EFFECTS OF A MINDFULNESS-BASED PROGRAM ON CHILDREN'S SOCIAL SKILLS, PROBLEM BEHAVIOR, AND EMOTION REGULATION

by

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ABSTRACT

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This quasi-experimental wait-list control study examined the effects of a mindfulness-based program on students in two open-enrollment public charter schools located in a mid-sized urban city. Participants (n=176) were 3rd through 6th grade students. Students were identified as 54% Hispanic/Latino, 39% African American, and 7% other (e.g., White, Asian, American Indian). Three classrooms at each school served as the treatment group, and three classrooms at each school served as the control group, for a total of 12 participating classrooms. Students and teachers reported on students' social skills, problem behavior, emotion regulation, and mindfulness before and after the program. The mindfulness program was taught twice a week for 10-weeks. Each session lasted approximately 20 minutes and was implemented in all six treatment classrooms by a trained mindfulness instructor. Multivariate analysis of covariance (MANCOVA) and analysis of covariance (ANCOVA) were the primary methods of analyses. After controlling for pre-treatment levels of each variable, gender, and age, results indicated no significant differences in student-reported social skills, problem behavior, or mindfulness between the treatment and control groups. Teachers reported no significant differences between the control and treatment groups' emotion regulation, empathy, engagement, self-control, externalizing, and internalizing at

post-test. However, teachers did report significantly higher cooperation and significantly lower hyperactivity/inattention for children in the treatment group at post-test. Interaction effects of gender by treatment group indicated males in the treatment group appeared to benefit significantly more than females in the treatment group in terms of hyperactivity/inattention. In addition, the effects of problem type were analyzed in an exploratory manner. Implications of this study suggest mindfulness may have particular utility to improve children's cooperation and reduce hyperactive and inattentive symptoms specifically for males. Although more research is needed, results also indicated that mindfulness may have particular utility as a universal intervention. After the implementation of the mindfulness program, children with externalizing and internalizing problems appeared to have levels of emotion regulation that were not significantly different from their typical peers.

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CHAPTER ONE

Introduction

Social-emotional learning (SEL) programs are increasingly becoming a standard practice in K-12 education. Evidence suggests SEL programs improve student outcomes in behavior, socioemotional skills, and academic performance (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). SEL programs also have demonstrated positive effects specifically in urban-contexts when compared with targeted small-group interventions. In a meta-analytic study that examined social-emotional interventions with children and adolescents in low-income, urban-schools, a moderator analysis examining level of intervention (small group vs. universal programs) revealed negative effects for small groups that targeted specific problems and positive effects for universal programs (Farahmand, Grant, Polo, & Duffy, 2011). This phenomenon was particularly true for externalizing problems, which commonly escalate when small group interventions targeting such behavior are implemented with similar peers (Dishion, McCord, & Poulin, 1999). For this reason, SEL programs implemented universally may demonstrate unique power in preventing and ameliorating behavioral health problems for both typically-developing students and students already experiencing deficits in socioemotional skills.

Preliminary findings suggest mindfulness-based programs are one such SEL program that hold promise in socioemotional prevention and intervention (Gouda, Luong, Schmidt, & Bauer, 2016; Zenner, Herrnleben-Kurz, & Walach, 2014). Mindfulness-based programs are thought to have particular utility within a school's tiered system of support specifically at the classroom level, which is often referred to as "universal programming," or Tier 1 (Felver, Doerner, Jones, Kaye, & Merrell, 2013). Due to the popularity of universal SEL programming and its potential unique contribution to preventing and ameliorating socioemotional problems, the focus of this study is on

the effect of a universally-implemented mindfulness-based program, called Growing Minds, on children attending two urban open-enrollment charter schools.

Definition of Mindfulness

Mindfulness is, "the cognitive propensity to be aware of what is happening in the moment without judgment or attachment to any particular outcome," (Napoli, Krech, & Holley, 2005, p. 99). Mindfulness-based programs aim to promote greater awareness of the present moment, including one's thoughts, sensations in the body, and emotions in order to better manage negative experiences (Lee, Semple, Rosa, & Miller, 2008). These programs integrate mindfulness practices such as meditation and body awareness in order to improve a person's ability to pay attention in the present moment and non-judgmentally (Kabat-Zinn, 2003).

Mindfulness-based programs in schools facilitate the practice of mindfulness, even though the term mindfulness can also be used to describe a state or trait (Brown & Ryan, 2003). The state of mindfulness is temporary, much like an emotional state and can be cultivated by the practice of mindfulness, such as mindfulness meditation. Trait-based mindfulness is mindfulness that is cultivated for longer-stretches of time and describes personality-based mindfulness that can also be cultivated by mindfulness practice. It is important to distinguish between these three different facets of mindfulness because the term mindfulness can be used interchangeably to describe the state, trait, and practice of mindfulness. This study is interested in the role that the practice of mindfulness has on children's socioemotional functioning as well as the impact mindfulness has on improving children's trait-based mindfulness.

Brief History of Mindfulness

Mindfulness is a 2,500-year tradition originating from Buddhism. Buddhism began in Northern India with the teachings of Siddhartha Gautama who later became known as "the

Buddha" or "awakened one." There are three major Buddhist schools: Theravada, Mahayana, and Vajrayana. Theravada was the first school developed chronologically and is commonly found in Thailand, Sri Lanka, Cambodia, and Burma. The Mahayana school is commonly found in China, Japan, Mongolia, Nepal, and Tibet. And, the Vajrayana school is a subset of Mahayana commonly found in Tibet, China, and Japan. The Buddha is believed to have discovered a path to free oneself from suffering, leading to 'enlightenment.' According to the teachings of the Buddha, mindfulness is just one piece of an eight-part path to enlightenment (Kang & Whittingham, 2010).

Mindfulness was first introduced to the West as a psychological practice in the 1970's by Jon Kabat-Zinn as part of a therapy called Mindfulness-Based Stress Reduction (MBSR). MBSR was developed to help individuals with chronic health conditions manage pain. Theravada Vipassana meditation, a type of meditation that leads to simple awareness and concentration on the present moment, most closely resembles the mindfulness meditation used by Kabat-Zinn in MBSR (for a more detailed historical account of mindfulness within the Buddhist tradition see Kang & Whittingham, 2010). Kabat-Zinn's MBSR program was originally designed to help individuals experiencing chronic pain. Since then, numerous secular mindfulness-based techniques, programs, and psychological interventions have emerged that target clinical levels of anxiety, depression, ADHD, and suicidal ideation. These programs are often referred to as 'third-wave' cognitive therapies. Prior to the 'third-wave' were the first- and second-wave therapies consisting of behavioral therapy and cognitive therapy, respectively. Third-wave therapies are often conceptualized as those that integrate metacognition, acceptance, and mindfulness (Hayes, 2016). Programs include Mindfulness-Based Cognitive Therapy (Segal, Williams, & Teasdale, 2012), Dialectical Behavioral Therapy (Robins, Ivanoff, & Linehan, 2001), and Acceptance and Commitment Therapy (Hayes, Hayes, Strosahl, & Wilson, 2012).

Although mindfulness is used as a tool to ameliorate clinical-level problems, it is also being used to help average individuals build a greater capacity to pay attention to inner thought and emotional processes, to disrupt unhelpful thought and behavioral patterns, and to reduce stress. Particularly since the turn of the new millennium, interest has grown within the field of psychology to not only heal mental illness, but to also build socioemotional competency in healthy individuals. The field dedicated to such interests is called Positive Psychology. The focus of Positive Psychology is to help all individuals build socioemotional skills that help them flourish. It includes the study of the positive aspects of human flourishing such as happiness, flow, positive relationships, and character strengths (Seligman & Csikszentmihalyi, 2014). The popularity of mindfulness is partly attributed to the increased interest and research within Positive Psychology and is seen as means to enhance well-being (Kashdan & Ciarrochi, 2013).

The Dalai Lama, a spiritual leader within the school of Tibetan Buddhism and believed successor to Buddhist masters, has frequently discussed the scientific study of mindfulness with leading researchers in the field of psychology. In 2000, at a conference with leading scientists and scholars in contemplative practices, the Dalai Lama endorsed the scientific study of secular mindfulness. He felt that if scientists demonstrated mindfulness had the power to help individuals with their destructive emotions, then it should be shared with those that may benefit. Coincidentally, around the same time, the popularity of mindfulness research and practice grew. As of 2017, there were approximately 6,800 published articles on mindfulness, with large increases in the number of published studies since 2014 (Goleman & Davidson, 2017). Although it would seem as though Buddhism, a religious practice, and the secular use and scientific study of mindfulness would be at odds, their aptly non-judgmental relationship can be best summarized in the following way by Williams & Kabat-Zinn (2011):

> The emergence within science and medicine of interest in Buddhist meditative practices and their potential applications represents a convergence of two different ways of knowing, that of western empirical science, and that of the empiricism of the meditative or consciousness disciplines and their attendant frameworks, developed over millennia. (p. 3-4)

Mindfulness with Youth

Mindfulness has gained a great deal of popularity in both clinical and school settings with adults, children, and adolescents. Extensive evidence has demonstrated that mindfulness is an effective psychological treatment for adults: It has been shown to improve perception of pain, depression, anxiety, compassion, and symptoms of ADHD (Brown & Ryan, 2003; Eberth & Sedlmeier, 2012; Gu, Strauss, Bond, & Cavanagh, 2015; Khoury et al., 2013). In addition, research has demonstrated that mindfulness is associated with changes in the brain that affect stress reactivity and immune functioning (Davidson et al., 2003; Davidson & McEwen, 2012). Because mindfulness has had such promising results for adults, researchers have examined whether or not the same effects are found for youth and youth in schools (Zenner et al., 2014; Zoogman, Goldberg, Hoyt, & Miller, 2015).

About 10-15 years ago, the first youth-focused mindfulness studies emerged (Napoli et al., 2005). Three separate meta-analyses have been able to combine effects of mindfulness specifically for youth and youth in schools (Klingbeil et al., 2017; Zenner et al., 2014; Zoogman et al., 2015). For example, Zenner et al. (2014) found mindfulness with youth led to large effect sizes for cognitive performance (Hedges' $g = 0.80$), small to moderate effect sizes for stress ($g = 0.39$) and resilience ($g = 0.36$), and small effect sizes for emotional problems ($g = 0.19$). A more recent meta-analysis of mindfulness with youth found the largest effects on measures of mindfulness ($g = 0.51$),

small to moderate effects on meta-cognition and cognitive flexibility (g = 0.40), and small effects on attention (g = 0.29) and emotion/behavior regulation (g = 0.32). General effect sizes were small for targeted therapeutic effects such as internalizing problems (g = 0.39) and negative emotions/subjective distress (g = 0.25). However, while there appeared to be small effect sizes for prosocial skills (g = 0.37) and externalizing problems (g = 0.30), neither were statistically significant (Klingbeil et al., 2017).

Although much research on mindfulness for youth has already been conducted, there is still a lot of work to be done. Zenner et al.'s (2013) meta-analysis called for additional research on mindfulness interventions for students living in low-SES urban communities. Only a few out of 24 studies included a sample of low-socioeconomic status (SES) students in an urban setting, and only one targeted social skills. In addition, many mindfulness studies in urban schools have had research design limitations such as small sample sizes or no control group (Sibinga et al., 2011). Thus, there is a need for more socioemotional intervention studies for students at risk for poor outcomes such as racial minority students living in urban poverty particularly because youth in low-income urban settings are at greater risk for psychological problems (Grant et al., 2004) and are susceptible to the negative effects of stress related to living in poverty in high-crime neighborhoods (Mendelson et al., 2010).

Growing Minds

A non-profit organization called Growing Minds developed a classroom-level mindfulness curriculum for children in schools. Their program is 10-weeks and is taught by a trained mindfulness teacher. A unique aspect of this particular mindfulness program is that students and teachers learn and practice mindfulness together. Session are 15-20 minutes, twice a week, for a total of 20 lessons that guide students and teachers through a series of standard mindfulness themes

and practices (see Appendix A). Each lesson falls into one of four categories: 1) focus and attention, 2) self-awareness and self-regulation, 3) thoughts and emotions, and 4) social skills and relationships. Teachers learn mindfulness alongside students and are asked to do short mindfulness exercises (<5 minutes) with students outside of Growing Minds instruction at least 4 times a day (Growing Minds Inc., 2015a).

Overview of Study

The aim of this study is to provide additional evidence, to a burgeoning field of research, related to the effects of Growing Minds on children's social skills, problem behavior, emotion regulation, and mindfulness. This is the first systematic study that examines the effectiveness of Growing Minds on specific socioemotional outcomes. Even with limited research, mindfulness programs, like Growing Minds, are already being used in schools in the U.S. and around the world (Bunting, 2014; Growing Minds Inc., 2015b; Zenner et al., 2014). Given the importance of implementing evidence-based interventions in schools (Elliott, Witt, Kratochwill, & Stoiber, 2002), researchers should carefully examine the specific school-related effects of mindfulness programs.

This study uses a quasi-experimental research design to examine the effects of the classroom-based Growing Minds program on 3rd-6th grade students in two urban open-enrollment charter schools. A trained mindfulness instructor implemented the intervention in six classrooms across two schools, and six classrooms across the same two schools served as the wait-list control. Specific outcomes of interest included students' social skills, problem behavior, emotion regulation, and mindfulness. Moderator analyses will specifically examine if the effect of the Growing Minds program on all dependent variables depends on gender. Additionally, a separate

analysis will examine whether effects on mindfulness and emotion regulation differ by problem type (i.e. internalizing vs. externalizing problems).

Potential Contributions of Study

It is believed that this study will contribute to the literature by introducing a new mindfulness program that is unique because of its approach to teaching mindfulness to both students and teachers. In addition, the Social Skills Improvement System (SSIS), which measures social skills and problem behavior, has strong reliability and validity but has never been used before to examine the specific effects of a school-based mindfulness program. As stated above, no study of mindfulness has been conducted for this specific population for these specific variables.

This study has important implications for schools, particularly those that are looking for information related to the socioemotional effects of the Growing Minds program on students in low-SES communities. Although Growing Minds is similar to other mindfulness programs that have been studied, this universal intervention has not been empirically examined. Growing Minds estimates that it has already implemented this program with 700 classrooms. Because it is already being used with thousands of teachers and students, there is a need to examine specific effects of the program on the population of students for which it is most commonly used.

CHAPTER TWO

Literature Review

This study evaluates the effectiveness of Growing Minds, a mindfulness program developed with the intention of creating calmer and kinder classrooms (Growing Minds Inc., 2015b). This literature review will begin by outlining two theories that propose the mechanisms of change underlying mindfulness programs like Growing Minds. Then, the Growing Minds program will be explained within the context of these theories.

Growing Minds is primarily implemented in urban schools, which are the focus of this study. For this reason, special consideration is given in the literature review to prior mindfulness studies conducted in urban schools. Next, the literature review will point out the findings of other studies of mindfulness specifically conducted with youth in school or clinical settings. The remaining sections of the literature review are dedicated to the specific constructs of interest in this study: (a) social skills, (b) problem behavior, (c) emotion regulation, (d) mindfulness, and (e) moderators, such as gender.

Mindfulness Mechanisms of Change

Shapiro, Carlson, Astin, and Freedman (2006) posit that there are three components of mindfulness: (1) intention, (2) attention, and (3) attitude. These three components originate from a popular definition of mindfulness: "paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment," (Kabat-Zinn, 2003, p. 143). Paying attention (i.e. attention), on purpose (i.e. intention), nonjudgmentally (i.e. attitude) are thought to lead to a change in one's perspective that Shapiro et al. (2006) call reperceiving. This change in perspective then leads to four mechanisms that are ultimately responsible for

mindfulness' positive effects: (1) self-management and self-regulation, (2) emotional, cognitive and behavioral flexibility, (3) values clarification, and (4) exposure.

Self-management and self-regulation are achieved by cultivating nonjudgmental attention to the present moment. This nonjudgmental attention allows people to take in more information, even information that may be uncomfortable to observe. Avoidance of the present moment then becomes less common. By paying attention to what is happening in the present moment, people begin to reperceive their own experience. Paying attention nonjudgmentally and reperceiving leads to a disruption in automatic and reactive habits, particularly those that are maladaptive (Shapiro et al., 2006).

Cognitive, emotional, and behavioral flexibility are also achieved through reperceiving. Mindfulness allows people to step back from the present moment and simply observe it. This observation leads people to make thoughtful observations rather than react automatically. For example, for a person who becomes angry at a classmate, mindfulness can help that person become aware of the anger and nonjudgmentally observe it. Reperceiving is thought to help individuals evaluate themselves because it leads to an understanding that the feeling of anger is just a temporary feeling that will eventually go away. And, by paying attention to the anger, people can step back from the situation and make a decision that is less automatic and more aligned with long-term goals (Shapiro et al., 2006).

Values clarification is achieved by reperceiving what is truly valuable to people. Our values are typically shaped by our family, culture, and society. However, sometimes these values are not in line with what we truly value. Mindfulness allows people to become more objective about these values through reperceiving. When people observes their values, they are able to choose values that they believe in rather than adopting those values that have been reflexively conditioned

(Shapiro et al., 2006). An example might be a person whose culture emphasized physical violence to express anger and solve problems. Mindfulness can then be used to cultivate awareness of a situation wherein the person might have typically fought to solve a problem. In cultivating mindfulness, a person can consider options that are more in line with his or her values and long-term goals, rather than those options that were automatic based on the person's upbringing.

The final mechanism of mindfulness that is thought to lead to change is exposure. Mindfulness allows people to pay attention to and fully experience their thoughts and emotions. Being present with these thoughts or emotions can be quite uncomfortable, particularly for negative emotions such as sadness, anxiety, or anger. However, mindfulness allows people to experience these strong emotional states with objectivity through non-judgmental attention and reperceiving. Rather than ignoring, avoiding, or denying difficult thoughts or emotions, mindfulness encourages individuals to be present with them. With greater exposure and experience with difficult thoughts or emotions people begin to realize that they do not need to be feared (Shapiro et al., 2006). A common analogy in mindfulness practice is to compare thoughts and emotions with leaves that pass down a stream. In mindfulness, thoughts and emotions are conceptualized in the same way: They are just temporary and eventually move out of our consciousness.

In addition to Shapiro et al.'s (2006) theory that explains the psychological mechanisms underlying mindfulness, there are also theories of the neurobiological mechanisms underlying mindfulness. Vago and Silbersweig (2012) describe a framework that also includes self-awareness, self-regulation, and self-transcendence (S-ART). Their S-ART framework includes six component mechanisms that underlie the practice and cultivation of mindfulness: (1) intention and motivation, (2) emotion regulation, (3) regulation of attention, (4) extinction and reconsolidation of memories,

(5) prosociality, and (6) non-attachment and decentering. Each of these mechanisms has a neurobiological underpinning that explains how practicing mindfulness leads to psychological and behavioral change. In their theory on the neurobiological mechanisms of mindfulness, Vago and Silbersweig (2012) describe self-networks and neurocognitive systems, including an integrative fronto-parietal network, that support the S-ART framework. These networks are thought to underlie the six neurocognitive component mechanisms outlined above and, "facilitate the integration of self-experience from both top-down and bottom-up mechanisms," (Vago & Silbersweig, 2012, p. 24).

