of yoga a week, and those in grades 7 and 8 participated in 120 minutes of yoga a week. 5 yoga instructors assessed students' participation and classroom discipline at the end of the school year.

Findings showed that yoga helped improve students' attitudes about themselves. Subjects scored higher on self-esteem questions after the intervention ($p < .001$). Student behavior also improved after the intervention. The negative correlation between yoga and bad behavior was significant ($p < .01$). Middle school subjects' GPA's also increased after yoga ($r = .463$, $p < .01$)

A weakness of this study was causal attribution due to the reliance on correlation analysis. It is unclear whether or not students received grades from the yoga class. If they did in fact, earn grades for their participation and discipline, students may have been externally motivated to perform well in the class.

Anxiety and Stress

Biegel et al (2009) studied the effect of formal and informal mindfulness on teenage psychiatric outpatients and found that meditation may reduce anxiety and hostility in youth. Chen-Kuan et al (2009) studied 19-20 year women in a Taiwan junior college to find that meditation may reduce stress due to lower physical and mental symptoms. Mendelson et al (2010) studied 4th and 5th grade students from four different urban public schools who participated in mindfulness practice and reported improvements in ability to manage involuntary stress

responses. Semple et al (2005) performed a six-week trial of anxious children of 7 and 8 who participated in mindfulness techniques and found improvements in adaptive functioning, a decrease in internalization and externalization of problems, and low levels of anxiety. Hayward et al (2000) studied a cognitive-behavioral group therapy of female adolescents with social phobia and found a reduction in social anxiety symptoms. Santangelo (2012) studied 4th and 5th grade girls who participated in yoga and found that self-esteem increased and help subjects manage stress.

The quantitative study of Biegel et al (2009) analyzed the effectiveness of the mindfulness-based stress reduction program for adolescents in a psychiatric facility and found that meditation may reduce anxiety and hostility in youth. Subjects included 104 14 to 18 year olds from an outpatient child and adolescent psychiatry department of a Kaiser Permanente hospital. Subjects' average age was 15.35 years. It was reported that none of the subjects had drug/alcohol abuse or psychiatric disorders. 73.5% of the subjects were female. The ethnicities of subjects included 45.1% white, 28%.4 Hispanic, 5.9% Asian, 2.9% African American, 1% Native American, and 16.7% of mixed ethnicities. All subjects continued psychological care when participating in the mindfulness-based stress reduction intervention program (MBSR). 74 of the subjects completed all three assessments.

The study lasted 20 weeks and used a 2 by 3 mixed factorial design. The MBSR consisted of 3 hour 8 weekly classes led by 2 trained instructors focusing on formal and informal mindfulness. Subjects were encouraged to be mindful of

intention, attention, and attitude. They received weekly training in body scan meditation, sitting meditation, hatha yoga, and walking meditation.

MANOVA on SCL-90 R scores showed generally significant condition x subscale interaction ($p < .05$) and condition x time x subscale interaction ($p < .02$). The study considered $p < .05$ a “reliable change” for individual RCI scores.

Global Assessment of Functioning (GAF) measuring general psychological and social functioning was taken at 3 time points to measure mental health. GLM analyses found highly significant improvement in GAF scores ($p < .0001$). Self-reports were also taken by the subjects. Post-intervention evaluation forms showed 95% of subjects responded with positive comments highlighting changes in stress, medication usage, and sleep due to mindfulness practice.

Subjects who participated in MBSR showed a decrease in anxiety, although not statistically significant ($p = .60$). However, a greater amount of time of sitting practice produced a significant increase in GAF score ($p < .005$) as well as a generally significant decrease in symptoms of depression and anxiety ($p < .05$). Statistically significant results were found in self-reported increases in self-esteem ($p = .0001$), somatization ($p = .0008$), obsessiveness ($p = .0006$), and depression ($p = .001$).

A strength of the study is that all of the subjects continued their normal psychological care as they participated in the study and that researchers reported this. Another strength was the transparency of information, as researchers mentioned that the average age of participant was 15.35 years when

one might assume it was 16 according to the age range of 14-18. Researchers were transparent in noting that 74 out of 104 subjects completed all three assessments but were not explicit about why this was the case. Researchers also included a breakdown of the genders and ethnicities of subjects when similar studies did not. A weakness of the study is that subjects were recruited from a psychiatry department of a major national hospital, limiting the subjects to those with financial means.

The quantitative study of Chen-Kuan et al (2009) analyzed 242 19-20 year old female freshman from six different junior college classes in Taiwan using a sampling technique. 119 students composed the meditating group and 123 were in the control group.

119 freshman participated in meditation led by a master with more than 20 years of experience for 2 hours a week for 18 weeks. 123 subjects were in the control group and did not participate. Meditation began with a training. Students would sit, use hand poses, balance the mind and body, regulate the body's functions, mind, and breathing. They were asked to be motionless with eyes closed and to give quiet reflection to sensations associated with breathing.

Both groups completed the pretest (in the first week before meditation), the posttest (after the last meditation session in the final 18th week), and Life Adaptation Scale forms with a questionnaire consisting of 3 parts: physical and mental distress, positive coping strategies, and negative coping strategies. Physical/mental distress described 35 physical and mental symptoms with one point for each symptom and the subject's current physical and mental health

compared to 6 months ago using a 5 point Likert scale (much worse, worse, no difference, better, much better). Positive coping strategy used a 5 point Likert scale to assess responses to 28 questions about daily life events. Negative coping strategies included negative responses to circumstances. Five bilingual and bicultural professionals with translation experience validated the content of the questionnaire. The data was then analyzed by analysis of covariance.

The questionnaire measured 35 symptoms of stress. Physical and mental symptoms were lower in the meditating group than the control group. Average physical and mental symptoms were 7.33 in the pretest and 6.64 after. Internal consistency coefficients of both the pretest and posttest was greater than .88. The pretest identified 59.7% subjects with pimples, 52.1% with fatigue, 48.7% with headaches, 47.9% with dizziness, and 38.7% with menstrual cramps. These symptoms remained similar after meditation. The mean score of physical and mental conditions in the pretest was higher than the control groups: $M \pm SD = 19.42 \pm 13.81$ vs. $M \pm SD = 18.6 \pm 13.08$. Negative coping strategies were lower for the meditation group. Homogeneity of regression coefficient analysis within the group indicated an f value of 0.003, but was not significant ($p = .957$).

A strength of the study was that researchers took the subjects' language and culture into account by hiring five bilingual and bicultural professionals with translation experience to validate the content of the questionnaire. Internal validity was strengthened when researchers used a sampling technique to select subjects from six different classes for the study. The data was further analyzed by analysis of covariance, also increasing the internal validity. However, because

p values for negative coping strategies were so high ($p=.957$), results cannot be concluded with enough accuracy. Finally, objectivity increased when researchers included all of the variables measured in the pre- and post-test, including those that had no statistical significance, and were transparent about the lack of statistical significance.

The quantitative study of Mendelson et al (2010) analyzed 97 4th and 5th grade students from four urban Baltimore public schools who participated in a school-based mindfulness intervention consisting of yoga, breathing, and guided mindfulness practice and reported improvements in the ability to manage involuntary stress responses. 55 of the subjects were in 4th grade with a mean age of 9.7 years. 42 were in 5th grade with a mean age of 10.6. 59 were female and 38 were male. 81 self-identified as African-American, 4 as Latino, 4 as white, 7 as mixed-race or other, and 1 did not report a race or ethnicity. 51 students were randomly assigned to the intervention condition, and 46 to the control condition.

