

Spring 2019

## **Reduction of Stress in High School Freshman Through Mindfulness Practice**

Jacob L. Arveson  
*California State University, Monterey Bay*

Follow this and additional works at: [https://digitalcommons.csumb.edu/caps\\_thes\\_all](https://digitalcommons.csumb.edu/caps_thes_all)

---

### **Recommended Citation**

Arveson, Jacob L., "Reduction of Stress in High School Freshman Through Mindfulness Practice" (2019).  
*Capstone Projects and Master's Theses*. 648.  
[https://digitalcommons.csumb.edu/caps\\_thes\\_all/648](https://digitalcommons.csumb.edu/caps_thes_all/648)

This Master's Thesis (Open Access) is brought to you for free and open access by the Capstone Projects and Master's Theses at Digital Commons @ CSUMB. It has been accepted for inclusion in Capstone Projects and Master's Theses by an authorized administrator of Digital Commons @ CSUMB. For more information, please contact [digitalcommons@csumb.edu](mailto:digitalcommons@csumb.edu).

Reduction of Stress in High School Freshman Through Mindfulness Practice

Jacob L. Arveson

Thesis Submitted in Partial Fulfillment of the Requirements for the  
Degree of Master of Arts in Education

California State University, Monterey Bay

May 2019

©2019 by Jacob L. Arveson. All Rights Reserved

REDUCTION OF CLASSROOM STRESS THROUGH MINDFULNESS

Reduction of Stress in High School Freshman Through Mindfulness Interventions

Jacob L. Arveson

APPROVED BY THE GRADUATE ADVISORY COMMITTEE

---

Kerrie Chitwood, Ph.D.  
Advisor and Program Coordinator, Master of Arts in Education

---

Dennis Kombe, Ph.D.  
Advisor, Master of Arts in Education

---

Approved by the Dean of Graduate Studies 05/20/2019 

---

Kris Roney, Ph.D. Associate Vice President  
Academic Programs and Dean of Undergraduate & Graduate Studies

# REDUCTION OF CLASSROOM STRESS THROUGH MINDFULNESS

## Abstract

Toxic stress is common in modern adolescence and can be detrimental to one's long-term physical and psychological well-being. Adolescents spend vast quantities of time at school and thus school is an ideal venue to introduce stress reducing mechanisms. Mindfulness interventions center on bringing non-judgmental awareness to one's breath and thoughts, and have proven beneficial in a wide range of clinical settings. It is only in the past two decades that mindfulness interventions have been researched in the K-12 classroom setting, but the results have been promising. This study examines whether participation in a tri-weekly five-minute guided meditation would reduce stress among high school freshmen. The research design for this study was quasi-experimental and included two non-equivalent groups taking a pretest and posttest comprised of the Students' Stress Rating Scale (SSRS; Balamurugan & Kumaran, 2008). Study participants were 51 general education high school freshmen. Analyses of the independent and paired *t*-tests showed a significant pretest to posttest change in the mean scores of the two groups, showing a significant *decrease* in stress in the treatment group, and an *increase* in stress for the control group. This study thus contributes to the growing body of research indicating that mindfulness practices reduce student stress. There is a need for further research and replication in order to make mindfulness in the classroom more mainstream, and to ensure that our students have access to research based practices that can improve their well-being.

*Keywords:* mindfulness; meditation; stress; school; education

**Acknowledgements**

First and foremost, I would like to thank my advisors, Dr. Kerrie Chitwood and Dr. Dennis Kombe, for their immense support throughout this process of research and writing. I would also like to thank my students for their open-mindedness and willingness to try something new; these are fundamental educational values that we should all cultivate as the process of intellectual concretization attempts to render us rigid and uninteresting. Finally, I would like to thank my wife Ayoko who has supported me profoundly throughout late nights and sunny weekends devoted to this research.

**Table of Contents**

Abstract..... iii

Literature Review..... 1

Method ..... 7

    Research Design ..... 8

    Setting & Participants ..... 9

    Measures ..... 10

    Procedures ..... 12

    Ethical Considerations ..... 13

    Data Analyses ..... 13

Results ..... 14

Discussion ..... 15

References ..... 20

Appendix A ..... 28

Appendix B ..... 30

## Reduction of Stress in High School Freshman Through Mindfulness Practice

**Literature Review**

Stress can be a tremendous motivator. It is the stress response that aids in ‘fight or flight’ survival situations, and it is stress that increases efficiency in order to meet an imminent deadline. The problem we are faced with in education is that levels of stress in students’ lives are often detrimental to both their physical and psycho/emotional well-being (Meiklejohn et al., 2012). Adolescents are particularly vulnerable to the effects of stress, and multiple studies have shown that persistent exposure to stress in adolescence yields an increased risk factor for developing depression and anxiety disorders in adulthood (Arnett, 1999; Lupien, McEwen, Gunnar, & Heim, 2009; Saul et al., 2012). Johnson and Riley’s (2012) research has helped highlight the difference between stress and *toxic stress*; toxic stress being the extended and nearly constant activation of the stress response. Toxic stress has been shown to be a precursor of depression (Kanner, Coyne, Schaefer, & Lazarus, 1981) as well as physical illnesses such as cancer and cardiovascular disease (Anda et al., 2008). A frequently stressed individual plays host to a pituitary gland that creates the hormone adrenocorticotropin, which in turn signals a release of cortisol into the bloodstream (Amen, 2005). The negative effects of cortisol on one’s physical, emotional and existential health are well documented (Adam, Hawkley, Kudielka, & Cacioppo, 2006; Lewis & Ramsay, 2002; Ramsay & Lewis, 2003). Being aware of the negative effects that toxic stress can have on an adolescent’s health, as well as the fact that children spend around 15,000 hours in the classroom from kindergarten to 12<sup>th</sup> grade has led to a growing field of research around stress reducing interventions in the classroom (Oberle & Schonert-Reichl, 2016).