There are similarities between Shaprio et al. (2006) and Vago and Sibersweig's (2012) theories. In both theories, intention, emotion regulation, attention, and reperceiving are underlying mechanisms that result in behavioral change. However, Shapiro et al.'s (2006) theory focuses on underlying psychological processes whereas Vago and Sibersweig (2012) explain these processes within the context of underlying neurobiological mechanisms. For example, Shapiro et al.'s (2006) conceptualization of attitude is taken a step further in Vago and Sibersweig's (2012) theory by extending it to prosocial behavior. Prosocial behavior is thought to extend from the cultivation of a loving-kindness attitude which leads not only to a more empathetic stance toward one's self, but also an empathetic stance toward others. The underlying "self-other" neural substrates, such as the anterior insular cortex, can map internal states not only in oneself, but also can predict how emotional stimuli might feel to others. Each perspective is integral to understanding how mindfulness leads to a fundamental change in psychological functioning; however, it should be noted that both theories hypothesize about the underlying mechanisms of mindfulness as it applies to adults. To date, there is little research that explores how these mechanisms might be different for children and adolescents.

Mindfulness Programs

A diverse sample of mindfulness programs designed for children and adolescents have been studied. Examples include MindUp, Learning to BREATHE (Broderick & Frank, 2014), MBCT-C (Semple, Lee, & Miller, 2006), and MBSR (Saltzman & Goldin, 2008). Many of these curriculums are used to teach and practice mindfulness with children or adolescents and are commonly integrated in a classroom or small group setting. Growing Minds (Growing Minds Inc., 2015a) is another class-wide mindfulness-based intervention that aims to cultivate non-judgmental, present moment awareness in classrooms of students and, to date, has never been empirically researched.

Growing Minds is a non-profit organization that implements a 10-week mindfulness program for students and their teachers. During the 10-week program, a trained mindfulness instructor meets with students twice a week for 15-20 minute sessions. A total of 20 total lessons guide students and teachers through a series of standard mindfulness themes and practices (see Appendix A). Each lesson falls into one of four categories: 1) focus and attention, 2) self-awareness and self-regulation, 3) thoughts and emotions, and 4) social skills and relationships. Teachers learn mindfulness alongside students and are asked to do short mindfulness exercises (<5 minutes) with students outside of Growing Minds instruction at least 4 times a day (Growing Minds Inc., 2015a).

An integral part of learning to be mindful is cultivating mindfulness through mindful meditation. In Growing Minds, there are opportunities for students to learn to use their breath as an anchor (i.e. lesson 2). There are also other mindfulness exercises, such as mindful eating and mindful smelling, that are used to teach students to non-judgmentally be in the present moment. Another critical piece of mindfulness instruction included in this curriculum is instruction on the

nature of thoughts and emotions. Mindfulness encourages individuals to decenter from their thoughts and take a non-judgmental, curious, and loving-kindness approach to one's self and others (Growing Minds Inc., 2015a). The Growing Minds curriculum touches on all of the important elements of cultivating mindfulness, particularly those elements that have been identified as underlying mindfulness practice such as intentionality, attention, and attitude (Shapiro et al., 2006).

The Growing Minds program aims to cultivate calmer and kinder classrooms through mindfulness exercises. Growing Minds (2015a) created their program based on research of other programs as well as neuroplasticity and its role in "retraining" our brain to act with less automaticity (see Davidson, 2005; Davidson, 2004; Davidson et al., 2003; Davidson & Lutz, 2008; Davidson & McEwen, 2012). For example, Davidson & Lutz (2008) have identified specific attentional mechanisms that were evident as a result of long-term mindfulness meditation that were not seen for individuals new to mindfulness meditation. This research has suggested that the brain's attentional mechanisms are not fixed; therefore, through practice a person can begin to retrain his or her brain to pay attention and act in a way that is less automatic.

Each of the Growing Minds (2015a) lessons falls into one of four categories which are also linked to Shapiro et al.'s (2006) components and mechanisms of mindfulness. The first category is focus and attention, which relates to the attention component of Shapiro et al.'s (2006) theory. The second category is self-awareness and self-regulation which are related to Shaprio et al's (2006) mechanism of self-regulation. The third category is thoughts and emotions which Growing Minds (2015a) describes as lessons that, "allows for a skillful way to step back from them…Emotions are metaphorically described as waves that come and go, rise and fall, and can be tamed," (p. iii). Growing Minds' lessons on thoughts and emotions cultivate the "reperceiving"

that Shapiro et al. (2006) describe as the meta-mechanism ultimately leading to the transformative changes in automatic behavior. The final Growing Minds lesson category is social skills and relationships. This category focuses on the usefulness of taking a nonjudgmental stance toward the present moment. By being nonjudgmental of the present moment individuals can take in information more objectively and respond in a way that is in line with their values and goals, rather than reacting automatically. This type of change is particularly useful in our interactions with others. These lessons allow students to nonjudgmentally explore not only negative emotions, but also positive ones (e.g., gratitude), as well.

The Growing Minds curriculum is similar to other curriculums available such as Learning to BREATHE and MindUp. However, Learning to BREATHE and MindUp can be purchased by any practitioner trained or untrained who is interested in implementing mindfulness in his or her classroom. Growing Minds, on the other hand, can only be implemented by someone trained in the program. Some debate continues as to whether mindfulness can be taught by someone who is not explicitly trained in mindfulness. For example Zoogman et al. (2015) found that mindfulness instructor experience did not moderate mindfulness outcomes. However, even without data to suggest if mindfulness is only effective if taught by a trained instructor, most mindfulness curriculums advocate for instructors that have a strong foundation in mindfulness (Broderick & Frank, 2014; Growing Minds Inc., 2015a; Hawn Foundation, 2011). For this reason, Growing Minds limits the dissemination of their materials to those individuals they have determined have enough training to teach the program to students and teachers.

Growing Minds includes many exercises that are fundamental to mindfulness-based programs. For example, mindful meditation is an exercise wherein one learns to pay attention to and focus on one's breathing. When the mind starts to wander, children learn to use their breath as

an anchor to bring their attention back to their breath. Learning to notice thoughts and emotions are also an important component of most mindfulness programs and the depth in which this is discussed depends on the age of the participating children. However, most programs emphasize the role being mindful can play in recognizing thoughts and emotions in a stressful event. For example, many programs point out that recognizing and being mindful when angry is important so that a person does not act impulsively. Many mindfulness programs use the word "autopilot" to describe a mindless state. The purpose of mindfulness is to get out of "autopilot" and to pay attention, to the present moment, with curiosity regardless of the situation (Broderick & Frank, 2014; Hawn Foundation, 2011).

The aforementioned aspects of mindfulness programs make it particularly well-suited to target emotion regulation and problem behavior because self-regulation is thought to be a mechanism of change in mindfulness (Shapiro et al., 2006). A great deal of problem behavior is brought on by strong dysregulated emotions that dampen our executive functions (Vago & Silbersweig, 2012). For example, fights often occur in the classroom when one acts on his or her anger. By using self-regulation to recognize the anger, a student can disengage from the impulse to fight.

The final component that is included in most mindfulness programs is non-judgment and kindness. Being mindful not only requires that one pay attention to the present moment, but it also requires that one pays attention non-judgmentally with kindness and compassion (Kabat-Zinn, 2003). For example, children are taught that when they have thoughts they do not like, they should not push them away, but instead, should picture thoughts like leaves floating down a stream. A central component of mindfulness is that thoughts come and go out of consciousness, and we can notice them with curiosity, rather than judgment (Teasdale, Segal, & Williams, 1995).

The non-judgmental/kindness aspects of mindfulness programs make them particularly well-suited to target pro-social skills such as empathy and cooperation (Flook, Goldberg, Pinger, & Davidson, 2015; Poehlmann-Tynan et al., 2016). Many mindfulness exercises force individuals to think about the moment, right now. In addition, approaching the present moment without judgment can increase cooperation and empathy when individuals are interacting with others (Flook et al., 2015; Kabat-Zinn, 2005).

It is important to note that not all mindfulness activities match children's developmental levels. Mindfulness programs in schools often differ based on grade levels. For example, Learning to BREATHE (Broderick & Frank, 2014) is targeted for adolescents. MindUp (Hawn Foundation, 2011) has different curriculums for grades preK-2, 3-5, and 6-8. The core components described above stay the same, but the language and activities are geared toward children's developmental level. For example, mindfulness curriculums for younger grades might incorporate more visuals and manipulatives, whereas mindfulness curriculums for adolescents might include more meditation and abstract thinking about the nature of thoughts (Broderick & Frank, 2014; Hawn Foundation, 2011). Growing Minds also has different curriculums based on developmental level (Lower Elementary, Upper Elementary, and Adolescent; Growing Minds Inc., 2015a).

Mindfulness in Urban Schools

In addition to the variety of available mindfulness programs, there is also a great deal of variability in the school settings in which mindfulness has been studied. Studies of mindfulness have been conducted in the U.S. and abroad, and with populations of high and low-SES students (de Bruin, Zijlstra, & Bögels, 2014; Gouda et al., 2016; Sibinga et al., 2011). Like any school-based intervention implemented in the U.S., there is a need to demonstrate its effectiveness in multiple school settings. Mindfulness-based programs are no exception. A particularly high-need

exists for socioemotional intervention effectiveness studies in schools at risk for poor outcomes. Youth in low-income urban settings are at greater risk for psychological problems (Grant et al., 2004). Youth living in urban areas, specifically those who are of low-SES, are susceptible to the negative effects of stress related to living in poverty in high-crime neighborhoods (Mendelson et al., 2010).

In urban contexts in the U.S., there are a disproportional number of children living in poverty who also belong to an ethnic minority group. Approximately 34% of African American youth and 30% of Latino youth live in poverty. These rates are twice as high as those for European American youth living in the U.S. (US Bureau of the Census, 2011). For this reason, Becker & Luthar (2002) outline a number of socioemotional factors that undermine academic achievement for children from ethnically diverse backgrounds who also live in poverty. For example, middle school years are a particularly tumultuous time for any adolescent; however, for emerging adolescents living in poverty, a lack of supports and resources that help with the transition to middle school leads to a decrease in academic interest and increase in emotional distress.

Preventative and reactive behavioral health services can ameliorate some socioemotional problems and improve achievement for early adolescents in urban schools, but access to such resources is often limited these settings (Garland et al., 2005). Adequate access to supports may be one reason children living in poverty experience grade repetition, suspension, and school dropout at rates much higher than children not living in poverty. Children living in poverty also experience emotional or behavioral problems at rates much higher than children not living in poverty and are more likely to report abuse and neglect, as well as report witnessing or experiencing violent crimes (Brooks-Gunn & Duncan, 1997).

Several mindfulness studies have been conducted in low-SES urban communities (e.g., Semple et al., 2010; Sibinga et al., 2014); however, there has been a call for additional experimental studies that examine a wide range of effects for this particular population of students because they are at risk for poor socioemotional, behavioral, and academic outcomes (Britton et al., 2014). Mendelson et al. (2010) conducted one of the first randomized-control trials of mindfulness in a low-SES, racially diverse school setting. The study included four elementary schools in the Baltimore Public School System. The intervention consisted of a combination of yoga, breathing exercises, guided meditation, and didactic components (e.g. positive relationships, using mindfulness techniques in response to stressors). Outcomes of interest were the effects of a mindfulness program on children's positive and negative affect, temporary mood, and response to stress. The researchers collaborated with a local holistic health center (Holistic Life Foundation), which was responsible for the intervention. The interventionists were trained in holistic approaches to social and emotional interventions in the urban school population and were ethnically similar to the participants who were predominantly African American and Latino. Their study concluded that the use of mindfulness and yogic interventions in urban public schools reduced negative physical and cognitive responses to stress such as rumination, intrusive thoughts, and emotional arousal.

Zenner et al.'s (2013) recent meta-analysis further demonstrated a need for additional research on mindfulness interventions for students living in low-SES urban communities: Only a few out of 24 studies included a sample of low-SES students in an urban setting, and only one targeted social skills. In addition, many mindfulness studies in urban schools had research design limitations such as small sample sizes or no control group (Sibinga et al., 2011). For example, a randomized-control trial that examined the effects of a mindfulness program on urban high school

students only included a sample size of 12 students. The results of the study found no significant differences between a control and treatment group in the areas of emotion regulation, behavior, grades, and school attendance. But, insignificant findings may be due to the small sample size (Mai, 2010).

Although small sample sizes have generally been a limitation of mindfulness studies in urban schools, some studies have recruited a large number of participants but have lacked a control group. For example, researchers examined the effects of a mindfulness program on 499 children (grades K-6) in a lower-income and ethnic minority sample (Black & Fernando, 2014). Researchers collected pre-intervention, post-intervention, and seven weeks post-intervention data. Results indicated that the mindfulness intervention was associated with improvements in student behavior (e.g. paying attention, calm and self-control, caring/respect for others) but that an addition of seven once-weekly sessions after completion of the 5-week program did not add significant benefit. Despite having a large sample size and pre-post data, a limitation of this study was the lack of control group, which makes it difficult to assume causality.

Quasi-experimental design, although still limited, is a typically feasible research design for applied research in schools because it does not require randomization which can be disruptive to the school routine. This type of design is also useful for recognizing general trends and threats to validity based on features of the control group, particularly when compared to non-controlled studies. No known large-scale quasi-experimental design study (n>100) has yet considered the effects of mindfulness in the areas of social skills and problem behavior in a low-SES elementary (3^{rd}-6^{th} grade) urban school population (Zenner et al., 2014). Research suggests that executive functioning skills, rumination, involuntary engagement, depression, stress, and intrusive thoughts improve for students in low-SES and racial-minority schools as a result of mindfulness (Gould, et

al., 2012; Mendelson et al., 2010; Sibinga et al., 2011, 2013), however, in addition to these constructs, researchers have yet to examine if mindfulness-based programs increase pro-social skills and emotion regulation and decrease problem behavior specifically for students in low-SES urban schools.

Effects of Mindfulness

Research suggests that overall treatment effect sizes of mindfulness programs fall in the small to moderate range with adults experiencing moderate (Hedges *g* =0.55; Khoury et al., 2013), youth experiencing small to moderate (*del* = 0.23; Zoogman, Goldberg, Hoyt, & Miller, 2015), and children/adolescents in schools experiencing moderate treatment effect sizes (*g* = 0.40; Zenner et al., 2014). A recent meta-analysis of mindfulness studies which included the largest number of studies (*n*=76) known to date with youth found an average treatment effect size of *g* = 0.32 in experimentally controlled studies and *g* = 0.31 for pre-post designs (Klingbeil et al., 2017).

Effects of mindfulness on youth. Although research on mindfulness for specific populations of students is still needed, evidence suggests that mindfulness leads to several positive psychological and physical outcomes for individuals. For example, extensive evidence has demonstrated that mindfulness is an effective psychological treatment for adults: It has been shown to improve perception of pain, depression, anxiety, compassion, and symptoms of ADHD (Brown & Ryan, 2003; Eberth & Sedlmeier, 2012; Gu et al., 2015; Khoury et al., 2013). In addition, brain research has demonstrated that mindfulness is associated with changes in the brain that affect stress reactivity and immune functioning (Davidson et al., 2003; Davidson & McEwen, 2012). Because mindfulness has had such promising results for adults, researchers have examined whether or not the same effects are found for youth and youth in schools (Zenner et al., 2014; Zoogman et al., 2015).

In a recent meta-analysis that examined effects of mindfulness on children in schools, Zenner et al. (2014) found large effect sizes for cognitive performance (Hedge's $g = 0.80$), small-to-moderate effect sizes for stress ($g = 0.39$) and resilience ($g = 0.36$), and small effect sizes for emotional problems ($g = 0.19$). When examining experimental studies, another recent meta-analysis of mindfulness on youth found the largest effects on measures of mindfulness ($g = 0.51$), small to moderate effects on meta-cognition and cognitive flexibility ($g = 0.40$), and small effects on attention ($g = 0.29$) and emotion/behavior regulation ($g = 0.32$). General effect sizes were small for targeted therapeutic effects such as internalizing problems ($g = 0.39$) and negative emotions/subjective distress ($g = 0.25$). However, while there appeared to be small effect sizes for prosocial skills ($g = 0.37$) and externalizing problems ($g = 0.30$), neither were statistically significant (Klingbeil et al., 2017).

General effect sizes give an overall picture of the potential effects of mindfulness-based programs. However, there are many limitations to generalizing the effects of mindfulness programs based on a meta-analysis. First, mindfulness programs included in the meta-analyses discussed above differ and because there are nuances within each individual study of mindfulness, consideration should be given to differences in effects of mindfulness depending upon the program implemented and the age or grade level targeted. Second, some meta-analyses have examined overall effects of interventions completed in both clinical and school settings (Klingbeil et al., 2017; Zoogman et al., 2015); therefore, there is a special interest to examine specific effects of mindfulness on students in schools. Third, although meta-analyses provide good information related to general effects and general effects in specific domains, the data do not differentiate based on the specific curriculum or the specific developmental level of students targeted for research. Meta-analyses provide a consensus regarding the effects of an intervention, such as mindfulness;

however, valuable information still needs to be gathered regarding the specific effects of various mindfulness programs and the effects of such programs on targeted populations of students. Additionally, meta-analyses combine the effects of programs, whereas individual studies can give insight into the effect that mindfulness has on specific constructs of interest. In meta-analyses, similar constructs might get combined into one overall construct (e.g., "executive functioning" and "attention" might get combined into an overall effect on "cognitive functioning,"); however, this study will define and measure specific constructs so that the specific effects of mindfulness might be compared to similar studies, as well as considered in the broader context of mindfulness research. Below, I will review studies that document the effect of mindfulness on constructs (i.e. social skills, problem behavior, emotion regulation, mindfulness) that are of interest in this study.

Social skills. Social skills are defined as behaviors that are learned and promote positive interactions. In this study, that includes cooperation, responsibility, empathy, engagement, and self-control (Gresham & Elliott, 1984). Schools are interested in implementing programs that support social skills because strong evidence exists to suggest a relationship between social skills and academic achievement (Malecki & Elliot, 2002).

Several studies have examined the effects of mindfulness on social competence and prosocial behavior (Bluth et al., 2016; Flook et al., 2015; Schonert-Reichl et al., 2015) and results appear promising. For example, a randomized-control trial (n=99) compared the effects of the MindUp program with an active control on 4th and 5th graders' prosociality. According to peer ratings, children who received the mindfulness program were reported as being more prosocial and more accepted by peers than those in the active control group. In addition, those in the mindfulness treatment reported increases in empathy and perspective-taking and decreases in depression and peer-rated aggression (Schonert-Reichl et al., 2015). This well-designed study was

conducted with a population of middle-income Canadian students. Racial demographics were not shared, but researchers reported that 66% of the children spoke English as their native language. Therefore, there may be some questions as to whether or not the results of this study would generalize to a population of low-SES, racial minority students living in the U.S. (Schonert-Reichl et al., 2015).

Some research exists, both qualitative and quantitative, to suggest mindfulness improves outcomes related to self-regulation. For example, in a study that qualitatively examined the effects of a mindfulness program on urban youth, improvements were reported in self-regulation of emotions and stress (Sibinga et al., 2014). In another study that used quantitative data collection methods via a self-regulation task with pre-school children, a mindfulness-based kindness curriculum was found to have a significant effect on self-regulation (Poehlmann-Tynan et al., 2016). And in yet another study, mindfulness has been found to have a significant effect on self-reported self-regulation, and interpersonal problems for a group of German adolescents who participated in an MBSR program (Gouda et al., 2016).