Participants were selected from a randomized sample of volunteers from four public schools in Baltimore and randomly assigned to an intervention condition or a control. Four days a week for twelve weeks, 25 participants attended 45-minute classes in yoga and mindful awareness practices taught by 2 African American and 1 Latino trained male instructors. Participants filled out self-report surveys before and after participation administered by trained research assistants. Involuntary stress responses were assessed through the Responses to Stress Questionnaire (RSQ) and the Involuntary Engagement

Coping Scale, which had five subscales: Rumination, Intrusive Thoughts, Emotional Arousal, Physiological Arousal, and Impulsive Action. Subjects' depression systems were assessed with the Short Moods and Feelings Questionnaire Child Version (SMFQ-C), which had a Cronbach's alpha score of 0.82 at the pretest. Positive and negative emotions were assessed with the Emotion Profile Inventory (EP). Relationships with peers and teachers were assessed with the People In My Life (PIML) survey, which measured the subscales Trust in Friends, Communication with Friends, Teacher Affiliation, Dissatisfaction with Teachers, Alienation/Dissatisfaction with Friends, and Bonding to School. Cronbach's alpha scores for the PIML subscales were 0.76 for Trust in Friends, 0.62 for Communication with Friends, 0.67 for Teacher Affiliation, and 0.66 for Dissatisfaction with Teachers. Cronbach's alphas for the Alienation/ Dissatisfaction with Friends and School Bonding were low ($\alpha \leq 0.45$). Researchers used ANOVA tests for continuous variables and Chi-Square tests for categorical variables to compare intervention and control groups for baseline differences in age, grade, gender, and pretest scores. ANOVA tests were used for continuous variables and Chi-Square tests for categorical variables to measure differences between pretests and posttests, and to measure differences between intervention and control groups on all survey measures.

Compared to the control group, the intervention group reported significant improvements in ability to manage involuntary stress responses on the Involuntary Stress Coping Scale ($p < 0.001$). The intervention group showed

generally significant improvements in three subscales on the ISCS: Rumination ($p < 0.01$), Intrusive Thoughts ($p < 0.01$), and Emotional Arousal ($p < 0.01$).

The study's internal validity was strengthened due to the transparency about the genders and ethnicities of the subjects in the study. Internal validity was also strengthened with the randomization of the control and intervention groups as well as the inclusion of subjects from four different schools. Another strength was that researchers considered factors of race, as 2 out of the 3 instructors were African American, representing 81 out of the 97 (83%) subjects participating in the study. Cronbach's alphas for the Alienation/ Dissatisfaction with Friends and School Bonding were low ($\alpha \leq 0.45$), so findings from those scales were not reported, decreasing reliability. Another weakness of the study is that pretest internal reliability was $\alpha = 0.79$ for the Involuntary Engagement Scale in this subject sample, and reliabilities for the five component subscales ranged from 0.52 to 0.61.

The qualitative study of Semple et al (2005) analyzed mindfulness-based cognitive therapy (MBCT) for children and found that symptoms of anxiety symptoms and attention and behavioral problems decreased. Subjects included 3 boys and 2 girls between the ages of 7 and 8 years old who were selected by teachers' observations of anxiety symptoms. They were then screened by a school psychologist who recommended them for the program.

A 6 week trial was conducted with 5 children between the ages of 7 and 8 suffering from anxiety. The session was 45 minutes long once a week in a quiet classroom. Data was obtained 4 days before the 1st session and following the

final 6th session. Each session focused on a single modality of kinesthetic, taste, sight, sound, smell, or touch. Sessions started and ended with 3 minute breathing meditations and a written self reflection of anxiety symptoms. Teachers completed a Teacher Report Form rating 113 problem-behaviors.

Teacher ratings suggest improvements in adaptive functioning and a decrease in internalization and externalization of problems. Subjects reported experiencing little anxiety.

One major weakness of the study was the degree of teacher involvement. Teachers selected the initial sample by observing students' anxiety symptoms, creating much subjectivity and impacting the credibility of the findings. There was also a lack of explanation of how the teacher selected the subjects, only that they observed anxiety symptoms, a further threat to credibility. However; the credibility was also strengthened because the school psychologist did screen and further recommend subjects for the study after they were initially chosen by the teacher.

The qualitative study of Hayward et al (2000) studied a cognitive-behavioral group therapy for female adolescents with social phobia and found a reduction in subjects' social anxiety symptoms. 12 subjects were randomly assigned to the treatment group and 23 to the control group. The treatment involved 16 weeks of cognitive-behavioral group therapy (CBGT-A). All subjects met diagnostic criteria for DSM-IV social phobia. 3 assessments were conducted including one baseline, one after treatment, and a final assessment 1-year after the treatment.

The CBGT-A sessions were each 1.5 hours long. The first two sessions gave subjects information about social anxiety while the next 5 introduced skill-building in social skills, social problem-solving, assertiveness, and cognitive restructuring. The last 7 sessions involved simulated exposure to social situations and the final session was a debriefing.

The Social Phobia and Anxiety Inventory (SPAI) was a self-report instrument that measured the degree of distress during fearful social situations. Internal consistency was high, with a Cronbach alpha score of .97. A Social Phobia subscale was also used and had a Cronbach alpha score of .98. The Anxiety Disorders Interview Schedule (ADIS) using DSM-IV criteria was used for diagnosing anxiety. The ADIS testing and retesting has been shown to be reliable when diagnosing social phobia (0.73). Diagnostic interviews were also performed.

Eleven out of the twelve subjects completed the treatment. Researchers reported a significant improvement in symptoms of social anxiety and a significant reduction in the number of subjects meeting *DSM-IV* criteria for social phobia in the CBGT-A group compared to the control group. Results from the final assessment one year later did not show significant differences between the treatment and control groups. For those with a history of depression, there was some evidence that treating social phobia may lower the risk for relapse of major depression.

The study provided some evidence of a positive short-term effect of CBGT-A on female adolescents suffering from social phobia. The treatment of social phobia may further result in a decrease in depression.

One strength of this study was the transparency in publishing that no significant differences between the control and intervention groups were found during the assessment one year after the study and that 11 out of the 12 subjects completed the treatment. Credibility was strengthened with the use of a common diagnostic criteria for social phobia according to DSM-IV.

Santangelo (2012) studied 155 8-11 year old 4th and 5th grade girls in 2 public schools. Criteria for subjects in the study included participation in weekly yoga for the entire intervention, willingness to complete homework, ability to speak, read and write, English, no developmental disorders, and no prior mindfulness or yoga training, and ability to pay attention for one hour and participate in physical poses. Subjects for the experimental group came from one school and subjects from the control group, from another. Letters of consent were sent to guardians of all 4th and 5th grade girls at the experimental school. Due to the preference of the principal, in the control group, letters were placed in students' backpacks. 58.7% of subjects were in 5th grade.

