Fuel for Learning: Impact of a Mindfulness, Yoga, and Nutrition Program on Social Emotional Skills and Behavioral Risk Factors

DISSERTATION

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Abstract

This study evaluated the impact of the Fuel for Learning (FFL) Program, a mindfulness-based yoga and nutrition program on factors related to psychosocial well-being for children in urban low income schools. A pilot study found that following the FFL program, students decreased on teacher-rated inattention and student rated hyperactive and impulsive behaviors compared to a control group. The current study evaluated the impact of the FFL program on behavioral risk factors (inattention and hyperactivity/impulsivity) and social emotional skills (self-awareness) for an economically disadvantaged and ethnically diverse sample of students across two urban schools. Data analysis was completed using Repeated Measures Multivariate Analysis of Variance (RM MANOVA). This study did not find significant differences between the intervention and control group on the dependent variables. To determine if school was a contributing factor for changes observed over time, school was included as an additional between subjects factor. A significant interaction was found between school and time on self-rated inattention, $F(5, 49)=2.722, p=.03$, where School A improved on self-rated inattention more than School B. A significant interaction was also found for school, group, and time on self-awareness, $F(5, 49)=4.044, p=.004$. Multiple contrasts and profile plots revealed that the control group in School A improved significantly compared
to the control group in School B, mean difference =13.0174, p=.003. The results suggest that school level and classroom level factors are impacting changes observed on the dependent variables. Directions for future research and limitations with regard to study design and challenges in consistency in intervention implementation are discussed.
Dedication

This dissertation is dedicated to my husband, Adam, whose unwavering support and encouragement over the years has gotten me to where I am today.

Forever Team Admy.
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I would like to sincerely thank the many people who have helped to get me to this point. First, I would like to thank my family and friends. Your love, support, and encouragement has carried me through.

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Without the financial support of Karen Jones, her family, and the Columbus Foundation, this study would not have been possible. I thank you for your dedication to mindfulness for children and meeting the needs of students in school. And to the teachers and administrators who participated in this study, I want to thank you for your willingness to support this program in your schools and classroom and for bringing this vision into reality.
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Fields of Study

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Chapter 1.

Introduction

Mindfulness, which refers to a particular way of paying attention to one’s experience without judgment (Kabat-Zinn, 1994), broadly represents a new wave of psychological and educational research. Emerging research on mindfulness, which includes mind-body practices such as yoga, suggests that mindfulness can support learning and success in schools and promote well-being for children and youth. Although the underlying functions and purpose of mindfulness are familiar to the practice of school psychology, the research on mindfulness is only now gaining a foothold in school psychology research and practice. Emerging research demonstrates a range of applications of mindfulness approaches and popular interest in the mindfulness has given rise to the perspective that mindfulness can and should have a place in education.

Mindfulness is a way of being in the world. A recent meta-analysis found that mindfulness programs for children impact on internalizing and externalizing behaviors, promote attention, reduce stress, and promote psychological well-being and emotional regulation (Renshaw et al., 2015). Researchers theorize that mindfulness enhances metacognition and self-awareness that, in turn, impacts emotional regulation and
behavioral control (Davis & Hayes, 2012). In essence, mindfulness can be viewed as a skill that facilitates the other skills. Given the emerging research, mindfulness has potential for a range of applications for children and youth; however, the available research is limited by methodological design and scope. More research is needed on mindfulness programs for school-based populations as well as the relationship between mindfulness and the development of other behavioral and academic skills (Renshaw et al., 2015).

The primary focus of this study is the impact of school-based mindfulness interventions on risk and protective factors related to psychosocial wellbeing. The available research on mindfulness supports the hypothesis that mindfulness promotes learning and is developmentally appropriate for school-age populations. Such potential benefits include improved attention, cognition, stress-management, and as well as decreased hyperactivity and impulsivity (Birdee, Yeh, Phillips, Davis, & Gardener, 2009; Burke, 2010; Galantino, Galbavy, & Quinn, 2008). In addition, mindfulness-based yoga has been linked to improved cardiovascular health and physical functioning in children (Galantino et al., 2008).

Mindfulness intervention programs can be applied across all tiers of multi-tiered systems of support, including classroom, school-wide, small group, and intensive or individualized intervention programs. Due to the potential impact of mindfulness on variety of barriers to learning, including physical health, cognition and inattention, social emotional deficits, and chronic stress, mindfulness may be particularly significant for children from low-income and/or racially and ethnically diverse populations, who are at
higher at risk for experiencing these issues. Schools play a central role in meeting the needs of all children and because mindfulness provides low cost and socially valid approaches to doing so, expanding the research in this area is paramount.

**Statement of the Problem**

Education should be aimed at the whole child, supporting student’s success in social, emotional, physical, ethical, civic, creative, and cognitive domains. Yet, this perspective is at odds with the current high stakes climate of education policy (Association for Supervision and Curriculum Development [ASCD], 2007). Current policy is narrowly focused on measuring student success based on academic achievement, but this is only one aspect of learning and development. Pressure to raise test scores has led many schools to cut instructional time and funding away from areas that support a comprehensive educational experience, such as the arts, physical education, or social emotional learning programs, to devote more time to core academic subjects. However, research has not supported the practice that cutting such programs improves academic achievement and equally problematic, high stakes testing is associated with increased stress and pressure in the learning environment. This restricted focus detracts from a comprehensive vision of education that centers on developing the whole child (Laitsch, Lewallen, & McCloskey, 2005).

The confines of current educational policy pose significant challenges in implementing practices that are aimed at educating the whole child. Adding to this, schools are expected to do more with less and meet a widening scope of student needs. This creates a challenging paradox, especially for schools serving large populations of
students with high levels of need. Fortunately, it appears that some change is afoot. Recently, there has been renewed support for more comprehensive approaches to education. A report by the Commission on the Whole Child (ASCD, 2007) called for increased attention to research-based factors that are essential to learning; including safe school environments that engage students in developing skills, attitudes, and behaviors that are needed for physical and psychological health. In terms of national educational policy, The *Blueprint for Reform of the Elementary and Secondary Education Act* put forth by the Obama administration attempts to address some of the issues of current education policy (i.e., No Child Left Behind) that places a significant emphasis on test scores (Hyde, 2012). *Blueprint* calls for successful, safe, and healthy students and supports grants for school programs that take a comprehensive approach to meeting student needs. Although *Blueprint* remains heavily focused on test scores and congress has yet to pass updated new educational policy, this stance by the White House reflects a shift in national conceptualization of education (Hyde, 2012).

The need for comprehensive education that focus on the mental and physical health of students as well as academic growth is underscored by alarming trends regarding the well-being of our nation’s youth. The 2012 National Health and Nutrition Examination Survey found that 13% of children aged 8-13 had a diagnosable mental disorder within the past year (Centers for Disease Control and Prevention [CDC], 2014). Howell (2004) estimates that 1 in 10 in youth have a serious mental health issue that interferes with functioning. Compared to the general population, children who live in poverty are at greater risk, with 21% of children from low-income households exhibiting
mental health problems (Howell, 2004). Children in the welfare system are particularly vulnerable, with up to 50% children in the child welfare system experiencing problems in mental health (Burns et al., 2004). Estimates show that most children who need mental health services do not receive the care they need (Kataoka, Zhang, & Wells, 2002). The department of Health and Human Services (2000) estimates that only about 7% of the nearly 15 million youth who need mental health services receive appropriate level of care. Race and ethnicity impact access to care. For children from racially and ethnically diverse backgrounds, only 13% receive any mental health services, compared to 31% for white children (Ringel & Sturm, 1998).

When considering the physical health of our nation’s youth, obesity stands out as a predominant threat. The prevalence rate for childhood obesity has nearly tripled in the past three decades and in 2012, nearly a third of children were overweight or obese (Ogden, Caroll, Kit, & Flegal, 2014). Children who are obese or overweight are at risk for several health conditions, including heart disease and cancer (Freedman, Zuguo, Srinivasan, Berenson, & Dietz, 2007). Obesity is associated with impaired social-emotional functioning due to increased levels of discrimination and lower quality of life, and research shows that obese individuals are more susceptible to depression (Harvard School of Public Health, 2014). Children from low-income families are more at risk for obesity due to limited resources, lack of access to healthy affordable food, fewer opportunities for physical activity (e.g., neighborhood crime, few green spaces), and limited access to health care (Drenowski & Specter, 2004).
For the most vulnerable, ongoing mental and physical health needs are confounded by exposure to violence, trauma, and/or chronic stress. Exposure to trauma early in life increases the likelihood of poor psychological outcomes later in life and ongoing trauma can alter the stress response and predispose children to mental health disorders (Cohen, Mannarino, & Deblinger, 2006). Unmet needs, such as trauma induced stress impact well-being and act as barriers to academic performance. Mental health issues impact student’s success in school by disrupting thinking and learning (Rempel, 2012). The urban poor are particularly vulnerable. Urban poor face a complex aggregate of chronic and acute stressors (including crowding, violence, and noise) and children from poor neighborhoods are more likely to come to school with a fewer range of appropriate skills than might be expected (Jensen, 2009). Students raised in poverty are more likely to display disruptive behaviors, impulsivity, and inappropriate emotional responses.

In order to be successful in school, students need to learn the skills needed for coping with stressors and to be able to navigate challenges they will inherently face (Rempel, 2012). Poor well-being impedes success in school and when schools fail to meet student’s basic needs students are likely to be less motivated, alienated, and perform more poorly academically (California Department of Education, 2005). Given the unmet needs of today’s student population, it is vital that schools implement evidence-based and socially valid programming aimed at developing health skills and behaviors that also fits the needs of today’s educational culture.
**Significance**

One avenue for schools to limit the deleterious effects of high stakes testing and improve the psychosocial well-being of youth is to pair public interest with empirically sound intervention. Including mindfulness programs in schools can teach valuable coping skills for managing these stressors, while at the same time promoting a more holistic view of education. Napoli and colleagues (2005) argue that the use of and consistent reinforcement of mindfulness in the schools may have long lasting effects that impact children’s school experiences and lives outside of school. Rempel (2012) further argues that mindful education empowers children and youth and provides them with valuable skills for life. The popularity of school-based mindfulness and yoga programs is growing, as is the use of mindfulness-based interventions for children and youth as treatment for mental health and medical conditions (Peck, Kehle, Bray, & Theodore, 2005).

The potential for mindfulness to bolster resiliency for children and youth aligns mindfulness with social justice perspectives. Hyde (2012) argues for the viewpoint that mindfulness in the schools is a critical pedagogy. Mindfulness can be a transformative practice by increasing awareness and focused attention on the self. For teachers, mindfulness can be viewed as a form of professional empowerment because it can provide teachers with a way to taking care of themselves and their students, learning skills to relax, stay fit, and relieve anxiety. For students and teachers, mindfulness raises consciousness, allowing for reflection and action upon the world in order to transform it. Emphasis is placed on the self and changes of self in the world, taking responsibility for self, and making small and continual efforts towards change. Though this focus may be
inwardly directed change, Hyde also argues that mindfulness does not ignore the social consciousness of the social justice initiative, because awareness of and compassion for self contributes to compassion for others and awareness of capacity for helping others.

The relationship between mindfulness in schools and social justice is further supported by the potential to address the unmet needs of marginalized and disenfranchised groups. Mindfulness demonstrates promise for improving stress management and impacting children’s self-regulation, mood, and social emotional development (Mendelson et al., 2010). These skills are essential for youth from underserved and marginalized populations who have limited access to care and ongoing unmet needs that interfere with school functioning. The field of school psychology advocates for school-based programming and services that promote well-being and better meet the needs of all children (NASP, 2010). While there is a growing body of evidence that supports mindfulness as an effective intervention for promoting psychosocial well-being, mindfulness has received little attention in school psychology research.

Research supports mindfulness programs as socially valid and feasible for the school setting and while mindfulness is an emerging area of inquiring, the research is limited by methodological design (Galantino et al., 2008). While there are several mindfulness programs and resources available, few are readily available that have been subject to empirical review, empirically validated with diverse populations, or designed specifically for school staff that may have limited exposure to mindfulness. In order for school staff to adopt such programs, more research is needed on the development of mindfulness programs that can easily be implemented by school personnel. The present
study aims to address these limitations by evaluating a mindfulness-based program that requires limited training for classroom teachers and implemented with an ethnically and economically diverse population.

In addition to program evaluation, this study extends beyond current research by expanding knowledge of the potential outcomes of mindfulness interventions. This study measures the impact of the Fuel for Learning (FFL) program on inattentive and hyperactive/impulsive behaviors that interfere with success in the classroom and impact psychosocial well-being. The FFL program is a mindfulness-based yoga and nutrition program which applies the principles of Appreciative Inquiry (AI) to promote stress and resiliency for children. A pilot study implementing the FFL program found significant decreases in teacher-rated hyperactivity/impulsivity and student-rated inattention for the intervention group, suggesting that the program may be an effective intervention for addressing behavioral risk factors (Klatt & Kaye, 2014). The present study further evaluated these outcomes by implementing the program in an urban district with economically and ethnically diverse population of students.

Some mindfulness research with children and youth has assessed impact on social emotional competence, however there is limited research on the impact of mindfulness programs for specific social emotional skills. By applying the conceptualization that mindfulness is a multi-component skill that helps to facilitate the use of other skills, the present study extends beyond current research by further delineating the outcomes related to specific social emotional skills. This approach is consistent with theoretical perspectives of mindfulness bolsters theoretically driven research.
Unlike the pilot study, this dissertation study does not include a measure of self-efficacy of dietary behavior. However, the program is designed to teach students skills identified as important for obesity prevention. The Harvard School of Public Health (2014) states that a primary avenue for schools to engage in obesity prevention is through educating students to choose and maintain healthy lifestyles. Some identified obesity prevention strategies for obesity include choosing healthy foods, increasing physical activity, and limiting stress, all included as components of the FFL program. Further investigation of the program across various outcomes will aid in understanding the potential benefits of the program and future research should include assessment of self-efficacy of dietary behavior.

**Purpose of the Study**

The purpose of this study is to further the research on the benefits of mindfulness programs for youth, with a focus on psychosocial variables that contribute to well-being and support the development of the whole child. The following study extends current school-based mindfulness research by evaluating the impact of the Fuel for Learning Program (FFL), a teacher-facilitated mindfulness, yoga, and nutrition program on variables related to psychosocial well-being for elementary youth from urban low-income areas. Psychosocial variables of interest in this study include inattention, hyperactivity/impulsivity, and social emotional competencies (i.e., self-awareness, self-management, and goal-directed behavior). FFL was designed to align with Ohio Department of Education standards (ODE) standards for third grade curriculum. A pilot study implementing the FFL program found that the program may benefit children
classroom behaviors, specifically inattention and hyperactivity/impulsivity for children (Klatt & Kaye, 2014). The school participating in this study were one private catholic school and one low income school in a suburban district and the data showed found greater benefit for the low income students (M. Klatt, personal communication, November 2, 2015). The current study further evaluates these results with a diverse population of students in a large urban district as well as measures the impact of the FFL program on outcomes not previously measured in the research.

**Research Questions**

This study evaluates a teacher facilitated mindfulness program on behavioral risk and protective factors for children from an urban economically and ethnically diverse population. This dissertation implemented the FFL program in order to further assess the programs impact on classroom behavior and social-emotional skills, further investigating the results of a pilot study as well as extend mindfulness research by evaluating outcomes not previously explored. Specific research questions include the following:

(1) Do behavioral risk factors (inattention and hyperactivity) decrease following completion of the FFL program for students from an urban, low-income, and ethnically diverse population. Inattention and hyperactive/impulsive behaviors are expected to decrease as a result of the program.

(2) Do social emotional skills (self-awareness, self-management, and goal directed behavior) increase following completion of the FFL program for students from an urban, low-income, and ethnically diverse population. Social emotional skills are expected to increase as a result of the program.
Definition of Terms

**Mindfulness.** According to renowned mindfulness researcher Kabat-Zinn (1994), the practice of mindfulness refers to "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (p. 4). Operationally, mindfulness practice centers on self-regulation of attention (i.e., being intentional with what ones attends to), being open and accepting towards experiences (i.e., focusing on the present), and includes three components: attention, intention, and attitude (Bishop et al., 2004). By way of mindfulness practice, mindfulness as a psychological construct is a process that enhances metacognition (thinking about thinking), memory, and awareness of self and that these cognitive gains intern impact emotional regulation and behavioral control (Davis and Hayes, 2012). Mindfulness is increasingly viewed as a skill or process that facilitates the use of other skills (such as attention and self-regulation).

**Psychosocial well-being.** As an aspect of overall well-being, psychosocial well-being is a multi-component construct. In a review of the literature exploring commonly used operational definitions of psychosocial well-being for children and youth, Tsang, Wong, and Lo (2011) determined that psychosocial well-being is operationally defined by both strength-based and deficit-based orientations and encompasses coping and resiliency, perceptions of self, positive and negative affect, emotional awareness and control, interpersonal communication, and functioning in social, familial, and occupational (i.e., school) domains.