Problem Behaviors. Problem behavior is a broad term to describe general maladaptive behaviors. For this study, problem behaviors are defined as externalizing problems, internalizing problems and hyperactivity/inattention (Gresham & Elliott, 2008). Reducing problem behaviors in schools is important for several reasons. First, students high in problem behavior, particularly those with emotional and behavioral disorders or externalizing problems, show large deficits in academic achievement (Nelson, Benner, Lane, & Smith, 2004).

Evidence exists to suggest that mindfulness may reduce externalizing problem behaviors for students. In a study that examined a clinical sample of fourteen adolescents experiencing externalizing disorders, mindfulness when taught in a group format (and separately with parents),

was found to reduce adolescent, self-reported internalizing problems, externalizing complaints and attention problems and to improve happiness, mindful awareness, and sustained attention. Parents also reported improvements in their children's externalizing and attention problems, self-control, awareness of others, and withdrawn behavior. These improvements were maintained 8-weeks after the training (Bögels, Hoogstad, van Dun, de Schutter, & Restifo, 2008).

The conclusions of research examining the effects of mindfulness on problem behaviors in school settings is mixed. For example, Britton et al. (2014) did not find a difference between a treatment and active control group on internalizing, externalizing, and attention problems when mindfulness meditation was taught by a teacher (Britton et al., 2014). Large improvements were found for both treatment and the active control groups post-intervention, indicating that mindfulness is no better than a novel activity (i.e. building an Egyptian sarcophagus) at improving psychological outcomes. Researchers of this study offered a few reasons that no differences were found between a mindfulness meditation group and an active control group. First, other studies have found that mindfulness is no more effective than a novel activity, like tango dancing, at improving depressive symptoms (Pinniger, Brown, Thorsteinsson, & McKinley, 2012). A second explanation is that the same teachers who were teaching the mindfulness meditation also taught the active control group. Thus, it is possible the teachers unintentionally exposed the active treatment control group to mindfulness or the teachers' mindful dispositional qualities affected student outcomes. And third, it is possible that the assessment tools that were used to measure outcomes, namely the Youth Self Report (YSR), was not sensitive enough to change.

Other studies have detected significant effects of mindfulness on reducing aggression in elementary-age boys and girls, as well as internalizing problems, such as anxiety, in elementary-age girls (Parker, Kupersmidt, Mathis, Scull, & Sims, 2014). Researchers conducted a small (n =

111) randomized wait-list control trial examining the effects of the *Master Mind* mindfulness program on 4th and 5th grade students. Teachers reported demonstrated improvements in executive functioning skills in all students and increases in self-control, in boys only. Teachers also reported reductions in aggression and social problems in both boys and girls and reductions in anxiety for girls.

Emotion Regulation. Emotion regulation refers to "the process by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions," (Gross, 1998, p. 275). Emotion regulation is an important skill for students in schools because research has found that after controlling for IQ, emotion regulation is a significant predictor of academic success (Graziano, Reavis, Keane, & Calkins, 2007). Several studies have examined the effects of mindfulness on emotion regulation (Broderick & Metz, 2009; Flook et al., 2015; Metz et al., 2013; Poehlmann-Tynan et al., 2016; Sibinga et al., 2013) and have generally found significant positive effects resulting from implementation of a mindfulness program. For example, effects of mindfulness on emotion regulation have been found to improve outcomes for high school students in private and suburban schools (Broderick & Metz, 2009; Metz et al., 2013) and pre-school students (Flook et al., 2015; Poehlmann-Tynan et al., 2016). Other studies have examined variables related to emotion regulation such as rumination and negative coping on an urban population. Sibinga et al. (2013), found that African American boys who participated in a Mindfulness-Based Stress Reduction program had less anxiety, less rumination, and less negative coping than boys in an active control group. But, there is no known study that has measured emotion regulation directly with a low-SES elementary-age population of students, using a class-wide intervention.

Mindfulness. In a recent meta-analysis of mindfulness (Klingbeil et al., 2017) the greatest effect sizes were found for the trait-based construct of mindfulness ($g = 0.51$) in controlled-studies. Theoretically, this finding is in line with Shapiro et al.'s (2006) conceptualization of the mechanisms of change underlying mindfulness in that the construct of mindfulness is thought to be the first therapeutic process change that then leads to second-order therapeutic changes (e.g. self-regulation). Specific studies of mindfulness with youth have yielded small to moderate effects sizes of mindfulness (Bluth et al., 2016; Raveepatarakul et al., 2014). However, other studies have found no differences between treatment and control groups following the implementation of a mindfulness program. These studies used a variety of measures to evaluate mindfulness such as the Cognitive and Affective Mindfulness Scale – Revised, the Child and Adolescent Mindfulness Measure (CAMM), and the Mindful Attention Awareness Scale (Himelstein, Hastings, Shapiro, & Heery, 2012; Huppert & Johnson, 2010; Jee et al., 2015; Lau & Hue, 2011).

Researchers have hypothesized why mindfulness programs have not brought behavior improvements despite designing programs to target children's trait-based mindfulness. Prior to mindfulness programs, children often do not know what mindfulness is and can answer questions about mindfulness higher than what is actually accurate. After learning about mindfulness, children may actually rate themselves lower on scales of mindfulness because the process of learning mindfulness has made them more aware of their mindlessness (Huppert & Johnson, 2010).

Moderators. Moderation refers to an additional variable that changes the relationship between a predictor and outcome variable. A moderator interacts with a predictor, or independent variable, and influences the outcome. When there is a significant interaction between a moderator variable and predictor variable, the effect of the predictor on the outcome variable depends on the level of the moderating variable. Statistically, main effects are moot if there is a significant

interaction between the predictor and moderating variable and the effects of the predictor on the outcome variable have to be interpreted in the context of the moderating variable (Fairchild & McQuillin, 2010).

Exploration of moderators in mindfulness research is important because it can provide information regarding variables that affect the impact of a program. It also tells us if certain participants benefit more or less from a program based on their problem-type (e.g. externalizing, internalizing), age, and gender (Durlak et al., 2011). Only a few studies of mindfulness with youth or in school settings have examined such variables through a moderator analysis. Therefore, research examining moderating variables of interest in this study (i.e. gender, age, problem-type) from mindfulness research, as well as research on Social Emotional Learning programs, are explained below.

Gender. In a study of a social-emotional learning program called the *Slowly but Steadily Program*, researchers examined if the program led to improvements in social-emotional competences and a reduction of internalizing and externalizing problems for fourth-grade children living in Portugal. Researchers were interested in whether or not the program worked better based on certain child characteristics such as gender. Results of the study indicated that in some cases, effects of the program depended upon gender. Namely, boys showed greater improvements in social skills and self-management, and greater decreases in aggressiveness, when compared to girls (Raimundo, Marques-Pinto, & Lima, 2013).

In a study that examined the effects of a school-based mindfulness and yoga program on fourth and fifth grade students in an urban school, researchers investigated whether the program's effects on self-regulatory outcomes differed depending upon gender. No differences were found in the effect of the program between males and females on self-regulatory outcomes (Gould et al.,

2012). However, in another study examining the impacts of a mindfulness program called *Master Mind*, researchers found that gender moderated anxiety outcomes. Girls who received the mindfulness program were rated by teachers as having fewer anxiety problems and boys were rated as having greater increases in self-control abilities (Parker et al., 2014). These findings taken together suggest that further investigation is needed on the role gender plays in moderating outcomes for specific mindfulness programs.

Age. In a meta-analysis of the effects of mindfulness on youth, Zoogman et al. (2015) hypothesized that adolescents may benefit more from mindfulness because of their increased developmental capacity to think abstractly. In a comparison of effects in studies with youth, Zoogman et al. (2015) found no differences between older and younger children in treatment effects after a mindfulness program. However, there were some limitations to these findings, such as inadequate sample sizes in the examined studies. Gould et al. (2012) also examined grade level as a potential moderator. In this study, researchers did not observe any differences between fourth and fifth graders' self-regulatory outcomes after a mindfulness intervention. Although theoretically, it makes sense that effects of a mindfulness program would be more pronounced in older children because of increased meta-cognitive and abstract thinking skills (Piaget, 1969), based on a current review of the literature of mindfulness with children, this difference has not yet been found. However, few studies of mindfulness with youth, to date, have examined age or grade level as a potential moderator.

In this study, age was included as a covariate ranging from 8 to 13. An examination of descriptive statistics prior to data analysis revealed that most children in this study were of very similar ages (i.e. 9 and 10 years); therefore, categorizing the ages did not make sense for this

sample. Instead, age was treated as a covariate to control the effects of age on the Growing Minds program.

Problem type. Social-emotional learning programs, generally, have found differences in intervention outcomes based on problem type or baseline levels of social-emotional constructs of interest. For example, baseline levels of self-management and peer relations skills appeared prior to the *Slowly but Steadily Program* affected intervention outcomes. Namely, children with average pre-test self-management and peer relations scores appeared to benefit more from a social-emotional learning program than children who scored below or above average (Raimundo et al., 2013). The implications of findings like these are that this particular SEL program is well-suited for class-wide implementation in a general education classroom (i.e. Tier 1) where most children will fall in the average range in constructs such as self-management and peer-relations.

Some studies of mindfulness programs have investigated baseline levels of functioning on constructs of interest to determine if baseline levels moderate intervention outcomes. In a study examining the effects of a mindful awareness practices program on children aged 7-9 years, baseline levels of executive functioning were found to moderate improvement in post-test levels of executive functioning for children in the intervention group. In other words, children in the treatment group with lower levels of executive functioning prior to the intervention, showed greater improvement in executive functioning compared with controls. The implications of these findings suggest that the mindful awareness practices program is particularly well suited for children specifically with low executive functioning skills (Flook et al., 2010).

In addition to gender and age, Gould et al. (2012) also investigated whether or not there were differential effects based on baseline depressive symptoms. For youth who had low or medium levels of baseline depressive symptoms, the mindfulness program reduced Involuntary

Engagement stress responses when compared with those who did not receive the intervention. However, for those who reported high-levels of baseline depressive symptoms, no differences were found between the intervention and control groups on Involuntary Engagement stress responses. Additionally, for youth who reported low baseline depressive symptoms, the intervention reduced Impulsive Action stress responses, but similar results were not found for youth who reported medium and high depressive symptoms (Gould et al., 2012). This study further suggests that baseline levels are an important consideration when investigating the specific effects of a mindfulness program, particularly ones targeted for class-wide, Tier 1, implementation.

Zoogman et al. (2015) investigated moderator variables within a meta-analytic study. Age, sample size, percent female, percent racial/ethnic minority, publication year, treatment length, treatment frequency, and treatment total time were investigated as potential moderating variables on treatment effects. Only sample origin (clinical sample vs. non-clinical sample) and measures of symptoms were found to significantly moderate study effect size. Clinical samples and a higher number of symptoms showed higher effects suggesting that mindfulness works better for children who have more significant problems.

There is much more information that needs to be gathered about the type of participant who may benefit more or less from mindfulness. Zoogman et al.'s (2015) meta-analysis suggests that mindfulness programs are more effective for clinical samples than non-clinical samples based on combined data from multiple interventions. However, it is not known whether or not the Growing Minds program is more effective for children with problem behavior, or whether or not it has greater effects on the majority of students in the class who do not have problem behavior.

Study Purpose

Growing Minds has collected preliminary program evaluation data suggesting that teachers and students perceive positive outcomes as a result of participating in the Growing Minds program (Growing Minds Inc., 2015b). However, there are several limitations to this previously collected data. For example, only descriptive data were collected following the implementation of the program. And, the questions asked were subjective, based on the perceptions of students and teachers. No formal measures were used, and questions were typically asked in a yes or no fashion. Growing Minds has collected qualitative data through teacher focus groups and has used this information to improve the program; however, this information was not systematically gathered.

This is the first systematic study that examines the effectiveness of Growing Minds on specific socioemotional outcomes. Even with limited research, mindfulness-based programs like Growing Minds are already being used in schools around the U.S., and even around the world (Bunting, 2014; Growing Minds Inc., 2015b; Zenner et al., 2014). Given the importance of implementing evidence-based interventions in schools (Elliott et al., 2002), researchers should carefully examine the specific school-related effects of specific mindfulness-based programs.

This study uses a quasi-experimental research design to examine the effects of the classroom-based Growing Minds program on 3rd-6th grade students in two low-SES urban schools. A trained mindfulness instructor implemented the intervention to six classrooms across two schools, and six classrooms across two schools also served as the wait-list control. Specific outcomes of interest included students' social skills such as cooperation, responsibility, empathy, engagement, and self-control, problem behavior, such as externalizing problems, internalizing problems, hyperactivity/inattention, emotion regulation skills, and mindfulness. Moderator analyses examined if there are difference in all outcome areas based on gender. Additionally, a

separate analysis examined whether effects on mindfulness and emotion regulation differ by problem type (i.e. internalizing vs. externalizing problems).

Research Questions

1. Do children who receive Growing Minds have higher levels of (a) cooperation, (b) responsibility, (c) empathy, (d) engagement, and (e) self-control compared to those in the control condition?

2. Do children who receive Growing Minds have lower levels of (a) externalizing problems, (b) internalizing problems, and (c) hyperactivity/Inattention compared to those in the control condition?

3. Do children who receive Growing Minds have higher levels of emotion regulation compared to those who were in the control condition?

4. Do children who receive Growing Minds have higher levels of mindfulness compared to those who were in the control condition?

5. Does the effect of Growing Minds on social/behavioral outcomes differ by gender?

6. Does the effect of Growing Minds on emotion regulation and mindfulness differ for students who have primarily internalizing problems, primarily externalizing problems, or both internalizing and externalizing problems when compared with typical children?

CHAPTER THREE

Methods

Participants

One hundred and eighty-eight students, third through sixth grade, participated in this study. Students were from 12 classrooms (six classrooms at each school) in two public open-enrollment charter schools. The demographics of the participates were as follows: 54% Hispanic/Latino, 39% African American/Black, 7% other (e.g., White, Asian, or American Indian), and 53% female. The population of students at School 1 was predominantly African American (94.5%) and the population of students at School 2 was predominantly Hispanic/Latino (89.3%).

The mean age of participants was 11 years. At School 1, 100% of students, and at School 2, 81% of students were economically disadvantaged at the time of the study (Wisconsin Department of Public Instruction, 2016). Because there were differences between the two schools based on ethnicity and administrator-reported problems (e.g., internalizing vs. externalizing problems), three classrooms at each school were chosen for the control group and three at each school were chosen for the treatment group. The aim of applying the intervention across schools, rather than comparing results between schools was to create control and treatment groups that were as equal as possible on baseline variables such as ethnicity and psychological functioning.

Procedures

University IRB approval was granted prior to recruitment of schools. A convenience sample of 14 university-affiliated public charter schools in a medium to large Midwestern city were considered for inclusion in the study. Interviews with administrators and school staff were conducted and two schools were chosen for the study based on administration and staff enthusiasm

for the Growing Minds program. Researchers collaborated with the Growing Minds organization to plan and implement this study.

Once schools were selected for the study, parental consent forms were sent home with students. School administrators and teachers assisted with the dissemination and collection of consent forms. Schools, teachers, and children were not offered anything for participating in the study but did receive the Growing Minds program for free. There is typically a minimal $50 fee for the 10-week program per classroom. This fee was waived by Growing Minds for classrooms/teachers who agreed to participate. In addition, students were offered a small stationary item (e.g., pencil, stickers) after completing a questionnaire.

Prior to the start of Growing Minds, but after pre-test questionnaires were completed, teachers in the treatment group attended a 45-minute professional development on mindfulness. The session was organized and facilitated by Growing Minds staff. Graduate school researchers assisted with scheduling the twice-weekly mindfulness classes at each school. Teachers in the treatment and control groups were asked not to discuss mindfulness with each other to avoid any spillover treatment effects.

One instructor, trained in mindfulness and a Growing Minds employee, was responsible for teaching all six classes in the treatment group and wait-list control. The trained mindfulness instructor had extensive classroom and mindfulness experience. She was a classroom teacher and yoga instructor prior to working for Growing Minds. In addition to training in the program, the instructor had 5 years of experience teaching Growing Minds. She also had been trained in several mindfulness curriculums such as *Mindful Schools*, *Learning to BREATHE*, *Mindful Life*, *Mindfulness in Schools* (*.b Curriculum*), and *Yoga Ed*.

All classrooms in the treatment group had the same instructor. After post-intervention data collection, the control group received a shortened version of Growing Minds (approximately 7-8 weeks) due to scheduling conflicts related to standardized testing schedules and end-of-the-year activities. The effects of the Growing Minds program on the wait-list control group was not studied because the duration of the program was compromised.

Research design. This study used a quasi-experimental wait-list control group design. Quasi-experimental studies are more feasible in schools because randomization can be disruptive to school structure and routines. At each school, three classrooms were chosen for the treatment group and three were chosen for the wait-list control. Administrators were asked to choose one of each grade level for the treatment and control groups so that ages/grades would be as equivalent as possible between the two groups. At School 1, one third/fourth grade combined class was included in the study. The remaining classrooms in Schools 1 and 2 were fourth (3 classrooms), fifth (4 classrooms), and sixth (4 classrooms) grade classrooms. Teachers in both the control and treatment groups had two weeks before the Growing Minds program began to complete questionnaires on each child in her class. Because a teacher in the control group at School 1 resigned shortly before data collection, the school's social worker, who knew the students in the class well, collaborated with the new teacher in the classroom to complete the questionnaires for that class.

The week before Growing Minds began, graduate student researchers administered questionnaires to students class-wide in both the control and treatment groups. Graduate student assistants monitored and circled the room while another graduate student researcher read directions and question items out loud to students. Classroom teachers were present in the room during administration but were encouraged not to circle the room. Students were informed that their

answers would be anonymous and would not be shared with school staff. For students who appeared to have difficulty with class-wide administration (i.e., trouble following along, appeared restless), individual administration of the questionnaire was provided later, but before Growing Minds began. After the ten weeks of Growing Minds was complete but before the Growing Minds program started for the wait-list control group, the graduate student researchers followed the same procedure to gather post-test data.

Measures. Information was gathered from both teacher-report and student-report measures. To measure the effects of Growing Minds on social skills and problem behavior, information was gathered from subtests of the Social Skills Improvement System (SSIS; Gresham & Elliott, 2008) as reported by both students and teachers. Additionally, data from the Emotion Regulation Checklist (Shields & Cicchetti, 1997), completed by teachers, and the Child and Adolescent Mindfulness Measure (CAMM; Greco, Baer, & Smith, 2011), completed by students, were collected to gather more information about the effect of the program on emotion regulation and mindfulness. Items from each subtest were averaged prior to data analysis. Intervention fidelity measures were also employed to descriptively report the implementation fidelity of the Growing Minds program. An in-depth explanation of each measure utilized in the study is included below.

Intervention fidelity measures. Two graduate students collected intervention fidelity data using checklists that aligned with the curriculum. They visited every participating classroom five out of twenty lessons and marked the number of curriculum components the Growing Minds instructor covered in each classroom on that day. During observations, the graduate students compared the lesson with the prescribed sequence from the program manual. When the Growing Minds instructor completed each program component within the lesson, the observer checked off the component as completed. These data were reported descriptively by dividing the number of

implemented curriculum components by the total components that should have been completed for all observed classrooms.