The Feel Bad Scale was used a 5-point Likert scale as a validated measure of children's perceived stress. One column of the scale had 20 different stressors, a second column asked how the child would feel with the stressor, and a third column measured the frequency of the stressor. A 3-point Likert scale was used with Schoolagers' Coping Strategies Inventory measured frequency of

coping. The intervention group scored higher on than the control group on this test ($f=4.28$, $p=.04$). The intervention group also scored higher on their appraisal of stress than the control group. Data showed no significant difference in perceived stress between the two groups ($f=.06$).

One weakness of the study is that the criteria for subject selection was limited to English speaking able-bodied literate girls. Another weakness of this study is that subjects from the intervention group and the control group came from 2 different schools, and according to baseline data, schools differed somewhat in terms of subjects' family demographic characteristics. The mortality rate was also much higher for the control group (52% response rate) compared to only 38.5% response rate for the intervention group.

Effects on Brain Efficiency

The final section of Chapter two will analyze the effects of mindfulness practice on cognitive efficiency. Many of the studies examined executive function, attention, and academic performance. Executive function refers to mental processes that assist in bridging present action and past experiences. Executive function (EF) is a critical component of learning, as it is used in processes such as planning, organizing, paying attention, memory, and management of time (NCLD.org). Attention is included in this section because it involves brain controls that determine what information is significant. Attention and learning are dependent on each other for productive functioning (NCLD 2010).

Cognition and Executive Function

Flook et al (2010)'s quantitative study of 7 and 9 year old participants of a school-based mindfulness program showed mindfulness may benefit children with low executive function levels.

In the study of Flook et al (2010), a school-based program of mindful awareness practices (MAPs) was evaluated in a randomized control study of 64 2nd and 3rd grade children between the ages of 7 and 9. Subjects were selected from four different classrooms of an Los Angeles on-campus university elementary school. Invitations to participate in the study were sent home to students' guardians with 58% of parent complying. Signed consent forms were approved by an Institutional Review Board. Subjects were put into an MAP group or a control group based on block randomization with stratification by classroom, gender, and age. 45% of subjects were white, 23% Latino, 14% Asian, 9% African American, and 9% other.

The MAPs program was 30 minutes twice a week over 8 weeks. Flook defines MAPs as exercises promoting more receptive attention to present experiences. Teachers and parents completed questionnaires assessing children's executive function before and after the training. A multivariate analysis of covariance (MANCOVA) was included in teacher and parent reports of executive function.

Levene's test of equality of error variance found that it was not significant for any of the outcomes ($p > .05$) and the MANCOVAs for parent and teacher reports did not show significant differences ($p > .05$) between the pre-test and posttest. Children in the MAPs group with lower initial executive function (EF)

levels showed significantly greater improvements in EF compared with the control group ($p = .005$). After MAPs, subjects with low initial EF levels had an average range of EF. These subjects also showed an increase in behavioral regulation, metacognition, and global executive control. These findings indicate that mindfulness may be especially beneficial for students with poor EF, as there was a stronger effect of MAPs on children with executive function difficulties.

One strength of the study is that after researchers used Levene's test of equality of error variance, discovered that it was not significant for any of the outcomes ($ps > .05$) and MANCOVAs did not show significant differences in EF in pre- and posttests, researchers still reported such findings. Another strength is that researchers made note that although there was no direct evidence of systematic bias by teachers, it cannot be completely unaccounted for.

Attention and Restful Alertness

Peck et al (2005) studied yoga intervention for 6-10 year old children with attention difficulties and found time on task remained unchanged. Baijal et al (2011) studied 13-15 year old children who practiced concentrative meditation training and found that it may increase attentional alerting. Napoli et al (2005) performed a formative evaluation of 1st – 3rd graders who participated in mindfulness training and found that mindfulness training may decrease test anxiety as well as increase attention. A study by Semple et al (2010) investigated mindfulness-based cognitive therapy for children and found that MBCT may decrease anxiety symptoms and attention and behavioral problems in youth. Finally, Redfering et al (1981) studied 8-11 year old students with behavioral

disturbances who participated in meditative-relaxation exercises and showed that the meditation condition significantly lowered the percentage of time students spent on non-attending behaviors, and therefore increased time on task.

Peck et al (2005) qualitatively studied yoga intervention for 6-10 year old children with attention difficulties and found time on task remained unchanged. Subjects were recruited by the school psychologist. Teachers had referred the students to the school psychologist because of their attention problems (less than 80% time-on-task). The students were from a suburban middle-upper middle class town in the northeast U.S. There were 3 boys and 7 girls. 1 Latino, 9 whites, 1 student with an identified learning disability, and 1 student with an identified speech/language impairment.

A multiple baseline design was used across children in grades 1, 2, and 3. A comparison group was also used to investigate the effectiveness of yoga for improving time on task with 10 elementary school children with attention (time-on-task) problems. A yoga videotape required subjects to follow an adult instructor and three children who engaged in deep breathing, physical postures, and relaxation exercises for 30 minutes, twice a week, over 3 weeks.

Effect sizes ranged from 1.5 to 2.7 as a function of the intervention. Effect sizes at follow-up decreased, but ranged from 0.77 to 1.95. Peer comparison data indicated that classmates' time on task remained unchanged throughout the three phases.

One weakness of this study is that subjects sometimes participated in different activities related to their normal classroom routine. The type of activity

may have affected the variability. The investigator also served as both implementer of the intervention and observer of the participants. This introduces a potential bias that impacts the internal validity of the findings. In attempt to reduce the potential bias, however; the investigator strictly adhered to the operationally defined criteria for time-on-task. Comparison students did provide a comparison in terms of demographics, however; they did not represent a control group for attention problems.

Baijal et al (2011) 's quantitative study studied 13-15 year old children who practiced concentrative meditation training and found increases in attentional alerting. The majority of students in both schools were Hindu. 79 subjects participated in the concentrative meditation training (CMT) as part of the regular curriculum. 29 of these subjects were 13 years old and had participated in a relaxation training as a pre-cursor to CMT for at least one year before the study. These subjects also had a few months of experience practicing meditation. The 26 14 year olds and 24 15 year olds in the CMT group had experience training in transcendental meditation for around 1 to 2 years. 60 males and 16 females made up the control group.

Subjects from both groups performed the Attention Network Test (ANT) where a target was shown pointing one direction on the screen of a computer until subjects indicated a response as to which direction it was pointing. Analyses were performed on reaction time (RT) scores for only correct trials and accuracy scores (% correct). Paired subtractions across condition subsets were used to

assess the efficiency of each attentional network. Attentional networks included alerting, orienting, and conflict monitoring.

ANCOVA was used to identify relationships between ANT subsystems, age, and MT. There was no effect of age but there was a generally significant effect of group for RT ($p < .05$) and accuracy ($p = .01$). ANCOVA for conflict monitoring showed an effect of age for RT ($p < .05$) and accuracy ($p < .01$). Scores for conflict monitoring were also lower in older subjects. The CMT group showed more efficient conflict monitoring than the control for congruent trials that were generally significant ($p < .05$). These scores suggest that conflict monitoring ability may be improved with age and CMT.