**Social Emotional Skills.** Social emotional skills serve as protective factors that decrease problem behaviors and build foundation for healthy development (Greenberg et
Emotional and behavioral self-regulation and effective coping and problem solving skills are identified as protective factors against mental, emotional, and behavioral disorders (US Department of Health and Human Services, 2015). Social emotional competencies impact all components of psychosocial well-being. The Collaborative for Academic, Social, and Emotional Learning (CASEL) defines the five core competencies for Social Emotional Learning (SEL) as self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. Based on the emerging mindfulness research, the social emotional skills areas of interest in the study include two of the competencies outlines by CASEL; self-awareness and self-management, as well as goal directed behavior.

**Self-Awareness.** Self-awareness is the ability to accurately assess one’s feelings, interests, values, and strengths: including a consistent desire for self-improvement.

**Self-Management.** Self-management is the ability to regulate one’s emotions and behaviors, to complete a task or succeed in a new or challenging situation.

**Goal Directed Behavior.** Goal directed behavior includes ability to initiate and persevere in completing tasks of varying difficulty.

**Behavioral Risk Factors:** For children and youth, impulsivity, attention issues, and lack of behavior control are identified among risk factors for mental, emotional, and behavioral disorders (US Department of Health and Human Services, 2015). In line with previous mindfulness research, impact on inattention and hyperactivity/impulsivity was further evaluated using the Fuel for Learning program.
**Hyperactivity/Impulsivity.** Hyperactivity/impulsivity refers to difficulty remaining still and tendency to be active and engage impulsive behaviors.

**Inattention.** Inattention refers to difficulty sustaining or maintaining attention and concentration, organizational problems, and completing tasks.

**Limitations**

It is important to note limitations of this study. A primary limitation involves lack of randomization in selection, which limits generalizations of the results. This is a common challenge in educational research, where randomized control trials are difficult to implement due to predetermined classroom or groups. Additional limitations include differential characteristics between the two schools that may have impacted outcomes. Difference may exist between teaching styles, factors specific to the classrooms, or school level variables such as school climate that may have affected implementation of the program or the outcomes of interest that is not captured by the assessment measures used in the study. Another limitation is the extent to which instrumentation captures true differences between groups, including accuracy at pretest and whether these differences are factored out when calculating posttest impact estimates. And finally, this study is likely limited by consistency in intervention implementation and sample size. Future research should consider including measures of school/classroom climate or other factors that may be likely to impact mindfulness interventions. Future research should also focus on larger sample sizes to increase power and reduce error.
Chapter 2

Literature Review

Within the fields of psychology and education, researchers recognize a broad scope of factors that impact children’s psychosocial well-being, otherwise referred to as risk and protective factors that exist across individual, familial, and school/community domains. From a risk/resiliency perspective, effective intervention for children and youth should aim to decrease risk factors and increase protective factors in order to promote well-being. For children and youth, poor social skills, impulsivity, attention issues, and lack of behavioral control are identified as risk factors for psychosocial well-being, whereas emotional and behavioral self-regulation, effective coping, and problem solving skills are identified as protective factors (US Department of Health and Human Services, 2015). The field of school psychology advocates for interventions that promote well-being to occur in the schools in order to better meet the needs of all children (NASP, 2010). There is a growing body of evidence that supports mindfulness as an effective intervention for reducing risk factors and promoting protective factors; however, mindfulness has received little attention in school psychology research.
While mindfulness is emerging as a promising area of inquiry, the research conducted with children and youth is limited by small sample sizes and methodological design, with very few studies exploring strength-based outcomes or providing clear descriptions of the interventions used. A large proportion of the studies conducted in schools have focused on feasibility studies and the research needs to move towards more rigorous methodological design and evaluating outcomes of interest to schools. Few evidence-based programs are easily accessible to teachers and school personnel with limited experience in mindfulness and many available programs require training programs that are either time consuming or may be costly.

The current study aimed to fill gaps in the literature by examining outcomes related to psychosocial well-being of a mindfulness-based program that is (a) cost effective and pragmatic for the lay teacher who may not have extensive mindfulness experience, (b) empirically validated for urban low income and racially diverse population of students, and (c) evaluated within a strong methodological research design. The purpose of the following literature review is to describe a theoretical framework within which the current study is positioned, to reveal limitations of existing research, and to provide a rationale for methodological decisions. The review offers a thorough understanding of mindfulness, including foundations and theoretical underpinnings of mindfulness practice, a perspective of mindfulness as a psychological construct, an overview of the available studies and pilots on outcomes for with children, and the development of mindfulness programs and their potential applications in schools. The field of mindfulness research is gradually increasing in degree of research rigor, however
due to the small literature base, the research reviewed here includes a number of pilot, uncontrolled, and exploratory studies. Further, because this study aims to provide a rationale for increased attention to mindfulness in school psychology research, one focus of this review is relevant school psychology research that supports mindfulness as a component of school psychology practice.

**Mindfulness**

Mindfulness is rooted in Buddhist meditative traditions dating back thousands of years (Bishop et al., 2004; Shapiro, Carlson, Astin, & Freedman, 2006). Contemporary mindfulness practice is generally not associated with any religious or philosophical perspective (Hyde, 2011). Today mindfulness is applied in secular contexts such as mental health services, medical treatment, and education and practiced recreationally by millions of Americans to promote mental and physical well-being.

Mindfulness research has grown exponentially in recent years, and researchers are beginning to define mindfulness as a psychological construct. Currently, various definitions of mindfulness exist in the literature. Though researchers have not agreed upon a definition of mindfulness, commonalities can be drawn among the various definitions highlighting key components of mindfulness. One of the most commonly used definitions of mindfulness is put forth by John Kabat-Zinn, a leading researcher in field of mindfulness for over 30 years. According to Kabat-Zinn (1994), mindfulness refers to "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (p. 4). Shapiro and colleagues (2006) theorize that mindfulness is comprised of three elements: intention, attention, and attitude. An operational definition
proposed by Bishop and colleagues (2004) centers on self-regulation of attention (i.e., being intentional with what ones attends to) and being open and accepting towards experiences (i.e., focusing on the present). Fundamental to these definitions is attention, which is at the core of traditional Buddhist mindfulness practices (Rempel, 2012). Attention is the root of mindfulness practice, with other key components including focusing on the breath and being open and aware of one’s own experiences (Napoli, Krech, & Holley, 2005). In essence, mindfulness teaches a different way of being (Rempel, 2012).

Mindfulness practices can take many forms but generally include the core components described above. Mindful exercises may include mindful meditation, which asks the practitioner to sit still, and focus on their breath or attend to their surroundings. During mindfulness meditation, the practitioner is asked to simply let thoughts float by, not engaging in internal dialogue: simply watch, listen, and attend. This approach can then be applied to many aspects of life with exercises developed to address particular needs (e.g., mindful eating, mindful parenting, etc). Mindfulness practices also encompass physical movement (e.g., yoga, tai chi, martial arts) that integrate components of mindfulness with a focus on connecting mind and body. Mindfulness practices that incorporate yoga may be more appealing to youth as yoga allows for an outlet for energy (Rempel, 2012). Including yoga in schools is increasing in popularity and thus a central focus of this review.

**Mindful Yoga.** Yoga is commonly viewed as a moving meditation in which attention is paid to quality of breath, position of the body in reference to self and
environment, and focusing of mind and the body (White, 2009). Yoga is a system of mind-body practices aimed at promoting physical and mental health and integrating breathing techniques, physical postures, deep relaxation, development of awareness/mindfulness, and meditation (Hyde, 2011; Khalasa, Hickey-Schultz, Cohen, & Cope, 2012). While all forms of yoga share these components, specific yoga styles can vary greatly in degree of intensity, style, and degree of emphasis on these various aspects. What ties the various styles together is the focus on the connection between body and mind. Depending on the target population, yoga styles can and should be modified based on developmental or individual considerations.

Mindfulness as a Psychological Construct

Despite its history, only recently has mindfulness begun to be defined as a psychological construct (Bishop et al., 2004; Shapiro et al., 2006). Just as mindfulness is defined as a practice, mindfulness is also viewed as a state of being (e.g., how mindful one is). Kabat-Zinn’s (1994) conceptualization of mindfulness as a ‘particular way of paying attention’ serves as a starting point for considering mindfulness as psychological construct. By ‘paying attention in a particular way’ one moves towards the purpose of mindfulness, which is to develop a de-centered perspective; a perspective that is non-judgmental, objective, and non-elaborative (i.e., witnessing thoughts, sensations, and emotions), such that ones’ relationship with these experiences changes. The individual learns to observe, recognize, and disengage from habitual behavior or mind states, so that they can react in a more reflective manner, rather than reactive (Burke, 2010).
**Mindfulness and Behavior Change.** In conceptualizing mindfulness as a de-centered state, mindfulness can then be evaluated in relation to how mindfulness impacts behavior change and promotes desired outcomes (e.g., stress reduction, self-regulation, etc). Researchers theorize that mindfulness enhances metacognition (thinking about thinking), memory, and awareness of self and that these cognitive gains intern impact emotional regulation and behavioral control (Davis & Hayes, 2012). In essence, mindfulness is a multi-component skill that facilitates the use of other skills. For example, Shapiro and colleagues (2006) posit that mindfulness practice is a shift in ones’ perception that allows for the deautomatization of behavior and creates opportunities to build self-regulatory skills, develop objective viewpoints about surroundings and experiences, promote cognitive/emotional/behavioral flexibility, and reduce avoidance of emotional experiences. Illustrated in Figure 2.1 is the conceptualization that mindfulness creates space between a stimulus and reaction, allowing for thoughtful responses to events and surroundings.

![Figure 2.1](https://mindfulschools.org)

*Figure 2.1. Mindfulness as a Psychological Construct. This figure displays the theoretical relationship between stimulus and reaction with and without mindfulness. Adapted from “What is Mindfulness,” by Mindful Schools, 2015, retrieved from Mindfulschools.org.*
By practicing mindfulness, individuals learn to simply observe their reactions and allow them to pass by, rather that acting. Thereby becoming more ‘mindful’ and able to direct behavior in a more purposeful and objective manner that is attuned with thoughts and internal feelings as well as the context of their surroundings (Williams, 2010).

In sum, mindfulness is both considered a skill that facilitates other skills and a state of being. Some research has focused specifically on measuring “how mindful one is” and other research has focused on mindfulness practices and their outcomes. Theoretical conceptualization helps to guide research along both of these lines of inquiry. The proposed study focuses on the theoretically driven outcomes, the behaviors and skills that may be affected by mindfulness practice, and have an impact on psycho-social well-being and consistent with.

**Mindfulness and Mental Health Treatment**

The use of mindfulness as a framework for mental health treatment began with Mindfulness-Based Stress Reduction (MSBR), developed by John Kabat-Zinn, as a supplement medical treatment (Rempel, 2012). Components of MBSR include mindful eating, body scan, sitting meditation, Hatha Yoga, walking meditation, and mindfulness in everyday living. MBSR has been used effectively with adult populations to treat chronic pain, stress, anxiety, psoriasis, eating disorders, fibromyalgia, substance abuse, and in cancer treatment (Burke, 2010).

Since MBSR was developed, a host of variations and adaptations on the program have been developed. Mindfulness based cognitive therapy (MBCT) incorporates MSBR
techniques into cognitive behavioral therapy (CBT). MBCT was first developed to treat depression; to teach clients a new way of paying attention to depression related thoughts by increasing nonjudgmental awareness of thoughts, feelings, and emotions as they occur (Ma & Teasdale, 2004). Research has shown that MBCT is effective for adult populations in treatment of anxiety, mixed mood disorders, treatment resistant depression, cancer, and used to prevent relapse of depression (Burke, 2010; Evans et al., 2004).

MBSR and MBCT programs have since been adapted for use with children and youth: aimed at improving self-management of attention, enhance emotional self-regulation, and developing social-emotional resiliency (Semple, Lee, Rosa, & Miller, 2010). In a review of the literature, Burke (2010) outlined the basic components of MSBR/MBCT programs as they are applied to children and adolescent populations. Such programs often include weekly sessions and regular home practice by bringing mindfulness activities to daily living (e.g., cleaning, chores, eating, and working) as well as mindful meditations, teacher led inquiry, discussion of experiences, and psycho-education (role of perception, wandering mind, mind/body association, stress reactivity, coping strategies). Skill development in mindfulness includes focusing, sustaining and switching attention, accepting present moment sensations (body sensations without judgment), anchoring the breath (connecting body and mind).

The application of mindfulness in treatment of mental and physical health extends beyond the use programs such as MBSR and MBCT to include the practice of yoga and other mind-body approaches. With adult populations, yoga has been shown to improve
symptoms of anxiety (Gupta, Khera, Vempati, Sharma, & Bijlani, 2006); enhance relaxation (Smith, Hancock, Blake-Mortimer, & Eckert, 2007); improve hypertension and reduce coronary artery disease (Gupta et al., 2006); improve stress management, quality of life, and emotional well-being (Granath, Ingvarsson Von Thiele, & Lundberg, 2006); and used effectively to treat traumatic stress disorders and co morbid conditions such as insomnia, anxiety and depression (Cohen, Warneke, Fouladi, Rodriguez, & Chaoul-Riech, 2004). In addition, yoga breathing exercises improve emotional regulation (Arch & Craske, 2006) and the meditative aspects of yoga decrease rumination (Bortz, Summers, & Pipe, 2007); reduce anxiety, depression, and stress (Schreiner & Malcom, 2008); and can be used to treat substance abuse (Bowen, Witkiewitz, Dillworth & Marlatt, 2007). The emerging mindfulness research with children is demonstrating similar benefits seen with adults including improved attention, hyperactivity, cognition, stress management, resiliency skills, cardiovascular health, and physical functioning. This is outlined in more detail later in this chapter. Alongside this developing body of research is a movement gaining steam in education, the mindfulness in schools movement.

**Mindfulness in Schools**

Proponents of mindfulness believe that by introducing children to this practice, children may be better prepared for challenges they may face and that such mindful teaching should be a part of contemporary education (Rempel 2004). The ‘mindfulness in schools’ movement is growing, particularly when considering the popular use of yoga in schools today. The lay educator may or may not connect the term mindfulness with yoga
programming, however many educators are integrating yoga into school curriculum (White, 2009). Advocates for mindful education point to benefits of stress reduction programs on academic performance, self-esteem, concentration, and behavior in support of integrating mindfulness into school curriculum (Napoli et al., 2005).

Several mindfulness programs are commercially available; however, very few have been subjected to rigorous scientific review. The Garrison Institute, a non-profit organization hosts an online database of available mindfulness programs. A search conducted on August 1st, 2015 of evidence-based mindfulness programs that are available for schools (research published in peer reviewed journal) yielded six programs targeting school-aged students, seven programs targeting teachers, five programs targeting administrators, and three programs targeting parents (see appendix B). Many of these programs overlapped, with certain programs developed to target more than one population. The available programming is clearly limited, yet more and more the term mindfulness is working its way into popular vernacular, creating interest in the practice.

In order for mindfulness to be integrated into education a formal program is not required, as mindfulness practices can be integrated in various ways across the school day. Yet in order for schools to implement mindfulness in a meaningful way, and for mindfulness to be accessible, user friendly curriculum is needed.

To address this need, some research, discussed in detail later on in this chapter, has begun to evaluate manualized mindfulness programs. For example, Move into Learning (MIL) and Fuel for Learning (FFL), were designed specifically for classroom wide implementation with FFL also designed to be implemented by classroom teachers.
without requiring prior mindfulness experience. Both programs integrate the theory of Appreciative Inquiry (AI), a strength based methodology of change rooted in industrial and organizational (I/O) psychology that parallels the goals and objectives of mindfulness. AI is a systematic model for creating change through generating inquiry into identifying strengths, what is currently working well, and why it is working well (Cooperrider, Whitney, & Stavros, 2008). AI works in four phases: (1) discovery phase, explore the best of what is; (2) dream phase, imaging the future; (3) design phase, construct positive possibility statements that capture participants vision for the future; and (4) destiny phase, where action plan is created to turn vision in to reality (Dickerson, 2011). Within the school context, AI has been used as a framework for strengthening collaborative relationships between staff (Diskerson, 2011). The focus on AI on indentifying, utilizing, and bolstering strengths also fits with others strength-based frameworks such as Solution-Focused Brief Therapy that have been found to be effective for the school setting (see Birdsall and Miller, 2002). Strength-based processes such as AI focus on identifying factors that can be utilized to build resiliency and promote positive outcomes for youth. In both the MIL and FFL programs, children are asked to process questions that are aimed at generating positive skills/coping mechanisms present in their life. Ongoing evaluation of MIL and FFL will aid in developing strength based, easily accessible, and evidence-based programs that not only offer an introduction into mindfulness practices for students and staff, but may also provide educators with resources and tools for continuing the practice beyond the prescribed intervention period.
The emerging body of research increasingly supports the case for the inclusion of mindfulness in educational settings. Teacher well-being is oft not taken into account in professional development in schools, though teacher turnover and burnout is a common issue in urban, low-income schools (Hyde, 2011). Incorporating the practice of mindfulness into daily school life can have benefits for teachers and school staff as well as students. For example, by integrating mindful teaching practices, providing mindfulness programming for school staff (e.g., teaching self-care and stress reduction techniques), and developing a ‘mindful school’ may reduce teacher stress and burnout and improve school climate (Hyde, 2011). This particular line of inquiry is beyond the scope of this paper, however the range of potential applications of mindfulness in education is worth noting as it bears added weight to the argument for including mindfulness in school settings.