Teachers in the treatment group also kept track of data related to student absences (see Appendix B). In consultation with the Growing Minds program developers, a threshold of 15% absences from Growing Minds sessions or three out of twenty sessions was established to determine student inclusion in the analysis. Therefore, students who did not attend at least 85% of the Growing Minds sessions were excluded from the study.

In addition, treatment group teachers monitored the number of extra mindfulness sessions and the duration of these sessions that were completed with students during the ten weeks of Growing Minds. Growing Minds suggests that teachers conduct short mindfulness practices outside of Growing Minds sessions, about four each day and lasting about one to five minutes, to supplement the curriculum (see Appendix C). The number of minutes that teachers practiced mindfulness with students outside of the Growing Minds program was calculated and reported for descriptive purposes in the *Results* section.

Social Skills Improvement System (SSIS) Rating Scales. The SSIS Teacher Report (SSIS-TR) and the SSIS Student Report (SSIS-SR) were used to measure specific social skills and problem behaviors**.** Teachers reported on each student's behavior and students self-reported. Information was gathered from both teachers and students because each provides complimentary information.

The SSIS is a standardized, norm-referenced, 4-point Likert-type rating scale that measures socioemotional and behavioral functioning under three domains: (a) social skills, (b) problem behaviors, and (c) academic competence. Rather than evaluating the composite scores in each of these domains, subscales from the social skills and problem behavior domains were chosen for this

study. There are several reasons why the subscales were used in this study instead of the domains. First, the subscales of the SSIS were conceptually interesting. The subscales chosen from social skills for the questionnaire were (a) cooperation, (b) responsibility, (c) empathy, (d) engagement, and (e) self-control. Problem behavior subscales chosen for the questionnaire were (a) externalizing problems, (b) hyperactivity/inattention, and (c) internalizing problems. These specific subscales are distinct (e.g., externalizing vs. internalizing) and give greater depth to the study analysis. Additionally, by looking at the subscales one is more likely to avoid type II error which can subsequently mask intervention effects. Although the responsibility and bullying subscales were included in the questionnaire, these constructs were later removed due to their distant theoretical connection to mindfulness and high correlation with other subscales (e.g., cooperation and externalizing). Example questionnaire items from the SSIS-SR and SSIS-TR can be found in Table 1.

Subscales not chosen for the questionnaire were (a) communication, (b) assertion, and (c) Autism Spectrum because they are not believed to be directly related to mindfulness. In addition, the questionnaire was created to be as brief as possible as to not prolong the time taken away from daily instruction for both teachers and students. Teachers completed a total of 56 questions from the SSIS-TR and students completed a total of 62 questions from the SSIS-SR. The subtests chosen from this measure yield the same subscales for both teachers and students.

The SSIS is designed for screening and classifying students, but the authors explicitly point out its ability to provide a baseline for post-intervention progress evaluation. There are multiple forms available based on student age. For this study, the teacher and student forms for ages five through twelve were used and covers the age range of students included in this study.

Table 1

Example Questionnaire Items

Variable	Example questionnaire items
SSIS-SR	
Cooperation	I ignore others who act up in class.
	I do what the teacher asks me to do.
Empathy	I feel bad when others are sad.
	I try to make others feel better.
Engagement	I get along with other children/adolescents.
	I make friends easily.
Self-Control	I stay calm when people point out my mistakes.
	I stay calm when I disagree with others.
Externalizing	I break the rules.
	I often do things without thinking.
Internalizing	I'm afraid of a lot of things.
	I get embarrassed easily.
Hyper/Inattention	I find it's hard to focus on what I am doing.
	I make careless mistakes in schoolwork.
SSIS-TR	
Cooperation	Follows your directions.
	Ignores classmates when they are distracting.
Empathy	Shows kindness to others when they are upset.
	Is nice to others when they are feeling bad.
Engagement	Makes friends easily.
	Interacts well with other children.
Self-Control	Stays calm when teased.
	Resolves disagreements with you calmly.
Externalizing	Is aggressive toward people or objects.
	Disobeys rules or requests.
Internalizing	Acts anxious with others.
	Acts lonely.
Hyper/Inattention	Fidgets or moves around too much.
	Is inattentive.
ERC	Is prone to angry outbursts/tantrums easily.
	Can say when s/he is feeling sad, angry or mad, fearful or afraid.
CAMM	I think about things that have happened in the past instead of thinking about things that are happening right now.
	I tell myself that I shouldn't feel the way I'm feeling.

The SSIS has good psychometric properties; There is high reliability, as well as strong validity. In the literature, reliability was analyzed by examining test-retest reliability and interrater reliability. Internal consistency for social skills and problem behavior scales were estimated using internal consistency reliability for each norm group. Median scale reliabilities of the social skills and problem behavior domains fell in the mid to upper 0.90's for each age group on each form (i.e., student-report, teacher-report). Subscales of the SSIS yield median scale reliabilities in the low to high 0.80's for all forms (Gresham & Elliott, 2008). In this study, internal consistency of the SSIS-SR ranged from 0.72 to 0.87 and for the SSIS-TR from 0.82 to 0.95. A summary of the internal consistency and reliability for all subscales included in this study can be found in Table 3.

Reliability coefficients for teacher and parent forms were moderately high and ranged from 0.70 to 0.80. Reliability coefficients for the student form ranged from 0.59 to 0.81, which indicates that over time, students do not rate items as consistently as parents and teachers. For teacher forms, interrater reliability coefficient medians were 0.58 and 0.60 for the social skills and problem behavior scales, respectively. And for parent forms, interrater reliability coefficient medians were 0.62 and 0.50 for the social skills and problem behavior scales, respectively (Gresham & Elliott, 2008).

Additionally, the developers of the SSIS compared teacher and student ratings of social skills. They found that social skills subscale scores between teachers and students correlated at a rate between 0.12 and 0.31. Comparisons between teacher and student ratings of communication and empathy were lowest (r=0.12), whereas the highest agreements were found for engagement (r=0.31). Correlations, on average, were higher for problem behavior than social skills when comparing teacher and student ratings and ranged from 0.14 to 0.40. The subdomains with the highest agreements were externalizing (r=0.37) and bullying (r=0.40) and the subdomains with

the lowest agreements were internalizing (r=0.14) and hyperactivity/inattention (r=0.34). Overall, there is a small to moderate degree of agreement between teachers and students on students' social and behavioral skills. This information validates gathering information from more than one rater (Gresham, Elliott, Cook, Vance, & Kettler, 2010). Correlations between teacher- and student-reports of social skills and problem behavior as reported on the SSIS can be found in Table 2.

Validity, or the extent to which this test measures what it intends to measure, was examined by considering internal structure and relations with other similar measures (Gresham & Elliott, 2008). Social skills and problem behaviors were negatively correlated (-0.42 to -0.65) indicating the two scales are measuring different constructs. The SSIS was also found to have moderate correlations with similar measures such as the Behavior Assessment System for Children (2nd edition) and Vineland Adaptive Behavior Scales (2nd edition).

Table 2

Correlations between Pre- and Post-Test SSIS Teacher- and Student-Report

Variable	Pre-Test	Post-Test
1. Cooperation	0.38**	0.46**
2. Responsibility	0.38**	0.42**
3. Empathy	0.25**	0.29**
4. Engagement	0.06	0.13
5. Self-Control	0.39**	0.34**
6. Externalizing	0.33**	0.39**
7. Internalizing	0.17*	0.08
8. Hyperactivity/Inattention	0.25**	0.32**

Note. **Correlation significant at the 0.01 level; *Correlation significant at the 0.05 level.

Emotion Regulation Checklist (ERC). Teachers completed the ERC, a 24-item questionnaire, validated for use with children ages six to twelve, for each student in their class. The ERC uses a 4-point Likert-type scale to measure processes that are a part of emotion regulation such as intensity, valence, flexibility, and affective lability (Shields & Cicchetti, 1998). There are two subscales: (a) lability/negativity (15 items), which measures anger reactivity, mood swings, and dysregulation and (b) emotion regulation (8 items), which measures emotional understanding, empathy, adaptive emotional regulation, and equanimity. Example items include, "is impulsive," and, "is prone to angry outbursts / tantrums daily." For the purposes of this study, a total emotion regulation score was used and questions on lability/negativity were excluded from the study.

The ERC has been used and validated in many prior studies (Curtis & Cicchetti, 2007; Kim & Cicchetti, 2010; Kim-Spoon, Cicchetti, & Rogosch, 2013; Shields & Cicchetti, 1997, 1998). A principal-components factor analysis using two time-points (Time 1 and Time 2) yielded two separate factors of emotion regulation and emotion lability/negativity. These two factors correlated at -0.47 at both time points (Kim-Spoon et al., 2013), which is consistent with previous research (Shields & Cicchetti, 1997). Additionally, in a previous study a principal component factor analysis using a varimax rotation compared all items from the ERC and the Child Behavior Checklist – Teacher Report Form (CBCL-TRF) aggression and attention problems subscales. The results of this analysis demonstrated that although there are some items that overlap, each scale measures different constructs.

Research has also demonstrated that scores on the ERC are generally reliable. Interrater agreement in previous studies ranged from 0.72 to 0.85 (Curtis & Cicchetti, 2007; Kim-Spoon et al., 2013). The internal consistency of the total ERC score ranged from 0.83 to 0.89 (Kim & Cicchetti, 2010; Shields & Cicchetti, 1997). The emotion regulation scale and emotion

lability/negativity scale had a Cronbach's alpha that ranged from 0.81 to 0.83 and 0.89 to 0.96, respectively (Kim-Spoon et al., 2013; Shields & Cicchetti, 1997, 1998). In this study, internal consistency ranged from 0.78 to 0.89 (see Table 3).

Child and Adolescent Mindfulness Measure (CAMM). The CAMM is a 10-item child and adolescent self-report questionnaire that yields scores that range from 0 to 40. Each item has children/adolescents rate themselves on a 5-point Likert scale (i.e., 0-4) to indicate how often each item is true for them (e.g., never true, rarely true, always true). Example questions include, "I keep myself busy so I don't notice my thoughts or feelings," and, "it's hard for me to pay attention to only one thing at a time."

The CAMM (Greco et al., 2011) was developed based on four facets of mindfulness: (a) observing, (b) acting with awareness, (c) accepting without judgment, and (d) describing. Observing refers to an individual's ability to notice his or her emotions, thoughts, and bodily sensations. Acting with awareness refers to the idea that a person goes through daily activities being aware and engaged moment to moment. Accepting without judgment involves a person experiencing events with openness and non-judgment. And, describing refers to being able to describe internal experiences such as thoughts and emotions.

The developers of the CAMM included all aspects of mindfulness except for describing due to the developmental limitations of children and adolescents to demonstrate this skill. Children and adolescents often have not fully developed the ability to describe thoughts and emotions. This skill is thought to involve higher level verbal-cognitive skills that are developed in later stages of adolescent development (Greco et al., 2011). Later, in the development of the measure, observing items were also eliminated due to the discovery that observing was not related to the trait of mindfulness in children and adolescents.

Four studies and a follow-up study in the Netherlands were used to develop and determine the validity and reliability of this measure (de Bruin et al., 2014; Greco et al., 2011). In the first study, an initial pool of 25 questions were considered. Experts in child clinical psychology and mindfulness interventions evaluated the initial 25 questions and gave feedback to enhance the clarity and developmental appropriateness of the question set. A group of 428 students, ages ten to seventeen (M=12.10, SD=1.28) from middle Tennessee completed the questionnaire and a follow-up interview with 35 randomly-selected students were asked to elaborate, clarify, and provide examples to demonstrate understanding of each item. The sample from this study was 82% White and 14% African American and 58% were female. Feedback from these sessions concluded that there was good comprehension of items by children and adolescents who participated in the study.

In a second study of the CAMM, participants (n=334) were recruited from public schools in middle Tennessee. The sample ranged in age from ten to seventeen (M=12.6, SD=1.68). Participants were 66% female and 83% White, 11% African American, 3% Hispanic, 1% Native American, 1% Asian American, and 1% other. As a result of the second study, the 25-item CAMM questionnaire was narrowed down to a 10-item questionnaire through factor analysis in an effort to allow CAMM to measure mindfulness on a single-factor. The internal consistency of this measure was found to be 0.80 with factor loadings ranging from 0.42 to 0.66. When differences between sex, race, age, and grade were examined, no significant differences were found. In this study, internal consistency was found to be between 0.74 and 0.78 (see Table 3).

The third study of the CAMM was a cross-validation confirmation analysis to see how well a single-factor fit the model. Participants (n=332) were 57.5% female, 78% White, 14.5% African American, and 2% other. Ages ranged from ten to seventeen with an average age of 12.77

(*SD*=1.11). The results from the third study indicated that the single-factor model was a good fit (*CFI*=0.90).

Table 3

Internal Consistency Reliability for the Current Sample

		Cronbach's α		
	Number of Items	Pre-Test	Post-Test	Literature
SSIS-SR				
Cooperation	7	0.82	0.83	0.79
Empathy	6	0.81	0.82	0.80
Engagement	7	0.72	0.77	0.74
Self-Control	6	0.81	0.83	0.79
Externalizing	12	0.86	0.86	0.86
Internalizing	10	0.81	0.87	0.82
Hyper/Inattention	7	0.77	0.76	0.79
SSIS-TR				
Cooperation	6	0.94	0.94	0.91
Empathy	6	0.95	0.95	0.92
Engagement	7	0.91	0.90	0.84
Self-Control	7	0.93	0.94	0.90
Externalizing	12	0.94	0.93	0.93
Internalizing	7	0.84	0.82	0.83
Hyper/Inattention	7	0.89	0.89	0.90
Other Scales				
ERC	8	0.85	0.78	0.81-0.83
CAMM	10	0.74	0.78	0.71-0.81

Note. SSIS-SR = Social Skills Improvement System – Student Report; SSIS-TR = Social Skills Improvement System – Teacher Report; ERC = Emotion Regulation Checklist; CAMM = Child and Adolescent Mindfulness Measure. Literature coefficient alphas from de Bruin, Zijlstra, & Bögels (2014); Gresham & Elliott, 2008; Kim-Spoon, Cicchetti, & Rogosch (2013); Shields & Cicchetti (1997).

The fourth study tested the convergent and incremental validity of the CAMM. Participants (n=319) were in fifth through tenth grade with a mean age of 12.68 years (SD=1.66). Fifty-nine percent of the participants were female. The sample was also gathered from public school students in middle Tennessee and was 81% White, 12% African American, and 7% other. The CAMM was compared to measures with similar constructs such as the White Bear Suppression Inventory (WBSI), the Avoidance and Fusion Questionnaire for Youth (AFQ-Y), and the Social Skills Rating System (SSRS). Scores on the CAMM had a small to medium negative correlation with internalizing symptoms, externalizing behavior problems, thought suppression, psychological inflexibility, and somatic complaints. Small but positive correlations were found between CAMM scores and teacher ratings of academic competence and social skills.

In a Dutch version of the CAMM, principle factor analysis was used to examine the factor structure, internal consistency, and construct validity of the measure. Internal consistency for children ages ten to twelve years was 0.71 and 0.81 for adolescents ages thirteen to sixteen years. This study also found strong correlations between the CAMM and measures of happiness, quality of life, and self-regulation. Significant negative correlations were found between the CAMM and measures of rumination, self-blame, stress, and catastrophizing. A significant and interesting finding of this study was that there were no differences found on CAMM scores between children who had experience with meditation versus those that did not. However, for adolescents, CAMM scores were lower if they had experience with meditation versus if they had no experience (de Bruin et al., 2014).

Analysis plan. To analyze the research questions, the Statistical Package for the Social Sciences (SPSS) version 23 was used. Prior to the analysis of this data there was an examination of student absences from the Growing Minds program (85% attendance of the Growing Minds

sessions is required to remain in the study) and of missing data. Data were entered independently by two graduate students and compared for accuracy.

This study examined if children assigned to receive Growing Minds display higher levels of (a) cooperation, (b) empathy, (c) engagement, (d) self-control, (e) emotion regulation, and (f) mindfulness than those in the control group after adjusting for the baseline level of these variables prior to the start of the program and adjusting for age and gender. Conversely, this study determined if children assigned to receive Growing Minds display lower levels of (a) externalizing problems, (b) internalizing problems, and (c) hyperactivity/inattention compared to the control group after adjusting for the baseline levels of these variables prior to the start of the Growing Minds program and adjusting for age and gender. The independent variables are treatment group (Growing Minds vs. control group) and the dependent variables are post-test levels of cooperation, empathy, engagement, self-control, externalizing problems, internalizing problems, hyperactivity/inattention, emotion regulation, and mindfulness. Covariates will include gender, age, and baseline levels of each respective dependent variable.

Age and gender. Covariates are included in the analysis to control for the effects of baseline levels of each dependent variable, as well as age and gender. Age and gender were chosen as covariates because of previous research suggesting that socioemotional variables such as social skills, problem behavior, and emotion regulation can differ by both age and gender. For example, Eisenberg et al. (2001) found that teachers rated boys significantly higher on impulsivity and significantly lower on focusing attention and inhibitory control when compared to girls.

Gender differences have also been found in the way that children socialize and express problem behavior with girls showing aggression relationally and with boys showing aggression more overtly (Crick & Grotpeter, 1995). Additionally, early development of problem behavior is

the same for girls and boys until about age 4 when girls' problem behavior can transform into internalizing problems. This transformation is found more often in girls than it is for boys (Keenan & Shaw, 1997).

The range of ages for this study was eight to thirteen. This is a wide age-range that includes children in different stages of cognitive development. Children from ages seven to twelve are considered to be in the concrete operational stage, wherein children often think logically and concretely. Children eleven years and older begin to think more abstractly and can consider many possibilities (Piaget, 1972). Although little is known about differences in the effect of mindfulness programs based on children's age, it is possible that children understand mindfulness instruction differently depending upon age. For example, conceptualization of thoughts and emotions may be more concrete for younger children in this study and more abstract for older children in the study. In addition to potential differences in cognitive development, there are differences in children's attentional abilities depending upon age. For example, Eisenberg et al., (2001) observed that teachers reported children's ability to pay attention decreased with age. For this reason, it was decided to control for the potential variance on the dependent variables that could be explained by age by controlling for age in the multivariate and univariate models.

Questions 1 through 5. A multivariate analysis of covariance (MANCOVA) was conducted for the social skills variables (i.e., research question 1) separately for student- and teacher-reported data. This type of analysis was used because pre-test scores, gender, and age could be entered as covariates, and because the social skills variables are predicted to be related. A MANCOVA, or multivariate analysis, has a few advantages over conducting separate analyses of covariance (ANCOVAs), a univariate analysis. A multivariate analysis allows the inclusion of multiple dependent variables in a model, whereas a univariate analysis only allows for one. When

there are several dependent variables, a multivariate analysis is more robust in protecting against inflated type I error than a univariate test. Additionally, there are occasions when multivariate analyses reveal differences that would not be detected in a univariate analysis (Tabachnick & Fidell, 2007; Warne, 2014).