**Mindfulness programs as a means for stress reduction**

The first twenty years of mindfulness research was clinical in nature, and was used almost exclusively by physicians and psychologists (Baer, 2011). Jon Kabat-Zinn of the University of Massachusetts Medical School was the first researcher to create an academically sound mindfulness intervention in 1979 with his Mindfulness Based Stress-Reduction (MBSR) program (Zinn, 2003; Jain & Shapiro, 2007). Zinn explains that while mindfulness practices are historically Buddhist, they are easily divorced from their religious packaging because they are not inherently ideological or belief-centered (Zinn, 2003). The creation of MBSR involved a program centered around breath-awareness meditation and physical yoga postures, and is still used in a variety of clinical settings by psychologists and physicians (Zinn et al., 1991). MBSR has been effective in reducing stress in a wide variety of clinical populations since its advent in 1979 (Carmody & Baer, 2007). Carlson and Garland's (2005) research showed that an MBSR intervention could decrease stress and improve sleep quality in cancer patients. Mackenzie and colleagues (2006) implemented a similar MBSR intervention amongst nurses and found a reduction in stress and burnout. Additionally, Zinn and Colleagues (1991) conducted a study amongst individuals with generalized anxiety disorder and/or panic disorder and found a significant reduction in stress and depression. The populations of various clinical studies implementing MBSR interventions vary greatly, but the success in reducing stress appears constant.

Mindfulness Based Cognitive Therapy (MBCT) was developed from MBSR and adds cognitive strategies derived from psychology in order to treat individuals within the clinical psychology sphere; it also has proved successful in lowering stress in a variety of studies (Evans & Fernando, 2008). Other mindfulness programs and interventions have been developed by



researchers, and they vary greatly in form, but most use Zinn's work to anchor their conceptual definition of mindfulness (Black & Fernando, 2014; Flook & Smalley, 2010; Jain et al., 2007; Nyklicek & Kuijpers, 2008; Zylowska et al., 2007). Zinn (2003) describes that mindfulness practices revolve around cultivating a non-judgmental awareness of moment-to-moment experience and bringing one's attention to their breath. When thoughts inevitably drift to other subjects outside of the present moment there is a prompt of some kind to return one's attention to their breath. Interventions in various studies may take the form of a guided walking meditation, listening to a recording of a guided meditation with one's eyes closed, or a regimen of physical yoga postures; the form differs but the practices are all generally rooted in Zinn's definition of mindfulness and the awareness that mindfulness is a skill to be developed through practice (Zinn, 2003).

Mindfulness interventions have often taken the form of MBSR but they also appear in the medical literature as Mindfulness Meditation (MM), Mindful Awareness Practices (MAP's), or Mindfulness Based Interventions (MBI's) amongst other mindfulness programs (Flook & Smalley, 2010; Jain & Shapiro, 2007). Mindfulness interventions have been utilized to measure dependent variables as wide ranging as stress, attention, mood, fatigue, and sleep (Carlson & Garland, 2005), and have used dozens of different scales and physiological markers to measure the effectiveness of these interventions (Zenner, Herrnleben, & Walach, 2014). Meta-studies have yielded the realization that there are a multitude of benefits attributed to mindfulness interventions (Meiklejohn et al., 2012; Zenner et al., 2014) and that they have a positive effect on lowering stress specifically, as measured by various scales and physiological markers such as lowered cortisol levels (Carlson & Speca, 2004; Maclean et al., 2006; Matousek & Dobkin, 2010). Meiklejohn and colleagues (2012) reported that the success of mindfulness interventions

in the fields of psychology and medicine have led to a greater focus over the past two decades on adapting and applying these interventions to be used with adolescents within the educational sphere.

### **Mindfulness interventions in the classroom**

Mindfulness interventions take many forms and have only been used in formal classroom research settings since the early 2000s (Mindful Schools, 2018). Recent decades have witnessed the rise of a greater prioritization of cultivating social-emotional well-being within educational environments (Burke, 2010). Stress is a common contributor to depression, and because depression is one of the most common mental health issues faced by adolescents there has been a rapidly increasing interest in reducing stress in school (Albrecht, Albrecht, & Cohen, 2012). Since the early 2000s there have been studies using a variety of mindfulness interventions to measure for a variety of effects (Biegel, Brown, Schubert, & Shapiro, 2009; Black, Milam, & Sussman, 2009; Burke, 2010). Initial studies of the early 2000s often focused on analyzing whether the mindfulness interventions that had proven effective with adults in medical settings would translate to clinical benefits for adolescents (Burke, 2010).

The vast majority of both adult and adolescent studies involving mindfulness interventions have been clinical in nature and have revolved primarily around individuals with mental health issues (Albrecht et al., 2012). Mental health programs generally revolve around either *reducing* risk factors or *increasing* protective coping factors, and the appeal of mindfulness interventions is due to their seeming effectiveness in both of these areas (Viafora, Mathiesen, & Unsworth, 2014). As with adult studies of the 1980s and 1990s, most initial studies of the 2000s involving adolescent populations focused on individuals with pre-existing mental health issues, especially attention or anxiety disorders (Biegel, Brown, Shapiro, & Schubert,

2009; Zylowska et al., 2007). Because most of the mindfulness studies prior to 2000 focused on adult populations, there are a growing number of recent studies that are the first of their kind and are contributing novel data. Zylowska and colleagues (2007) conducted one of the first feasibility studies to examine the effectiveness of mindfulness practice in reducing the primary symptoms of Attention Deficit Hyperactivity Disorder (ADHD). This study had adolescents with ADHD take part in an eight-week mindfulness intervention and found a reduction in ADHD symptoms such as attention, anxiety, and depression (Zylowska et al., 2007). Biegel and colleagues (2009) experienced similar positive results when researching the effects of an eight-week modified MBSR intervention on adolescents in psychiatric outpatient care. This study found reductions in perceived stress as well as an *increase* in self-esteem. Barnert and colleagues (2013) conducted the first mixed-methods study examining the effectiveness of mindfulness interventions on incarcerated youth. This study began with an intensive one-day meditation retreat followed by a ten-week mindfulness intervention comprised of body scan meditations and mindful eating exercises. Results showed an *increased* ability to self-regulate one's emotions as well as a *decreased* level of perceived stress (Barnert et al., 2013). These positive results amongst populations with specific psychiatric needs are fueling a surge of interest in studies whose findings could be applied to more general classroom populations.