The integration of mindfulness into school-based services for students is increasing, yet there is significant need for evidence-based programs that can be easily implemented in the schools. School psychologists are recognized as school-based mental and behavioral health providers and assist in developing and implementing school-based services that include classroom or school wide programming to promote psychosocial well-being and resiliency. The field of school psychology has seen a shift towards a comprehensive model of service delivery with an increased focus on prevention and early intervention (Rogers & O’Bryon, 2008). In 2010 the National Association of School Psychology published the Model for Comprehensive School Psychology Services. According to this model, school psychologists should engage in mental health services
that promote social and life skills and promote school-wide preventative services and programs that promote learning. The inclusion of mindfulness in school-based mental health services directly fits with the NASP model of comprehensive service delivery. School psychologists in particular can draw on this research in advocating for and recommending services for children and youth in the schools.

**Research on Social, Emotional, and Behavioral Outcomes**

Research on mindfulness with school-age populations demonstrates potential for a wide range of outcomes on social, emotional and behavioral functioning with more and more research occurring in school setting. Though yet to be published in a peer reviewed journal, a paper presentation at the National Association of School Psychologists Annual Convention in February of 2015 reported on the results of a meta-analysis analyzing the effect sizes the available school-based mindfulness research for children and youth. This meta-analysis found that mindfulness programs for children to have a moderate effect size for internalizing and externalizing problems; small to moderate effect on attention; and a small effect for stress, psychological well-being and emotional regulation (Renshaw et al., 2015). Another review of research evaluating the use of mindfulness as an avenue for supporting resiliency for students and teachers, found that the emerging evidence suggests potential outcomes for mental health, cognitive, and interpersonal domains (Meiklejohn et al., 2012).

In one quasi-experimental study, attention training and mindful breathing exercises were used with fourth through seventh graders and found improvements in self-reported optimism, positive affect, and externalizing behaviors with a larger effect size.
for the younger participants (Schonert-Reichl & Lawlor, 2010). Further, classroom teachers reported improved attention and social emotional competence for the intervention group. Differential effects where observed between younger and older grades, greater benefits demonstrated for the younger grades. The authors hypothesized that the differential effects found for younger versus older grades maybe related to differences in self-awareness for the older grades that leads initially to more critical self-evaluation in introspective practices.

Huppert and Johnson (2010) measured the impact of a brief mindfulness program on mindfulness, resiliency, and well-being for adolescents boys in private schools following four week (1 x per week) MBSR based intervention. The study did not find an overall main effect for the intervention group compared to the control group, but they did find that greater benefit on mindfulness and well-being outcomes was associated with greater individual practice. In addition, personality factors were found to be related to greater benefit. Students who were higher on agreeableness and lower on emotional stability was associated with greater benefit.

Lee, Semple, Rosa, and Miller (2008) reported on a 12-week open trial of an adaption of MBCT for children. The study included 25 children (9–12 years), taught MBCT by experienced mindfulness instructors. Parent-ratings were obtained for those who completed the trial, finding a significant decrease in externalizing behaviors (small to moderate effect size), but not for internalizing behaviors or any significant change on self-report measures. This study is limited by lack of randomization or control group and a small sample.
Stress and Coping. As has been observed in research with adults, an increasing focus in this area of research has been on the impact of mindfulness on stress and coping. One nonequivalent control group design study on mindful yoga with fourth and fifth grade girls reported an increase in frequency in use of coping skills as well as a greater appraisal of stress for the intervention group (White, 2012). Similar to the findings of Schonert-Reichl and Lawlor’s (2010) study, a greater appraisal of stress for the intervention group suggests possible iatrogenic (i.e., worsening of symptoms) effects of yoga and mindfulness programs initially. However, this effect occurred in conjunction with increased use of coping skills, again suggesting a relationship with self-awareness. White (2012) hypothesizes that this may dissipate over time and is part of the therapeutic process in learning to cope with stress.

In another study, a randomized control trial with fourth and fifth grade students in urban schools, students who participated in the yoga intervention group demonstrated marked reductions in involuntary stress; particularly in rumination, intrusive thoughts, and emotional arousal (Mendelson et al., 2010). Mendelson and colleagues (2010) incorporated yoga, breathing exercises, and guided mindfulness exercises to target stress in children. This program was aimed at increasing sustained attention and children’s ability to regulate cognitive, physiologic, and bodily states. The focus on involuntary stress as an outcome rather than perceived stress as in the White (2012) study is of note as it may suggest that perception of one’s stress level may be related to more to awareness of self.
Lastly, a nonrandomized control group design study conducted by Stueck and Gloeckner (2005) evaluated the effects of a yoga-based relaxation intervention for students (ages 11-12) with high levels of test anxiety. The study found significant differences on helplessness in school, aggression, and an increase in stress-coping skills, but no differences on test anxiety. Overall, the available research suggests some positive impact on use of adaptive coping skills, but also suggests that some youth, particularly adolescents and pre-adolescents, may experience increased perception of stress as self-awareness of stress increases and that this would be expected to decrease over time.

**Mindful Exercise.** Physical exercise is important for healthy development of mind and body for children and youth impacting a range of social emotional and behavioral outcomes. Compared to other forms of exercise, yoga demonstrates similar or better outcomes on social emotional functioning. Research has shown that exercise is beneficial in addressing symptoms of anxiety and depression in nonclinical youth, with no differences in outcomes based on intensity of exercise (Larun, Nordheim, Ekeland, Hagen, & Heian, 2006). A handful of studies have been conducted comparing yoga to general physical activity. In a pilot study, high school students were randomly assigned into a semester of yoga or regular physical education class (Khalsa, Hickey-Schultz, Cohen, Steiner, & Cope, 2012). Students in the regular physical education classes showed significant deterioration in anxiety, tension, negative affect, anger control, fatigue, and resilience, whereas students in the yoga class remained the same or showed small improvements in these areas. In a follow-up to this study, a randomized control trial found improvements to mood for the yoga group only (Noggle, Steiner, Minami, &
Khalsa, 2012). In a third study, Berger, Silver, and Stein (2009) compared yoga to general physical activity in an after-school setting in a quasi-experimental study for fourth and fifth graders. The results of the study found fewer negative coping behaviors in response to stress for the yoga group compared to the general physical activity group. While more research is needed, the findings of these studies suggest that compared to regular exercise conditions, yoga may have greater impact on social emotional functioning such as mood and protect against the negative effects of stress.

**Research on Cognitive and Executive Outcomes**

With respect to the areas of cognition and executive functioning, attention has garnered the most notice, but some research has focused on additional cognitive or executive functioning outcomes. In a review of research on activities for promoting executive functioning in children, yoga was determined to be an effective intervention (Diamond, 2012). The results from this review found stronger effects for cognitive-based training, but yoga based programs were found to be more effective than general exercise on executive functioning. For example, a pilot study included in the review, found that students in a yoga group (ages 10-13) scored higher on the Tower of London test, a task requiring working memory, reasoning, and self-control compared to a general exercise program (Manjuanath & Telles, 2001). This finding was particularly true for more complex tasks.

Another study comparing yoga and general physical activity measured concentration before and after each activity and found that concentration increased equally for both groups (Hopkins & Hopkins, 1979). This study measured concentration
after only one session, rather than over time. Manjunath and Telles (2001) study was implemented daily for four weeks, indicating a possible dosage effect for yoga and mindfulness. Flook and colleagues (2010) conducted an RCT evaluating the effectiveness of mindful awareness practices for second and third grade students on executive functioning. Children with weaker executive functions at baseline were found to have significantly improved skills in attention shifting, monitoring, and initiating compared to the control group.

Some additional research points to the effects of yoga on reaction time. One study explored reaction time in school-aged males (ages 13-16) after nine rounds of a specific yoga breathing technique, this study found improved auditory and visual reaction time, which, according to the authors, suggests enhanced processing in the central nervous system (Bhavani, Madanmoham, & Udupa, 2008). A similar study was conducted with children receiving special education services for cognitive delay (Bhavani & Ramanathan, 2012). Similar to the previous study, participants showed decreases in auditory and visual reaction time. In both studies, participants had been practicing yoga for three years and decreases in reaction time immediately after practice are possibly due to continued practice over time.

Some interesting research has been conducted looking at the effects of yoga on spatial versus verbal memory. For elementary age students attending a day camp, Manjunath and Telles (2004) found that yoga increased spatial memory test scores for the yoga intervention group compared to those attending a fine arts camp but verbal memory scores remained same for both groups. Naveen, Nagarathna, Nagendra and Telles (1997)
trained children aged 10-17 in different yoga breathing techniques (right nostril, left nostril, alternating nostril, no nostril manipulation) and tested on spatial and verbal memory compared to an age matched control group. Improved on spatial memory was found for all intervention groups, but no change was found on verbal memory.

This research suggests that yoga and mindfulness may be an effective tool for supporting children’s cognition, especially in the areas of executive functioning, spatial memory, and reaction time. Relatively little is known about the neuro-cognitive impact of meditative approaches, such as yoga, on emotion and cognition for adults or children (Froeliger, Garland, Modlin, & McClemnon, 2012) though researchers hypothesize that changes to neuro-cognitive functioning occurs gradually as mindfulness is practiced over time. Some evidence suggests that mindfulness might affect the prefrontal cortex (e.g., Manjunath & Telles, 2001) and neurotransmitter functions (Streeter et al., 2007) as well as increase brain grey matter concentration, which is related to learning, memory, emotional regulation, and perspective taking (Holzel et al., 2011). In addition, yoga postures and breathing may activate the parasympathetic nervous system, stabilizing autonomic nervous system and increasing resistance to stress (Parshad, 2004). Much more research is needed on the relationship between mindfulness and cognitive development, particularly with regard to how mindfulness practice may impact neurological development over time. However, the available research suggests that mindfulness practices can impact cognitive processes that are vital to learning and success in the classroom, such as attention, memory, and executive functioning.
Treatment of Childhood Disorders

**ADHD.** A relatively popular area of mindfulness research centers on outcomes with children and youth with ADHD. This line of inquiry is not surprising when considering the central tenants of mindfulness on attention, self-regulation, and awareness of self; common deficits for this population. Yoga practices in particular lends itself to interventions for children with ADHD due to the pairing of movement based activities with control of breathing and body-mind connection (Greenberg & Harris, 2012). A handful of reviews have examined the therapeutic effects of yoga on attention and collectively have found that yoga practice has potential for improving attention difficulties and reducing ADHD symptoms for clinical populations (Birdee et al., 2009; Galantino et al., 2008; Kayley-Isley et al., 2010). Some researchers suggest that combining mindful exercises with more physical mind-body practices help to prepare children for these practices by dissipating excess energy, especially those with attention problems or high levels of anxiety (Jenson, Stevens, & Kenny, 2012; Kayley-Isley et al., 2010).

A few studies have been conducted utilizing experimental or quasi-experimental designs. In one randomized control trial comparing treatment-as-usual to treatment-plus-yoga for boys with ADHD (ages 8-13), differential outcomes were found for the two intervention methods (Jenson & Kenny, 2004). For the treatment plus yoga group, decreases were found on measures of oppositional behavior, impulsivity, and total ADHD problems after a 20-week intervention. For the treatment-as-usual group, significant differences were found for hyperactivity, anxiousness, and social problems.
Those in the yoga group who participated in more homework and attended more sessions demonstrated increased attention further supporting dosage effects or greater benefit with consistent practice.

Consistent with research on parent training for children with ADHD, some research has focused on parent training components of mindfulness interventions. Van der Oord, Bögels, and Peijnenburg (2012) studied the impact of a mindful parenting program combined with a mindful training program for children with ADHD based on the components of MBCT and MBSR. This waitlist controlled study found that after the 8-week program, significant reductions in parent rated ADHD behavior where observed at posttest and at follow up. Teacher ratings yielded no significant results.

A second quasi-experimental design study looked at the impact of a mindfulness-based training program on executive functioning, internalizing behaviors, externalizing behaviors, and social skills for adolescents (ages 12-18) with learning disabilities and co-occurring ADHD or Anxiety (Haydicky, Wiener, Badali, Milligan, & Ducharme; 2012). This study utilized a program consisting of mindful meditation, cognitive behavioral therapy, and mixed martial arts. Compared to the control group, those in the intervention group with comorbid ADHD showed improvement on parent-rated externalizing behaviors, oppositional behaviors, and conduct problems. Participants with elevated inattention improved on parent-rated social problems and participants with comorbid anxiety reported decreased anxiety compared to the control group.

In a nonrandomized control trial with Iranian children with ADHD, found improved attention and decreased hyperactivity/impulsivity for participants in an eight-week yoga
program compared to the control trial (Abadi, Madgaonkar, & Venkatesan, 2008). A second nonrandomized control study reported reduced dosage of stimulant medication, decreased ADHD symptoms, and increased parent reported parent-child relationship for children aged 8-13 diagnosed with ADHD (Harrison, Manocha, & Rubia, 2004).

Much of the research findings utilize self or third party ratings of behavior, however some studies have been conducted with that utilize direct observation of behavior to evaluate the impact of mindfulness programs. A multiple baseline study conducted with elementary students exhibiting high levels of attention problems found that a yoga program increased time on task (Peck et al., 2005). A second multiple baseline study found that for two children with ADHD (ages 10 and 12), a 12-week mindfulness program resulted in a 262% increase in frequency of parent recorded compliant behaviors. Parent and child training in mindfulness was included in this study and 10% increase in compliance was maintained at 24 week follow up (Singh et al., 2009).

Although studies comparing dosage levels have yet to be conducted, the review by Kayley-Isley and colleagues found that six to eight weeks of weekly sessions or approximately 20 hours of intervention time may be needed for benefits to manifest for children with ADHD, and greater benefit is seen with additional home practice.

**Anxiety and Depression.** Mindfulness practices utilize attention enhancing techniques that have shown promise as clinical treatments for adults with anxiety and depression (Baer, 2003). In reviewing the research on the effects of yoga on anxiety for children and adolescents, Kayley-Isley, Peterson, Fischer, and Petterson (2010) found a general trend in reduction of anxiety related behaviors and mixed results when looking at
the impact of yoga on increasing positive affect. Though the authors caution that the results of this review are preliminary due to limited methodological design of the available research, the authors suggest that these results show that yoga can be used a complimentary treatment for anxiety for children. One study compares yoga to other forms of relaxation. In a quasi-experimental study conducted in a hospital with adolescents diagnosed with depression or adjustment disorders, Plantania-Solasso and colleges (1992) compared a combined treatment of yoga, progressive relaxation, and massage to watching a relaxing video. The study results demonstrated a decrease in self-reported anxiety, observed anxious behavior, as well as increased positive affect immediately after one session of the combined intervention. In addition, for participants diagnosed with adjustment disorder and for one third of those diagnosed with depression, reductions to cortisol levels after the intervention were also reported.

Semple, Reid, and Miller (2005) hypothesize that because impaired attention is a core symptom of anxiety, improving attention and focus through mindful practices may help to reduce anxiety. The authors conducted an open trial evaluating the impact of mindfulness-based cognitive therapy for children (MBCT-C), for 5 children (ages 7-8) with clinically significant levels of anxiety symptoms. The results of the study found significant changes to teacher-rated internalizing and externalizing behaviors, and though these results cannot be generalized beyond the sample, the study demonstrates an example of mindfulness and mental health service in the schools. In a follow-up randomized control trial, children (aged 9-13) from ethnically diverse populations participated in MBCT-C. The intervention group showed significant reduction in
attention problems, with results maintained at three months (Semple et al., 2010). A significant correlation was also observed between levels of attention and behavior problems and an observed decrease in attention problems accounted for 46% of the variance in reduction in behavior problems. Furthermore, children with clinically significant levels of anxiety showed significant reductions in anxiety and behaviors problems. This study builds upon the previous preliminary study, suggesting that programs such as MBCT-C that focus on facilitating mindful attention demonstrate promise as effective treatment for childhood anxiety and related difficulties. And lastly, Biegel, Brown, Shapiro, and Shubert (2009) studied the effectiveness of MBSR with adolescents and found reduced symptoms of anxiety, depression, and somatic complaints as well as increases to self-esteem and improved sleep.