For question 2, the problem behavior variables, externalizing and internalizing, will be entered together in a MANCOVA for both student- and teacher-reports. Hyperactivity/inattention must be separated from the MANCOVA analyses for both student- and teacher-report because questions from the externalizing subtest were also included in an overall hyperactivity/inattention score. This means that items for externalizing and hyperactivity/inattention were not independent of each other which could cause potential problems in a MANCOVA model. However, it was decided to retain the hyperactivity/inattention and externalizing variables in the analysis because they are important outcomes of interest and thought to be closely linked to mindfulness. Therefore, ANCOVAs were conducted separately with the hyperactivity/inattention variable for both student- and teacher-report.

Separate ANCOVAs were conducted to determine the effect of the Growing Minds program on emotion regulation and mindfulness variables (i.e., research questions 3 and 4). Covariates for all MANCOVA and ANCOVA analyses will be the baseline/pre-test scores for the outcome variables (i.e., emotion regulation, problem behavior, social skills), gender, and age to account for differences between individual scores prior to the mindfulness intervention for both the control and treatment groups. In addition, an interaction term will be generated that answers research question 5, which asks whether the effect of Growing Minds on social skills, problem behavior, emotion regulation, and mindfulness depends on gender.

Question 6. Question 6 was conducted in an exploratory manner and asks whether there are differences in the effects of Growing Minds on emotion regulation and mindfulness by problem type as identified prior to the Growing Minds program by teachers. Four categories of problem type were generated and coded as either Typical (=1), Internalizers (=2), Externalizers (=3), or Both Externalizers and Internalizers (=4). Children who are not categorized as having externalizing problems, internalizing problems, or both are considered typical. Cutoff scores to determine whether or not children fit into a certain problem type category was determined by referencing the SSIS Manual (Gresham & Elliott, 2008). Children's pre-test externalizing and internalizing sum of scores on the SSIS-TR were compared to average and above average levels of internalizing and externalizing problems for combined male and female scores from the SSIS manual and were then coded.

Children whose internalizing sum of scores fell between 0 and 7 were considered to have average internalizing problems and coded as 'typical.' Children whose internalizing sum of scores was between 8 and 21 was considered above average was coded as being an 'internalizer.' Children whose externalizing sum of scores fell between 0 and 12 were considered to have typical levels of externalizing problems and children whose externalizing sum of scores fell between 13 and 36 were considered to have above average externalizing problems and were coded as 'externalizer.' If a child was coded as both an internalizer and externalizer, then they were given a separate categorical variable of 'both.'

The problem type variable was then entered as a fixed factor into an ANCOVA model. Separate ANCOVAs were conducted for emotion regulation and mindfulness. Gender, age, and baseline levels of each respective variable were entered as covariates to control for the effects of these variables on post-test emotion regulation and mindfulness. This analysis will specifically

look at the effect of Growing Minds on internalizers, externalizers, and both internalizers and externalizers as compared to typical children.

Assumptions. Several assumptions were tested for MANCOVA and ANCOVA analyses. Assumptions included (a) normality and outliers, (b) linearity, (c) homogeneity of variance-covariance, (d) homogeneity of regression slopes, and (e) multicollinearity. All of these assumptions were investigated using statistical software.

Hypothesized Outcomes

Because differences between treatment and control groups have generally been observed on other populations of students, using similar curriculums in the areas of emotion regulation, problem behavior, social skills, and mindfulness it is expected that there would be a small but significant positive effect of the mindfulness program on social skills, problem behaviors, emotion regulation, and mindfulness. Based on the mixed findings of previous studies that examined moderator variables, it is difficult to determine the effect of gender and age on all outcome variables. The last research question is exploratory in nature; however, it is expected that typical children will have significantly higher emotion regulation and mindfulness as post-test when compared to children with externalizing problems, internalizing problems, or both.

CHAPTER FOUR

Results

Fidelity & Data Screening

Fidelity. Program fidelity was collected by the researcher and a graduate student for five out of twenty sessions for each classroom in the treatment group, for a total of 30 classroom observations. Implementation fidelity was assessed by counting the number of program components that were successfully completed in each classroom on one day of observation. During observations, the observer compared the lesson with the prescribed sequence from the program manual. When the Growing Minds instructor completed each program component included in the lesson, the observer would check off the component as completed. There were two optional program components that were not included in intervention fidelity. These components were a closing exercise and a journal entry. Growing Minds lessons are 20 minutes each, and during the majority of observations, there was not time to complete these optional exercises.

Results from 30 classroom observations of the Growing Minds program indicated 82.5% intervention fidelity. Most program components that were not implemented by the instructor were due to the 20-minute time constraints of the lessons. The number of practice sessions that were completed by teachers with students were also recorded by teachers. There was a great deal variability in the amount of mindfulness teachers conducted with students outside the Growing Minds sessions. Outside practice may have contributed to the effect, but this was not analyzed. The six classroom teachers reported a total of 744 minutes, or an average of 124 minutes, of time practicing mindfulness with the students outside of Growing Minds lessons. A summary of the data collected by teachers is included in Table 4.

Table 4

Teacher-Report of Mindfulness Practice with Students Outside of Sessions

Classroom	*Recorded Practice Sessions*	*Total Minutes*
1	4	33
2	34	245
3	32	57
4	43	195
5	53	147
6	56	67

Student data were examined for participation in the program. In consultation with the Growing Minds program developers, a threshold of 15% absences from Growing Minds sessions or three out of twenty sessions was established to determine student inclusion in the analysis. Eleven students in the treatment group were excluded from the analysis due to missing three or more sessions.

Data Screening & Scoring. Data were examined for patterns in missing data. A frequency table was created for all items answered by participants on the SSIS-SR, SSIS-TR, ERC, and CAMM. There were no missing answers to items on the SSIS-TR, ERC, and CAMM. On the SSIS-SR, there were 33 missing item answers, 18 of these missing item answers were from a single participant in the treatment group. For this reason, this case was removed from the analysis. Therefore, for the set of data analyzed, 15 data points were missing from 11 separate participants. Four of the missing data points were from the SSIS-SR given before the intervention and 11 were from the SSIS-SR given after the intervention. Missing data comprised less than 5% of the overall data set. Missing data is likely attributed to student error (i.e., accidentally skipping items). When

less than 5% of data points are missing, the problem of missing data is thought to be less serious, and any procedure for handling the missing data is thought to lead to analogous results (Tabachnick & Fidell, 2007).

To address missing data from the analysis, missing data were estimated using mean substitution. Mean substitution was employed at the variable domain level. For example, if one item was missing for a pre-test SSIS-SR score under the empathy domain variable for a specific participant, ratings for that single participant under the SSIS-SR empathy domain variable (pre-test) were averaged, and that average was used as a substitute for the missing item. This procedure for replacing missing data can reduce variance. The extent of this loss of variance is not likely significant due to nature of the low amount of missing data (Tabachnick & Fidell, 2007).

Attrition was calculated by dividing the number of participants absent more than 15% of the time or with missing data divided by the number of student participants with parental consent (n=188). Eleven students, all from the treatment group, were removed from the sample due to not meeting the 85% or more Growing Minds session attendance. One participant, in the treatment group, was removed from the sample due to missing a significant number of items from the questionnaires. And, 11 students, 2 in the treatment group, and 9 in the control group, were counted in the total attrition rate due to missing items on questionnaires. The What Works Clearinghouse (WWC, 2017) recommends that participants with missing data, even if a procedure to fix the missing data is employed, should be included in the attrition rate. Therefore, 23 out of 188 participants were included in the calculation of the overall attrition rate of 12%. To calculate the differential attrition rate, first, the total number of participants absent or with missing data in the treatment group (n=14) were divided by the total number of students who participated in the study (n=188) for a total attrition rate in the treatment group of 7%. Then, the attrition rate for the control

group was calculated by dividing the total number of participants with missing data in the control group (n = 9) by the total number of students who participated in the study (n = 188) for a total attrition rate of 5%. The differential attrition rate, or the difference between the control and treatment groups' attrition rates was 2%. According to the WWC, a total attrition rate of 12% and differential attrition rate of 2% would still meet criteria for their standards outlining attrition bias (WWC, 2013).

After missing data were addressed, each measure (pre-and post-intervention) was appropriately scored and averaged. The ERC and CAMM yielded one overall average score, respectively, and the SSIS-SR and SSIS-TR yielded several separate average scores based on specific domains/variables (e.g., empathy, cooperation, internalizing). The variable average scores (pre- and post-intervention) were used in the final analysis.

Assumptions

Normality and outliers. Each variable average score for both pre- and post-intervention scores in the treatment and control groups were then analyzed for normality. Frequency histograms with overlying normal distribution graphs and skewness and kurtosis statistics were evaluated to determine normality. Additionally, normal Q-Q plots separated by dependent variables in each treatment group were examined. Upon examination of graphs, as well as an examination of skewness and kurtosis statistics, SSIS-TR post-intervention externalizing scores demonstrated non-normality. Although externalizing appeared to deviate from normality, researchers have demonstrated robustness despite non-normality when overall sample sizes are above 40 with a minimum of 10 participants in each independent variable (Seo, Kanda, & Fujikoshi, 1995). Sample sizes in this study meet this criteria with 87 participants in the treatment group and 89 in the control group.

Multivariate analyses are particularly sensitive to outliers. For this reason, significant outliers were identified using box-plots. Although only a portion of the variables will be used in a multivariate analysis, all covariates and dependent variables were examined for outliers. Upon examination, the variables included in this study did not appear to have significant outliers.

Linearity. Bivariate scatter plots of all pairs of dependent variables, all pairs of covariates, and all dependent-covariate pairs included in each MANCOVA analysis were assessed to determine linearity between variables. Graphs of bivariate plots of variables demonstrated general linearity between each pair of variables in each respective MANCOVA model indicating a linear relationship between each pair of dependent variables, covariates, and dependent-covariate pairs.

Homogeneity of Variance-Covariance Matrices. The assumption of homogeneity of variance-covariance matrices is assumed to be met when sample sizes are equal (Tabachnick & Fidell, 2007). In this study, sample sizes for research questions 1-5 were essentially equal with 89 participants in the treatment group and 87 in the control group. Pillai's Trace is thought to be robust, despite violations of assumptions, when sample sizes are equal, and for this reason, was chosen as the test statistic (Bray & Maxwell, 1985a; Hakstian, Roed, & Lind, 1979). However, for research question 6, sample sizes are unequal. Therefore, this analysis in particular should be interpreted with caution. A common test for the assumption of homogeneity of variance-covariance, Box's Test, is not thought to be robust and can be overly sensitive (Field, 2013). Homogeneity of Variance-Covariance Matrices is assumed to be met based on equal sample sizes, but nonetheless, Pillai's Trace, which is robust despite violations of assumptions, will be used as the primary MANCOVA test statistic.

Homogeneity of Regression Slopes. When there is an interaction between the treatment group and covariates, treatment effects may not be the same across different levels of the covariate.

In other words, covariates and the dependent variable should have the same slopes across all levels of the grouping variable, which in this case is treatment group. A violation of Homogeneity of Regression Slopes would not allow for the accurate use of covariates because they would not accurately "control" for the variance in the dependent variable (Johnson, 2016).

Homogeneity of regression slopes analysis was conducted by examining interactions between the treatment group and covariates for variables used in the MANCOVA and ANCOVA analyses. First, custom models were created in SPSS by entering a treatment group by covariate interaction term. For example, treatment group was entered into SPSS as a fixed factor, pre-test cooperation was entered as a covariate, and post-test cooperation was entered as the dependent variable. To create the interaction term, a custom model was created under the "model" tab in SPSS that included a treatment group by covariate interaction for each respective covariate.

To meet the assumption of homogeneity of regression slopes, interactions between the treatment group and covariates must be non-significant. A *p*-level of 0.01 was chosen as the significance level. The analysis of student-report prosocial skills and problem behavior and teacher-report prosocial skills and problem behavior yielded nonsignificant results between each treatment group and covariate interaction term. Interaction terms from all analyses indicated interactions between independent variable and covariates were non-significant. Therefore, it was determined that the assumption of homogeneity of regression slopes was met.

Multicollinearity. Bivariate correlation analyses were conducted specifically to examine relationships between SSIS-SR dependent variables and between SSIS-TR dependent variables to detect signs of multicollinearity. There are varying opinions on the degree of relationship required to eliminate or combine dependent variables in order to avoid issues of multicollinearity. Some authors suggest a correlation of r=0.70 or higher, but others acknowledge that statistical problems

will occur at a rate of r=0.90 and higher (Tabachnick & Fidell, 2007). For this reason, a more conservative correlation of r=0.75 was chosen because it is near the lower end suggested in the literature.

Correlation matrices are can be found for the SISS-SR variables in Table 5. According to the SSIS-SR correlation matrix, there were two relationships between dependent variables greater than r=0.75. The relationship between responsibility and cooperation was $r(176)=0.78$, $p<0.01$ and the relationship between externalizing and hyperactivity/inattention was $r(176)=0.78$, $p<0.01$.

Table 5

Correlations of Post-Intervention SISS-SR Variables

Dependent Variable	1	2	3	4	5	6	7	8
1. Cooperation	–							
2. Responsibility	**.78**	–						
3. Empathy	.50	.48	–					
4. Engagement	.35	.40	.36	–				
5. Self-Control	.63	.59	.52	.42	–			
6. Externalizing	-.69	-.62	-.37	-.28	-.63	–		
7. Internalizing	-.18	-.23	.13	-.32	-.21	.32	–	
8. Hyperactivity/Inattention	-.60	-.56	-.20	-.24	-.44	**.78**	.52	–

Note. All correlations are significant at $p<0.01$ except the correlation between empathy and internalizing. Bolded numbers indicate $r>0.75$.

The SSIS-TR matrix, found in Table 6 yielded several correlations above the r=0.75 mark. The correlation between SSIS-TR post-levels of responsibility and self-control was $r(176)=0.80$, $p<0.01$, responsibility and cooperation was $r(176)=0.88$, $p<.01$, cooperation and self-control $r(176)=0.76$, $p<0.01$, and externalizing and hyperactivity/inattention was $r(176)=0.87$, $p<0.01$.

These high correlations suggest that these variables are very highly related and are likely measuring the same construct.

Table 6

Correlations of Post-Intervention TR-SSIS Variables

Dependent Variable	1	2	3	4	5	6	7	8
1. Cooperation	–							
2. Responsibility	**.88**							
3. Empathy	.60	.72						
4. Engagement	.56	.58	.63					
5. Self-Control	**.76**	**.80**	.64	.55				
6. Externalizing	-.81	-.84	-.56	-.44	-.82			
7. Hyperactivity/Inattention	-.85	-.81	-.52	-.46	-.75	**.87**		
8. Internalizing	-.20	-.13	-.19	-.36	-.23	.21	.25	

Note. All correlations are significant at $p<.01$. Bolded numbers indicate $r>0.75$.

Based on the high correlations on both the SSIS-SR and SSIS-TR, decisions had to be made about steps moving forward in the analysis. Because responsibility was highly correlated with two variables on the SSIS-TR and with cooperation on the SSIS-SR and because responsibility ranks lower than other variables in terms of potential effects of the Growing Minds program, it was decided that responsibility would be removed from both the SSIS-TR and SSIS-SR analyses of social skills. On the SSIS-TR, cooperation and self-control were highly related but were very close to the cut off of $r<0.75$. It was decided that because cooperation and self-control are conceptually important variables in the study, they would remain in the analysis.

The relationship between externalizing and hyperactivity/inattention was not surprising on the SSIS-TR and SSIS-SR given four out of the twelve SSIS-TR externalizing items and three out of the seven SSIS-SR items also went into the total hyperactivity/inattention score. The between

scale correlations in the technical manual were similar to what was found in this study. The technical manual indicates a correlation of 0.76 on the student form and 0.82 on the teacher-form (Gresham & Elliott, 2008). Theoretically, reducing hyperactivity/inattention and externalizing problems are important outcomes for the Growing Minds program, and while acknowledging that they may have measured a similar construct, it was decided that analyzing them in separate models would still provide valuable information about the effects of the program on each respective variable.

Descriptive Statistics

Examination of differences between schools. Although both schools included in the study were represented in the control and treatment groups, independent sample t-tests were conducted to identify differences between schools at baseline. Independent sample t-tests revealed significant differences between schools on baseline levels of student reported engagement $t(174)=2.56$, $p=0.01$, self-control $t(174)=-2.51$, $p=0.01$, internalizing $t(174)=-3.12$, $p<0.01$, and mindfulness $t(174)=3.12$, $p<0.01$. There were also significant differences between schools on teacher-reported self-control $t(174)=-3.60$, $p<0.01$ and internalizing scores $t(174)=-2.37$, $p=0.02$.

Students in School 1, who were predominantly African American, reported significantly higher levels of engagement ($M=2.20$, $SD=0.46$) than School 2 ($M=1.98$, $SD=0.63$) and significantly higher levels of mindfulness ($M=2.55$, $SD=0.83$) than School 2 ($M=2.15$, $SD=0.76$) at baseline. On the other hand, students in School 2, who were predominantly Latino/Hispanic, reported significantly higher levels of self-control ($M=2.03$, $SD=0.64$) than students in School 1 ($M=1.64$, $SD=0.78$) and reported higher levels of internalizing problems ($M=1.27$, $SD=0.66$) at baseline than School 2 ($M=0.96$, $SD=0.65$). There were no significant differences between schools

at baseline on the remaining variables. Group differences between schools are summarized in Table 7.

Table 7

Baseline Means and Standard Deviations by School (n = 176)

	School 1 (predominantly African American)		School 2 (predominantly Latino/Hispanic)			
	M	*SD*	*M*	*SD*	*t*(174)	*p*
SSIS-SR						
Cooperation	1.96	0.61	1.96	0.64	0.00	1.00
Empathy	1.99	0.67	2.13	0.65	-1.38	0.17
Engagement	2.20	0.46	1.98	0.63	2.56	0.01*
Self-Control	1.35	0.70	1.62	0.72	-2.51	0.01*
Externalizing	0.85	0.64	0.89	0.62	-0.40	0.69
Internalizing	0.96	0.65	1.27	0.66	-3.12	0.00*
Hyper/Inattention	1.12	0.68	1.20	0.68	-0.78	0.44
SSIS-TR						
Cooperation	1.91	0.76	2.06	0.73	-1.33	0.18
Empathy	2.05	0.75	1.99	0.69	0.59	0.56
Engagement	1.95	0.62	2.09	0.67	-1.34	0.18
Self-Control	1.64	0.78	2.03	0.64	-3.60	0.00*
Externalizing	0.60	0.61	0.46	0.53	1.64	0.10
Internalizing	0.41	0.43	0.60	0.55	-2.37	0.02*
Hyper/Inattention	0.76	0.65	0.67	0.61	0.99	0.33
Other Scales						
Emotion Reg.	3.23	0.53	3.14	0.53	1.13	0.26
Mindfulness	2.55	0.83	2.15	0.76	3.32	0.00*

Note. *$p < 0.05$. SSIS-SR and SSIS-TR scores range from 0-3. Emotion Reg. scores range from 1-4. Mindfulness scores range from 0-4.

Examination of differences between treatment groups. Data were examined to determine if significant differences existed between control and treatment groups in terms of

gender and age. Descriptive statistics including frequencies, means, and standard deviations related to treatment group, gender, and age can be found in Table 8. An independent samples t-test was conducted to determine if there were significant differences between control and treatment groups in terms of age. Results of the independent samples t-test yielded no significant differences between control and treatment groups in terms of children's age $t(166)=1.32$, $p=0.19$.