Research utilizing mindfulness interventions in classroom settings is less than two decades old, and given the range of dependent variables being studied it is still unknown whether the efficacy seen amongst adults (and more recently adolescents) with psychiatric needs are similarly effective in adolescents in general education classroom settings (Black, Miliam, & Sussman, 2009). Recent clinical studies amongst adolescents have been encouraging, and studies involving similar populations within the *classroom* setting have yielded similar results (Barnert

et al., 2013; Biegel et al., 2009; Zylowska et al., 2007). For example, a study by Beauchemin (2008) amongst adolescents with learning disabilities examined the effects of a five-week mindfulness intervention in which class was begun each day with a five-minute guided mindfulness meditation. Results showed decreased anxiety and a greater level of comfort in social situations (Beauchemin, Hutchins, & Patterson, 2008). Additionally, Viafora and colleagues (2015) enacted an eight-week mindfulness intervention amongst middle school students facing homelessness that included a weekly mindfulness session composed of a mindful listening exercise, mindful eating, and discussion about mindfulness practice. This study examined the intervention's effect on students' self-compassion and avoidance thought patterns, both of which yielded encouraging results for those in the treatment group (Viafora et al, 2015).

Given the broad range of mindfulness interventions, and anticipated outcomes, research has been slow to develop – particularly for students in general education classes. Findings from studies conducted amongst general education elementary school populations have shown that mindfulness interventions can increase attention (Napoli, 2005), improve quarterly grades (Backosh, 2016), and decrease overall levels of stress (Mendelson et al., 2010). While there is very little research that has been done amongst general education middle school students, Sibinga and colleagues (2016) recently found statistically significant reductions in stress and depression amongst inner-city middle school students practicing mindfulness; they concluded that further research is essential.

Only a small percentage of mindfulness research is conducted with students within a K-12 classroom setting, and it is an even smaller percentage of these studies that deal specifically with stress reduction. Mindfulness studies looking at stress amongst high school students are fewer still, but they are uniformly propitious. A 2018 Sri Lankan study employed an MBSR intervention and

found that high schoolers responded with decreased levels of stress, as well as an increased sense of life satisfaction (Chandrsekara, 2018). A similar study focusing on high school girls found a significant reduction in test anxiety amongst students who participated in bi-weekly mindfulness exercises (Shahidi, Akbari, & Zargar, 2017). A nearly universal element of all classroom mindfulness studies regardless of age or measure is a call from the researchers for more studies to be conducted, and with larger populations. With anxiety and adolescent suicide at their highest recorded U.S. levels (Center for Disease Control and Prevention, 2018) stress reduction techniques such as mindfulness practice are being shown to be an effective, even morally necessary area of continuing research.

### **Method**

Recent studies have shown that incorporating mindfulness practices into the classroom routine can reduce stress and increase well-being, but the majority of these studies still await replication. (Black & Fernando, 2013; Kuykun et al., 2013; Maynard, Solis, Miller, & Brendel, 2017; Zenner et al., 2014). Meta-analyses have concluded that while these early studies in mindfulness are promising, they are often underpowered and highly heterogeneous in both the interventions employed and the dependent variables being measured (Zenner et al., 2014). This study contributes to our understanding of the role stress reduction interventions can play in mitigating alarming instances of anxiety, depression, and suicide amongst adolescents. Given the significant amount of time that students spend at school, the classroom presents itself as the ideal setting to enact stress reducing interventions. This study aimed to contribute to mindfulness research in order to help discover how to best aid the state of our students' well-being. This study did not use novel instruments or interventions but rather replicated the use of instruments and interventions previously used in the existing literature (Balamurugan & Kumaran, 2008)

### **Research Question**

This study was driven by the following research question: Do stress reduction techniques in the form of mindful breathing exercises reduce stress in high school freshmen?

### **Hypothesis**

Based off of the research (Black & Fernando, 2013; Kuykun et al., 2013; Maynard et al., 2017; Zenner et al., 2014), the researcher hypothesized that teaching mindful breathing exercises would reduce stress in students, and contribute to the growing body of research supporting the incorporation of mindfulness techniques into secondary classroom routines.

### **Research Design**

The research design for this study was quasi-experimental and included two non-equivalent groups taking a pretest and posttest. Both the treatment group and the control group took a pretest consisting of the Students' Stress Rating Scale (SSRS; Balamurugan & Kumaran, 2008). The pretest was followed by a four-week period in which the treatment group received the intervention and the control group did not receive the intervention. Both groups took a posttest consisting of the SSRS that was identical to the pretest.

**Independent variable.** The independent variable in this study was the incorporation of a short mindful breathing exercise into the beginning of the class routine three times a week. More specifically, the intervention involved a five-minute guided breathing exercise (utilizing an audio recording created by UCLA's Mindful Awareness Research Center, or MARC) in which focus is brought to the breath and there is an emphasis on relaxing the body (Winston, 2017).

**Dependent variable.** The dependent variable in this study was students' stress. Stress is defined as both a physical and psychological response to a given stimulus that manifests in various ways such as worry, tightening of the chest and shoulders, and general anxiety

(Shahmohammadi, 2011). Stress was measured within this study using the SSRS scale as developed by Balamurugan and Kumaran (2008; see Appendix A).