One strength of this study is that repeated measures of ANOVAs were used for scores of conflict monitoring subsystem difference. One weakness of this study is that at least some of the subjects had already been practicing meditation or relaxation training before the study, so subjects may already be starting with desired levels of attention. However; this fact should not matter if pre-tests were performed on subjects to determine their initial levels. Another weakness is that subjects from the control group came from a different school than those of the experimental group. Although both schools are representative of a similar socio-economic status and academics, the subject selection may fault the data because the findings in the study could be related to the school structure as opposed to the actual intervention. Another weakness is that data may have been construed when the study reported that 76 subjects made up the control group and that there were 60 males in the group. The low number of females

may have been left out on purpose because it creates a skewed distribution of genders. The generalization of data, therefore; does not apply to females.

Napoli (2005) performed a quantitative formative evaluation of 1st – 3rd graders who participated in mindfulness training and found that mindfulness training decreased test anxiety as well as increased attention. There were 120 males and 108 females. Subjects were randomly assigned to two groups: 114 subjects composed the experimental group that received AAP training and 114 were in the control group. The study included subjects from 9 classrooms and 2 different elementary schools in a city in the Southwest U.S. Researchers noted that they had established a positive relationship with school administrators due to past collaboration.

A formative evaluation was conducted 12 times over 24 weeks to determine if participation in mindfulness training by first, second, and third graders affected their attention. The sessions included a sequence of breathing exercises, body-scan, body movement tasks, and a post-session de-briefing or feedback by the instructor. Before and after the intervention, subjects participated in an ADD-H Comprehensive Teacher Rating Scale (ACTeRS) used to measure attention, hyperactivity, social skills, and oppositional behavior. There was also a Test of Everyday Attention for Children (TEA-Ch) measuring sustained and selective visual attention. Finally, a Test Anxiety Scale (TAS) was used to measure debilitating test anxiety. The TAS had a reliability of .86.

Findings showed a significant decrease in test anxiety scores ($p = .007$), increase in selective attention scores ($p < .001$) measured by TEA-Ch, and a

reduction in ADHD behaviors reported by teachers. These findings suggest that mindfulness training may decrease test anxiety and increase attention. There was not a significant difference in sustained attention.

One strength of this study is that researchers were transparent in the fact that there was no statistical significance found in attention differences between control and intervention groups. Another strength is that they selected students from two different schools and nine different classrooms, increasing randomization. Another strength is that parental consent forms were presented to students in both English and Spanish, increasing the possibility of an ethnically diverse sample. Reliability was also high due to statistically significant results on test anxiety ($p=.007$) and attention ($p<.001$). A weakness of this study was that researchers and school administrators had a positive relationship due to past collaboration, increasing possibilities of bias.

Semple (2010) quantitatively studied mindfulness-based cognitive therapy for children and found that MBCT decreased anxiety symptoms and attention and behavioral problems in youth. 3 boys and 2 girls ages 7-8 from a Harlem, New York City elementary school participated in the mindfulness-based cognitive therapy (MBCT-C). 2nd and 3rd grade teachers at the school observed symptoms of anxiety in their students and nominated the students for the study. A school psychologist further screened and recommended the children to participate in the program.

The school-based intervention was administered by 2 researchers for 45 minutes once a week over 6 weeks in a quiet room at the school. The program

incorporated concepts from MBSR and MBCT. Each session focused on either kinesthetic, taste, sight, sound, smell, or touch. Participants were provided with in-session instruction and exercises to practice at home. 3 minutes of seated breath meditations were performed at the start and end of each session. 3 of the sessions also included slow walking exercises and body movement meditations.

There was a 3-month follow-up of subjects. Measures included the Child Behavior Checklist, State-Trait Anxiety Inventory for Children, and Multidimensional Anxiety Scale for Children. Subjects who participated in MBCT-C had fewer attention problems than the control groups. The same results were also seen in the 3-month follow-up, although results were not statistically significant [$F(1, 1, 18) = 5.965, p = .025, \text{Cohen's } d = .42$]. The study found that there was a somewhat significant correlation between attention problems and behavior problems ($r = .678, p < .01$). Subjects who reported clinically elevated levels of anxiety at pretest had a decrease in anxiety symptoms and behavior problems. These findings suggest that MBCT-C may decrease anxiety symptoms and attention and behavior problems in youth.

One weakness of this study was the possibility of Type I errors due to the failure of researchers to correct for multiple data analyses. Another weakness was that subjects anxiety may be due to the fact that they lived in an inner-city setting and struggled academically, as opposed to a clinical diagnosis of anxiety disorder. Reliability was also weakened as results were not incredibly statistically significant.

Redfering et al (1981) quantitatively studied 8-11 year old students with behavioral disturbances who participated in meditative-relaxation exercises and showed that the meditation condition significantly lowered the percentage of time students spent on non-attending behaviors, and therefore increased time on task. Subjects included 18 students age 11 with diagnosed behavioral disturbances from a public school in Florida. Students were excluded from the sample for cognitive disabilities, diagnosed psychoticism, and brain damage. 14 of the subjects were male and 4 were female, representing a variety of socioeconomic backgrounds.

To gather initial data, the students' special education teacher as well as a teacher's aide sampled the students' behaviors for a half hour at the same time each day for five days. This time was then divided into ten three-minute samples that were assessed how often students paid attention to their tasks. Attending behavior was defined as students with faces pointing toward work and finishing assigned tasks. Reliability checks showed that the teacher and the classroom aide agreed on what was considered attending and non-attending behavior in students 98% of the time during a three-minute sample period. Students were randomly separated into experimental and control groups of nine. Both groups participated in an hour-long relaxation session in a quiet classroom every day for five days. There were 8 males and 1 female in the experimental group who listened to a recording of Benson's meditative-relaxation exercises. There were 6 males and 3 females in the control group who listened to a recording of non-meditative exercises. The percentage of non-attending behaviors were assessed

by the teacher and classroom aide one week after participation in the study. The same sampling technique that was used to obtain the initial data was used. Reliability of agreement about observed attending and non-attending behaviors was 98%.

A t-test was used as means of determining the significance of difference between the experimental group's change in attending behaviors vs. the control group's. Results from this test indicated a mean change of -10.7%. Initial data showed the mean non-attending behavior in the experimental group at 19.1% with a decrease to 8.4% from post-test data. Initial data for the control group was a 18.8% mean non-attending behavior vs. 15.6% post-test mean, showing a decrease of 3.2%. Meditation significantly lowered the percentage of time students spent on non-attending behaviors ($t= 4.70$, $p < .001$), increasing time on task.

One strength of the study was that researchers observed students during the same 30 minute time period five different days. This time was broken down into 10 3 minutes samples which researchers then assessed, increasing randomization. Another strength was that researchers checked for reliability between the teacher and the classroom aide and reported that they agreed with whether students were attending or non-attending 98% of the time. A further strength was in the study's internal validity as the experimental and control groups were played the same tape recording to maintain consistency. Researchers also used a consistent sampling technique when gathering initial baseline data as well as data one week into the study.

Academic Performance

Nidich et al (2011)'s study showed that at-risk middle school students participating in transcendental meditation improved in math and English tests. Witt et al (2005) studied 2nd and 8th grade students who practiced qigong and found that those in the experimental group showed an increase in academic performance as well as appropriate social behavior.