Table 8

Gender, Age, and School Totals and by Treatment Group (n=176)

	Male	Female	Age	School 1	School 2
Group	*n*	*n*	*M* (*SD*)	*n*	*n*
Treatment	42	45	9.90 (0.95)	50	50
Control	40	49	10.10 (1.22)	36	53
Total	82	94	10.00 (1.09)	73	103

A chi-square analysis was conducted to determine if there were significant differences between the control and treatment groups in terms of gender. There were 40 males in the control group and 42 males in the treatment group and there were 49 females in the control group and 45 females in the treatment group. A chi-square analysis indicated that the relationship between gender and treatment group was not significant $x^2(1, N = 176) = 0.20$, $p = 0.76$. In other words, there was no association between gender and treatment group as baseline.

Differences between control and treatment groups at baseline were also examined for each pre-test score (i.e., covariate). All pre-test scores from the SSIS-SR, SSIS-TR, ERC, and CAMM were entered individually into an ANOVA with the pre-test score as the dependent variable and the treatment group as the independent variable. Tests of between-subjects indicated no differences between control and treatment group ($p>.05$) on all pre-test scores, except one. Tests of between

subjects indicated a significant difference between control and treatment groups on the pre-test SSIS-SR empathy score $F(1, 174)=4.62$, $p=.03$. Before the intervention, the control group's average empathy score ($M=2.18$, $SD=0.63$) was significantly higher than the treatment group's empathy score ($M=1.97$, $SD=0.68$). The differences at baseline were corrected for, statistically, by including baseline scores as a covariate in the model.

Primary Analyses

After all data were screened and examined for assumptions, the main analyses were conducted. Each research question, with corresponding analyses is included below. Research question 5, which asks whether the effect of the Growing Minds program on social and behavioral outcomes differs by gender is investigated as part of each research question, with the exception of the last (i.e., question 6). However, a summary of differences in outcomes by gender is included under the heading *Research Question 5*.

The final analysis plan, which accounts for changes in the plan based on the pre-analysis data screening, is summarized in Table 9. Pillai's Trace criterion was used for all omnibus tests. Pillai's Trace is thought to be robust, despite violations of assumptions, when sample sizes are equal (Bray & Maxwell, 1985b; Hakstian et al., 1979). Additionally, Cohen's (1969) interpretation of partial eta squared (i.e., partial η^2) will be used to interpret effect size with partial η^2=0.01 indicating a small effect, partial η^2 =0.06 indicating a medium effect, and partial η^2 = 0.14 indicating a large effect.

Research Question 1 - Social Skills

Self-report of children's social skills. The first research question asked if children who receive the Growing Minds program have significantly higher levels of social skills such as

Table 9

Final Analysis Plan Summary by Research Question

	Measure	Analysis Type	Independent Variable	Covariates	Dependent Variables
1	SR-SSIS	MANCOVA	Treatment Group	Cooperation, Empathy, Engagement, Self-Control, Gender, Age	Cooperation, Empathy, Engagement, Self-Control
1	TR-SSIS	MANCOVA	Treatment Group	Cooperation, Empathy, Engagement, Self-Control, Gender, Age	Cooperation, Empathy, Social Engagement, and Self-Control
2	SR-SSIS	MANCOVA	Treatment Group	Externalizing, Internalizing, Gender, Age	Externalizing, Internalizing,
2	SR-SSIS	ANCOVA	Treatment Group	Hyper/Inattention, Gender, Age	Hyper/Inattention
2	TR-SSIS	MANCOVA	Treatment Group	Externalizing, Internalizing, Gender, Age	Externalizing, Internalizing
2	TR-SSIS	ANCOVA	Treatment Group	Hyper/Inattention, Gender, Age	Hyper/Inattention
3	ERC	ANCOVA	Treatment Group	Emotion Regulation, Gender, Age	Emotion Regulation
4	CAMM	ANCOVA	Treatment Group	Mindfulness, Gender, Age	Mindfulness

Note. Covariates indicate pre-test scores. Dependent variables indicate post-test scores.

cooperation, empathy, social engagement, and self-control. To answer this question, a MANCOVA was conducted with data reported by child participants. The dependent variables were self-reported cooperation, empathy, engagement, and self-control variables collected after the completion of the Growing Minds program. Treatment group (treatment versus control) and gender were entered in SPSS as fixed factors. Age and self-reported baseline levels of cooperation, empathy, engagement, and self-control variables were entered as covariates. The results of the three main effects, or overall multivariate tests, are summarized below in the following order: 1) covariate effect, 2) treatment group, 3) gender, and 4) treatment group x gender.

Covariate effect. Self-reported baseline levels of cooperation, empathy, engagement, and self-control variables were entered as covariates. The omnibus test indicated significant effects for cooperation $F(4, 164)=12.46$, $p<0.01$, partial $\eta^2=0.23$, empathy $F(4, 164)=18.42$, $p<0.01$, partial $\eta^2=0.31$, engagement $F(4, 164)=26.11$, $p<0.01$, partial $\eta^2=0.39$, and self-control $F(4, 164)=8.48$, $p<0.01$, partial $\eta^2=0.17$. In addition, an omnibus test indicated a significant effect of age $F(4, 164)=4.25$, $p<0.01$, partial $\eta^2=0.09$. The results from these analyses validate the use of these variables as covariates in the model.

Treatment effect. The omnibus effect of treatment group was non-significant. After controlling for pre-test scores, age, and gender, the combined self-reported social skills variables did not significantly differ by treatment group after the Growing Minds program $F(4, 164)=0.70$, $p=0.59$, partial $\eta^2=0.02$. The partial eta squared value for this multivariate model indicates a small effect of treatment group. Additionally, it indicates treatment group accounts for 2% of the variance across all the self-reported social skills variables. The test of between-subject effects indicated a non-significant treatment effect for each dependent variable. Specifically, there were no significant differences between control and treatment groups at post-test on cooperation $F(1,$

167)=0.07, p=0.80, partial η^2 =0.00, empathy F(1, 167)=0.70, p=0.40, partial η^2 =0.00, engagement F(1, 167)=1.55, p=0.22, partial η^2=0.01, and self-control F(1, 167)=1.88, p=0.17, partial η^2=0.01 after controlling for pre-test scores, age, and gender. Additionally, the direction of the relationship between control and treatment groups was not in the expected direction. Estimated marginal means indicated children in the control group self-reported higher levels of cooperation, empathy, engagement, and self-control at post-test when compared with children in the treatment group. A summary of means and standard deviations for pre- and post-test average scores by treatment group can be found in Table 10.

Gender effect. After controlling for pre-test scores, age, and gender, the omnibus effect of gender was significant F(4, 164)=4.36, p<0.01, partial η^2=0.10. The partial eta squared value for this multivariate model indicates a medium effect of gender. Additionally, it indicates gender accounts for 10% of the variance across all the self-reported social skills variables. An examination of between-subject effects indicated a significant difference between males and females for self-reported post-Growing Minds engagement scores only F(1, 167)=5.52, p=0.02, partial η^2= 0.03. Effect size estimates for the between-subjects effects of the engagement variable indicate a small effect of gender. Male participants self-reported a significantly higher engagement score (M=2.12, SD=0.55) than female participants (M=1.96, SD=0.63) at post-test. There were no significant differences between males and females on post-test levels of cooperation F(1, 167)=0.04, p=0.85, partial η^2=0.00, empathy F(1, 167)=2.99, p=0.09, partial η^2=0.02, or self-control F(1, 167)=3.46, p=0.07, partial η^2 =0.02. A summary of means and standard deviations for each dependent variable, separated by gender for both the control and treatment group is included in Table 11.

Interaction effect. The interaction effect (i.e., treatment group x gender) was non-significant. The interaction effect analyzes whether or not the effects of Growing Minds on the

Table 10

Pre- and Post-test Means and Standard Deviations (n = 176)

	Pre-Test				Post-Test			
	Control		Treatment		Control		Treatment	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
SSIS-SR Prosocial								
Cooperation	1.94	0.07	1.97	0.06	1.99	0.07	2.01	0.06
Empathy	2.18	0.07	1.97	0.07	2.11	0.06	1.97	0.07
Engagement	2.15	0.06	2.00	0.06	2.10	0.06	1.96	0.06
Self-Control	1.52	0.08	1.48	0.07	1.61	0.08	1.49	0.07
SSIS-TR Prosocial								
Cooperation	1.98	0.08	1.99	0.08	2.04	0.07	2.20	0.07
Empathy	2.06	0.07	1.95	0.08	2.20	0.07	2.03	0.08
Engagement	2.05	0.07	2.00	0.07	2.15	0.06	2.21	0.06
Self-Control	1.86	0.07	1.86	0.08	1.91	0.08	1.97	0.08
SSIS-SR Problem Behavior								
Externalizing	0.91	0.07	0.84	0.07	0.81	0.06	0.82	0.06
Internalizing	1.12	0.07	1.16	0.07	1.08	0.08	1.05	0.08
Hyperactivity/Inattention	1.20	0.07	1.14	0.07	1.04	0.07	1.14	0.07
SSIS-TR Problem Behavior								
Externalizing	0.48	0.05	0.56	0.07	0.52	0.06	0.48	0.06
Internalizing	0.45	0.05	0.59	0.06	0.46	0.05	0.55	0.06
Hyperactivity/Inattention	0.65	0.06	0.77	0.07	0.71	0.07	0.65	0.07
ERC								
Emotion Regulation	3.20	0.05	3.15	0.06	3.20	0.04	3.23	0.05
CAMM								
Mindfulness	2.27	0.09	2.36	0.08	2.45	0.09	2.40	0.08

Note. SSIS-SR and SSIS-TR scores range from 0-3. ERC scores range from 1-4. CAMM scores range from 0-4.

Table 11

Post-test Means and Standard Deviations by Gender (n = 176)

	Control				Treatment			
	Male		Female		Male		Female	
Variable Name	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
SSIS-SR Prosocial								
Cooperation	1.97	0.69	2.02	0.59	1.90	0.64	2.12	0.50
Empathy	1.99	0.54	2.22	0.62	1.80	0.73	2.13	0.60
Engagement	2.21	0.50	2.01	0.65	2.03	0.59	1.90	0.61
Self-Control	1.63	0.66	1.61	0.87	1.56	0.72	1.43	0.58
SSIS-TR Prosocial								
Cooperation	1.70	0.73	2.33	0.54	1.96	0.76	2.43	0.51
Empathy	1.87	0.63	2.49	0.59	1.89	0.76	2.16	0.66
Engagement	1.96	0.62	2.32	0.54	2.14	0.59	2.27	0.56
Self-Control	1.74	0.77	2.08	0.69	1.82	0.81	2.11	0.63
SSIS-SR Problem Behavior								
Externalizing	0.82	0.63	0.78	0.58	0.77	0.53	0.86	0.61
Internalizing	0.86	0.67	1.25	0.79	0.77	0.57	1.30	0.78
Hyperactivity/Inattention	1.10	0.73	0.98	0.58	1.10	0.58	1.18	0.66
SSIS-TR Problem Behavior								
Externalizing	0.75	0.59	0.33	0.37	0.58	0.64	0.39	0.39
Internalizing	0.59	0.45	0.36	0.38	0.58	0.58	0.53	0.51
Hyperactivity/Inattention	1.00	0.70	0.46	0.41	0.82	0.73	0.48	0.41
ERC								
Emotion Regulation	3.01	0.35	3.37	0.37	3.11	0.53	3.34	0.43
CAMM								
Mindfulness	2.57	0.77	2.36	0.88	2.60	0.72	2.22	0.80

Note. SSIS-SR and SSIS-TR scores range from 0-3. ERC scores range from 1-4. CAMM scores range from 0-4.

combined social skills variables depend on gender. After controlling for pre-treatment scores and age, the omnibus test of interaction effect was non-significant $F(4, 164)=1.13$, $p=0.35$, partial $\eta^2=0.03$. The partial eta squared value for this multivariate model indicates a small effect of the interaction term. Additionally, the interaction between treatment group and gender accounts for 3% of the variance across all the self-reported social skills variables. Based on the results of this analysis, the effects of Growing Minds on student-reported combined social skills variables does not appear to depend on gender. The test of between-subject effects indicated non-significant treatment effect for each dependent variable. After controlling for baseline scores and age there were no treatment by gender effects on cooperation $F(1, 167)=1.31$, $p=0.25$, partial $\eta^2=0.01$, empathy $F(1, 167)=0.43$, $p=0.51$, partial $\eta^2=0.00$, engagement $F(1, 167)=0.03$, $p=0.88$, partial $\eta^2=0.00$, or self-control $F(1, 167)=0.58$, $p=0.45$, partial $\eta^2=0.00$.

Teacher-report of children's social skills. Teacher report of children's social skills were gathered to help determine if the children who receive the Growing Minds program display significantly higher levels of cooperation, empathy, social engagement, and self-control. A MANCOVA was conducted with data reported by children's classroom teachers. The dependent variables were teacher-reported cooperation, empathy, engagement, and self-control variables collected after the completion of the Growing Minds program. Treatment group (treatment vs. control) and gender were entered in SPSS as fixed factors. Age and teacher-reported baseline levels of cooperation, empathy, engagement, and self-control variables were entered as covariates. The results of the three main effects, or overall multivariate tests, are summarized in the following order: 1) covariate effect, 2) treatment group, 3) gender, and 4) treatment group x gender.

Covariate effect. Teacher-reported baseline levels of cooperation, empathy, engagement, and self-control variables were entered as covariates. The omnibus test indicated baseline levels

of cooperation $F(4, 164)=34.36$, $p<0.01$, partial $\eta^2=0.46$, empathy $F(4, 164)=22.96$, $p<0.01$, partial $\eta^2=0.36$, engagement $F(4, 164)=46.44$, $p<0.01$, partial $\eta^2=0.53$, and self-control $F(4, 164)=26.44$, $p<0.01$, partial $\eta^2=0.39$ have a significant effect on post-test cooperation, empathy, engagement, and self-control scores. In addition, an omnibus test indicated the effect of age $F(4, 164)=6.54$, $p<0.01$, partial $\eta^2=0.14$ also had a significant impact on cooperation, empathy, engagement, and self-control at post-test. The results from these analyses validate the use of these variables as covariates in the model.

Treatment effect. The omnibus effect of treatment group was significant. After controlling for pre-test scores, age, and gender, the combined teacher-reported social skills variables significantly differed by treatment group after the Growing Minds program $F(4, 164)=4.71$, $p<0.01$, partial $\eta^2=0.10$. The partial eta squared value for this multivariate model indicates a medium effect of treatment group. Additionally, it indicates treatment group accounts for 10% of the variance across all the teacher-reported social skills variables.

The test of between-subject effects indicated a significant treatment effect for cooperation. Specifically, after controlling for baseline scores, age, and gender there was a significant difference between control and treatment group levels of teacher-reported cooperation $F(1, 167)=5.43$, $p=0.02$, partial $\eta^2=0.03$. Treatment group accounted for 3% of the variance across teacher-reported cooperation indicating a small effect. At post-test, teachers reported a significantly higher cooperation score for children that participated in the Growing Minds program ($M=2.20$, $SD=0.68$) than they did for children who did not ($M=2.05$, $SD=0.70$). There were no significant differences between control and treatment group at post-test on empathy $F(1, 167)=3.91$, $p=0.05$, partial $\eta^2=0.02$, engagement $F(1, 167)=1.49$, $p=0.22$, partial $\eta^2=0.01$, and self-control $F(1, 167)=0.12$, $p=0.75$, partial $\eta^2=0.00$ after controlling for pre-test scores, age, and gender. Although the

differences were non-significant, estimated marginal means indicated teachers reported higher levels of engagement and self-control for students in the treatment group, when compared to the control group, and lower levels of empathy for the treatment group when compared to the control group.

Gender effect. After controlling for pre-test scores and age the omnibus effect of gender was significant $F(4, 164)=3.05$, $p=0.02$, partial $\eta^2=0.07$. The partial eta squared value for this multivariate model indicates a medium effect of gender. Additionally, it indicates gender accounts for 7% of the variance across all the teacher-reported social skills variables. An examination of between-subject effects indicated a significant difference between males and females on teacher-reported post-Growing Minds cooperation scores only $F(1, 167)=10.97$, $p<0.01$, partial $\eta^2= 0.06$. Effect size estimates for the between-subjects effects of the cooperation variable indicate a medium effect of gender. Female participants were reported by teachers as having significantly higher cooperation ($M=2.38$, $SD=0.53$) than male participants ($M=1.83$, $SD=0.76$) at post-test. There were no significant differences between males and females on post-test levels of empathy $F(1, 167)=1.75$, $p=0.19$, partial $\eta^2=0.01$, engagement $F(1, 167)=1.34$, $p=0.25$, partial $\eta^2=0.01$, or self-control $F(1, 167)=0.35$, $p=0.55$, partial $\eta^2=0.00$.

Interaction effect. The interaction effect (i.e., treatment group x gender) was non-significant. The interaction effect analyzes whether or not the effects of the Growing Minds on the combined social skills variables depend on gender. After controlling for pre-treatment scores and age, the omnibus test of interaction effect was non-significant $F(4, 164)=0.73$, $p=0.57$, partial $\eta^2=0.02$. The partial eta squared value for this multivariate model indicates a small effect of the interaction term. Additionally, the interaction between treatment group and gender accounts for 2% of the variance across all the teacher-reported social skills variables.

Based on the results of this analysis, the effects of Growing Minds on teacher-reported combined social skills variables does not appear to depend on gender. The test of between-subject effects indicated non-significant treatment effect for each dependent variable. Specifically, after controlling for baseline scores and age, there were no treatment by gender effects on cooperation $F(1, 167)=2.87$, $p=0.09$, partial $\eta^2=0.02$, empathy $F(1, 167)=0.52$, $p=0.47$, partial $\eta^2=0.00$, engagement $F(1, 167)=1.04$, $p=0.31$, partial $\eta^2=0.01$, or self-control $F(1, 167)=0.54$, $p=0.47$, partial $\eta^2=0.00$ at post-test as reported by teachers.

Research Question 2 –Problem Behavior

Self-report of children's problem behaviors. The second research question asked if children who receive the Growing Minds program display significantly lower levels of problem behavior such as hyperactivity/inattention, externalizing, and internalizing. To answer this question, a MANCOVA was conducted with data reported by child participants for the internalizing and externalizing variables and an ANCOVA was conducted for student-reported hyperactivity/inattention. The dependent variables for the MANCOVA were self-reported externalizing and internalizing variables, and for the ANCOVA, hyperactivity/inattention, collected after the completion of the Growing Minds program. Treatment group (treatment vs. control) and gender were entered in SPSS as fixed factors. Age and self-reported baseline levels were entered as covariates. The results of the three main effects, or overall multivariate tests, are also summarized below in separate MANCOVA and ANCOVA analyses and in the following order: 1) covariate effect, 2) treatment group, 3) gender, and 4) treatment group x gender.

Externalizing/internalizing covariate effect. Self-reported baseline levels of externalizing and internalizing variables were entered as covariates. The omnibus test indicated baseline levels of externalizing $F(2, 168)=64.98$, $p<0.01$, partial $\eta^2=0.44$ and internalizing $F(2, 168)=89.68$,

p<0.01, partial η^2 =0.52 have a significant effect on post-test levels of externalizing and internalizing. The results from this analysis validate the use of using pre-test scores as covariates in the model. An omnibus test indicated the effect of age F(2, 168)=0.97, p=0.38, partial η^2=0.01 did not have a significant impact on externalizing and internalizing at post-test.