### **Setting & Participants**

The population of this study came from a Central California high school. According to the organization Ed Data (Ed-Data, 2018), this school has 73% of its students graduating having completed A-G Requirements; 49% of students qualifying for free or reduced lunches; and 6% of students designated as English Language Learners (ELLs). This school consists of students identifying as Hispanic (46%), White (31%), Asian (9%), Black (5%), and Other (9%). The students who were sampled in this study were in mainstream Geography classes and represent a wide range of socioeconomic backgrounds as well as English language proficiency. The students involved in this study were sampled using purposeful and convenient sampling methods. The sampling was convenient because both groups were taught by the researcher and they were purposeful in that the two groups were chosen because of their demographic similarities. The two sample classes had the same instructor and instructional aide and were similar in terms of demographics, average grade, percentage of ELL students, class size, and percentage of students with an Individualized Education Program (IEP) or 504 plan. One class was randomly assigned to be the control group and the other became the treatment group. There were 73 participants total.

**Treatment group.** The treatment group in this study was a freshman geography class of 37 students. This class had 20 males and 17 females. Three students in this class were classified as ELL's. Three students were on IEP's and one student had a 504 plan. The class average was a 72%.

**Control group.** The control group in this study was a freshman geography class of 36 students. This class had 18 males and 18 females. Four students in this class were classified as ELL's. Three students were on IEP's and one student had a 504 plan. The class average was a 74%.

### **Measures**

The study utilized the Students' Stress Rating Scale survey (SSRS). Both control and treatment groups responded to items on the SSRS for pretest and posttest (see appendix A). The SSRS is designed to quantify students' stress by measuring for five different types of stress: physiological, emotional, social, examination, and behavioral (Balamurugan & Kumaran, 2008). The SSRS consists of 35 statements on a seven-point scale. Students respond according to the frequency with which they experience a given stressor (e.g., anger) by marking one of the seven following options: 1. Every Day (ED), 2. Once in 2/3 days (OT), 3. Once In a Week (OW), 4. Once in a Fortnight [15 days] (OF), 5. Once in a Month (OM), 6. Rarely (R), or 7. Never (N). Examples of statements include items such as "I get irritated" and "I find it difficult to sleep". Students completed the pretest and posttest in a paper and pencil format within a 20-minute time frame.

**Validity.** The SSRS is less than a decade old but it has been utilized in recent studies relating to stress in secondary education (Santhi & Akila, 2013). Balamurugan and Kumaran (2008) report that the validity of the instrument has been established through subjecting the items to the scrutiny of experts in the fields of Education and Psychology using the jury technique; the Intrinsic Validity Coefficient was also satisfactory as it was calculated to be 0.93 (Balamurugan & Kumaran 2008). The measure thus has construct and content validity.



**Reliability.** It is reported that the reliability of the instrument has been insured through utilizing the Cronbach Alpha Coefficient, which has been calculated as 0.87 and is thus acceptable (Balamurugan & Kumaran 2008). The pretest and posttest were administered and scored by both the researcher and an instructional aide who was present daily in both the control and treatment groups thus ensuring inter-rater reliability.

### **Intervention**

The intervention in this study was the incorporation of a five-minute mindful breathing exercise into class three times each week for four weeks. The mindful breathing exercise itself was an audio recording created by UCLA's MARC (Winston, 2017). This five-minute audio recording was played at the beginning of class after students were seated at their desks in order to see if there was a statistically significant reduction in stress at the end of the four-week period. For the intervention, students were instructed by both the researcher and the audio recording to close their eyes, stay silent, and focus on their sensory experience through attention to the breath. The audio guides students with prompts such as "notice where you feel your breath in your body, it might be in your abdomen, it may be in your chest or throat...see if you can feel the sensations of breath one breath at a time" (Winston, 2017). The intervention was played from the classroom speakers. Students were seated in their normal assigned seats and remained seated for the five-minute duration of the intervention. For the duration of the intervention, instructions remained constant for both the treatment and control groups. While the treatment group received the intervention, the control group did not.

### **Procedures**

The study began with the administration of the SSRS pretest by the researcher to both the control and treatment groups. Many mindfulness studies set out to measure attention, but the focus

of this research centered on stress (Black & Fernando, 2013; Kuykun et al., 2013; Maynard et al., 2017; Zenner et al., 2014). The five-minute mindfulness intervention was administered to the treatment group by the researcher three times each week at the beginning of class. The control group did not receive the intervention and instead had a more conventional warm-up at the beginning of class. After four weeks, both the control and treatment groups took the SSRS posttest.

**Data collection.** Data was collected following the administration of the pretest and posttest. Both the pretest and posttest consisted of taking the SSRS with paper and pencil and was taken by the control and treatment groups. No data was gathered in the four-week period between the pretest and posttest.

**Fidelity.** Fidelity was ensured by the presence of an instructional aide who was present in both the control and treatment groups on a daily basis (see appendix B). Prior to the intervention, the researcher and instructional aide met and discussed the study's expectations and observable intervention processes. For the duration of the intervention, the second rater checked to ensure that the mindfulness audio recording was being played at the beginning of class, that the class was quiet, and that the audio recording was loud enough for all students to hear. This aide was present each day for the entire four-week duration of the study and ensured that the control group did not receiving the intervention, thus ensuring 100% fidelity.

### **Ethical Considerations**

Many of the SSRS test items included in the pretest and posttest could be considered sensitive information and thus measures were taken to ensure confidentiality. The researcher was the only person that saw students' actual names attached to their SSRS responses, and the data was de-identified to ensure student anonymity. The pretest and posttest as well as the intervention were all administered within the classroom during normal class hours. Students

were not subjected to any harmful physical, emotional, or social situations. If any participants expressed any psychological discomfort in regards to the tests or intervention they were removed from the study.

**Validity threats.** Several threats to validity were apparent in this study and each of these threats were minimized in specific ways by the researcher. The threat of researcher bias was minimized by the researcher faithfully following the intervention plan and having the instructional aide verify that the plan was being followed. The mindfulness intervention was played from a recording rather than read from a script to ensure that the aspects of tone, speed, and delivery remained constant throughout the study. Convenience sampling presents possible challenges of sampling bias, but these challenges were addressed and minimized through ensuring that both the control and treatment groups were as similar as possible; class averages, number of ELLs, ratio of male to female students, number of students with IEP's or 504 plans, grade level, and class size were all highly similar in both the control and treatment groups.