Nidich et al (2011)'s quantitative study showed that at-risk middle school students participating in transcendental meditation improved in math and English tests. Subjects included 189 6th, 7th, and 8th grade students from the same public middle school located in a large, urban school district with low socioeconomic status. 125 6th and 7th grade students made up the meditation group and 64 8th grade students made up the control group. The control group did not participate in the school's "quiet time". There was also a matched-control subgroup of 50 meditating students and 50 control students. 60% of the subjects were boys, 97% were racial or ethnic minority students, and 59% spoke English as their first language at home. All of the students in the study were below proficiency level at baseline in English or math on the California Standards Test. All students continued with the school's standard curriculum and instruction.

The 189 6th and 7th students who were below proficiency level at baseline in English and math were evaluated for change in academic achievement using the California Standards Tests. The Transcendental Meditation program was practiced for 12 minutes twice a day for three months during "quiet time" in school before the California Standards Test posttest. Students were taught

transcendental meditation by certified instructors in a 7-step course and then practiced once in the morning and once in the afternoon during “quiet time” while being supervised by their teacher or a T.M. instructor. The 7 steps were a one-hour introductory lecture explaining the benefits, a one-hour preparatory lecture explaining the technique, a ten-minute personal interview with the teacher, a one-hour personal instruction session, and one-hour group meetings. Analysis of covariance was used to analyze changes from baseline to posttest in English and math scale scores on the California Standards Test.

Changes in scores on the California Standards Test in both English and math were measured using analysis of covariance (ANCOVA). The percentage of students who improved at least one performance level on English and math in the control and meditating groups was determined by Chi square statistics.

Baseline scale scores for the meditating students for math were 274.03 ± 8.62 and 289.06 ± 31.53 for English. Baseline scale scores for the non-meditating students were 284.60 ± 34.95 for math and 301.67 ± 33.04 for English. This shows that baseline scale scores for English were significantly different between groups ($p < .05$) with an improvement in English scale scores ($p = .002$) and math scale scores ($p < .001$) for students participating in the transcendental meditating group. A greater percentage of meditating students improved at least one performance level in math and English compared to controls (p values $< .01$). 40.7% of meditating students gained at least one performance level in math while only 15% of the control group did. 36.8% of the meditating group gained at least one performance level in English and 17.2% did

in the control group. Results of this study indicate that meditation may help at-risk students improve scores on standardized tests, which California uses to rate academic performance.

The reliability of the study was strong, as results of English and math scores were statistically significant. One weakness of the study was that the meditation group consisted of 6th and 7th grade students while the control group had 8th grade students. Data would have been more accurate had the control group had 6th and 7th graders like the meditation group. This is a threat to the internal validity of the study. Another weakness is that the study did not measure what was happening that caused students to score higher after meditating; they simply looked at test scores. This is threat to external validity because a change in test scores does not measure understanding or intelligence, but simply a change in test scores.

Witt et al (2005) qualitatively studied 2nd and 8th grade students who practiced qigong and found that those in the experimental group showed an increase in academic performance as well as appropriate social behavior. 90 subjects from 2 classes of 2nd graders with an average class size of 20 and 2 classes of 8th graders with an average class size of 25 participated in the study. The total sample size included 40 2nd graders with an average age of 13 ± 0.8 years and 50 8th graders with an average age of 7.4 ± 0.5 years. 52% were boys and were 48% girls.

A controlled intervention pilot study was conducted with one class from each school received qigong lessons for 20 minutes 2 or more times a week for 6

months. There was a control group from the same school that did not receive the intervention. Two additional classes at two elementary schools participated in the analysis. Teachers, parents, and students answered standardized questionnaires at the beginning of the study as well as after the 6 months period. The questionnaire included questions on complaints, concentration, creativity, grades, and social behavior. Quality of life (QOL) was assessed by a KINDL questionnaire. In-depth, semi-structured interviews were conducted with participating teachers at the end of the intervention as an evaluation.

A factor analysis consisted of three scales for the teacher questionnaire including learning process, social behavior, and appropriate behavior. There were four scales for the parent questionnaire including creativity, concentration, well-being, and restlessness. The qigong group showed significantly better results in the teacher questionnaire and in grades than the control group. No effect was found in the parent questionnaire, medical complaints, sick days, or in the children's assessment of QOL. Scores for appropriate behavior in the intervention group was especially higher than in the control group. There was a relevant decrease of individual complaints for some children in the qigong group.

Confirmability and transferability were weakness of the study because subjects represented 2nd grade and 8th grade classes but the demographics were summarized into one statistic when researchers claim that 52% of subjects were boys and were 48% girls.

Summary

Chapter two provided a critical review of the literature on the impact of mindfulness practices on elementary and middle school students. While many of the studies analyzed a variety of mindfulness effects, this paper focused specifically on student behavior in terms of self-control, impulse control, and AD/HD symptoms; emotional well-being in terms of self-awareness, self-esteem, social-emotional growth, anxiety, and stress; and finally, brain efficiency in terms of cognition, executive function, attention, and restful alertness.

8 studies analyzed the impact of mindfulness practice on student behavior. Student behavior was further examined in terms of self-control, impulse control, and symptoms of AD/HD. Barreiros et al (2011) and Singh et al (2007) examined self-control and impulse control. Barreiros et al (2011) studied the mindfulness practice of meditation. The study found that non-meditators significantly activated more brain regions than meditators in order to achieve the same performance during the attention task. The conclusion was made that the ability that individuals have to sustain attention during meditation can be generalized for other attention tasks and that meditation may reduce the need of impulse control. Singh et al (2007) used self-reported data to conclude that mindfulness training reduced impulsive behavior, increased self-control, and increased focus of the task at hand.

The other 6 studies in the section on student behavior analyzed the impact of mindfulness practice on AD/HD symptoms. Grosswald et al (2008) found that the mindfulness practice of transcendental meditation has a profoundly significant positive effect on emotional control in children with ADHD. Subjects

also experienced increases in working memory. Harrison et al (2004) found that the mindfulness practice of Shajara Yoga Meditation improved symptoms of ADHD. Subjects also reported better sleep patterns and less anxiety in the home as well as an increased ability to concentrate and fewer incidents of conflict at school. However, results should be interpreted with caution as the study was weakened by a lack of external and internal validity. Oord et al (2010) used semi-structured diagnostic interviews to find that mindfulness training significantly reduced inattention and hyperactivity symptoms for subjects with ADHD. The results of the study of Zylowska et al (2007) were inconclusive, as p values for combined inattentiveness and hyperactivity were presented as $p < .01$, leaving the reader to believe that the findings may have a probability of 99% based on chance. Semrud-Clikeman et al (1999) found that subjects with ADHD participating in an attention training intervention increased visual attention to the same level as non-ADHD subjects who did not participate in the intervention. Auditory attention also increased after the attention training intervention. Jensen & Kenny (2004) found that the mindfulness practice of yoga may have the potential to be beneficial for boys with ADHD who take regular medication, but results are not convincing, as the overall data is not statistically significant.