Externalizing/internalizing treatment effect. The omnibus effect of treatment group was non-significant. After controlling for pre-test scores, age, and gender, the combined self-reported problem behavior skills did not significantly differ by treatment group after the Growing Minds program F(2, 168)=0.85, p=0.43, partial η^2 =0.01. The partial eta squared value for this multivariate model indicates a small effect of treatment group. Additionally, it indicates treatment group accounts for 1% of the variance across all the self-reported problem behavior variables. The test of between-subject effects indicated non-significant treatment effects for each dependent variable. Specifically, there were no significant differences between control and treatment group at post-test on externalizing F(1, 169)=0.81, p=0.37, partial η^2 =0.01 or internalizing F(1, 169)=0.62, and p=0.43, partial η^2=0.00 after controlling for pre-test scores, age, and gender. Although the differences were not significant, children in the treatment group self-reported lower levels of internalizing problems at post-test when compared to the control group. However, children in the treatment group self-reported higher levels of externalizing problems at post-test than children in the control group.

Externalizing/internalizing gender effect. After controlling for pre-test scores and age, the omnibus effect of gender was not significant F(2, 168)=1.68, p=0.19, partial η^2=0.02. The partial eta squared value for this multivariate model indicates a small effect of gender. Additionally, it indicates gender accounts for 2% of the variance across the combined problem behaviors. An examination of between-subject effects indicated non-significant differences between males and

females for self-reported post-test externalizing $F(1, 169)=0.90$, $p=0.34$, partial $\eta^2= 0.01$ and internalizing $F(1, 169)=2.94$, $p=0.09$, partial $\eta^2= 0.02$ problems. Results indicate that there is no difference between males and females on the combined or individual problem behavior variables, as reported by students.

Externalizing/internalizing interaction effect. The interaction effect (i.e., treatment group x gender) was non-significant. The interaction effect analyzes whether or not the effects of Growing Minds on the combined problem behavior variables depend on gender. After controlling for pre-treatment scores and age, the omnibus test of interaction effect was non-significant $F(2, 168)=0.25$, $p=0.78$, partial $\eta^2=0.00$. The partial eta squared value for this multivariate model indicates the interaction between treatment group and gender accounts for none of the variance across the combined problem behavior variables. Based on the results of this analysis, the effects of Growing Minds on student-reported combined problem behavior variables does not appear to depend on gender. The test of between-subject effects indicated non-significant treatment effects for each dependent variable. After controlling for baseline scores and age there were no treatment by gender effects on externalizing $F(1, 169)=0.04$, $p=0.84$, partial $\eta^2=0.00$ or internalizing $F(1, 169)=0.50$, $p=0.48$, partial $\eta^2=0.00$.

Hyperactivity/inattention covariate effect. Self-reported baseline levels of hyperactivity/inattention were entered as covariates. The omnibus test indicated baseline levels of hyperactivity/inattention $F(1, 170)=114.52$, $p<0.01$, partial $\eta^2=0.40$ have a significant effect on post-test levels of hyperactivity/inattention. The results from this analysis validates the use of using pre-test scores as covariates in the model. An omnibus test indicated the effect of age $F(1, 170)=3.16$, $p=0.08$, partial $\eta^2=0.02$ did not have a significant impact on hyperactivity/inattention at post-test.

Hyperactivity/inattention treatment effect. The between-subject effects of treatment group was non-significant. After controlling for pre-test scores, age, and gender, self-reported hyperactivity/inattention did not significantly differ by treatment group after the Growing Minds program $F(1, 170)=3.98$, $p=0.05$, partial $\eta^2=0.02$. The partial eta squared value for this univariate model indicates a small effect of treatment group. Additionally, it indicates treatment group accounts for 2% of the variance across all the self-reported problem behavior variables. Although the differences were not significant, children in the treatment group self-reported higher levels of hyperactivity/inattention at post-test when compared to the control group.

Hyperactivity/inattention gender effect. After controlling for pre-test scores and age, the omnibus effect of gender was not significant $F(1, 170)=0.05$, $p=0.83$, partial $\eta^2=0.00$. The partial eta squared value for this multivariate model indicates no effect of gender. Children's self-reports indicate that there is no difference between males and females on hyperactivity/inattention at post-test.

Hyperactivity/inattention gender x treatment effect. The interaction effect (i.e., treatment group x gender) was non-significant. The interaction effect analyzes whether or not the effects of Growing Minds on hyperactivity/inattention depend on gender. After controlling for pre-treatment scores and age, the interaction effect was non-significant $F(1, 170)=0.49$, $p=0.49$, partial $\eta^2=0.00$. The partial eta squared value for this multivariate model indicates the interaction between treatment group and gender accounts for none of the variance across self-reported hyperactivity/inattention. Based on the results of this analysis, the effects of Growing Minds on student-reported hyperactivity/inattention does not appear to depend on gender.

Teacher-report of children's problem behaviors. Teacher-reports of children's hyperactivity/inattention, externalizing, and internalizing problems were also gathered to help

answer the second research question. Similarly to the analyses conducted on student-reported data, a MANCOVA and ANCOVA were conducted with data reported by teachers. Due to the multicollinearity of the externalizing and hyperactivity/inattention variables, these variables had to be analyzed separately. Removing the hyperactivity/inattention variable all together was considered, however, there is a strong theoretical benefit to examining hyperactivity/inattention due to the desire for schools to find programs that improve attention. Therefore, it was decided that hyperactivity/inattention would be examined separately in an ANCOVA.

For the MANCOVA, the dependent variables were teacher-reported externalizing and internalizing variables collected after the completion of the Growing Minds program. Treatment group (treatment vs. control) and gender were entered in SPSS as fixed factors. Age and self-reported baseline levels of externalizing and internalizing variables were entered as covariates. For the ANCOVA, the analysis was the same with the exception of one covariate and the dependent variable (i.e., pre- and post-test hyperactivity/inattention). The results of the three main effects, or overall multivariate tests for teacher-reported problem behavior, are summarized separately for the MANCOVA and ANCOVA analyses and in the following order: 1) covariate effect, 2) treatment group, 3) gender, and 4) treatment group x gender.

Externalizing/internalizing covariate effect. Teacher-reported baseline levels of externalizing and internalizing variables were entered as covariates. The omnibus test indicated baseline levels of externalizing $F(2, 168)=239.37$, $p<0.01$, partial $\eta^2=0.74$, and internalizing $F(2, 168)=120.04$, $p<0.01$, partial $\eta^2=0.59$ have a significant effect on post-test externalizing and internalizing scores. The results from this analysis validate the use of using pre-test scores as covariates in the model. An omnibus test indicated the effect of age $F(2, 168)=1.81$, $p=0.17$, partial $\eta^2=0.02$ did not have a significant impact on externalizing and internalizing at post-test.

Externalizing/internalizing treatment effect. The omnibus effect of treatment group was non-significant. After controlling for pre-test scores, age, and gender, the combined teacher-reported externalizing and internalizing problems did not significantly differ by treatment group after the Growing Minds program $F(2, 168)=2.94$, $p=0.06$, partial $\eta^2=0.03$. The partial eta squared value for this multivariate model indicates a small effect of treatment group. Additionally, it indicates treatment group accounts for 3% of the variance across all the self-reported problem behavior variables. However, this effect is not significant. Interestingly, the test of between-subject effects did indicate significant treatment effect for externalizing behaviors, but not internalizing behaviors. Specifically, there was a significant difference between control and treatment group at post-test on externalizing problems $F(1, 169)=5.77$, $p=0.02$, partial $\eta^2=0.03$ after controlling for pre-test scores, age, and gender. However, there were no significant differences between control and treatment group at post-test on internalizing problems $F(1, 169)=0.05$, and $p=0.83$, partial $\eta^2=0.00$ after controlling for pre-test scores, age, and gender. However, according to the estimated marginal means, teachers reported lower levels of externalizing and internalizing problems for children in the treatment group at post-test, when compared to children in the control group.

Externalizing/internalizing gender effect. After controlling for pre-test scores and age, the omnibus effect of gender was significant $F(2, 168)=3.30$, $p=0.04$, partial $\eta^2=0.04$. The partial eta squared value for this multivariate model indicates a small effect of gender. Additionally, it indicates gender accounts for 4% of the variance across teacher-reported externalizing and internalizing problems. An examination of between-subject effects indicated a significant difference between males and females for teacher-reported post-test internalizing problems $F(1, 169)=5.71$, $p=0.02$, partial $\eta^2= 0.03$ but no significant difference for teacher-reported externalizing problems $F(1, 169)=2.30$, $p=0.13$, partial $\eta^2= 0.01$ at post-test. Results indicate that females

(*M*=0.44, *SD*=0.45) in the control and treatment groups were reported by teachers as having significantly fewer internalizing problems than males in the control and treatment groups (M=0.58, SD=0.52) at post-test.

Externalizing/internalizing interaction effect. The interaction effect (i.e., treatment group x gender) was non-significant. The interaction effect analyzes whether or not the effects of the Growing Minds program on the combined externalizing and internalizing variables depend on gender. After controlling for pre-treatment scores and age the omnibus test of interaction effect was non-significant $F(2, 168)=2.91$, $p=0.06$, partial $\eta^2=0.03$. The partial eta squared value for this multivariate model indicates a small effect of the interaction term. Additionally, the interaction between treatment group and gender accounts for 3% of the variance across the externalizing and internalizing variables at post-test. Based on the results of this analysis, the effects of Growing Minds on student-reported externalizing and internalizing variables does not appear to depend on gender.

However, despite the non-significant results of the omnibus test, the test of between-subject effects did indicate a significant treatment effect for externalizing problems, but not internalizing problems. Specifically, there was no treatment by gender interaction effect on internalizing problems $F(1, 169)=0.56$, $p=0.46$, partial $\eta^2=0.00$ at post-test after controlling for baseline scores and age. However, after controlling for baseline scores and age there was a significant treatment by gender effect on externalizing problems $F(1, 169)=4.21$, $p=0.04$, partial $\eta^2=0.02$ at post-test. These results indicate that the effect of Growing Minds on externalizing problems depends on gender. Specifically, males in the treatment group (*M*=0.58, *SD*=0.64) appeared to have significantly lower $F(1, 169)=9.41$, $p<.01$, partial $\eta^2=0.05$ externalizing problems at post-test than males in the control group (*M*=0.75, *SD*=0.59). However, there appeared to be no significant

difference $F(1, 169)=0.06$, $p=0.80$, partial $\eta^2=0.00$ between females in the control ($M=0.33$, $SD=0.37$) and treatment ($M=0.39$, $SD=0.39$) groups at post-test.

Hyperactivity/inattention covariate effect. Teacher-reported baseline levels of hyperactivity/inattention were entered as a covariate. The omnibus test indicated baseline levels of hyperactivity/inattention $F(1, 170)=320.42$, $p<0.01$, partial $\eta^2=0.65$ have a significant effect on post-test hyperactivity/inattention scores. In other words, 65% of the variance in post-test hyperactivity/internalizing scores can be attributed to baseline levels of hyperactivity/inattention. The results from this analysis validate the use of using pre-test scores as covariates in the model. An omnibus test indicated the effect of age $F(1, 170)=1.96$, $p=0.16$, partial $\eta^2=0.01$ did not have a significant impact on hyperactivity/inattention at post-test.

Hyperactivity/inattention treatment effect. The omnibus effect of treatment group was significant. After controlling for pre-test scores, age, and gender, teacher-reported hyperactivity/inattention significantly differed by treatment group after the Growing Minds program $F(1, 170)=9.73$, $p<0.01$, partial $\eta^2=0.05$. The partial eta squared value for this multivariate model indicates a small to medium effect of treatment group. Additionally, it indicates treatment group accounts for 5% of the variance across teacher-reported hyperactivity/inattention. Children who participated in Growing Minds had significantly lower hyperactivity/inattention ($M=0.65$, $SD=0.61$) than those in the control group ($M=0.71$, $SD=0.62$) at post-test.

Hyperactivity/inattention gender effect. After controlling for pre-test scores and age, the omnibus effect of gender was not significant $F(1, 170)=2.19$, $p=0.14$, partial $\eta^2=0.02$. The partial eta squared value for this multivariate model indicates a small effect of gender, but this effect is not significant. Additionally, it indicates gender accounts for 2% of the variance across teacher-

reported hyperactivity/inattention at post-test. Results indicate that there is no difference between male and female reports of hyperactivity/inattention at post-test.

Hyperactivity/inattention interaction effect. The interaction effect (i.e., treatment group x gender) was significant. The interaction effect analyzes whether or not the effects of the Growing Minds program on hyperactivity/inattention depend on gender. After controlling for pre-treatment scores and age, the omnibus test of interaction effect was significant $F(1, 170)=4.23$, $p=0.04$, partial $\eta^2=0.02$. The partial eta squared value for this multivariate model indicates a small effect of the interaction term. Additionally, the interaction between treatment group and gender accounts for 2% of the variance on teacher-reported hyperactivity/inattention at post-test.

Based on the results of this analysis, the effects of Growing Minds on teacher-reported hyperactivity/inattention depends on gender. A pairwise comparison indicates males in the treatment group ($M=0.82$, $SD=0.73$) had significantly lower hyperactivity/inattention $F(1, 170)=12.45$, $p<.01$, partial $\eta^2=0.07$ than males in the control group ($M=1.00$, $SD=0.70$). However, there was no significant difference between females in the control ($M=0.46$, $SD=0.41$) and treatment groups ($M=0.48$, $SD=0.41$) $F(1, 170)=0.63$, $p=0.43$, partial $\eta^2=0.00$.

Research Question 3 – Emotion Regulation

Teacher-reports of children's emotion regulation. The third research question asked whether children who receive Growing Minds have higher levels of emotion regulation compared to those that were in the control condition. An ANCOVA was used to determine the effects of the Growing Minds program on children's emotion regulation as rated by teachers on the ERC after controlling for pre-test ERC scores, age, and gender. Average post-intervention emotion regulation scores were entered as the dependent variable, pre-test emotion regulation scores, age, and gender were entered as the covariate, and treatment group was the independent variable. The results of the

overall omnibus tests, are summarized below in the following order: 1) covariate effect, 2) treatment group, 3) gender, and 4) treatment group x gender.

Covariate effect. Teacher-reported baseline levels of children's emotion regulation, age, and gender were entered as covariates. The omnibus test indicated baseline levels of emotion regulation $F(1, 170)=161.27$, $p<0.01$, partial $\eta^2=0.49$ have a significant effect on post-test emotion regulation scores. That is, pre-test emotion regulation scores accounted for 49% of the variance on post-test emotion regulation. The results from this analysis validate the use of using pre-test scores as covariates in the model. An omnibus test indicated the effect of age $F(1, 170)=6.09$, $p=0.02$, partial $\eta^2=0.04$ had a significant impact on emotion regulation at post-test. Age accounted for 4% of the variance on post-test emotion regulation. The results of these analyses validate the use of age and pre-test scores as a covariate in the model.

Treatment effect. The omnibus effect of treatment group was non-significant. After controlling for pre-test scores, age, and gender, emotion regulation did not significantly differ by treatment group after the Growing Minds program $F(1, 170)=0.96$, $p=0.33$, partial $\eta^2=0.01$. The partial eta squared value for this multivariate model indicates a small effect of treatment group. Additionally, it indicates treatment group accounts for 1% of the variance in emotion regulation at post-test. Although the differences were not significant, teachers rated children in the treatment group at post-test as higher in emotion regulation, than those in the control group.

Gender effect. After controlling for pre-test scores and age, the omnibus effect of gender was significant $F(1, 170)=5.94$, $p=0.02$, partial $\eta^2=0.03$. The partial eta squared value for this multivariate model indicates a small effect of gender. Additionally, it indicates gender accounts for 3% of the variance on emotion regulation at post-test. Female participants were reported as

having a significantly greater emotion regulation (M=3.36, SD=0.40) than male participants (M=3.06, SD=0.45) at post-test.

Interaction effect. The interaction effect (i.e., treatment group x gender) was non-significant. The interaction effect analyzes whether or not the effects of the Growing Minds program on the combined social skills variables depend on gender. After controlling for pre-treatment scores and age the omnibus test of interaction effect was non-significant $F(1, 170)=0.69$, $p=0.41$, partial $\eta^2=0.00$. Based on the results of this analysis, the effects of Growing Minds on teacher reports of children's emotion regulation does not appear to depend on gender.

Research Question 4 – Mindfulness

Self-reports of children's mindfulness. The fourth research question asked whether children who receive Growing Minds have higher levels of mindfulness compared to those that were in the control condition. An ANCOVA was used to determine the effects of the Growing Minds program on children's mindfulness as rated by children on the CAMM after controlling for pre-test CAMM scores, age, and gender. Average post-intervention mindfulness scores were entered as the dependent variable, pre-test mindfulness scores, age, and gender were entered as the covariate, and treatment group was the independent variable. The results of the overall omnibus tests, are summarized below in the following order: 1) covariate effect, 2) treatment group, 3) gender, and 4) treatment group x gender.

Covariate effect. Self-reported baseline levels of children's mindfulness, age, and gender were entered as covariates. The omnibus test indicated baseline levels of mindfulness $F(1, 170)=67.16$, $p<0.01$, partial $\eta^2=0.28$ have a significant effect on post-test mindfulness. That is, pre-test mindfulness scores account for 28% of the variance on post-test mindfulness. The results from this analysis validates the use of using pre-test scores as covariates in the model. An omnibus

test indicated the effect of age $F(1, 170)=1.81$, $p=0.18$, partial $\eta^2=0.01$ did not have a significant impact on mindfulness at post-test. Age accounted for only 1% of the variance on post-test mindfulness.

Treatment effect. The omnibus effect of treatment group was non-significant. After controlling for pre-test scores, age, and gender, mindfulness did not significantly differ by treatment group after the Growing Minds program $F(1, 170)=0.58$, $p=0.45$, partial $\eta^2=0.00$. The partial eta squared value indicates treatment group did not account for any of the variance in mindfulness at post-test. Additionally, students in the control group rated themselves as higher in mindfulness at post-test than children in the treatment group.

Gender effect. After controlling for pre-test scores and age, the omnibus effect of gender was not significant $F(1, 170)=1.80$, $p=0.18$, partial $\eta^2=0.01$. The partial eta squared value for this univariate model indicates a small effect of gender. Additionally, it indicates gender accounts for 1% of the variance on mindfulness at post-test.

Interaction effect. The interaction effect (i.e., treatment group x gender) was non-significant. The interaction effect analyzes whether or not the effects of the Growing Minds program on mindfulness depends on gender. After controlling for pre-treatment scores and age, the omnibus test of interaction effect was non-significant $F(1, 170)=0.75$, $p=0.39$, partial $\eta^2=0.00$. Based on the results of this analysis, the effects of Growing Minds on self-reported mindfulness does not appear to depend on gender.

Research Question 5 – Gender as Moderator

The fifth research question asked whether the effect of the Growing Minds program on social and behavioral outcomes differed by gender. Analyses to answer this question were investigated as part of each research question above. Based on the results of the analyses explored

above, gender appeared to moderate effects of the Growing Minds program for two variables: teacher-reported externalizing problems and teacher-reported hyperactivity/inattention. There was a significant interaction between treatment group and gender for both of these variables indicating that the effect of the Growing Minds program significantly differed based on whether a child was male or female for teacher-reported externalizing and hyperactivity/inattention only. For both externalizing problems and hyperactivity/inattention, males in the treatment group were rated as having significantly lower levels of externalizing problems and hyperactivity/inattention than the control group. However, there were no significant differences between control and treatment groups for females.