### **Proposed Data Analyses**

All data was entered into the Statistical Package for the Social Sciences (SPSS) for Windows, version 24.0.0 (SPSS, 2016). No names or identifying information were included in the data analyses. Before any analyses were conducted all data was cleaned to ensure no outliers were present (Dimitrov, 2012). After cleaning the data, Independent sample t-tests (control and treatment groups) and dependent sample t-tests (pretest and posttest) were conducted to determine the significant difference in stress between the two means scores on the SSRS (Balamurugan & Kumaran, 2008). Further, before interpreting the analytical output, Leven's Homogeneity of Variance was examined to see if the assumption of equivalence was violated (Levene, 1960). If Levene's Homogeneity of Variance were not violated (i.e., the variances were

equal across groups), data was interpreted for the assumption of equivalence; however, if the variances were not equal across groups the corrected output was used for interpretation.

### Results

Two independent samples t-test were conducted on the whole sample ( $n = 51$ ) for both the pre and post assessment scores. Results for the pre-test were: Levene's Homogeneity of Variance was not violated ( $p > .05$ ), meaning the variance between groups was not statistically different and no correction was needed, and the t-test showed non-significant differences between the mean scores on the pre-tests between the two groups  $t(49) = 0.72$ ,  $p > .05$ . This means there was not a significant difference between the pre-test scores of the treatment and control groups and they can be compared (see Table 1). Results for the post-test were: Levene's Homogeneity of Variance was not violated ( $p > .05$ ), meaning the variance between groups was not statistically different and no correction was needed and the t-test showed significant differences between the mean scores on the post-tests between the two groups  $t(49) = -3.43$ ,  $p < .001$ . This means there was a significant difference between the post-test means indicating a decreased level of stress in the treatment group, and an increased level of stress in the control group (see Table 1).

Table 1

#### *Results of Independent Samples T-Tests*

	Mean	SD
Pre Test		
Treatment	130.40	39.38
Control	122.77	34.76
Post Test*		
Treatment	111.53	33.38
Control	148.43	43.48

*Note.* SD = Standard Deviation. \* =  $p < .001$

After determining the differences between pre and post assessment scores between groups, two paired t-tests were run for both groups (i.e., treatment and control) to determine if participants' mean scores from pre to post were significantly different within each group (See Table 2). Results for each group were as follows: treatment group,  $t(29) = 3.009, p > .05$ ; control group,  $t(49) = -3.43, p < .01$ . Therefore, the treatment group showed a reduction in stress while the control group showed an increase in stress. This indicates that the intervention applied was effective in reducing stress within the treatment group.

Table 2

*Results of Paired T-Tests*

	Mean	SD
Treatment Group		
Pre	130.40	39.38
Post	111.53	33.38
Control Group		
Pre	122.76	34.76
Post	148.43	43.48

*Note.* SD = Standard Deviation.

### Discussion

Adolescence can be a time of inherent stress, and recent years show that levels of adolescent anxiety and depression are only becoming more alarming (Arnett, 1999; Center for Disease Control and Prevention, 2018). Being that students spend an abundance of time at school, it seems reasonable to suggest that schools ought to implement stress reducing mechanisms into their procedures and curriculum if they truly care about student well-being. Physical education has long been accepted as a necessary part of our general schooling for fostering physical health, but there is a notable absence of general education programs meant to

promote students' psycho/emotional health. Many districts around the country are gradually recognizing the importance of cultivating greater social-emotional competence in their students and staff, but the widespread implementation of effective stress reducing programs and interventions are still in their infancy (Schonert-Reichl & Lawlor, 2010). Research surrounding mindfulness interventions in general education populations began only in the early 2000s, and they have examined a diverse number of dependent variables such as attention, stress, and grades (Barnert et al., 2013; Biegel et al., 2009; Zylowska et al., 2007). The wide range of dependent variables being examined is a testament to the multifaceted promise of mindfulness interventions, but this heterogeneity also means that the need for replication is especially demanding.

This study was conducted to contribute to the growing body of mindfulness research by examining the effects of guided mindfulness practice on classroom stress. Both the treatment and control groups were given the Students' Stress Rating Scale survey pretest to assess for stress levels, and this measure found that the two groups' preliminary results were not significantly different and thus comparable. After a four-week period in which the treatment group took part in a tri-weekly five-minute guided meditation (audio recording from UCLA's MARC), both groups took the SSRS again as a posttest. Data collected from the pretest and posttest was analyzed for independent and dependent samples *t*-tests in order to compare the means of both groups and tests. Results showed a significant reduction in stress for the treatment group and an increase in stress for the control group (see table 2). This study supports and affirms the hypothesis that the treatment group would exhibit a reduction in stress as measured by the SSRS. Moreover, this study supports the growing body of research showing mindfulness to be an effective mechanism for reducing stress in K-12 classrooms generally, and high school

classrooms more specifically (Chandrsekara, 2018; Mendelson et al., 2010; Shahidi, Akbari, & Zargar, 2017)

This study concludes that having students engage in guided mindfulness meditation may hold significant benefits of stress reduction. Multiple studies over the past decade have shown mindfulness practice to be an effective classroom stress reducer (Chandrsekara, 2018; Shahidi, Akbari, & Zargar, 2017), and so the results of this study are not especially surprising. One element that *was* surprising was the starkness of the posttest contrast between the treatment and control groups. The control group becoming significantly *more* stressed was unexpected, but may be explained by the timing of the posttest; both groups took the posttest during a week in which many students had midterms, a time which many find inherently stressful. However, students in the treatment group faced this same potential stressor and still showed a significant reduction in stress from their pretest, making the results and their implications even more compelling. Though outside the scope of this study, the researcher also observed qualitative improvements in areas of student attention, student behavior, and the overall classroom culture of the treatment group; improvements that have been widely attributed to mindfulness interventions in multiple recent studies (Barnert et al., 2013; Meiklejohn et al., 2012). The findings of this research were significant, and thus point to a significant amount of work yet to be done to ensure that stress reduction techniques such as mindfulness become more mainstream in future classrooms.