13 studies examined the impact of mindfulness practice on students' emotional wellbeing. 7 of these studies focused on self-awareness, self esteem, and social-emotional growth. The results of the study of Stuek & Gloeckner (2005) were not statistically significant and had weak internal validity. Lohaus & Klein-heßling (2001) found that imagery-based relaxation training increased

subjects' positive moods and physical wellbeing. Powell et al (2008) studied a relaxation intervention, but the study was weak due to a lack of detail of procedures. In the study of Rosaen & Benn (2006), subjects reported greater emotional intelligence, empathy, and tolerance after transcendental meditation. Ciarrochi et al (2010) studied the mindfulness practice of Acting with Awareness and found positive affect (joviality) to be somewhat significantly improved. Sibinga et al (2011) found that all subjects experienced changed perspectives after Mindfulness Based Stress Reduction. MBSR helped subjects avoid interpersonal conflicts, stay more focused, perform better in school, experience less daily judgment and negativity and increase concentration. A few subjects also experienced major changes in perspective including a new sense of self and relationship to life. Slovacek et al (2003) found that yoga significantly improved self-esteem. Yoga also improved student behavior and GPA.

The other 5 studies analyzing the effects of mindfulness practice on students' emotional wellbeing focused on anxiety and stress. Biegel et al (2009) found statistical significance in Mindfulness Based Stress Reduction increasing self-esteem as well as somatization, obsessiveness, and depression. The results of the study of Chen-Kuan et al (2009) were not statistically significant. Mendelson et al (2010) studied a school-based mindfulness intervention consisting of yoga, breathing, and guided mindfulness practice. The study found that the mindfulness intervention significantly improved subjects' abilities to manage stress. Rumination, intrusive thoughts, and emotional arousal also improved after the intervention. Subjects reported experiencing little anxiety after

participating in Mindfulness Based Cognitive Therapy in the study of Semple et al (2005). Hayward et al (2000) found that Cognitive Behavioral Group Therapy reduced social anxiety and social phobia in girls with social phobia over the short term. Santangelo (2012) studied the mindfulness practice of yoga, but found no statistically significant results.

The final section included 8 studies that critiqued the impact of mindfulness practice on brain efficiency. Flook et al (2010) focused on the effects of Mindfulness Awareness Practices on brain efficiency in terms of students' cognition and executive function. Children who began the study with lower executive function levels improved significantly. After MAPs these subjects had EF levels in the average range, indicating that MAPs may be especially beneficial for students with poor EF.

5 studies analyzed the effects of mindfulness on students' attention and restful alertness. Peck et al (2005) found that yoga did not significantly change time on task for female students with attention issues. Baijal et al (2011) found that concentrative meditation training as well as developmental maturity led to more efficient conflict monitoring and attentional alerting, although several weaknesses in the study hampered the certainty of the results. Napoli et al (2005) found that mindfulness training brought about a significant increase in selective (but not sustained) attention as well as a decrease in test anxiety scores and ADHD behaviors. Semple et al (2010) found that for anxious students, issues of attention and behavior as well as anxiety symptoms improved with Mindfulness Based Cognitive Therapy. Redfering et al (1981) found that

meditation significantly lowered the amount of time students spent on non-attending behaviors, thus increasing time on task.

The final 2 studies focused on the impact of mindfulness practice on students' academic performance. Nidich et al (2011) found that both math and English test scores significantly improved after meditation, although it was not clear exactly what caused students to score higher on the tests after meditating. Finally, Witt et al (2005) found that the mindfulness practice of qigong produced stable grades as well as improved social behavior and decreased inappropriate behavior.

The following chapter (three) provides summaries of Chapters one and two. Chapter three also uses the analysis of the findings to discuss classroom implications and provide suggestions for further research.

CHAPTER 3: CONCLUSION

Introduction

Chapter one provided background information on the history of mindfulness practices and included significant definitions relevant to the studies that were explored in Chapter two. While there have been a fair amount of studies analyzing the impact that mindfulness practice has on adults, few have pertained to children until recently. Mindfulness practice has become even more significant in the culture of stress and anxiety that is experienced in and outside of the classroom. Chapter two examined and reviewed a selection of 30 studies on the effect of mindfulness practice on students. The studies were organized into 3 main sections: the effects of mindfulness on student's behavior, emotional wellbeing, and brain efficiency. Each of these studies were summarized and analyzed to examine the effectiveness of mindfulness practice on elementary and middle school students. Chapter three summarizes the findings of the studies, implications for classroom practice, and suggestions for further research.

Summary of Findings

Effects on Student Behavior

The studies in this section found that various mindfulness practices resulted in increases in positive student behavior. Positive behavior increased through improvements in self-control and impulse control. Both meditation and mindfulness training produced positive correlations with controlling behavior and impulse control. Children who meditate may have better impulse control because of the ability to sustain attention during meditation practice (Barreiros et al, 2011).

Mindfulness training helped reduce impulsive behavior as well as increase self-control and focus (Singh et al, 2007).

Studies also found that the mindfulness practices of transcendental meditation, mindfulness training, and attention training intervention can help alleviate children's symptoms of AD/HD, directly impacting the behavior of the students (Grosswald et al, 2008; Oord et al, 2010; Semrud-Clikeman et al, 1999). Mindfulness training significantly reduced ADHD behavior in parents and children (Oord et al, 2010). Attention training intervention improved auditory attention in children with ADHD (Semrud-Clikeman et al, 1999).

Contrary to the findings in the aforementioned studies, Jensen & Kenny (2004) found few significant correlations between the mindfulness practice of yoga and symptoms ADHD. Researchers noted that the null statistics may be due to the data that was taken when subjects were on their daily ADHD medication at school. The greatest significant finding included a change from pre- to post-test in boys' emotional lability ($p=.009$). Researchers added that emotional lability in boys with ADHD can substantially impact the manifestation of ADHD and that the mothers of subjects did report that they observed decreases in mood swings and temper tantrums.

A number of studies in this section had strong external validity (Zylowska et al, 2007; Jensen & Kenny, 2004). External validity was strengthened by inclusive methods of recruiting subjects (Zylowska et al, 2007) and remaining overt about hesitations with generalizability (Jensen & Kenny, 2004). Strengths were also noted in the credibility of many studies through the use of a set criteria

for determining ADHD symptoms (Semrud-Clikeman et al, 1999) and implementing a within-group waitlist to control effects of time and repeated measurements (Oord et al, 2010).

One study where external validity was weakened is Grosswald et al (2008). The study found that the mindfulness practice of transcendental meditation positively affected subjects with ADHD, as there were improvements in executive function, emotional control, and working memory. However, the subjects included only 1 female out of 10. External validity was further threatened because 80% of the subjects were medicated while the rest of the subjects were not.

Harrison et al (2004) did find that Sahaja yoga meditation (SYM) improved ADHD behavior, but there were significant threats to the external validity of the study, thereby weakening the significance of the findings. The recruitment of subjects was performed through a newspaper article and lecture on SYM that was open to parents of school-age children with ADHD. This means that subjects were limited to those individuals who were aware of the newspaper article and lecture. External validity was further threatened because the 95% of the subjects were white. With such a limited group of subjects, generalizations to other populations cannot be made. Finally, the researchers did not account for the fact that 31 of the subjects were medicated and 14 were not medicated, so the external validity was once again weakened. The internal validity of Harrison et al (2004) was also threatened because no measure was put in place to guarantee that subjects were actually practicing SYM in the home.