**Autism.** A few studies were found evaluating the effects of mindfulness for children with Autism. In one study, a non-randomized control group design, evaluated the effects of a daily classroom yoga intervention. This study found significant decreases in teacher ratings of maladaptive behaviors for the yoga group compared to the control group (Koenig, Buckley-Reen, & Garg, 2012). Another study measured changes in rates of aggressive behaviors for adolescents with Autism when employing a mindfulness technique that focuses on shifting attention away from a triggering event to a neutral stimulus. For the three participants, aggression decreased from 14-20 events per week at baseline to zero incidents in the final four weeks of an eight-week intervention period. Follow up data revealed that aggression only occurred an average of one time per year in the three years following. Though very small in sample size, these studies show potential
for the use of mindfulness for individuals with autism, particularly with respect to aggressive or maladaptive behaviors and maintenance of gains over time. A related line of inquiry that is outside the purview of this review is also beginning to emerge evaluating the impact of mindful training programs for parents of children with autism (for a review see Ferraioli & Harris, 2013)

**Trauma.** Some discussion exists on how mindfulness and yoga can be used in treatment of children with mental health issues related to trauma. Abrams (2007) suggests that mindfulness practices such as yoga, breathing, and meditation can be useful in grounding during trauma related flashbacks. Yoga in particular may offer trauma survivors a means to cultivate a more positive relationship to their bodies and ease many of the symptoms of traumatic stress through gentle breathing and movement (Emerson, Sharma, Chaudhry, & Turner, 2009). The available research on mindfulness for trauma with children and youth it lacking any experimental design, however a few studies provide some insight into the potentials benefits for this population. In a pilot study (non-experimental), Gordon, Staples, Blyta, and Bytyqi (2004) used breathing, relaxation, and guided imagery with Kosovo high school students and found reductions to symptoms of post-traumatic stress disorder. One article detailed case studies to provide examples for how yoga can be used in treatment with trauma-affected youth. Based on case studies, Spinazzola, Rhodes, Emerson, Earle, and Monroe (2011) explain that yoga may be a promising intervention in building attachment, self-regulation, and competency in structured consistent routines. They further explain that yoga may be an effective treatment for trauma youth because yoga can provide a safe in the moment focal point for
individuals who are often overwhelmed with bodily sensations. Thus, focusing on gentle and slow movements with gradual progression.

**School-Based Research**

A review of school-based mindfulness research conducted by Burke in 2010 found that, at this time, most of the school-based research had focused on the feasibility and acceptability of mindfulness programs in school settings. The review found strong support for both feasibility and acceptability of such programs, but little experimental research evaluating its empirical value. As recommended by Burke, the field has begun to move away from feasibility research and move towards experimental research.

In moving the school-based mindfulness research towards evaluation of empirical value, Napoli and colleagues (2005) conducted a randomized control trial with 228 first to third grade students, participating in a mindfulness training intervention. The study found significant changes in self-rated test anxiety, teacher-rated attention, social skills, and objective measures of selective (visual) attention. The intervention lasted 24 weeks and included movement and body scan activities, mindful meditations, and relaxation exercises. This study is one of few studies that report effect sizes, ranging from small to medium.

For children with emotional and behavioral problems, a relaxation-based-yoga program (Yoga Nidra) demonstrated effectiveness in stabilizing breathing patterns (Jensen, Stevens, & Kenny, 2011). In this study, students were trained on using Yoga Nidra by gradually lengthening the time of relaxation, starting with 30 seconds working up to 20 minutes. After the training period the students were able to remain still for 20
minutes. The authors argue that building up the technique may be needed for students with high levels of anxiety, restlessness, oppositional, and aggressive behavior and should follow a very active phase of yoga postures in order to achieve the desired effect.

In a university-based elementary school, Flook and colleagues (2010) conducted a randomized control trial for 64 second and third grade students participating in mindful awareness intervention and found improved parent and teacher ratings of executive functioning (behavioral regulation, metacognition, and overall executive control). The study also found an interaction effect, where students with lower executive scores at baseline showed greater benefit as a result of the intervention. Teacher and parents reported specific improvement to children’s ability to shift, initiate, and monitor. The authors argue that mindfulness-based practices in elementary schools may be a viable and cost effective way to improve children’s social emotional, cognitive, and academic development.

In a feasibility study, Klatt, Harpster, Browne, White, and Case-Smith (2013) investigated the effectiveness of a school-based mindfulness intervention, Move into Learning (MIL), which was designed to reduce stress and improve behavior for at-risk elementary school students. This program included meditation, yoga movement, breathing exercises, and Appreciative Inquiry (AI), as well as a visual arts component. This study found significant improvements on teacher ratings of hyperactivity/impulsivity and inattention. Follow up data was also gathered for one of the classrooms and found that at eight weeks post-intervention, inattention continued to improve and improvements observed in hyperactivity/impulsivity levels were maintained.
Semi-structured teacher interviews revealed that the MIL program was feasible and acceptable to teachers for use in third grade classrooms. Though this study is limited by lack of a control group, this preliminary study warrants further research on this program and similar programs. In addition, a qualitative study using the MIL program found that students who participated in the program reported that the program helped them to feel calmer and more focused, and that they gained self-management strategies and improved their self-image (Case-Smith, Sines, & Klatt (2010).

**Urban and Disadvantaged Youth.** Much of the available mindfulness research does not specify the racial, ethnic, or socioeconomic demographics of the population or sample studied. With that, few studies have specifically focused on examining the implications of mindfulness for urban, low income, and ethnically diverse youth in school-based settings. One of the few examples is the Semple and colleagues (2005) study, which found improvements to attention, academic performance, and classroom behavior for urban elementary school students with clinical levels of anxiety. Mendelson and colleagues (2010) also studied mindfulness for urban youth from low-income neighborhoods and found on impact on stress and emotional arousal. And lastly, the MIL study conducted by Klatt and colleagues (2013) was implemented in two classrooms in a low income, urban neighborhood. The focus of these studies has been on disadvantaged youth from low-income urban neighborhood who are more likely to experience chronic stress and be exposed to a greater number of risk factors than those from affluent or middle class populations. The findings related to behavioral risk factors such as inattention and hyperactivity/impulsivity as well as coping and stress are consistent with
the findings observed across the research in both school-based and clinical settings. Though limited, these studies suggest that mindfulness should be explored further for the potential impact on both protective and risk factors related to psychosocial well-being for urban, economically disadvantaged, and ethnically diverse populations.

**Teacher Facilitated Programs.** The degree of mindfulness training needed for the individuals facilitating school based programming has yet to be evaluated in the research. This factor may well depend on the intensity or intent of the program. For example, as with other types of interventions, mindfulness based-therapy likely requires and a different set of practitioner skills and degree of personal practice than a classroom-based intervention that follows a specific curriculum. However, because the premise of mindfulness is a way of being that extends beyond the framework of a temporal intervention, a personal mindfulness practice by all school personnel as well as a school culture that embraces mindfulness would be beneficial and preferred. Burke (2010) discusses the issues of teacher training and argues that lack of teacher training for mindfulness programs may be an issue, though may be less critical in this context where interventions are not intensive programs, but brief mindfulness techniques integrated in to the curriculum as was the case in this study. With that said, existing mindfulness programs designed for schools vary greatly in the degree of training provided to facilitators of the programs. Though it is believed that this factor is important, little research has evaluated this in a systematic way.

Most of the studies utilized trained mindfulness practitioners as the interventionists; yet if teachers are expected to be implementing mindfulness curriculum,
then research is needed on classroom-wide intervention that utilizing classroom teachers as facilitators. Schonert-Reichl and Lawlor’s 2010 study is one of few studies that used teachers as facilitators. The intervention provided in this study was a manualized curriculum lasting 10 lessons based on mindfulness techniques and positive psychology. For this study, the teachers received 1 day of intensive training. An example of relatively brief mindfulness training for teachers is a study conducted by Beauchemin, Hutchins, and Patterson (2008), which included training lasting a few hours. This pre/post non-control group design study included student volunteers (aged 13-18) with learning disabilities in a specialized school setting. This study is extremely limited due lack of control group, however the study reported significant changes in self-rated anxiety and social skills and teacher rated social skills and academic achievement.

In a pilot study using a quasi-experimental control group design, Klatt and Kaye (2014) studied the impact of the mindfulness-based yoga and nutrition program, Fuel for Learning, in third grade classrooms. The intervention, designed to address obesity and stress related behaviors, consisted of 50 minutes of mindfulness-based movement and exercises/week, and 35 minutes of nutrition instruction/week, was delivered via DVD with the classroom teacher as facilitator. Similar to the Move into Learning program, the Fuel for Learning program incorporates principals of Appreciative Inquiry. In the pilot study, psychosocial behaviors in the classroom and self-efficacy regarding dietary behavior were evaluated pre and post the eight-week intervention. Teacher ratings of classroom behaviors were used to gauge impact on behavioral risk factors. Significant differences were found in teacher-rated classroom behavior concerning the children's
inattention, while the child-rated scales showed changes in classroom self-rated hyperactive/impulsive behavior. Additionally, significant differences on self-efficacy concerning dietary behavior were found for the intervention group only. These results suggest that FFL may be an effective classroom intervention that effectively addresses behavioral risk factors to classroom performance and promotes obesity prevention through self-efficacy of dietary behavior. The results of this study are consistent with the available research regarding mindfulness and inattention and hyperactivity/impulsivity and as well as in line with the conceptualization of mindfulness as a facilitative skill. The DVD format of the Fuel for Learning program is noteworthy as it requires limited training (1 hour) for classroom teachers in order to implement mindfulness programming in their classroom, making the programming easily accessible to the lay teacher. The results of this pilot study warrant further investigation of the Fuel for Learning program on additional skills and behaviors related to psychosocial well-being. Further study is also needed to evaluate empirical value of the program for diverse populations.

**Mindfulness Across Multi-Level Systems of Support**

School-based mindfulness programs can be implemented by either trained professionals or classroom teachers. The length and frequency of the programs varies depending on the age of the students and several programs are designed for universal implementation (Meiklejohn et al., 2012). The flexibility of mindfulness intervention lends itself to applications across all tiers of intervention within multi-leveled systems of support. For example, mindfulness intervention at Tier 1 may include school-wide programming through physical education curriculum or school-wide/classroom wide
programming and can be designed to incorporate a range issues or skills of need for particular schools or classrooms such as bullying, stress management, and/or healthy eating.

Mindfulness intervention may also be used as stress and burnout prevention for teachers and school staff and to promote and more mindful school climate by incorporating mindful exercises in daily routines such as brain breaks, movement breaks, or quite time. For example, in one mindfulness-based yoga program, at the end of class students were asked to attend to a specific body parts or to their breathing (i.e. sensory awareness or guided relaxation) and included discussion on sensory experiences (Greenberg & Harris, 2012). Discussion topics included identifying stressors, techniques for responding, and cultivating positive relationships with others, keeping body and mind healthy.

Mindfulness intervention at Tier 2 may include small group targeting children at-risk for anxiety, depression, attention difficulties, or disruptive behavior. And at Tier 3, more intensive programming may include direct intervention for children receiving special education services or with more significant mental health needs.

Summary and Discussion

Collectively, the review of the research suggests that mindfulness programs may have various benefits for children and youth. However, comparing the results from the various studies has limitations due to methodological flaws and design issues. Yet some potential implications may be gleaned from the available research. First, in the area of stress and coping skills: some research suggested possible iatrogenic effects on perceived
stress, especially for those in late childhood or adolescence attributed in increased awareness of self but positive outcomes are found on increasing adaptive coping skills and reducing stress related behaviors. A variety of studies found positive impact on externalizing behaviors such as aggression and the research also suggests that children with ADHD and anxiety may benefit from mindfulness practice that precede other guided mindfulness activities with active movement such as yoga. In terms of cognitive outcomes, the research suggests that mindfulness may have a positive impact on attention, concentration, executive functions, reaction time, and spatial memory. Though little is known regarding the mechanisms by which mindfulness may improve cognitive, social emotional, and behavioral outcomes, these results are promising. There is little data available on long-term outcomes and implications for development over time. Thus, it is unknown if mindfulness has any impact on developmental trajectories or on what level of continued or consistent practice may be need to maintain and positive outcomes.

Meiklejohn and colleagues (2012) note that a challenge facing school-based mindfulness programs includes lack of a clearly defined theory of change model. Meiklejohn puts forth several questions that need to be explored in the research, among them: (a) How might mindfulness processes be conceptualized from a behavioral, cognitive, or bio-behavioral perspective, or from the perspective of executive function? (b) What are the essential intervention activities and processes common to mindfulness practices with children and youth? (c) What short- and long-term outcomes are hypothesized to result from mindfulness practice? (d) What mechanisms link mindfulness practices to these outcomes? (e) How much mindfulness practice is necessary to predict a
certain outcome in different age groups? (f) And, should mindfulness be defined narrowly as attention training, or broadly as a multi-faceted portal to greater social and emotional well-being?

The research seems to support the perspective that mindfulness may be a multi-faceted construct for improving various behaviors and skills that then promote resiliency and psychosocial well-being for children and youth. And if we apply the conceptualization of mindfulness as a skill that facilitates other skills or behaviors, then a natural line of inquiry is to evaluate outcomes related to specific behaviors and skills areas that impact psychosocial well-being. However, the current research has focused more on broader outcomes such as perceived stress, affect, or emotional arousal rather than specific social emotional skills and behaviors. If mindfulness is believed to have a direct impact on specific skills or behaviors, and thereby a secondary impact on broader components of psychosocial well-being, then more investigation is needed on specific skill areas. A proportion of the research has focused on behavioral risk factors that affect functioning in school and social domains such as attention issues and poor behavioral control, supporting these outcomes as potential benefits for children and youth in both clinical and school-based settings.

When considering the research on strength-based psychosocial outcomes, mindfulness may help to promote positive affect and optimism. Some studies have included measures of overall social emotional competence, suggesting this as a potential benefit, but very few studies have included measures evaluating specific social emotional skills areas that promote psychosocial well-being. White (2012) and Stueck and

The mindfulness research focusing on cognition and executive functioning has more directly measured the impact of mindfulness on specific behaviors and skills such as reaction time (Bhavanani et al., 2008), spatial memory (Manjunath and Telles, 2004), and attention (Zylowska, 2008), demonstrating positive outcomes in these skills. However, given the range of behaviors and skills that contribute to psychosocial well-being, there is a clear paucity in the mindfulness research with respect to breadth and depth of outcomes as well as program development. What is clearly missing from the research is empirical study of the impact of mindfulness on children’s awareness of self, ability to manage self, and direct their behavior toward a goal. Related to these skills, Flook and colleagues (2010) findings regarding behavioral regulation and monitoring overlap with the study of social skills and warrant further investigation into social skills that relate to these areas of executive functioning (e.g., self-awareness, self-monitoring, and ability to direct behavior towards a goal). These social emotional skills are directly related to the goals and functions of mindfulness and touted as benefits by mindfulness proponents, yet no studies were found assess these outcomes in peer-reviewed research.

Rationale for Current Study

By integrating mindfulness programs into general curriculum, schools can teach valuable coping skills for managing these stressors while also promoting a more holistic view of education. However, it should be underscored that the available mindfulness
research is limited by methodology and scope. There are very few randomized control trials and little to no replication studies or studies evaluating long-term outcomes. Research reviews (e.g., Birdee et al, 2009; Burke, 2010; Galantino et al., 2008; Kayley-Isley et al., 2010) cite small sample sizes, lack of power, varying outcome measures, as well as poor description of intervention methods as primary methodological limitations.

Much of the research targets specific groups or populations (e.g., anxiety or ADHD) and only a limited number examine the inclusion of mindful into general school curriculum. In addition, limited description of intervention methods limits the ability to replicate findings or isolate factors contributing to change and address the questions outlined by Meiklejohn and colleagues as central to moving the research forward. To address the limitations in the research, this study utilized a quasi-experimental control group design. While a true experimental design is not feasible due to lack of random selection; use of random assignment, control group, and pretest/posttest comparisons increases the interval validity of the experiment and bolsters the methodology of the available mindfulness research.

Much of the research has focused on feasibility studies, which consistently suggests that mindfulness can be easily implemented in schools and is acceptable to teachers, parents, and students. However, few programs are readily available that have been subject to empirical review, empirically validated with diverse populations, or designed specifically for school staff that may have limited exposure to mindfulness. In order for school staff to adopt such programs, more research is needed on the development of mindfulness programs that can easily be implemented by school
personnel. Of the research on school-based mindfulness programs, the MIL feasibility study and the FFL pilot study are among the very few studies that have evaluated manualized programs designed for classroom teachers or for classroom-wide implementation. The integration of AI principals with mindfulness practices in both the MIL and FFL programs allows for research on these programs to be based in a theoretically driven strength based model of change. Further, the MIL feasibility study addresses some additional limitations in the research by implementing the program in low income, urban neighborhood (MIL feasibility study). A limitation of the MIL study however is lack of control group comparison, but this preliminary study research warrants further investigation into this and similar programs. The FFL pilot study did include a control group comparison and data also suggested greater benefit for low income students (M. Klatt, personal communication, November 2, 2015), but was not implemented in an urban setting. Neither study included systematic assessment of strength based factors or social skills.