### **Limitations and Recommendations for Future Research**

One of the primary limitations of this study is found in its small sample size ( $n=51$ ). Most studies surrounding mindfulness interventions and stress conducted thus far have likewise consisted of small sample sizes (Burke, 2009; Mendelson et al., 2010), and while they are almost

uniformly promising, they are limited due to this sampling factor. The researcher recommends that this study, as well as other mindfulness based stress reduction studies be replicated with larger sample sizes. A secondary limitation of this study was the duration of the intervention. Four weeks was enough to yield startlingly effective results, but most mindfulness studies such as those involving a Mindfulness Based Stress Reduction program have an eight-week standard, thus the researcher recommends that future studies last for eight weeks if possible given that this is the most common study duration of studies thus far conducted (Zinn, 2003). Additional variables that future researchers should consider and plan for accordingly are distractions such as phone calls, announcements over the loud-speaker, and behavioral issues that could present themselves while the intervention is being applied.

The need for replication is urgent. Adolescent stress is often a predictor of elevated levels of anxiety and depression in adulthood, and thus the need for replication contains a clear moral dimension. If we care about our students, we should care about their well-being. The picture of what mindfulness interventions can look like in schools is coming into focus, and the potential benefits are clear. Schools should infuse their curriculum with research supported mechanisms that help students; mindfulness is not only shown to be effective, it is also very inexpensive to implement. There is every reason to believe that future mindfulness studies will confirm the promise that the data of the present moment seems to be indicating. It is the task of educational researchers to replicate these mindfulness studies so more schools will begin implementing effective stress reducing mechanisms, and more students will be able to benefit from these practices.



## References

- Adam, E., Hawkley, L., Kudielka, B., & Cacioppo, J. (2006). Day-to-day dynamics of experience-cortisol associations in a population-based sample of older adults. *Proceedings of the National Academy of Sciences of the United States of America*, *103*(45), 17058-17063.
- Albrecht, N. J., Albrecht, P., & Cohen, M. (2012). Mindfully teaching in the classroom: A literature review. *Australian Journal of Teacher Education*, *37*(12).  
doi:10.14221/ajte.2012v37n12.2
- Amen, D. (2006). *Making a good brain great*. New York: Three Rivers Press.
- Anda, R. F., Brown, D. W., Dube, S. R., Bremner, D., Felitti, V. J., & Giles, W. H. (2008). Adverse childhood experiences and chronic obstructive pulmonary disease in adults. *American Journal of Preventative Medicine*, *34*(5), 396-403.  
doi:10.1016/j.amepre.2008.02.002
- Arnett, J. J. (1999). Adolescent storm and stress, reconsidered. *American Psychologist*, *54*(5), 317-326. doi:10.1037//0003-066x.54.5.317
- Bakosh, L. S., Snow, R. M., Tobias Mortlock, J. M., Houlihan, J. L. & Barbosa-Leiker, C. (2016). Maximizing mindful learning: Mindful awareness intervention improves elementary school students' quarterly grades. *Mindfulness*, *7*(1),  
doi: 10.1007/s12671-015-0387-6
- Balamurugan, M., & Kumaran, D. (2008). Development and validation of students' stress rating scale (SSRS). *Meston Journal of Education*, *7* (1): 17-25. Retrieved from <https://files.eric.ed.gov/fulltext/ED501881.pdf>.

- Barnert, E., Himelstein, S., Herbert, S., Garcia-Romeu, A., & Chamberlain, L. (2013). Innovations in practice: Exploring an intensive meditation intervention for incarcerated youth. *Child and Adolescent Mental Health*. doi:10.1111/camh.12019
- Beauchemin, J., Hutchins, T. L., & Patterson, F. (2008). Mindfulness meditation may lessen anxiety, promote social skills, and improve academic performance among adolescents with learning disabilities. *Complementary Health Practice Review*, 13(1), 34-45. doi: 10.1177/1533210107311624
- Biegel, G. M., Brown, K. W., Shapiro, S. L., & Schubert, C. M. (2009). Mindfulness-based stress reduction for the treatment of adolescent psychiatric outpatients: A randomized clinical trial. *Journal of Consulting and Clinical Psychology*, 77(5), 855-866. doi: 10.1037/a0016241
- Black, D. S., & Fernando, R. (2013). Mindfulness training and classroom behavior among lower-income and ethnic minority elementary school children. *Journal of Child and Family Studies*, 23(7), 1242-1246. doi: 10.1007/s10826-013-9784-4
- Burke, C. A. (2010). Mindfulness-based approaches with children and adolescents: A preliminary review of current research in an emergent field. *Journal of Children and Family Studies*, 19, 133-144. doi: 10.1007/s10826-009-9282-x
- Carmody, J., & Baer, R. A. (2007). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine*, 31(1), 23-33. doi: 10.1007/s10865-007-9130-7