Effects on Emotional Wellbeing

Several studies showed that mindfulness practice instilled children with a greater ability to control their emotions (Ciarrochi et al, 2010; Rosaen & Benn, 2006; Slovacek et al, 2003; Zylowska et al, 2007) and improved children's self-esteem through greater self-awareness (Harrison et al, 2008; Powell et al, 2008; Rosaen & Benn, 2006; Sibgina et al, 2011).

Findings from Powell, et al (2008) and Lohaus & Klein-heßling (2001) showed that children who participated in a relaxation intervention consisting of massage, yoga, and breath work had improvements in self-confidence, social confidence, communication and contribution in class (Powell et al, 2008) and positive mood and physical wellbeing (Lohaus & Klein-heßling, 2001). In the study of Powell et al (2008), teachers noted that children who had participated in this mindfulness practice used the skills they learned during the school day. Weaknesses of these 2 relaxation intervention studies included offering subjects a financial reward for participation (Lohaus & Klein-heßling, 2001) and a lack of details about the methods and procedures (Powell et al, 2008). 7th graders who participated in transcendental meditation experienced an increase in social-emotional growth and flexibility in emotional response (Rosaen & Benn, 2006). Acting With Awareness mindfulness practice somewhat significantly improved positive affect (Ciarrochi et al, 2010). Mindfulness-based stress reduction helped create heightened self-awareness Sibinga et al (2011). Yoga significantly improved self-esteem. Yoga also improved student behavior as well as GPA

(Slovacek et al, 2003). Self esteem increased with the practice of Mindfulness Based Stress Reduction (Biegel et al, 2009)

Several studies also analyzed the impact that mindfulness practice has on feelings of stress and anxiety in children. A mindfulness intervention consisting of yoga, breathing, and guided mindfulness practice significantly improved subjects' abilities to manage involuntary stress responses. Rumination, intrusive thoughts, and emotional arousal also showed improvements with the mindfulness intervention (Mendelson et al, 2010). Subjects with high levels of social anxiety also benefited from mindfulness practice as evident in the studies of Semple et al (2005) and Hayward et al (2000). Mindfulness Based Cognitive Therapy produced a decrease in internalization and externalization problems as well as levels of anxiety in anxious children (Semple et al, 2005). Cognitive Behavioral Group Therapy reduced social anxiety symptoms over the short term in subjects with social phobia (Hayward et al, 2000). Santangelo (2012) did not find statistically significant results for the impact of yoga on students nor did Chen-Kuan for the impact of meditation on students.

Effects on Brain Efficiency

The impact of mindfulness practice on students' academic performance was studied in Nidich et al (2011) and Witt et al (2005). While students' scores in both math and English tests significantly improved after meditation, it is not clear exactly what caused students to score higher on the tests after meditating (Nidich et al, 2011). Other studies found that children who meditated had more efficient cognitive function (Barreiros et al, 2011; Grosswald et al, 2008). Non-meditators

required more brain regions to be activated than meditators during an attention task while achieving the same performance (Barreiros et al, 2011). Finally, the mindfulness practice of qigong produced stable grades as well as improved social behavior and decreased inappropriate behavior (Witt et al, 2005).

Classroom Implications

This review summarized and analyzed research studying the impact of mindfulness on K-8 students in order to inform elementary and middle school classroom practice. The collection of studies has numerous implications to teaching in elementary and middle schools.

Mindfulness practice in the classroom benefits students in a multitude of ways including reduced stress and anxiety, more focus and concentration, increased executive function, and greater self-esteem. These effects in turn, help increase academic performance (Nidich et al, 2011; Rosaen & Benn, 2006; Witt et al, 2005).

There are many different types of mindfulness practices that have been analyzed in the studies in Chapter 2, and their impact on students may help in maintaining a focused, productive and stress-free classroom. The studies focusing on meditation, transcendental meditation, Mindfulness Based Stress Reduction, and mindfulness training/intervention showed the most significant positive results for students, therefore these practices are explored in the following paragraphs.

The results of the studies on meditation showed significantly decreased amounts of time students spent on non-attending behaviors, thereby increasing

time on task (Bareiros et al, 2011; Redfering et al, 1981). By implementing meditation in the classroom, students' time on task would increase and they would be better able to focus for a greater amount of time, thereby increasing their ability to learn.

The practice of transcendental meditation (TM) should be considered in the classroom, as it's numerous benefits have been shown to include greater emotional intelligence, empathy, tolerance, self-awareness, and improved test scores (Nidich et al, 2011; Rosaen & Benn). TM also had profoundly significant positive effects on emotional control for children with ADHD (Grosswald et al, 2008). Improved test scores directly affect students' success in school. Greater emotional intelligence and control, empathy, tolerance, and self-awareness also impact students' ability to succeed in the classroom, as cooperative learning and group work are now commonplace in elementary and middle school classrooms. Having emotional skills like empathy and tolerance help students better understand one another as well as communicate. Emotional intelligence and self-awareness also become essential as students enter the upper elementary and middle school grades when students' desires to belong and have high self-esteem are profound (Wood, 2007).

As mentioned briefly in chapter 1, some individuals see the mindfulness practice of meditation as religious in nature. The implementation of Mindfulness-Based Stress Reduction (MBSR) is a possible alternative mindfulness technique to meditation, as it does not involve the recitation of a mantra. MBSR would be beneficial in the classroom setting, as it has shown positive results in increasing

students' self-esteem and decreasing anxiety, depression, and stress (Biegel et al, 2009; Sibinga et al, 2011). It was also found that a greater amount of time of sitting practice produced a significant increase in students' general psychological and social functioning scores as well as a generally significant decrease in symptoms of depression and anxiety (Biegel et al, 2009). Mindfulness Based Cognitive Therapy (MBCT) is another mindfulness practice that would benefit students' social-emotional resiliency, as seen in the study of Semple et al (2010). Because this was the only study that used MBCT, more studies focusing on this mindfulness practice are needed in order to determine whether or not MBCT should be implemented in the classroom.

Mindfulness training/intervention proved to be beneficial to students in a multitude of ways; positively affecting students with and without AD/HD. Mindfulness intervention reduced impulsive behavior and increased self-control and focus (Singh et al, 2007). Mindfulness training significantly increased selective attention and reduced test anxiety scores, inattention and hyperactivity symptoms for subjects with ADHD (Napoli et al, 2005; Oord et al, 2010). The study of Mendelson et al (2010) is especially significant, as it studied a school-based mindfulness intervention. The intervention consisting of yoga, breathing, and guided mindfulness practice significantly improved subjects' stress management abilities, rumination, intrusive thoughts, and emotional arousal.

Mindfulness Awareness Practices may be especially beneficial for students with poor executive function, as their EF levels improved to an average level after MAPs (Flook et al, 2010). However, more studies examining the

impact of MAPs on EF need to be assessed before classroom implications can be made.

Suggestions for Further Research

While there was much research on how mindfulness affects children, few studies actually assessed classroom-based mindfulness practices. It would be valuable to study the effects of mindfulness on students in a classroom setting because it would allow for specific results of how mindfulness directly impacts students at school. Teachers would be able to evaluate the benefits and costs and see how mindfulness impacts students' performance in school.