The present study aimed to address these limitations by evaluating the FFL program, a theoretically driven mindfulness-based program that requires limited training for classroom teachers with an ethnically and economically diverse population within an urban public school setting. In addition to program evaluation, the proposed study would extend beyond current research by expanding knowledge of the potential outcomes of mindfulness interventions. The FFL pilot study found significant decreases in teacher-rated hyperactivity/impulsivity and student-rated inattention, suggesting that the program may be an effective intervention for addressing behavioral risk factors (Klatt & Kaye,
The proposed study further evaluated these outcomes by implementing the program in a public urban district.

Though school-based research on mindfulness programs has emerged in recent years, there is little research that explores strength-based outcomes and future research should focus on isolating specific skills and behaviors that are likely to be affected by mindfulness practices. Some mindfulness research with children and youth has assessed impact on social emotional competence, however, there is limited research on the impact of mindfulness programs for specific social emotional skills. By applying the conceptualization that mindfulness is a multi-component skill that helps to facilitate the use of other skills, the proposed study would extend beyond current research by evaluating outcomes on specific social emotional skills. This approach is also consistent with theoretical perspectives of mindfulness, enhancing theoretically driven research.
Chapter 3.

Methodology

The purpose of this study was to further the research on the benefits of mindfulness programs for youth, with a focus on psychosocial variables that contribute to well-being and support the development of the whole child. The following study evaluated the impact of the Fuel for Learning Program (FFL), a teacher-facilitated mindfulness, yoga, and nutrition program on variables related to psychosocial well-being. Psychosocial variables of interest in this study include inattention, hyperactivity/impulsivity, and social emotional skills (i.e., self-awareness, self-management, and goal-directed behavior). The current study aimed to further research by evaluating these outcomes with a diverse population of students in a large urban district as well as measure the impact of the FFL program on outcomes not previously measured in the research.

Research Design

A quasi-experimental nonequivalent control group design was used to determine the impact of the Fuel for Learning (FFL) program on outcomes behavioral risk factors
and social emotional skills. The chosen design allows for maximal interval validity when randomization in selection is not feasible (Campbell & Stanley, 1963). This design is most appropriate for the educational contexts, where groups are predetermined by classroom and therefore considered unequal (i.e., lack of randomization in selection). In this study, existing third grade classes were chosen as groups and randomly assigned to either treatment or waitlist-control group conditions. Dependent variables were assessed before and after implementation of the FFL intervention, providing pretest-posttest comparisons. The teachers in the waitlist control group classrooms were provided the opportunity to implement the receive the FFL program in their classrooms.

**Research Questions**

Question 1. Do behavioral risk factors (inattention and hyperactivity) decrease following completion of the FFL program for students from an urban, low-income, and ethnically diverse population. Inattention and hyperactive/impulsive behaviors are expected to decrease as a result of the program.

Question 2. Do social emotional skills (self-awareness, self-management, and goal directed behavior) increase following completion of the FFL program for students from an urban, low-income, and ethnically diverse population. Social emotional skills are expected to increase as a result of the program.

**Setting**

The setting for this study is an urban school district located in a large Midwestern city. To explore the impact of the FFL program for economically and ethnically diverse
populations, this study was conducted in two schools located in low income neighborhoods. The school district is the largest in the state with 88% of children living below the poverty level (Ohio Department of Education, 2015). During the 2014-2015 school year, School A was designated by the state department of education as a focus school. Focus schools refer to low performing schools that have failed to decrease achievement gaps over a number of years. School B was designated by the state department of education as a Priority school. Priority schools refer to the lowest performing schools in the state based on the past five years of math and reading achievement.

Population

The target population for this study was third grade students from an urban, low income, and ethnically diverse school district. The sample was drawn from the third grade population in two schools within the district, School A and School B. Demographics of the student population of both schools was obtained from publically available state issued school report cards. Because state report cards are not yet available for 2014-2015 school year, data is presented (Table 3.1) from the previous two years to establish enrollment trends with regard to ethnicity and income level.
As demonstrated in Table 3.1, School B typically has a much higher proportion of black/non-Hispanic students and moderately higher percentages of low income students in comparison to School A. These trends show consistency across years, establishing trends in school enrollment. School B is predominantly black, whereas School A is more mixed. Both schools have very high poverty rates, however School B appears to be slightly higher.

**Sample and Participant Selection**

The participating schools needed to meet the follow criteria for selection in this study, be an urban elementary school located in a low income neighborhood and have at least two third grade classrooms. Participating schools were recruited through convenience sampling (Campbell and Stanley, 1963). The researcher was working as a school psychology intern within the school district, working in several elementary schools that met the aforementioned criteria. The schools the researcher was working in were invited to participate in the study and all five classroom teachers (two in School A...
and three in School B) agreed to participate in the study. All students in the five participating classrooms were invited to participate and while all students in each condition participated in the FFL program, only students who returned signed parental consent were included in data collection. Total sample size is from both schools (N=57), \( n = 38 \) in the intervention group and \( n = 19 \) in the control group.

**Demographic Variables**

Demographic information was collected in order to describe the study sample and setting. Participants were asked to provide demographic information regarding age and gender. School demographics such as proportion of economically disadvantaged (i.e., low income) students and racial/ethnic minorities was collected using publically available data (e.g., Ohio Department of Education State Report Card).

**Independent Variables**

The independent variable of interest in this study is the Fuel for Learning Program. Levels of the independent variable include treatment condition (receiving FFL program) and waitlist control condition (not receiving FFL program during intervention period).

**Dependent Variables**

The dependent variables to be measured in this study include factors related to psychosocial well-being: social emotional skills and behavioral risk factors. Social emotional skills measured in this study are based on mindfulness theory and research. Social emotional skills (self-awareness, self-management, and goal directed behavior)
were measured by asking classroom teachers to complete the Devereaux Student Strengths Assessment –Teacher Scale (DESSA: LeBuffe, Shapiro, & Naglieri, 2009). Behavioral risk factors: inattention and hyperactivity/impulsivity, were measured by having both classroom teachers and third grade participants complete the Conners-3 short form (Conners-3s: Conners, 2008). All dependent variables were measured on an ordinal scale.

**Self-Awareness.** Self-awareness is the ability to accurately assess one’s feelings, interests, values, and strengths: including a consistent desire for self-improvement.

**Self-Management.** Self-management is the ability to regulate one’s emotions and behaviors, to complete a task or succeed in a new or challenging situation.

**Goal Directed Behavior.** Goal directed behavior includes ability to initiate and perceiver in completing tasks of varying difficulty.

**Hyperactivity/Impulsivity.** Hyperactivity/impulsivity refers to difficulty remaining still and tendency to be active and engage impulsive behaviors.

**Inattention.** Inattention refers to difficulty sustaining or maintaining attention and concentration, organizational problems, and completing tasks.

Measurement of dependent variables took place before and after the treatment group received the FFL program. Classroom teachers were asked to complete pre- and posttest questionnaires on participants’ social emotions skills. Both participating students and classroom teachers were asked to complete self-report and teacher rated questionnaires on students’ behavioral risk factors.
**Instrumentation**

**Devereaux Student Strengths Assessment – Teacher Scale (DESSA).** The DESSA is a strength-based measure that assesses children’s skills in eight areas of social emotional competence, resilience, and academic success for kindergarten through eighth grade (Labuffe, Shapiro, Naglieri, 2009). The DESSA was developed as strength-based assessment of behaviors related to psychosocial well-being. Aligned with CASEL standards and definitions of resiliency, the DESSA assesses social emotional skills in the following areas: self-awareness, self-management, social awareness, relationship skills, goal directed behaviors, personal responsibility, decision-making, and optimistic thinking. The DESSA is written at a fourth grade reading level, completed by teachers, and takes 10 minutes to complete. Normative data is based on 2500 teacher ratings in a nationally representative sample.

For the proposed study Self-awareness (SA), Self-management (SM), and Goal Directed Behavior (GD) subscales were used. Items on the DESSA are rated on a five point likert scale (1= Never, 2= Rarely, 3= Occasionally, 4= Frequently, 5= Very Frequently). The DESSA Teacher scale demonstrates strong internal reliability with coefficients (Cronbach’s alpha) ranging from .89-.94 for the eight scales and .99 for Social Emotional Composite Scale (Labuffe, Shapiro, & Naglieri; 2008). Test retest reliability at one week range from $r=.84$ to $r=.94$ for the eight scales and $r=.94$ for the Social Emotional Composite. Analyses of factor structure, content validity and, criterion validity supports the structure of the validity of the DESSA.
**Conners 3- Short Form (Self Report & Teacher Scale).** Conners 3 (short form) assesses cognitive, behavioral, and emotional problems with a focus on ADHD and comorbid disorders - providing student perspectives. The Self-Report Scale, written at a third-grade reading level, is appropriate for ages 8 to 18 years old (Conners, 2008). The short form requires only 10 minutes to complete. Normative data is based on 1,000 self-reports, are presented at one-year age intervals and separated by sex. Student participants completed the self-report scale at pretest and posttest. The Teacher Scale, written at a fourth-to-fifth grade reading level, can be used to evaluate students from 6 to 18 years of age. Normative data based on 1,200 teacher ratings are presented at one year age intervals and separated by sex. The standardization sample reflects the US population in regard to race, ethnicity, gender, and parent education.

The Inattention (I) and Hyperactivity/Impulsivity (HI) subscales were used to assess self-report and teacher observed behavior. Scale items are rated on a four point likert scale (0= Never/Seldom, 1= Occasionally, 2= Often/Quite A Bit, 3= Very Often/Very Frequently). Several studies have been conducted evaluating the psychometric properties of the Conners-3(s) (Conners, 2008). Internal consistency coefficients have been found to be very good, ranging from .77-.97. Test-retest coefficients (Cronbach’s Alpha) are very good ranging from .71-.98. Factor analysis supports the validity of the structure of the Conners 3.

**Intervention**

The FFL program is an eight-week DVD-based mindfulness yoga, nutrition education, stress prevention curriculum that supports selected 3rd grade Ohio educational
standards. The FFL program was developed by Dr. Maryanna Klatt and Dr. Gail Kaye. Two 40 minute in-service sessions were provided to teachers prior to implementation of the FFL program. During the in-service, teachers were provided with information on the basics of mindfulness, training on implementing the Fuel for Learning program, and an overview of the program materials. FFL curricula is designed to occur daily for eight weeks. Each week, with a 45-minute session provided on day one, and 10-minute sessions occurring the remaining four days. The classroom teachers were asked to deliver all program sessions during the school day. Due to needs of the particular building, School B requested support in implementing the 45-minute nutrition section and thus the researcher assisted in implementing the nutrition section on some weeks.

The FFL program is theory driven program and draws upon several areas of research. The movement and stress reduction component of the FFL program draws upon principles from yoga and MBSR, and the resiliency activities draw from principles of Appreciate Inquiry (AI). Yoga has been found to improve coordination, attention, focus and sensory awareness and maybe helpful in achieving optimal arousal and attention in all children (Birdee et al., 2009; Galantino et al., 2008; Stueck & Gloeckner, 2008). Yoga combines stretching with movement patterns, emphasizing stability, and sustained postures; integrating mindful breathing and mindfulness awareness (Stueck & Gloeckner, 2005). In addition to yoga-based mindfulness approaches, other mindfulness methods based on MBSR techniques are included in the program. MBSR approaches used with children are aimed at improving self-management of attention, enhance emotional self-regulation, and develop social-emotional resiliency (Semple & Lee, 2008; Semple et al.,
AI is integrated into the program through the resiliency and hands-on activities throughout the program outlined in Table 3.2. Specifically, students are asked each week to evaluate and identify strengths in their lives.

<table>
<thead>
<tr>
<th>Week</th>
<th>Nutrition Skill</th>
<th>Resiliency Skill/ AI Prompt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Choosing Lower Calorie Snack Foods</td>
<td>Deep Calming Breaths</td>
</tr>
<tr>
<td>2</td>
<td>Serving of a Packaged Snack Food</td>
<td>Celebrating Your Successes</td>
</tr>
<tr>
<td>3</td>
<td>Choosing Beverages without Added Sugars</td>
<td>Elements of Strength</td>
</tr>
<tr>
<td>4</td>
<td>Choosing Breakfast Cereals Low in Sugar</td>
<td>What Helps you Grow</td>
</tr>
<tr>
<td>5</td>
<td>Choosing 3 Different Fruits Everyday</td>
<td>Getting on the Right Track</td>
</tr>
<tr>
<td>6</td>
<td>Choosing 3 Different Vegetables Everyday</td>
<td>Feeling Just Right</td>
</tr>
<tr>
<td>7</td>
<td>Choosing 3 Servings of Skim Milk or Dairy Alternatives Everyday</td>
<td>Who Values Me?</td>
</tr>
<tr>
<td>8</td>
<td>Choosing Healthier Foods for Breakfast Everyday</td>
<td>Building a Healthy Toolbox</td>
</tr>
</tbody>
</table>

The objective of the nutrition components (see Table 3.2) is to positively impact food selection behaviors that are thought to contribute to the prevention of childhood obesity (Wiswanath, 2008). Though not explored in the proposed study, this portion of the program aims to protect children against childhood obesity by reducing their ‘energy
gap’ and improving diet quality. The nutrition component is theoretically based in social cognitive theory, which posits that human behavior is the product of the dynamic interplay of personal, behavioral, and environmental influences (Bandura, 2001). The nutrition component is designed to impact two social cognitive theory psychosocial variables purported to mediate behavior change: behavior capabilities (i.e., knowledge and skill) and self-efficacy (i.e., confidence about using the skill). Embedded in each lesson topic, are ‘target’ behaviors to be achieved. Each lesson is designed to teach children the critical skill needed to perform each target behavior.

By participating in FFL, children learn simple and discrete skills, through skills and knowledge training. Students participate in demonstrations, role-playing, taste testing and role modeling; aimed at promoting well-being across physical and psychosocial domains. Positive and vicarious reinforcement are used throughout the DVD, to further enhance children’s self-efficacy and encourage attainment of target behaviors.

Parent/caregiver newsletters are sent home to parents/caregivers weekly. Each newsletter contains information and practical tips in nutrition, movement and stress prevention to promote practical applications of concepts learned in the classroom, while at home.

**Detailed Study Procedures**

The school district’s research review board approved the proposed research study in October 2014 and university IRB approval was obtained in December of 2014. Following IRB approval, building principals and, subsequently, classroom teachers were approached in person and via email for participation in the study. Once participating
classrooms were determined, parent/caregiver consent and student assent was obtained for all participants. Participation was strictly voluntary. Children who had parental permission were eligible to participate and were assigned subject numbers. IRB approved principal/teacher and student recruitment materials and consent/assent forms were used. All materials needed for the FFL program along with $25 gift cards to Target for school supplies was provided to the classroom teachers for their participation. Following survey completions periods, participating students were provided with small incentives such as pencils and erasers.

To recruit students, the verbal assent script was read to the children in the classroom. For those students who chose to sign the verbal assent form, parent consent forms were sent home with the children, which included an envelope in which forms could be returned to the study co-investigators. To increase the likelihood of forms being returned, teachers were also provided with additional copies of the consent forms for students who needed them and asked to remind students to return the forms frequently. During the recruitment period, I also returned to each of the classrooms to twice to remind students as well. All students in the five third grade classrooms were eligible to participate in the Fuel for Learning program, but only those children who provided verbal assent and whose parents provided parental permission were eligible to participate in the pre- and post assessment. Subject IDs were assigned to all study participants. Recruitment of students begin in early December of 2014 and continued through winter break to allow for sufficient time to recruit enough participants.
During January 2015, the teachers were asked to participate in the in service training that included an overview of the program, training on program implementation, and to answer any questions. Pretesting for teacher rated assessments occurred at this time and child self-reports for pretesting occurred in the classroom between on January 12\textsuperscript{th} and 16\textsuperscript{th}, 2015. For child rated assessments at pretest and posttest, the research read aloud each of the items as the students responded to them.

Participating classrooms were randomly assigned using a random numbers table to either the treatment or control condition. The three treatment classrooms (two from school A and one from school B) began the 8-week program on Monday, January 19\textsuperscript{th}, 2015 and concluded on Friday, March 27\textsuperscript{th}, 2015 for School A and on Thursday April 1\textsuperscript{st} for School B. The length of the program was not extended, but the duration was extended beyond eight weeks for both schools due to calamity days used by the school district due inclement weather and, for School B only, state testing needs.

Students who did not return consent forms were allowed to participate in the FFL program; however, they did not participate in the research study. A parent newsletter was sent home each week on how parents can support the skills/behaviors learned during the week to the parents of the study participants. The control group continued with normal classroom activities during this time.

Around the week of March 30\textsuperscript{th}, 2015 (School A) and April 20\textsuperscript{th}, 2015 (School B) the study participants completed the posttest assessments. The assessments took place in the school during the 10\textsuperscript{th} week. Teachers completed teacher rated posttest assessments during the same week as the students in their schools. Following the posttest, the
treatment group resumed normal classroom activities and the control group began the 8-week program. Due to teacher illness, only the control group at School A received the program.