- Carlson, L. E., & Garland, S. N. (2005). Impact of mindfulness-based stress reduction (MBSR) on sleep, mood, stress and fatigue symptoms in cancer outpatients. *International Journal of Behavioral Medicine, 12*(4), 278-285. doi: 10.1207/s15327558ijbm1204\_9
- Carlson, L. E., Speca, M., Patel, K. D., & Goodey, E. (2004). Mindfulness-based stress reduction in relation to quality of life, mood, symptoms of stress and levels of cortisol, dehydroepiandrosterone sulfate (DHEAS) and melatonin in breast and prostate cancer outpatients. *Psychoneuroendocrinology, 29*(4), 448-474. doi: 10.1016/s0306-4530(03)00054-4
- Chandrasekara, W. (2018). The effects of mindfulness based stress reduction intervention on depression, stress, mindfulness and life satisfaction in secondary school students in Sri Lanka. *International Journal of Information, Business and Management, 10*(4), 69-80. Retrieved from [http://ijibm.elitehall.com/IJIBM\\_Vol10No4\\_Nov2018.pdf#page=75](http://ijibm.elitehall.com/IJIBM_Vol10No4_Nov2018.pdf#page=75)
- Dimitrov, D.M. (2012). *Statistical methods for validation of assessment scale data in counseling and related fields*. Alexandria, VA: American Counseling Association.
- Ed-Data. (2018). Name of School.
- Evans, S., Ferrando, S., Findler, M., Stowell, C., Smart, C., & Haglin, D. (2016). Mindfulness-based cognitive therapy for generalized anxiety disorder. *Mindfulness-Based Cognitive Therapy, 145-154*. doi: 10.1007/978-3-319-29866-5\_13
- Flook, L., Smalley, S. L., Kitil, M. J., Galla, B. M., Kaiser-Greenland, S., Locke, J., Kasari, C. (2010). Effects of mindful awareness practices on executive functions in elementary school children. *Journal of Applied School Psychology, 26*(1), 70-95. doi: 10.1080/15377900903379125

- Jain, S., Shapiro, S. L., Swanick, S., Roesch, S. C., Mills, P. J., Bell, I., & Schwartz, G. E. (2007). A randomized controlled trial of mindfulness meditation versus relaxation training: Effects on distress, positive states of mind, rumination, and distraction. *Annals of Behavioral Medicine, 33*(1), 11-21. doi: 10.1207/s15324796abm3301\_2
- Johnson, S. B., Riley, A. W., Granger, D. A., & Riis, J. (2013). The science of early life toxic stress for pediatric practice and advocacy. *Pediatrics, 131*(2), 319-327  
doi:10.1542/peds.2012-0469
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future. *Clinical Psychology: Science and Practice, 10*(2), 144-156. doi:10.1093/clipsy/bpg016
- Kabat-Zinn, J., Massion, A., Kristeller, J., Peterson, L. G., Fletcher, K., Pbert, L., Santorelli, S. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry, 149*(7), 936-943.  
doi:10.1176/ajp.149.7.936
- Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *Journal of Behavioral Medicine, 4*(1), 1-39. doi: 10.1007/bf00844845
- Kuyken, W., Weare, K., Ukoumunne, O. C., Vicary, R., Motton, N., Burnett, R., Huppert, F. (2013). Effectiveness of the mindfulness in schools programme: non-randomised controlled feasibility study. *British Journal of Psychiatry, 203*(02), 126-131.  
doi:10.1192/bjp.bp.113.126649
- Levene, H. (1960). Robust tests for equality of variances. *Contributions to Probability and Statistics, 1*, 278-292.

- Lewis, M., & Ramsay, D. (2002). Cortisol response to embarrassment and shame. *Child Development, 73*(4), 1034-1045. Retrieved from <http://www.jstor.org/stable/3696268>
- Lupien, S. J., McEwen, B. S., Gunnar, M. R., & Heim, C. (2009). Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nature Reviews Neuroscience, 10*(6), 434-445. doi: 10.1038/nrn2639
- Mackenzie, C. S., Poulin, P. A., & Seidman-Carlson, R. (2006). A brief mindfulness-based stress reduction intervention for nurses and nurse aides. *Applied Nursing Research, 19*(2), 105-109. doi:10.1016/j.apnr.2005.08.002
- Maclean, C. R., Walton, K. G., Wenneberg, S. R., Levitsky, D. K., Mandarino, J. V., Waziri, R., & Schneider, R. H. (2006). Altered responses of cortisol, GH, TSH and testosterone to acute stress after four months practice of transcendental meditation (TM)a. *Annals of the New York Academy of Sciences, 746*(1), 381-384. doi:10.1111/j.1749-6632.1994.tb39261.x
- Matousek, R. H., Dobkin, P. L., & Pruessner, J. (2010). Cortisol as a marker for improvement in mindfulness-based stress reduction. *Complementary Therapies in Clinical Practice, 16*(1), 13-19. doi:10.1016/j.ctcp.2009.06.004
- Maynard, B. R., Solis, M.R., Miller, V.L., Brendel, K. E. (2017). Mindfulness-based interventions for improving cognition, academic achievement, behavior, and socioemotional functioning of primary and secondary school students. *Campbell Systematic Reviews 2017:5*. doi:10.4073/csr2017.5
- Mendelson, T., Greenberg, M. T., Dariotis, J. K., Gould, L. F., Rhoades, B. L., & Leaf, P. J. (2010). Feasibility and preliminary outcomes of a school-based mindfulness intervention

- for urban youth. *Journal of Abnormal Child Psychology*, 38(7), 985-994. doi: 10.1007/s10802-010-9418-x
- Meiklejohn, J., Phillips, C., Freedman, M. L., Griffin, M. L., Biegel, G., Roach, A., Saltzman, A. (2012). Integrating mindfulness training into K-12 education: Fostering the resilience of teachers and students. *Mindfulness*, 3(4), 291-307. doi: 10.1007/s12671-012-0094-5
- Mindful Schools. (2018). Retrieved from <https://www.mindfulschools.org/about-mindfulness/mindfulness-in-education/>
- Nyklíček, I., & Kuijpers, K. F. (2008). Effects of mindfulness-based stress reduction intervention on psychological well-being and quality of life: Is increased mindfulness indeed the mechanism? *Annals of Behavioral Medicine*, 35(3), 331-340. doi: 10.1007/s12160-008-9030-2
- Napoli, M., Krech, P. R., & Holley, L. C. (2005). Mindfulness training for elementary school students. *Journal of Applied School Psychology*, 21(1), 99-125. doi:10.1300/j370v21n01\_05
- Ramsay, D., & Lewis, M. (2003). Reactivity and regulation in cortisol and behavioral responses to stress. *Child Development*, 74(2), 456-464.
- Santhi, P., & Akila, S. (2013). A study on the level of stress based on gender and course of study among student teachers. *International Journal for Life Sciences and Educational Research*, 1, 47-53. Retrieved from <https://pdfs.semanticscholar.org/4fe0/a7e9bde0ca609d566b7d6b6ec4c970a2edcf.pdf>.
- Saul, M. L., Tylee, D., Becoats, K. T., Guerrero, B. G., Sweeney, P., Helmreich, D. L., & Fudge, J. L. (2012). Long-term behavioral consequences of stress exposure in adolescent versus