The practice of mindfulness can take many different forms including yoga, Shaja Yoga Meditation, Mindfulness Based Stress Reduction, Mindfulness Based Cognitive Therapy, meditation, transcendental meditation, qigong and more. Further research comparing and contrasting the different methods used to achieve mindfulness states is worth studying in order to determine their effectiveness.

Several studies had very small sample sizes and results of these studies would have been more significant with larger sample sizes because the outcome could be more generalized to the student population (Singh et al, 2007; Rosaen & Benn, 2006). Further research should include larger sample sizes so more credible generalizations can be made about children who practice mindfulness.

Some studies did not mention methods of triangulation, thereby weakening the credibility of the study (Barreiros et al, 2011). Further research should be sure to include measures to increase credibility like the implementation

of triangulation. Some studies failed to use the most credible method of obtaining subjects thereby creating a sample limited to certain characteristics (Harrison et al, 2008). Other studies were not explicit enough about their criteria for selecting subjects for the study (Powell et al; 2008; Semple et al, 2005; Semrud-Clikeman et al, 1999; Sibinga et al, 2011; Slovacek et al, 2003).

Several studies did include subjects from families of low socioeconomic status, ethnic minorities, and girls. Many of these students were not performing well in school and mindfulness practice proved to alleviate some of the daily stresses in their lives, create more awareness of self and relationships, and increase academic performance (Slovacek et al, 2003; Powell et al, 2008; Rosean & Benn, 2006; Sibinga, 2011). Promoting social justice in the classroom is necessary in combating the negative attitudes towards and neglect of children from oppressed backgrounds. More studies that focus on students from oppressed groups should be undertaken in order to equalize access to opportunities.

Conclusion

Chapter One discussed the historical background of mindfulness and the educational importance of studying the impact of mindfulness practices on elementary and middle school students. Elementary and middle schools create extremely stressful environments for students through social situations, daily quizzes, and high stakes tests. Indeed, 44% of children reported school performance as a cause of stress in a 2010 study. Still, schools fail to address

this harmful state of anxiety that they are causing in students. Educators often have difficulties accommodating students with AD/HD in their classrooms.

Chapter Two provided a summary and analysis of literature considering the practice of mindfulness in regards to student behavior, emotional wellbeing, and brain efficiency.

Findings showed positive correlations between meditation and sustained attention and impulse control. Impulsive behavior, self-control, and focus all improved with mindfulness training (Barreiros et al, 2011; Napoli et al, 2006; Singh et al, 2007). Mindfulness Based Stress Reduction also increased students' concentration (Sibinga et al, 2011). Students with ADHD benefited from transcendental meditation, mindfulness training, and attention training intervention.

Meditation significantly decreased students' non-attending behaviors and increased time on task. Mindfulness intervention decreased impulsive behavior and intrusive thoughts and increased stress management abilities, emotional arousal, focus, and self-control. Students with ADHD showed improvements in selective attention as well as decreases in test anxiety, inattention, and hyperactivity from mindfulness intervention (Napoli et al, 2005).

Students' emotional wellbeing improved with relaxation training, transcendental meditation, Acting with Awareness, Mindfulness Based Stress Reduction, and yoga. Positive moods and physical wellbeing increased after imagery-based relaxation training (Lohaus & Klein-heßling, 2010). Emotional intelligence, empathy, and tolerance improved after transcendental meditation

(Rosaen & Benn, 2006). Transcendental meditation also significantly improved emotional control for students with ADHD (Grosswald et al, 2008, Napoli et al, 2005) Acting with Awareness practice somewhat significantly improved students' joviality (Ciarrochi et al, 2010). Students reported significantly changed self and life perceptions after participating in Mindfulness Based Stress Reduction. MBSR allowed students to better avoid interpersonal conflicts, stay more focused, perform better in school, and experience less daily judgment and negativity (Sibinga et al, 2011).

Stress and anxiety also decreased with MBSR, mindfulness training/intervention, and Mindfulness Based Cognitive Therapy. (Biegel et al, 2009; Mendelson et al, 2010; Napoli et al, 2005; Semple et al, 2005).

Studies showed that mindfulness practice positively impacts students' brain efficiency. Children with low levels of executive function significantly improved to average levels of executive function after Mindfulness Awareness Practices. These findings indicate that MAPs may be especially beneficial for students in the elementary classroom with poor EF (Flook et al, 2010). Brain efficiency in terms of selective attention improved with mindfulness training (Napoli et al, 2005). Attention also improved after Mindfulness Based Cognitive Therapy for students suffering from anxiety (Semple et al, 2010). Time on task improved with meditation (Redfering et al, 1981).

Mindfulness practice may also have an impact on students' academic performance in school. Students' grades improved after meditation (Nidich et al, 2011) and qigong (Witt et al, 2005).

Chapter Three summarized both the strengths and weaknesses of the 30 studies. There was also a discussion of the implications of the studies' findings for educators. These included implementing meditation, TM, mindfulness training/intervention, MBSR, or MBCT into the classroom.

There were a lack of studies that assessed classroom-based mindfulness practices. While it is certainly valuable to measure the effects that mindfulness has on children, being able to study its effects in a classroom setting would allow for detailed results of how mindfulness impacts students at school. It would also be easier to measure student's academic performance with the assistance of teachers and ethnographers in the classroom.

Meditation significantly decreased students' non-attending behaviors and increased time on task. Transcendental meditation improved students' emotional intelligence, empathy, tolerance, self-awareness, and test scores. Students with ADHD experienced significant improvements in emotional control. Students' self-esteem also increased with Mindfulness Based Stress Reduction. MBSR also helped in decreasing students' anxiety, depression, and stress. Mindfulness intervention decreased impulsive behavior and intrusive thoughts and increased stress management abilities, emotional arousal, focus, and self-control. Students with ADHD showed improvements in selective attention as well as decreases in test anxiety, inattention, and hyperactivity from mindfulness intervention.

Elementary and middle schools could greatly benefit from the implementation of the mindfulness practices of meditation, TM, MBSR, and mindfulness intervention/training in the classroom. These mindfulness practices

provide relief from feelings of stress and anxiety that are commonplace in schools. Giving students the tools to deal with stress and anxiety will help them not only within the confines of school, but throughout their daily lives.

AD/HD is one of the most common neurobehavioral conditions of students in today's classrooms. Students who have AD/HD often struggle with symptoms of hyperactivity, impulsivity, and inattention. Such symptoms directly impact their ability to learn. With mindfulness practices like meditation, TM, MBSR, and mindfulness intervention/training, behavior problems are often minimized and time on-task and academic performance improve.

Having social skills and self-awareness is necessary not only in school but as we navigate through life. Mindfulness practices help give students the social and emotional skills needed to learn and thrive. Through self-reflection and awareness, students build self-esteem and learn valuable traits like empathy and tolerance.

Achieving a state of mindfulness through the practice of meditation, TM, MBSR, and mindfulness intervention/training is a possible remedy to the stressful and fast paced classroom atmosphere. Mindfulness practice allows one to feel and experience life in the present moment. This focus of the mind on the present can help alleviate feelings of stress and anxiety. In the school setting, these effects also help increase students' academic achievement. School administrators and educators should consider the benefits of mindfulness practices analyzed in the aforementioned research findings, as mindfulness can

create a safe and productive learning environment, encouraging students to succeed within the walls of the classroom as well as beyond.

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