**Threats to Internal and External Validity**

Several limitations to internal and external validity exist for this design of this study (Campbell & Stanley, 1963). With respect to internal validity, the first major threat noted by Campbell and Stanley (1963) is the interaction between selection and maturation, or otherwise stated as changes specific to the experimental group may have occurred in absence of the treatment. This threat may still occur despite similar scores at pretest and the intervention and control groups are only as similar as availability permits. Protection from this threat offered by pretest comparisons is not guaranteed and thus the design cannot be considered a true experiment. A second limitation is the extent to which instrumentation captures true differences between groups at pretest and whether these differences are factored out when calculating posttest impact estimates. Although avoidable, the third major threat to internal validity for this design outlined in Campbell and Stanley is regression. Regression occurs when either of the groups is chosen for their extreme scores. This is particularly problematic in designs where participants self-select to groups. In the current study, students in this study did not self-select into the intervention versus control group, which offers some protection against this threat. Attempts to protect against regression effects in this study are done through statistical methods used for accounting for differences in pretest scores.
Due to lack of random selection, this design does little to control for threats to external validity (Campbell & Stanley, 1963). The first threat, interaction of testing with treatment, refers to when the control group reacts differently to repeated testing than the intervention group. The second threat to external validity is the interaction of selection and treatment. This threat refers to cases where treatment may have differential effects on the specific participants chosen for the treatment (due to some characteristic) than for those not chosen. For example, in this study students who are included in this study may react differently to the FFL program than those who are not included. Another threat, reactive arrangement is in essence the “guinea pig effect”. The environment and design of the program used in this study helps to protect against reactive arrangements because teacher led programming is typical of the classroom environment; however, students were aware that they were involved in a research study.

Data Analysis

To evaluate the research questions in this study, Repeated Measure Multivariate Analysis of Variance (RM MANOVA) was used. RM MANOVA is used to test one or more categorical independent variables, on several dependent variables across two or more time points (Mayers, 2013; Tabachnick & Fidell, 20012), RM MANOVA is used to test for an interaction effect between the within-subjects factor, time, and the between-subjects factor, group, using pooled variances of the dependent variables (DV). In instances where multivariate tests were found significant, univariate F tests (ANOVA) were run to determine significance on the individual dependent variables using Bonferroni’s correction to adjust for inflated Type I error. When needed, post hoc
contrasts were run to determine the nature of interactions between groups within the DV. A \( p < .05 \) level of significance was used for all analyses in the study to determine if the null hypotheses could be rejected.

A priori power analysis was conducted with the G*power program, which found that strong power (power >.90) for two groups and seven dependent variables could be achieved with a sample size of 48. As the study was original designed, adequate power would be expected with the sample in this study (\( N=57 \)). Due to hypothesized differences between the two groups in implementation of the study, school was added in to the RM MANOVA procedure to test for an interaction between time, school, and group. Different suggestions exist for determining the number of participants needed per group, ranging from 20 per group to six to ten times the number of dependent variables, but at minimum the number of participants must exceed the number of dependent variables (Swanson & Holton, 2005). The addition of school into the analysis resulted in reduction of some of the groups far below 20 for some groups. This change likely had an impact on power for the analysis.

Estimates of effect size and power of the analysis were calculated using SPSS. Effect size was reported using the partial Eta squared (partial \( \eta^2 \)) statistic and interpreted based on Cohen’s (1988) criteria for small, medium, large effect sizes. Post Hoc Power was reported using the Observed Power for statistically significant results. Data screening and preliminary analyses were conducted for all dependent variables through various SPSS programs for accuracy of data entry, missing values, and fit between their
distributions and the assumptions of multivariate analysis including; outliers, normality, homogeneity of variance-covariance, linearity, and multicollinearity.

**Limitations**

A major limitation to this study is randomization in selection of participants and differences between predetermined groups on various factors not included study. Additional limitations include lack of power for some aspects of the analysis due to small \( n \)’s for some groups as well as challenges related to consistency in implementation of the FFL intervention. Finally, this study is limited by instrumentation being a valid assessment of the outcomes of interested. It is unclear how much observed difficulty in reading and understanding the vocabulary of the student rated assessments, despite assessment readability being at the appropriate grade-level, and teacher absences may have impacted ratings at pretest and posttest.
Chapter 4

Results

The purpose of this study was to evaluate a teacher facilitated mindfulness program on social skills and behavioral risk factors for children from an urban economically and ethnically diverse population. For this study, the FFL program (Independent Variable) was implemented to further evaluate its impact on the following dependent variables: self-awareness, self-management, goal directed behavior, and teacher and self-rated inattention and hyperactivity/impulsivity. Data obtained in the study was analyzed using the Statistical Package for Social Science (SPSS) for Mac version 22. First, results from preliminary analysis (missing data, outliers, normality, homogeneity of variance-covariance, linearity, and multicollinearity) are reported followed by descriptive statistics regarding group frequencies, gender distribution of the sample, and mean age of sample participants. And finally, the research questions and associated research hypotheses are presented and evaluated with the results of the RM MANOVA procedure.
Preliminary Analysis

The first step was to screen for missing data. Total missing data for the data set was found to be 7%. Missing data was determined to be due to scales or items not fully completed for some participants. Multivariate analysis, particularly MANOVA, is sensitive to missing data (Tabachnick & Fidell, 2012). Expectation Maximization (EM) procedure is recommended over case wise deletion with data sets with less than 8% missing data (Tabachnick & Fidell, 2012). A prerequisite to EM is that the data is missing completely at random, determined by Little’s MCR test. Little’s MCR test was not significant, $\chi^2=63.225, df=67, p=.606$, satisfying this assumption and thereby EM procedures were used to replace missing data.

Based on variation in implementation of the FFL program, it was hypothesized that school level factors may impact results and therefore preliminary analysis was conducted to screen for a possible interaction effect between group and school. Thus, a MANOVA was conducted with group and school as fixed factors and self-management, goal directed behavior, self-awareness, teacher-rated inattention, Teacher-rated hyperactivity/impulsivity, self-rated inattention, and self-rated hyperactivity/impulsivity scores at pretest as the dependent variables. All four tests statistics were significant, $F(7, 47) =3.940, p=.002$, indicating an interaction between School and Group at pretest. Therefore, school was added as a between-subjects factor in the RM MANOVA in order to asses for interactions between school, group, and time. The addition of school as a between-subjects factor reduced one of the cells (control group for School A) to eight cases, limiting power and causing singularity with seven dependent variables in the
analysis. RM MANOVA requires, at minimum, more degrees of freedom (cases) per cell than dependent variables (DVs), thus it was necessary to reduce the number of DVs.

Bivariate correlations were used to analyze the relationship between the variables and identify potential variables for deletion. Bivariate correlations revealed correlations above .9 for goal directed behavior, self-management, and self-awareness for some groups and time points. Self-awareness had the highest correlations with the other two variables (thus accounting for the most variance of the three variables). Tabachnick and Fidell (2012) discourage including dependent variables with correlations \( r \) greater than .90 in multivariate analysis because you are measuring constructs that overlap too much. Goal-directed behavior and self-management were subsequently identified as the dependent variables to be removed from the analysis.

The data was screened for univariate and multivariate outliers. By deriving z-scores, no cases were found to be univariate outliers \( (z\text{-values} > 3.29; p<.01) \).

Multivariate outliers were assessed using Mahalanobis distance scores, derived from leverage scores by using a chi-square table, \( p<.001, df=5 \), critical \( \chi^2 \) value =15.08. No cases identified as multivariate outliers. Assessment of the normality of the distributions for each DV by group and school was conducted first using Shapiro-Wilks test. Overall, Shapiro-Wilks showed that the assumption of normality was met for most variables \( (p>.05) \). Dependent variables with significant Shapiro-Wilks test statistics were investigated further using skewness/kurtosis values. Using z scores, none of the variables were found to have significant skew and kurtosis \( (z\text{-values} > 3.29; p<.001) \), indicating that the assumption of normality was met for all distributions. Further, pairwise linearity
was assessed using bivariate scatterplots and was found to be satisfactory for all DVs. Reasonable correlation is one assumption of RM MANOVA. A simple bivariate correlations was computed between all of the dependent variables (pooled across groups) for each time point. Tests for assumption of Homogeneity of Variance and Homogeneity of variance co-variance were conducted within the RM MANOVA GLM procedure presented below.

**Descriptive Statistics**

Descriptive statistics were used to describe the sample of third grade students participating in this study. A total of 59 consent forms were returned, with two participants excluded from data analysis. During the study, one participant moved up a grade level and the other moved out of the school, neither of which finished the program. There were a total of 38 participants in the intervention group and 19 in the control group. Table 4.1 shows the frequencies for each group by school. Because the largest group (intervention for School B) is more than 1.5 times greater than the smallest group (control School A), the sample sizes are considered unequal.

<table>
<thead>
<tr>
<th>Group Frequencies (n)</th>
<th>Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Intervention</td>
</tr>
<tr>
<td>School A</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>School B</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>38</td>
</tr>
</tbody>
</table>
The gender distribution for group and school is found in Table 4.2. Overall, there were more girls (57.9\%) in the sample than boys (42.1\%). A similar gender distribution is found across intervention and control groups, with the exception of control group for School A, which is evenly split between boys and girls.

Table 4.2. 

*Gender Distribution by School and Group*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School A</td>
<td>Count</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>% of Total</td>
<td>8.8%</td>
<td>14.0%</td>
<td>22.8%</td>
</tr>
<tr>
<td>School B</td>
<td>Count</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>% of Total</td>
<td>19.3%</td>
<td>24.6%</td>
<td>43.9%</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School A</td>
<td>Count</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>% of Total</td>
<td>7.0%</td>
<td>7.0%</td>
<td>14.0%</td>
</tr>
<tr>
<td>School B</td>
<td>Count</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>% of Total</td>
<td>7.0%</td>
<td>12.3%</td>
<td>19.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>Count</td>
<td>24</td>
<td>33</td>
</tr>
<tr>
<td>% of Total</td>
<td>42.1%</td>
<td>57.9%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Mean age of intervention group and control groups respectively are presented in Table 4.3. Mean ages are similar between the intervention group ($M=9.17, SD=.60$) and Control group ($M=8.99, SD=.49$), with similarity also found between schools.
Table 4.3

*Mean Age by Group and School*

<table>
<thead>
<tr>
<th>Group ID</th>
<th>School</th>
<th>n</th>
<th>Min.</th>
<th>Max.</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>School A</td>
<td>8</td>
<td>8.00</td>
<td>10.25</td>
<td>9.00</td>
<td>.68</td>
</tr>
<tr>
<td></td>
<td>School B</td>
<td>11</td>
<td>8.50</td>
<td>9.60</td>
<td>8.98</td>
<td>.32</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>19</td>
<td>8.00</td>
<td>10.25</td>
<td>8.99</td>
<td>.49</td>
</tr>
<tr>
<td>Intervention</td>
<td>School A</td>
<td>13</td>
<td>8.00</td>
<td>10.20</td>
<td>9.04</td>
<td>.58</td>
</tr>
<tr>
<td></td>
<td>School B</td>
<td>25</td>
<td>8.20</td>
<td>10.25</td>
<td>9.24</td>
<td>.51</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>38</td>
<td>8.00</td>
<td>10.25</td>
<td>9.17</td>
<td>.60</td>
</tr>
</tbody>
</table>

**Repeated Measures MANOVA**

To evaluate the research questions, overall change scores for the intervention and wait-list control groups were compared using Repeated Measures Multivariate Analysis of Variance (RM MANOVA) using the General Linear Model (GLM). School was added to the analysis as a between-subjects factor, and therefore included in the analysis to assess for School x Time and School x Group x Time interaction effects. The within-subjects factor, time, has two levels, pretest and posttest. The between-subjects factors, group and school both have two levels, control and intervention, and School A and School B respectively. The inclusion of school as an additional between-subjects factor created a 2 x 4 factorial design (nested) rather than a 2 x 2 design as originally intended.

For the main effect and the interaction effects, the RM MANOVA procedure generates four test statistics to evaluate group differences on the combined DV: Pillai’s Trace, Wilks’ Lambda, Hotelling’s Trace, and Roy’s Largest Root. Because all four test
statistics yielded identical results, only Pillai’s trace is presented in tables. Box’s Test revealed that within-subject equal variance can be assumed, \( F(110, 2833.576) = 1.198, p = .082 \); therefore, the assumption of the model was met and the multivariate effects can be interpreted. Because there are only two levels of the repeated measures independent variables, sphericity is assumed and thus does not need to be tested.

A RM MANOVA was conducted to test both research questions. The first research question, listed below, centers on change related to behavioral risk factors and includes the dependent variables Teacher-rated inattention, Teacher-rated inattention, self-rated inattention, and self-rated hyperactivity/impulsivity. The second research question focuses on changes related to social emotional skills. The original question included self-management, self-awareness, and goal directed behavior. As previously described, self-management and goal directed behavior were removed from the analysis. As such, the original research questions and research hypotheses are amended below including self-awareness as the dependent variable. And subsequently, by including school as an additional independent variable, two additional research question were added. The third research question centers on if differences are seen between the schools on the dependent variables over time. And the fourth research question, centers on the interaction between group and school over time. Specific research questions along with associated null hypothesis are presented below.

**Research Questions and Hypotheses**

Question 1: Will behavioral risk factors (inattention and hyperactivity) decrease following completion of the FFL program for students from an urban, low-income, and
ethnically diverse population? Inattention and hyperactive/impulsive behaviors are expected to decrease as a result of the program. The null hypotheses ($H_0$) for each of the dependent variables is presented below.

$H_0$ 1a: Following the FFL program, there will be no significant differences in changes from pretest to posttest between the intervention group and the control group on Teacher-rated inattention.

$H_0$ 1b: Following the FFL program, there will be no significant differences in changes from pretest to posttest between the intervention group and the control group on Teacher-rated hyperactivity/impulsivity.

$H_0$ 1c: Following the FFL program, there will be no significant differences in changes from pretest to posttest between the intervention group and the control group on self-rated inattention.

$H_0$ 1d: Following the FFL program, there will be no significant differences in changes from pretest to posttest between the intervention group and the control group on self-rated hyperactivity/impulsivity.

Question 2: Will social emotional skills (self-awareness) increase following completion of the FFL program for students from an urban, low-income, and ethnically diverse population? Social emotional skills are expected to increase as a result of the program. The null hypotheses for each of the variable is presented below.

$H_0$ 2a: Following the FFL program, there will be no significant differences in changes from pretest to posttest between the intervention group and the control group on teacher rated self-awareness.

Question 3. Will there be no significant differences in changes observed from pretest to posttest on behavior risk factors and social emotional skills between the two schools participating in the research study. Observed changes from on the dependent variables is expected to be similar between School A and School B, when groups are not
split by those who participated in the FFL program and those who did not? The null hypotheses for each of the dependent variables on the interaction is presented below.

Hₐ 3a: Following the FFL program, there will be no significant differences in changes from pretest to posttest between School A and School B on teacher rated self-awareness.

Hₐ 3b: Following the FFL program, there will be no significant differences in changes from pretest to posttest between School A and School B on teacher-rated inattention.

Hₐ 3c: Following the FFL program, there will be no significant differences in changes from pretest to posttest between School A and School B on teacher-rated hyperactivity/impulsivity.

Hₐ 3d: Following the FFL program, there will be no significant differences in changes from pretest to posttest between School A and School B on self-rated inattention.

Hₐ 3d: Following the FFL program, there will be no significant differences in changes from pretest to posttest between School A and School B on self-rated hyperactivity/impulsivity.

Question 4. Is there an interaction between school and group on changes observed between pretest and posttest on behavioral risk factors and social emotional skills?

Observed changes from pretest to posttest between the intervention and control groups is not expected to be significantly different between School A and School B. The null hypotheses for each of the dependent variables is presented below.

Hₐ 4a: Following the FFL program, there will be no interaction between school and group on changes observed between pretest and posttest between the control group on teacher-rated self-awareness.

Hₐ 4b: Following the FFL program, there will be no interaction between school and group on changes observed between pretest and posttest between the control group on teacher-rated inattention.

Hₐ 4c: Following the FFL program, there will be no interaction between school and group on changes observed between pretest and posttest between the control group on teacher-rated hyperactivity/impulsivity
H₄ 4d: Following the FFL program, there will be no interaction between school and group on changes observed between pretest and posttest between the control group on self-rated inattention.

H₄ 4e: Following the FFL program, there will be no interaction between school and group on changes observed between pretest and posttest between the control group on self-rated hyperactivity/impulsivity.

The results of the analysis on the main effects for time are presented first to establish if changes are observed on the dependant variables regardless of group, or levels of the independent variable. This is followed by analysis of the Time x Group interaction, which addresses Questions 1 and 2. Question 3 is addressed by the analysis for the Time x School interaction and Question 4 is addressed analysis of the Time x School x Group interaction.