- young adult rats. *Behavioral Brain Research*, 229(1), 226-234.  
doi:10.1016/j.bbr.2012.01.022
- Schonert-Reichl, K. A., & Lawlor, M. S. (2010). The Effects of a Mindfulness-Based Education Program on Pre- and Early Adolescents' Well-Being and Social and Emotional Competence. *Mindfulness*, 1 (3), 137-151. doi: 10.1007/s12671-010-0011-8
- Shahidi, S., Akbari, H., & Zargar, F. (2017). Effectiveness of mindfulness-based stress reduction on emotion regulation and test anxiety in female high school students. *Journal of Education and Health Promotion*, 87(6), 1-6. doi:10.4103/jehp.jehp\_98\_16
- Shahmohammadi, N. (2011). Students' coping with stress at high school level particularly at 11<sup>th</sup> & 12th grade. *Procedia - Social and Behavioral Sciences*, 395-401.  
doi:10.1016/j.sbspro.2011.10.078
- Sibinga, E. M., Webb, L., Ghazarian, S. R., & Ellen, J. M. (2015). School-based mindfulness instruction: An RCT. *Pediatrics*, 137(1). doi:10.1542/peds.2015-2532
- Suicide rates rising across the U.S. (2018). Retrieved from  
<https://www.cdc.gov/media/releases/2018/p0607-suicide-prevention.html>
- Viafora, D. P., Mathiesen, S. G., & Unsworth, S. J. (2014). Teaching mindfulness to middle school students and homeless youth in school classrooms. *Journal of Child and Family Studies*, 24(5), 1179-1191. doi:10.1007/s10826-014-9926-3
- Winston, D. (2017). Guided meditations. Retrieved from  
[https://www.uclahealth.org/marc/body.cfm?id=22&iirf\\_redirect=1](https://www.uclahealth.org/marc/body.cfm?id=22&iirf_redirect=1)
- Zenner, C., Herrnleben-Kurz, S., & Walach, H. (2014). Mindfulness-based interventions in schools- a systematic review and meta-analysis. *Frontiers in Psychology*, 5, 603-645.  
doi:10.3389/fpsyg.2014.00603

Zylowska, L., Ackerman, D., Yang, M., Futrell, J., Horton, N., Hale, T., Smalley, S. (2007).

Mindfulness meditation training in adults and adolescents with ADHD; A feasibility study. *Journal of Attention Disorders*, 20(10), 1-10. doi: 10.1177/1087054707308502



## Appendix A

### Students' Stress Rating Scale (SSRS)

ED= Everyday, OT=Once in 2/3 days, OW= Once in a Week,  
OF= Once in a Fortnight (15 days), OM= Once in a Month, R= Rarely, N= Never

#	Statements	ED	OT	OW	OF	OM	R	N
1	I get angry							
2	I do not take proper rest							
3	I get irritated							
4	I do not share my misgivings (failures) with others							
5	I complain about the past							
6	I rush through the day							
7	I feel lonely							
8	I have the problem of constipation							
9	I get jealous of others							
10	I get viral infections							
11	I suffer from headaches							
12	I take long time to recover from illness							
13	I suffer from diarrhea							
14	I find it difficult to sleep							
15	I have difficulty in concentrating on my studies							
16	I eat fast							
17	I worry about my future							
18	I can't find time to have fun to enjoy myself							
19	I cry or feel like crying							
20	I feel restless when I have to take a surprise test/exam							

**ED**= Everyday, **OT**=Once in 2/3 days, **OW**= Once in a Week,  
**OF**= Once in a Fortnight (15 days), **OM**= Once in a Month, **R**= Rarely, **N**= Never

#	Statements	ED	OT	OW	OF	OM	R	N
21	I talk fast							
22	I get nervous when I forget points that I really know							
23	I get depressed after taking an examination							
24	My heartbeat increases during examinations							
25	I feel tired even though I had enough sleep							
26	I do not maintain my body weight							
27	I feel stiffness or pain in my neck							
28	I have difficulty in remembering things							
29	I become tensed with delays or interruptions							
30	I enjoy games only when I win							
31	No one understands me							
32	My parents scold me							
33	My teachers scold me							
34	I find myself thinking of consequences of failing an exam							
35	I fail to see the humor in situations that others find funny							

**Appendix B**

**Fidelity Checklist**

**Treatment Group**

<u>Week of Observation</u>	<u>Date Observed (1)</u>	<u>Date Observed (2)</u>	<u>Initial</u>
Monday, February 18, 2019 to Friday, February 22, 2019			
Monday, February 25, 2019 to Friday, March 1, 2019			
Monday, March 4, 2019 to Friday, March 8, 2019			
Monday, March 11, 2019 to Friday, March 15, 2019			

**The Researcher....**

**Yes No**

Played the five minute mindfulness meditation audio (intervention) loud enough for all students to hear	<input type="checkbox"/>	<input type="checkbox"/>
Played the intervention at the beginning of class	<input type="checkbox"/>	<input type="checkbox"/>
Ensured that the classroom was quiet while the intervention was applied.	<input type="checkbox"/>	<input type="checkbox"/>

**Control Group\***

<u>Week of Observation</u>	<u>Date Observed (1)</u>	<u>Date Observed (2)</u>	<u>Initial</u>
Monday, February 18, 2019 to Friday, February 22, 2019			
Monday, February 25, 2019 to Friday, March 1, 2019			
Monday, March 4, 2019 to Friday, March 8, 2019			
Monday, March 11, 2019 to Friday, March 15, 2019			

\*Observing to ensure that the intervention is *not* being applied to the control group.