**Time Main Effects**

As shown in Table 4.5, the multivariate main effect for the within-subjects variable Time is presented first, and is not significant on all four test statistics, \( F(5,49) = 1.403, p = .240 \). This indicates that when pooled together participant scores on the DV’s did not change as a function of time regardless of group. Therefore, univariate results are not evaluated for the main effects for time on the individual DVs.
Table 4.4.

*Multivariate Effects*

<table>
<thead>
<tr>
<th>Within Subjects Effect</th>
<th>Value</th>
<th>F</th>
<th>Hypoth. df</th>
<th>Error df</th>
<th>p</th>
<th>Partial $\eta^2$</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>.125</td>
<td>1.403</td>
<td>5.000</td>
<td>49</td>
<td>.240</td>
<td>.125</td>
<td>.452</td>
</tr>
<tr>
<td>Time x Group</td>
<td>.100</td>
<td>1.090</td>
<td>5.000</td>
<td>49</td>
<td>.378</td>
<td>.100</td>
<td>.354</td>
</tr>
<tr>
<td>Time x School</td>
<td>.217</td>
<td>2.722</td>
<td>5.000</td>
<td>49</td>
<td>.030</td>
<td>.217</td>
<td>.775</td>
</tr>
<tr>
<td>Time x Group x School</td>
<td>.292</td>
<td>4.044</td>
<td>5.000</td>
<td>49</td>
<td>.004</td>
<td>.292</td>
<td>.928</td>
</tr>
</tbody>
</table>

*Note.* P values less than .05 are denoted in boldface. Partial $\eta^2$ = Partial Eta Squared

**Time x Group Interaction**

The multivariate effects for the Time x Group interaction, are not significant for all four statistics (Table 4.4), $F(5,49)=1.090, p=.378$, indicating that significant differences in change from pretest to posttest were not observed between the intervention and control group. Therefore, univariate results are not evaluated for the interaction between time and group on the individual DVs and the null hypotheses for Research Questions 1 and 2 cannot be rejected.

**Time x School Interaction**

The multivariate effects for the School x Time interaction were significant all four multivariate tests (Table 4.4), $F(5, 49)=2.722, p=.03, partial \eta^2=.217, power=.775$. This indicates that differences in changes from pretest and posttest scores are dependent on school. Univariate outcomes provide further analysis as the nature of this interaction. To adjust for unequal sample sizes, Type III sums of squares are used. Univariate outcomes
(Table 4.5) for the School x Time interaction show that significant differences are found for the dependent variable self-rated inattention only, $F(1, 440)=7.137$, $p=.010$, $n^2=.345$, \( power=.746 \).

Table 4.5.  
Univariate Effects

<table>
<thead>
<tr>
<th>Source</th>
<th>Measure</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>F</th>
<th>P</th>
<th>Partial $\eta^2$</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time*</td>
<td>Self-awareness</td>
<td>130.820</td>
<td>1</td>
<td>3.040</td>
<td>.087</td>
<td>.054</td>
<td>.402</td>
</tr>
<tr>
<td>School</td>
<td>Self-rated inattention</td>
<td>440.387</td>
<td>1</td>
<td>7.137</td>
<td>.010</td>
<td>.119</td>
<td>.746</td>
</tr>
<tr>
<td></td>
<td>Self-rated hyperactivity/impulsivity</td>
<td>171.497</td>
<td>1</td>
<td>1.752</td>
<td>.191</td>
<td>.032</td>
<td>.255</td>
</tr>
<tr>
<td></td>
<td>Teacher-rated inattention</td>
<td>7.094</td>
<td>1</td>
<td>.133</td>
<td>.717</td>
<td>.003</td>
<td>.065</td>
</tr>
<tr>
<td></td>
<td>Teacher-rated hyperactivity/impulsivity</td>
<td>36.544</td>
<td>1</td>
<td>.907</td>
<td>.345</td>
<td>.017</td>
<td>.155</td>
</tr>
<tr>
<td>Time*</td>
<td>Group*</td>
<td>Self-awareness</td>
<td>295.015</td>
<td>1</td>
<td>6.857</td>
<td>.011</td>
<td>.115</td>
</tr>
<tr>
<td>Group*</td>
<td>Self-rated inattention</td>
<td>4.324</td>
<td>1</td>
<td>.07</td>
<td>.792</td>
<td>.001</td>
<td>.058</td>
</tr>
<tr>
<td>School</td>
<td>Self-rated hyperactivity/impulsivity</td>
<td>349.493</td>
<td>1</td>
<td>3.570</td>
<td>.064</td>
<td>.063</td>
<td>.458</td>
</tr>
<tr>
<td></td>
<td>Teacher-rated inattention</td>
<td>54.588</td>
<td>1</td>
<td>1.023</td>
<td>.316</td>
<td>.019</td>
<td>.168</td>
</tr>
<tr>
<td></td>
<td>Teacher-rated hyperactivity/impulsivity</td>
<td>28.399</td>
<td>1</td>
<td>.705</td>
<td>.405</td>
<td>.013</td>
<td>.131</td>
</tr>
</tbody>
</table>

Note: $p<.05$ denoted in boldface

No significant changes were found for self-awareness, self-rated hyperactivity/impulsivity, teacher-rated inattention, and teacher-rated hyperactivity/impulsivity. The null hypothesis for Question 3 is rejected for self-rated inattention, which indicates that the rate of change from pretest to posttest on self-rated inattention differed between School A and School B. The effect size for this interaction is small to moderate. In order
to aide in interpretation of this outcome, it is useful to analyze profile plots. Figure 4.1 shows the profile plots based on estimated marginal means for the School x Time interaction. The profile plot shows that for self-rated inattention, School A is higher at pretest and decreases from Time 1 to Time 2, whereas school B increases moderately.

![Figure 4.1. Time x School interaction profile plot: Self-Rated Inattention.](image)

**Time x School x Group Interaction**

The multivariate effects for the Time x School x Group interaction, all four multivariate tests were significant (Table 4.4), $F(5, 49)=4.044, p=.004$, $partial \, n^2=.292$, $power=.928$, indicating that differences observed between pretest and posttest scores is dependent on an interaction between group and school. The effect size for this interaction is small.

Univariate outcomes provide further analysis of the interaction effect. To adjust for unequal sample sizes, Type III sums of squares are used. Univariate outcomes (Table 4.5) show that significant differences are found for the dependent variable self-
Awareness only, $F(1, 295)=6.857, p=.011$, with non-significant results for self-rated inattention, self-rated hyperactivity/impulsivity, teacher-rated inattention, and teacher-rated hyperactivity/impulsivity. The null hypothesis for question 4 is rejected for self-awareness, indicating that differences observed between intervention and control groups between pretest to posttest is a function of school.

Multiple comparisons were conducted to determine the nature of the interaction with Bonferroni’s correction applied to adjust for inflated Type I error (Table 4.6). Significance was found for the comparison between the control group for School A and the control group for School B only, mean difference $=13.0174, p=.003$, indicating these two groups changed on self-awareness at different rates between pretest and posttest.
Table 4.6

*Multiple Comparisons*

<table>
<thead>
<tr>
<th>Measure</th>
<th>(I) Group x School x Time</th>
<th>(J) Group x School x Time</th>
<th>Mean Difference (I-J)</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Awareness</td>
<td>Intervention School A</td>
<td>Control School A</td>
<td>-6.4327</td>
<td>3.37182</td>
<td>.371</td>
</tr>
<tr>
<td></td>
<td>Intervention School B</td>
<td>Control School B</td>
<td>-6.5847</td>
<td>3.07404</td>
<td>.221</td>
</tr>
<tr>
<td>Control School A</td>
<td>Intervention</td>
<td>School A</td>
<td>6.0653</td>
<td>3.04799</td>
<td>.311</td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>School B</td>
<td>6.5847</td>
<td>3.07404</td>
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<td>School B</td>
<td>-13.0174*</td>
<td>3.48664</td>
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</table>

*Note.* P<.05 are denoted in boldface, Bonferroni’s correction applied. SE= Standard Error.

In order to aide in interpretation of the interaction effect, it is useful to analyze profile plots. Figure 4.2 depicts the profile plot based on estimated marginal means (see Appendix B) for self-awareness, which shows that compared to the control group for School B, the control group for school A is higher on self-awareness at pretest and increased significantly from pretest to posttest. The control group for School B decreased slightly from pretest to posttest.
Summary

RM MANOVA was used to analyze the research hypotheses. The results are summarized first in order of analysis, then in response to each research question. The dependent variables, teacher-rated inattention, teacher-rated hyperactivity/impulsivity, self-rated inattention, self-rated hyperactivity/impulsivity, and self-awareness, were analyzed by RM MANOVA with two between-subjects factors, group (intervention and control) and school (School A and School B) across two time points (time 1, pretest; and time 2, posttest) as the within subjects factor. The main effects were not significant for time nor for the interaction between time and group. However, significant effects were found for the Time x School interaction and for the Time x School x Group interaction. Univariate effects for the School x Time interaction were significant for self-rated
inattention. Profile plots of the predicted means (Figure 4.1) show that at pretest the participants in School A rated themselves as higher on inattention compared to participants from School B, and that ratings decreased from pretest to posttest, where School B increased from pretest to posttest. Univariate effects for the Time x School x Group interaction were significant for self-awareness. Multiple comparisons between groups found that this interaction was only significant for the changes from pretest to posttest between control group from School A and the control group from School B. Profile plots based on predicted means (Figure 4.2) shows that the control group from School A increased from pretest to posttest whereas the control group for school B decreased slightly.

**Question 1: Will behavioral risk factors (inattention and hyperactivity) decrease following completion of the FFL program?** The results of the analysis show that behavioral risk factors, inattention and hyperactivity/impulsivity, did not decrease significantly for the intervention group compared to the control group following the FFL program.

**Question 2: Will social emotional skills (self-awareness) increase following completion of the FFL program?** The results of the analysis show that self-awareness did not significantly increase for the intervention group compared to the control group following the FFL program.

**Question 3. Will there be no significant differences in changes observed from pretest to posttest on behavioral risk factors and social emotional skills between the two schools participating in the research study?** No significant differences were found
in changes from pretest to posttest between the two schools on self-rated hyperactivity/impulsivity, self-awareness, teacher-rated inattention, and teacher-rated hyperactivity/impulsivity. However, there was a significant difference for self-rated inattention, where as School A decreased or improved on self-rated inattention compared to School B.

Question 4. Is there an interaction between school and group on changes observed between pretest and posttest on behavioral risk factors and social emotional skills? There were no significant interactions between school, group, and time on teacher and self-rated inattention and hyperactivity/impulsivity. However, differences were found on self-awareness, specifically between the two control groups. The control group in School A increased significantly on self awareness compared to the control group in School B.
Chapter 5.

Discussion

The purpose of this study was to explore the impact of a mindfulness-based yoga and nutrition program on social-emotional skills and behavioral risk factors related to psychosocial well-being for children in an urban school located in low income neighborhoods. The catalyst for this study was the researcher’s interest in yoga and mindfulness and desire to contribute to the paucity of research on school-based mindfulness programs. Theoretical perspectives of mindfulness as a skill that facilitates other skills, informed this study and development of the research questions.

This study aimed to extend current school-based mindfulness research by evaluating a teacher-facilitated program requiring little training within the context of a quasi-experimental design. A pilot study evaluating the FFL program found improvements to teacher-rated inattention and student-rated hyperactivity/impulsivity. Extending the pilot study, the current study evaluated the FFL program on self-awareness as well as teacher and student rated inattention and hyperactivity/impulsivity, for students in public urban schools in low income neighborhoods.
To evaluate the research questions RM MANOVA was used. While the findings provide an array of information, they must be interpreted in the context of the sample, the schools in which the research takes place, and the limitations of the study design. The quantitative findings are addressed alongside plausible explanations of the findings in relation to current research, anecdotal notes regarding study and intervention implementation, and relevant school-based factors. The discussion focuses on the behavioral risk factors (Question 1) and then the social-emotional skills (Question 2). The differences (or not) by school (Question 3) and between school and group (Question 4) are discussed within these sections.

**Behavioral Risk Factors: Impact of the FFL Program**

The first research question hypothesized that behavioral risk factors, self and teacher-rated inattention and hyperactivity/impulsivity, would decrease following participation in the FLL program. The findings of the data analysis found that the intervention group did not decrease from pretest to posttest on either teacher-rated or self-rated measures of inattention or hyperactivity/impulsivity when compared to the control group. In fact, when only time (pretest and posttest) and group (intervention and control) where included in the analysis, neither group changed significantly on any of the measures. However, when school was factored into the analysis, an interaction effect emerged between school and time for self-rated inattention.

In further evaluating the Time x School interaction, analysis of profile plots and predicted means found that School A decreased, or improved, on self-rated inattention, whereas School B increased slightly from pretest to posttest. While this finding does not
point to any changes as a result of the FFL program, this finding suggests that school-level factors impacted students’ ratings of inattention. Further analysis of school level factors aide in interpreting the results and challenges or limitations of the study as a whole. When looking specifically at the outcomes related to self-rated inattention, it is likely that factors that are unique to School A contributed to improvements in self-rated inattention, and it is also plausible that factors specific to School B mediated improvements that might be expected naturally as a function of time. Developmentally, we would expect increases in attention and executive functioning capabilities as children get older (Mezzacappa, 2004). The available demographic data of the sample and the two schools provides insight to factors might be contributing to differences between the schools. The sample consisted of a relatively equal distribution across gender and similar mean ages between the schools. Differences between the groups becomes apparent when considering differences between the schools themselves. School B is one of the lowest performing schools in the state, which is reflected in its designation as a priority school. Research shows that high levels of inattention is associated with and poor academic performance. (Barry, Lyman, & Klinger, 2002; Finn, Pannozzo, & Voelkl, 1995). School A is not a high performing school, but comparatively to School B, its designation as a focus school indicates that it fairs better on measures of student academic performance. Research suggests that differences in academic performance might be related to the differences in self-rated inattention observed between the schools.

Further analysis of profile plots for the Time x School x Group interaction provides additional insight into data trends and when discussed within the context of
limitations of the study, provide guidance for further research. Further evaluation of the profile plots for the Time x School x Group interaction (Appendix C) shows that consistent with the results of the Time x School interaction, self-rated inattention for both the control group and intervention group in School A decreased. For School B, the intervention group remained unchanged but the control group increased (worsened slightly). For self-rated hyperactivity/impulsivity, visibly there appears to be a large decrease for School A’s intervention group from pretest to posttest compared the other groups. For teacher rated hyperactivity/impulsivity, the control group in school B appears to decrease (improve) whereas the rest of the groups remain unchanged. For teacher rated inattention, the same decrease is seen for the control group from School B, but a decrease is also seen for the intervention group in School A. The trends in the data seen on the profile plots may pinpoint factors that may be contributing to these findings. The apparent decrease for the intervention group for School A on self-rated hyperactivity/impulsivity and teacher rated inattention were not found to be significant changes, but this trend is consistent with the results of the pilot study (Klatt & Kaye, 2014), which found significant changes on these outcomes.

**Social-Emotional Skills: Impact of the FFL Program**

The second research question explored the impact of the FFL program on self-awareness. Based on preliminary research pointing to benefits of mindfulness for social-emotional competence, this study hypothesized that social emotional skills (self-awareness, self-management, and goal directed behavior) would increase following participation in the FFL program. Due to a need to reduce dependent variables, only self-
awareness was included in the data analysis. Again, no significant results were found between the intervention and control groups until school was included in the analysis. The interaction between school, time, and group found significant changes on self-awareness. Further analysis found that the control group in School A increased from pretest to posttest, specifically when compared to the control group from School B. No significant changes were observed for any other group in either school.

The increase observed for the control group in School A may be due to several factors. The control group in School A is the smallest of the four groups, meaning that this particular group may be less representative of the entire class. Self-awareness skills can develop dramatically in middle childhood (Eccles, 1999). It is possible that factors that developmental factors that contribute to maturation in self-awareness also related to factors that made the students more likely to return the consent forms for this group, creating a selection bias. Given that these differences are only observed in one control group classroom, it is also reasonable to conclude that classroom or teacher level factors are contributing to this finding; such as teacher perspectives variables or additional interventions or activities that were occurring in the classroom.

The control group in School A is the smallest of the four groups. The small $n$ for this group means that any changes observed in this group may be more susceptible to individual differences. For example, a significant increase on self awareness for a handful of participants that happens by chance is more likely to affect the data. Though the data was screened for outliers, a small $n$ in this group means that it is more difficult to detect
outliers or determine extreme scores because the participants are not necessarily representative of the whole group or classroom.

From the researcher’s perspective, there are also notable differences between the climates of the two schools that has particular implications for mindfulness programming as well as psychosocial well-being. School climate of the participating schools is discussed in more detail later in this chapter, within the context of challenges of study implementation. But in short, School A’s climate is viewed as generally calm and positive (e.g., calm hallways, positive staff/student communication), whereas School B is viewed as stressed and at times erratic (e.g., yelling in the hallways, negative communication style). The differences in school climate may directly impact some of the dependent variables of interest. For example, schools with positive school climates support students’ social emotional learning as well as mental and physical health (Thapa, Cohen, Higgins-D’Alessandro, & Guffey, 2012).

Limitations

Several reasons could be contributing to these findings not being significant that relate to limitation of this study as a whole. Notable limitation exists in this study both due to study design and challenges that arose in implementation of the study and the intervention. The first being sample size. A priori power analysis found that more than 40 participants for two groups and seven dependent variables would provide sufficient power. However, due to the inclusion of school in the data analysis, four groups were formed significantly reducing the number of participants per group. As evidenced by preliminary analysis, the addition of school in the data and reduction of dependent
variables did increase the observed power for many of the outcomes due to an increase in explained variance. However, in order to detect small but significant changes and reduce error, at least 20 participants in each of the groups is recommended. Therefore, differences that visually appear on profile plots might not result in significance due to variability in the scores.

Several notable limitations arose with respect to instrumentation in this study. One is the extent to which instrumentation captures true differences between groups at pretest and whether these differences are factored out when calculating posttest impact estimates. Ratings are subjective and likely impacted by mood of the rater, timing, and other biases or factors. For example, because many students had difficulty reading the items, for the student ratings the researcher read aloud all the questions for the students in each class. This was done for at both pretest and posttest in each classroom. Many students had questions about the meaning of certain vocab words on some of the rating items (e.g., strict). The students also had difficulty with the small print of the rating scale and circling their response on the correct line. Due to this, the researcher stayed in close proximity to students who appeared to have difficulty with this and assisted them in finding the correct line. Though it is likely that this was not corrected for all students having this issue (as indicated by missed items). Further, the close proximity of the researcher to the students when completing their responses may have influenced their responses. Further, repeated exposure to the rating scale may have resulted in increased understanding and accuracy in completing the ratings at pretest. These issues suggest
limitations in the degree to which student ratings are a true depiction of their perceptions of their inattentive and impulsive/hyperactive behaviors.

Another issue with instrumentation in this study is a result of inconsistency implementation that extended the time period in which the FFL program was implemented for School B. Both posttest periods were scheduled to occur immediately after the intervention group completed the program in that school, but for School B this occurred several weeks later creating variability in the time between pretest and posttest. Lastly, teacher related variables may have also affected instrumentation. For the teacher rated inattention and teacher rated hyperactivity/impulsivity, a decrease is observed for the control group in School B. This decrease, or improvement observed by the teacher maybe in part be due to the teacher being out of the classroom for personal reasons. This particular teacher was out of the classroom frequently due to personal health issues, and it is possible that her perceptions of the students’ behavior was impacted by less direct contact with the students.

Consistency in implementation of the FFL intervention is a notable limitation, particularly for School B. The intervention took place in the winter months in a Midwestern city. During this intervention period, seven calamity days were used by the district for inclement weather and in combination with previously scheduled days off (i.e. parent teacher conferences), there were two weeks where the students were in school as little as one or two days a week. All intervention groups were instructed to make up any days missed (extending the intervention across a longer time period), and in some instances two sessions occurred in one day. For School A, the intervention group teacher
completed the implementation log, indicating when each session was completed. All sessions were completed for this group, but the number of days missed meant that implementation of the intervention deviated from the way it was designed.

Above and beyond days off school, additional factors contributed to School B’s ability to implement the intervention consistently and possibly how much the students were able to benefit from the intervention. During the intervention period, School B participated in the norming process for a newly developed national assessment for academic achievement (School A was not involved in this process). And while the student’s performance on this norming process was not “high stakes” meaning it was not included in school report cards for that year, there still appeared to be high levels of stress associated with this process. The test was designed to be exclusively administered online and subsequently additional time was spent on training staff and students on test taking procedures and working out technological logistics. This processes occurred in tandem with the many of the calamity days, resulting in daily schedule changes and extremely limited instructional time during this period. Despite these challenges to consistency in implementation, this is not altogether inconsistent with implementation of interventions, school-wide or classroom-wide in particular, in the school setting. In general, it is expected that interventions are interrupted given the various planned or unplanned that often arise in the school setting (e.g., calamity days, state testing, parent-teacher conferences). Research in school psychology recognizes the common occurrence of such factors in schools and the importance of their consideration in the study of interventions,
as various contextual factors are likely to facilitate or constrain intervention effectiveness (Kratochwill, 2007).

Policy in this state is that students are required to pass a state test in reading during the third grade in order to advance to fourth grade. Thus, there is added pressure placed on third grade teachers and students alike. Anecdotally, a notable increase was observed in the stress level of the teachers in School B when more and more instructional time was cut due to the norming process and missed days of school. As a result, the two intervention teachers in School B asked for more support in implementing the intervention in their classroom. The teacher, principal, and I agreed that I would support the teachers by facilitating the longer 45 min session (nutrition component) for study participants during recess time to allow the teachers time to address other needs on that day. I raised concern with this plan because I feared that the students would view the loss of “free time” during recess as punishment. I facilitated the nutrition session (day 1) for intervention weeks 4-6, while the 10 minute sessions on the remainder of the four days continued to occur in the classroom setting as designed, with the classroom teacher facilitating. Feedback from the students was that they wanted their recess back and mixing of classes caused challenges with behavior management. All of these factors distracted from the intervention and appeared to limit student engagement more so than what might have occurred in the typical classroom environment. Through conversation with the teachers and administration, the nutrition component of the intervention was moved back into the classroom for weeks 7 and 8. The challenges that occurred in School
B contrast with School A, which needed no support from me, aside from preparing the materials needed for the intervention.

There has been some research to support the hypothesis that school-based factors may impact intervention effectiveness. For example, school adversity (i.e. high levels of aggression, percentage of student mobility, and low income students) and factors associated with school adversity such as teacher stress may have differential effects on intervention effectiveness (Hughes, Cavell, Meehan, Zhang, & Collie, 2005). Hughes and colleagues (2005) found that programs universal programming, targeting ecology of peer interaction was more effective than an intervention only targeting student skills on aggression for students from high adversity schools. School climate has also been found to be a moderator in school-based interventions. Dymniki (2014) evaluated the impact of school climate on a universal violence prevention program and found that the intervention was less effective in distressed climates, whereas the intervention was more effective in conducive climates, and moderately effective in average climates.

School climate is hypothesized to have been a factor in this study and in particular differences between the climates of the two schools. A school’s climate has a major impact on a school’s capacity to engage learners and promote academic and life success. For example, Wang (2009) found that climate factors such as promotion of autonomy and teacher emotional support, were negatively related to adolescent behavior and depression. Social emotional competence was a mediator for perceived school climate and adolescent adjustment. Because I was completing my internship in both schools, I spent a fair amount of time in the schools and had an opportunity to experience the climate of the
school over the course of the school year the study took place. The climate between School A and B appeared to differ in many ways. For School B, staff tension existed between staff members perceived by others as getting in the way of progress. High levels of social-emotional and behavioral needs of the student population, barriers to learning associated with poverty, and the culture of violence in the neighborhood placed strain on the staff and students. I observed frustration related to feelings of ineffectiveness in meeting student needs as well as pressure to produce change in spite of ongoing unmet meets. The school has a reputation as being a school with “behavior issues”. Parent-school connectedness was poor and adversarial and there was recent staff and administration transitions due to school failure. Overall the climate appeared stressed and at times erratic. The climate in School A is in contrasted with School B in many ways. School A also went through administration transition during the 2014-2015 school year; however, this was due to principal retirement and not due to school failure and most of the staff has been at the school for many years. Parent engagement is stronger and the overall feeling of the school is welcoming and generally calm.

Conclusion

In sum, findings in the data analysis did not support the research hypotheses. And while, further analysis of the profile plots may provide greater insight into the study outcomes caution is taken in interpreting non-significant findings without further research. The intervention groups did not increase significantly on the self and teacher-rated inattention and hyperactivity/impulsivity or teacher rated self-awareness compared to the control groups following participation in the FFL program. According to the data
analysis, school was found to be contributing factor to changes observed over time on self-rated inattention and self-awareness. Differences between the two schools and lack of change observed for the intervention group following the FFL program is hypothesized to be related to several factors including; school climate, selection bias of participants, challenges in instrumentation, and possibly additional unknown variables. Sample size may have impacted ability to detect smaller but significant changes and issues with consistency in implementing the FFL program may have limited the degree of benefit the participants received.

Implications for School Based Practitioners

Despite the lack of findings in support of the research hypotheses, there is still important information that can be gleaned from this study. A truly unique aspect of the FFL program is the use of a DVD as the method of intervention delivery, and the results of the present study suggests that further research may be needed on factors that may facilitate or constrain the effectiveness of similar interventions. The present study aimed to address gaps in the literature by examining outcomes related to psychosocial well-being of a mindfulness-based program that is (a) cost effective and pragmatic for the lay teacher who may not have extensive mindfulness experience, (b) empirically validated for urban low income and racially diverse population of students, and (c) evaluated within a strong methodological research design. However, unforeseen issues and challenges limit the ability of this study to address these research gaps. This study does, however, suggests that school-level factors should be considered when implementing
mindfulness intervention in schools and that, for brief mindfulness interventions, consistency may be key.

The need for comprehensive education that focus on the mental and physical health of students as well as academic growth is underscored by alarming trends regarding the well-being of our nation’s youth. Most children who need mental health services do not receive the care they need, with income and race further impacting access to care (Ringel & Sturm, 1998). Ongoing mental and physical health needs are confounded by exposure to violence, trauma, and/or chronic stress. In order to meet these needs and increase access to care, intervention and prevention needs to occur in the schools. According to the Model for Comprehensive School Psychology Services, school psychologists should engage in mental health services that increase social and life skills and promote school-wide preventative services and programs that support learning (NASP, 2010). Included within the realm of mental health, are classroom-wide interventions aimed at decreasing risk factors and increasing protective factors for psychological well-being. The available school-based mindfulness research supports the inclusion of mindfulness in educational settings and suggests that mindfulness programs may be beneficial in decreasing behavioral risk factors and increasing protective factors for psychosocial well-being (Birdee, et al., 2009; Greenberg & Harris, 2012; Kaley-Isley, et al., 2010). The potential for mindfulness to bolster resiliency for children and youth aligns mindfulness with social justice perspectives and meeting unmet needs of students in school. However, the research available research is limited by methodological issues such as few quasi experimental and true experimental studies, small sample sizes,
lack of replication studies, and variability in outcomes and measures used. The research is further limited by lack of clearly defined theory of change, isolation of essential intervention components, factors that are conducive to intervention effectiveness, as well as how such intervention are transported to the reality of the school setting.

Burke’s (2010) discussion on the potential issues of teacher training in mindfulness interventions is relevant for this study. Burke argues that lack of teacher training for mindfulness programs may be an issue, though may be less critical in this context where interventions are not intensive programs. The current study implemented a relatively brief classroom-wide mindfulness intervention and did not find impact on the outcomes of interest. The FFL pilot study found significant decreases in teacher-rated hyperactivity/impulsivity and student-rated inattention, suggesting that the program may be an effective intervention for addressing behavioral risk factors (Klatt & Kaye, 2014). However, the question remains, what conditions might be necessary for students to benefit from the program. Because assessment of climate of the schools in this study was gathered anecdotally by the researcher, speculation as to the impact of school climate is difficult. However, it is possible that a positive school climate and certain aspects of school climate in particular are more conducive to mindfulness interventions. While no research was found on the relationship between school climate and the effectiveness of mindfulness interventions for children, some research suggests these general constructs may be related. One study found that faculty trust, a dimension of school climate, was related to school mindfulness (Hoy, Gage, and Tarter, 2006). Similarly, a dissertation study found that an enabling school structure (i.e. high collaboration, trust, and
innovation between faculty) was related to teacher perceptions of school mindfulness (Watts, 2009).

Burke (2010)’s argument that teacher training may be less important when considering brief interventions may be correct, but a certain degree of positive school climate or “mindfulness” of a school may be needed in order for such brief interventions to be effective. As disused in chapter 2, mindfulness is both considered to be a skill that facilitated other skills, but also a state of being. There may be a threshold of “mindfulness’ in classroom or school climate that may be needed in order for brief interventions such as the FFL program to beneficial. More intensive or longer programs may be less affected by these factors but would likely require more training as well as a personal mindfulness practice of the facilitator as Burke suggests.

For school-based practitioners interested in implementing mindfulness programming or interventions in their school, this study points to potential factors that should be considered. First, for teacher facilitated and brief programs, consider capacity of the teachers to implement the program in a consistent manner and timing of the intervention. In instances where school-based or classroom-based factors may be problematic, consider more comprehensive programs that target mindfulness of teachers, staff, and students alike. In high stress environments, school-wide interventions that address teacher self-care and promote a more mindful and positive school climate might be more appropriate.

Another consideration for school based practitioners is the need for consistency in implementation of brief mindfulness interventions. Very little attention in the research
has been paid to determining the amount of intervention, or dosage, that is needed to produce benefit. Providing some insight, a review conducted by Kayley-Isley and colleagues (2010) found that for children with ADHD, six to eight weeks of weekly sessions or approximately 20 hours of intervention time may be needed for benefits to manifest and greater benefit is seen with additional home practice. The FFL provides approximately 12 hours of intervention time over the course of eight weeks. Benefit was found for the FFL on the pilot study (Klatt and Kaye, 2014) and for a similar intervention, MIL (Klatt et al., 2013). For such brief intervention, opportunities for consistent practice may be key in producing positive outcomes.

**Recommendations for Future Research**

Using the key questions or targeted areas for future school-based mindfulness research suggested by Meiklejohn and colleagues (2012), the results of this study along with the associated challenges and limitations provide guidance for future research. These targeted areas include conceptualizing mindfulness from a behavioral, cognitive, or bio-behavioral perspective, or from the perspective of executive function; identifying essential intervention activities and processes common to mindfulness practices with children and youth; identifying short- and long-term outcomes; identifying what mechanisms link mindfulness practices to these outcomes; and determining how much mindfulness practice is necessary to predict a certain outcome in different age groups.

As evidenced by the findings of this study, future school-based mindfulness research should include assessment of school-based and classroom-based factors in order to determine what factors mediate or facilitate outcomes. Factors such as school climate,
may be more relevant for brief interventions and by including school climate measures future research can work towards identifying particular school climate components that may be important perquisites for brief mindfulness intervention.

There are few studies that include racial and economic demographics of the participants and only a handful of studies have been conducted that evaluate mindfulness programs with urban, economically, and ethnically diverse populations. Given the limitations of the present study, the results cannot be generalized beyond the sample and thus it would be inappropriate to conclude that the FFL program is not effective for this population. Rather, future research should include diverse populations of students to determine differences that exist that may be related to race, ethnicity, or socioeconomic status. Additionally, evaluating mindfulness programs in various types of school settings (suburban/urban, private/public) helps to identify environmental factors that may impact intervention effectiveness.

Dosage should also be considered. Meiklejohn and colleagues (2012) suggest that we need to determine how much mindfulness practice is needed to facilitate outcomes. The answer to this question likely varies depending on the intended purpose of the intervention (i.e., classroom vs more intensive mental health treatment), but in addition to intervention time, consistency in implementation should be considered in future research. Future research on manualized programs allows for more direct comparison on both intervention time and consistency.

In sum, school-based mindfulness research suggests positive outcome for students and preliminary studies have found benefit of brief mindfulness program on students’
classroom behavior. The development of teacher facilitated mindfulness programs offers a practical approach for integrating mindfulness program in the general classroom setting. Limitations of the current study inform future lines of inquiry through analysis of school based factors and issues with intervention consistency that may interfere with effective of mindfulness interventions. Additionally, this study provides an important contribution by illustrating the need to examine classroom and school-wide characteristics, such as teacher stress or school climate, that might impact the effectiveness of a mindfulness intervention.
References


# Appendix A. School Based Mindfulness Programs

## Table A.1

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<tr>
<th>Program and Research</th>
<th>Program Focus</th>
<th>Program Participants</th>
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<tbody>
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<td><strong>The Mindfulness in School Project</strong> (Huppert &amp; Johnson, 2013)</td>
<td>Mindfulness, MBSR, Breath awareness</td>
<td>Elementary X  Middle X  High X  Teacher/Admin. X  Parents X</td>
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<td><strong>CARE for Teachers</strong> (Jennings et al., 2013)</td>
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Note: Adapted from The Contemplative Education Program Database, by The Garrison Institute, 2015, retrieved from [http://www.garrisoninstitute.org/contemplative-education-program-database?resetfilters=0](http://www.garrisoninstitute.org/contemplative-education-program-database?resetfilters=0).
# Appendix B. Estimated Marginal Means

## Table B.1

<table>
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Note: SE = Standard Error.
Appendix C. Time x School x Group Interaction Profile Plots