Research Question 6 – Differences Based on Problem Type

The sixth research question asked whether the effects of Growing Minds on emotion regulation and mindfulness differ by the problem type (i.e., typical, primarily externalizing problems, primarily internalizing problems, or both internalizing and externalizing problems). Two separate ANCOVAs were used to answer this question. Pre-test scores, age, and gender were entered as covariates and treatment group was the independent variable. In addition, typical (=1), internalizing (=2), externalizing (=3), and both internalizing and externalizing (=4) variables (i.e., problem type) were entered as covariates in the model. For one ANCOVA, post-test emotion regulation was entered as the dependent variable, and for the second ANCOVA, post-test mindfulness was entered as the dependent variable. The results from this analysis are summarized first for emotion regulation and then for mindfulness.

Emotion regulation interaction effect. The interaction effect of treatment group by group membership (i.e., typical, externalizers, internalizers, both) was significant. The interaction effect analyzes whether or not the effects of the Growing Minds program on emotion regulation depends

on the group to which a child belongs. After controlling for pre-treatment scores, gender, and age, the omnibus test of interaction effect was significant $F(3, 165)=2.94$, $p=0.04$, partial $\eta^2=0.05$.

Pairwise comparisons for the treatment group were then examined to determine whether, when compared to the typical group, Growing Minds resulted in higher or lower emotion regulation for internalizers, externalizers, or both. In the treatment group, there were no significant differences between typical children and internalizers ($p=0.12$) or externalizers ($p=0.75$) but there was a significant difference between typical children and children who were both internalizers and externalizers ($p=0.01$). Means and standard deviations can be found in Table 12. Typical children

Table 12

Question 6 Post-test Means and Standard Deviations by Problem Type

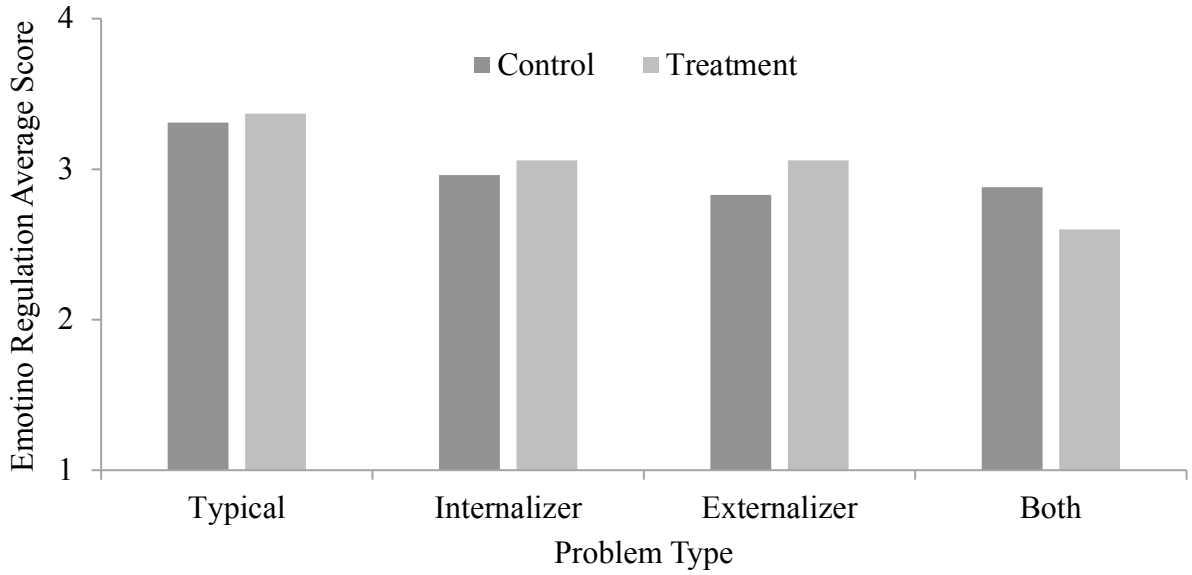
		Control		Treatment	
	N	*M*	*SD*	*M*	*SD*
ERC					
Typical	56	3.31	0.39	3.37	0.40
Internalizer	11	2.96	0.29	3.06	0.69
Externalizer	14	2.83	0.25	3.06	0.44
Both Internalizer and Externalizer	6	2.88	0.23	2.60	0.35
CAMM					
Typical	56	2.51	0.81	2.35	0.83
Internalizer	11	2.32	0.99	2.27	0.43
Externalizer	14	2.46	0.86	2.65	0.80
Both Internalizer and Externalizer	6	1.73	0.83	2.55	0.73

Note. Means derived from an average item scores, not average scaled scores.

in the treatment group had higher levels of emotion regulation when compared to internalizers, externalizers, and both but only the relationship between typical children and children who have both internalizing and externalizing problems was significant. Results indicate no significant differences between the emotion regulation scores of children who are typical, internalizers, or externalizers at post-test. However, typical children had significantly higher emotion regulation at post-test after controlling for pre-test scores, gender, and age when compared to children with both externalizing and internalizing problems. The treatment by problem type interaction effects are summarized in Figure 1.

Figure 1

Emotion Regulation: Means of Treatment Group by Membership Type

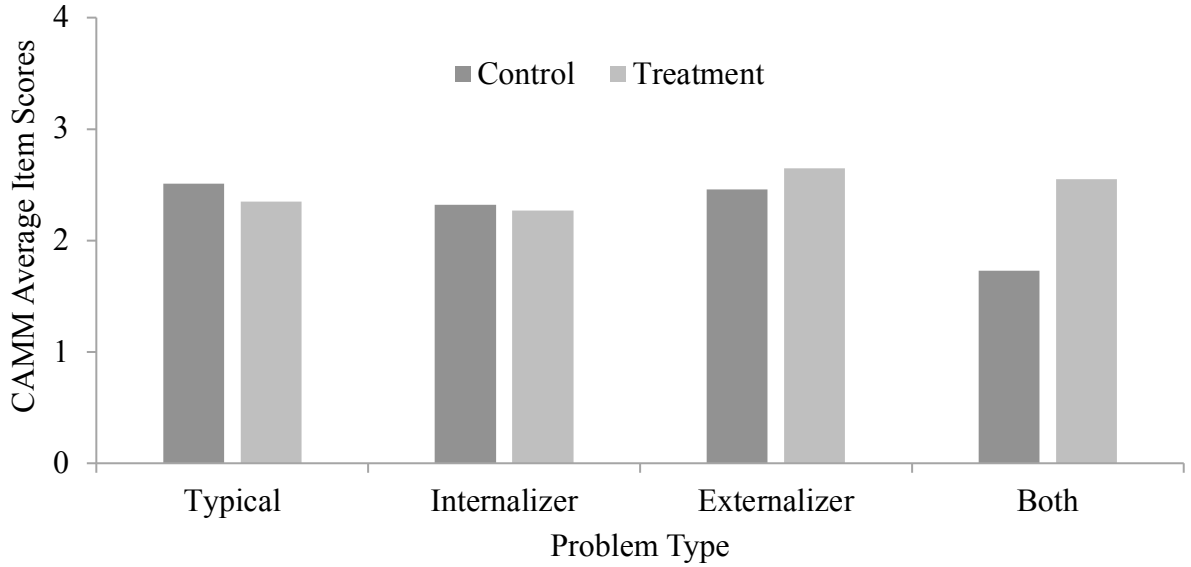


Mindfulness interaction effect. The interaction effect of treatment group by group membership (i.e., typical, externalizers, internalizers, both) was not significant. The interaction effect analyzes whether or not the effects of the Growing Minds program on mindfulness depends on the group to which a child belongs. After controlling for pre-treatment scores, gender, and age, the omnibus test of interaction effect was not significant $F(3, 165)=2.25$, $p=0.09$, partial $\eta^2=0.04$.

Pairwise comparisons for the treatment group were then examined to determine whether, when compared to the typical group, Growing Minds works better for internalizers, externalizers, or both externalizers and internalizers. In the treatment group, after controlling for baseline scores, age, and gender, typical children had about the same levels of mindfulness when compared to internalizers, and thus the difference between typical children and children with internalizing problems was not significant (p=0.98). Typical children had lower levels of mindfulness after the Growing Minds program when compared to children with externalizing problems, but this difference was not significant (p=0.12). And, typical children had lower levels of mindfulness after the Growing Minds program when compared to children with both internalizing and externalizing problems, but this difference was also not significant (p=0.24). Results indicate that the effects of the Growing Minds program on mindfulness does not differ for typical children when compared with children who are primarily internalizers, externalizers, or both. The treatment by problem type interaction effects are summarized in Figure 2.

Figure 2

Mindfulness: Means of Treatment Group by Membership Type



CHAPTER FIVE

Discussion

Summary of Results

Research Question 1. *Do children who receive the Growing Minds program have significantly higher levels of pro-social skills such as cooperation, empathy, engagement, and self-control?* After controlling for pre-treatment, gender, and age there were no significant differences found between control and treatment groups in any of the self-reported social skills at post-test. Comparison of means indicated that children in the treatment group reported lower levels of cooperation, empathy, engagement, and self-control at post-test when compared with the control group. The direction of effect was unexpected; however, these differences were not significant. For each of the self-reported social skills variables, treatment group accounted for 0 to 2% of the variance in each of the self-reported post-test social skills variables.

After controlling for pre-intervention scores, gender, and age, children who received the Growing Minds program were rated by teachers as having significantly higher cooperation than children who did not receive the program. Treatment group accounted for 3% of the variance across teacher-reported cooperation. However, after controlling for pre-treatment scores, gender, and age no significant differences were found between control and treatment groups in empathy, engagement, and self-control. When compared to the control group, teachers reported higher levels of engagement and self-control for students in the treatment group, but these differences were not significant. Surprisingly, after controlling for pre-intervention scores, gender, and age, teachers and students both reported lower levels of empathy for the treatment group when compared to the control group at post-test, but these differences were not significant. Empathy, engagement, and

self-control each accounted for 0 to 2% of the variance across each of the teacher-reported post-test social skills variables.

Research Question 2. *Do children who receive the Growing Minds program have significantly lower levels of problem behavior such as hyperactivity/inattention, externalizing, and internalizing problems?* After controlling for pre-intervention scores, gender, and age, there were no significant differences between the treatment and control groups' levels of self-reported externalizing, internalizing, and hyperactivity/inattention at post-test. Self-reported and teacher-reported externalizing, internalizing, and hyperactivity/inattention accounted for 0% to 5% of the variance across each of the problem behavior variables at post-test. Teachers and children both rated treatment-group children as having lower levels of internalizing problems at post-test; however, these differences were not significant. Conversely, children in the treatment group self-reported higher levels of externalizing problems and hyperactivity/inattention at post-test when compared to children in the control group, but again, these differences were not significant. However, teacher-reported hyperactivity/inattention significantly differed between treatment and control group. Teachers indicated children who participated in Growing Minds had significantly lower hyperactivity/inattention than those in the control group at post-test. Treatment group accounted for 5% of the variance across teacher-reported hyperactivity/inattention.

Research Question 3. *Do children who receive the Growing Minds program have significantly higher levels of emotion regulation?* After controlling for pre-intervention scores, gender, and age, emotion regulation, as reported by teachers, did not significantly differ between control and treatment groups at post-test. Treatment group accounted for 1% of the variance in emotion regulation at post-test. Teachers rated children in the treatment group as higher in emotion regulation than those in the control group at post-test but the differences were not significant.

Research Question 4. *Do children who receive the Growing Minds program display significantly higher levels of mindfulness?* After controlling for pre-intervention scores, gender, and age, there were no significant differences between the control and treatment groups on post-test levels of mindfulness. Treatment group did not account for any of the variance in mindfulness at post-test. In fact, children in the control group rated themselves as higher in mindfulness at post-test, when compared to the treatment group, but the difference was not significant.

Research Question 5. *Does the effect of the Growing Minds program on all outcomes differ by gender?* To examine this question, the effect of gender, as well as the gender by treatment group interaction results will be summarized below. The interaction effect answers this research question; however, the effect of gender across control and treatment groups at post-test explains how each respective variable differs between male and female participants across groups.

Social Skills. Gender accounted for 0 to 3% of the variance across each of the self-reported pro-social variables at post-test and 0 to 6% of the variance across each of the teacher-reported pro-social variables at post-test. Males self-reported a significantly higher engagement at post-test than female participants and female participants were reported by teachers as having significantly higher cooperation than male participants at post-test. However, there were no self-reported or teacher-reported treatment group by gender interactions, meaning the effect of Growing Minds on social skills does not appear to differ by gender.

Problem Behavior. A small effect of gender was found with 1 to 3% of the variance across each of the teacher-reported externalizing and internalizing problems accounted for by gender. Students, on the other hand, did not report any differences between males and females on any of the post-test problem behaviors. Students reported that 0 to 2% of the variance for each of the

problem behavior variables could be accounted for by gender. Additionally, there were no student-reported treatment by gender interaction effects.

A significant difference between males and females was found for teacher-reported post-test internalizing problems but no differences were found for teacher-reported externalizing problems. Females in the study were reported by teachers as having significantly fewer internalizing problems than males at post-test. However, the interaction between gender and treatment group was not significant. Therefore, it does not appear as though the effect of the Growing Minds program on teacher-reported internalizing and externalizing problems depends on gender.

However, for teacher-reported hyperactivity/inattention, the interaction effect (i.e. treatment group x gender) was significant. Therefore, the effect of the Growing Minds on teacher-reported hyperactivity/inattention appears to depend on gender. The interaction between treatment group and gender accounted for 2% of the variance on teacher-reported hyperactivity/inattention at post-test. A pairwise comparison indicated males in the treatment group had significantly lower hyperactivity/inattention than males in the control group. However, there was no significant difference between females in the control and treatment groups. In other words, teachers report that Growing Minds seems to benefit males more than females in reducing hyperactivity/inattention.

Emotion Regulation. A significant difference between males and females was found on post-test levels of emotion regulation with girls reporting significantly greater emotion regulation than boys in the study. Gender accounted for 3% of the variance on emotion regulation at post-test. However, the gender by treatment group interaction effect was not significant indicating that the effect of Growing Minds on emotion regulation did not differ by gender.

Mindfulness. A significant effect of gender indicated no differences between females and males on levels of mindfulness at post-test. The treatment group accounted for 1% of the variance on mindfulness at post-test, but this effect was not significant. Also, no treatment group by gender interaction was found indicating the effects of the Growing Minds program on student-reported mindfulness does not differ by gender.

Research Question 6. *Compared to typical children, does the effect of Growing Minds on emotion regulation and mindfulness differ for children with internalizing problems, externalizing problems, or both externalizing and internalizing problems?* Results from this analysis must be interpreted with caution because of the low sample size of students included in the "both externalizers and internalizers" group (n=6).

Emotion regulation. After controlling for pre-treatment scores, age, and gender, the interaction between treatment group and group membership was significant indicating the effect of Growing Minds on emotion regulation appears to differ depending upon to which group (i.e. typical, internalizer, externalizer, both) a child belongs. Compared to typical children in the treatment group, internalizers, externalizers, and both internalizers and externalizers in the treatment group had lower levels of emotion regulation. However, the difference between typical children and children in other groups was only significant for those children who were both internalizers and externalizers. The results indicate that after controlling for baseline emotion regulation scores, age, and gender, typical children, or children whose scores fell in the average range, had significantly higher emotion regulation than those children who were both externalizers and internalizers.

Mindfulness. After controlling for pre-intervention scores, age, and gender the interaction effect of treatment group by group membership was not significant, indicating the effect of

Growing Minds on children's' mindfulness does not appear to depend on group membership. For the treatment group, typical children and children who were primarily internalizers had about the same level of mindfulness at post-test. Surprisingly, children who were primarily externalizers and children who were both internalizers and externalizers indicated higher levels of mindfulness than typical children at post-test.

Unexpected Findings

Social skills. No differences were found between control and treatment groups on many of the self-reported and teacher-reported social skills variables. For example, on student-reported social skills, students in the treatment group unexpectedly rated themselves lower on all variables when compared to the treatment group. Teachers, however, were not in general agreement with children about the direction of the relationship between treatment and control groups, with the exception of empathy. For empathy, both teachers and students rated children in the treatment group lower than children in the control group, although the difference between the two groups was not significant. Furthermore, teachers reported students in the treatment group as higher in cooperation, engagement, and self-control at post-test.

Problem behavior. It was also surprising that, when compared with the control group, children in the treatment group rated themselves as higher in externalizing problems and hyperactivity/inattention whereas teachers rated children in the treatment group as having significantly lower hyperactivity/inattention at post-test. The differences between control and treatment groups were not only dissimilar between children and their teachers, but, in some cases, the direction of the relationship between treatment and control groups was also the opposite. For example, children in the treatment group rated themselves as higher in externalizing and hyperactivity/inattention, when compared to children in the control group at post-test, whereas

teachers rated children in the treatment group as lower in externalizing and hyperactivity/inattention when compared to the control group at post-test.

According to the authors of the SSIS, child and teacher-reports are correlated in the positive direction, but some variables are more correlated than others. In a cross-informant examination of the SSIS, teachers' and children's correlations were weak to moderate and not statistically different. In other words, children and teachers generally agree when rating children's social skills and problem behaviors, but the relationship of the agreement is not strong (Gresham & Elliott, 2008). Therefore, it is interesting that students and teacher ratings did not result in the same conclusions, but not entirely surprising considering agreement between children and their teachers on the SSIS is not strong.

Emotion regulation. Children in the treatment group were rated by teachers as having greater emotion regulation at post-test but the differences between treatment and control were not significant. These findings are surprising given that emotion regulation is thought to be an underlying mechanism of mindfulness that leads to behavioral change (Shapiro et al., 2006). These findings are also surprising given several prior studies investigating the impact of mindfulness found improvements in children's emotion regulation. Children in these studies (e.g., Broderick & Metz, 2009; Flook, Goldberg, Pinger, & Davidson, 2015; Poehlmann-Tynan et al., 2016) ranged in age from pre-school to high school and the mindfulness program was implemented with the same approximate dosage (i.e., 10-12 weeks). However, prior studies that examined the effect of mindfulness on children's emotion regulation used different measures such as the Difficulties in Emotion Regulation Scale and Teacher-Rated Social Competence. It is possible that the Growing Minds program did not result in greater emotion regulation for children in the treatment group

after ten weeks, but it is also possible that the measure of emotion regulation used for this study was not sensitive enough to detect short-term changes in children's emotion regulation skills.

Mindfulness. Children in the treatment group rated themselves lower in mindfulness than those in the control group. This result was quite surprising given the most recent meta-analysis of mindfulness with youth found the greatest effects on mindfulness (Klingbeil et al., 2017). Improvements in trait-based mindfulness are thought to mediate the relationship between the practice of mindfulness and socioemotional and behavioral outcomes. However, other studies using the CAMM to measure mindfulness have also found no treatment effects on mindfulness as a result of a mindfulness program or intervention (Johnson, Burke, Brinkman, & Wade, 2016; Lagor, Williams, Lerner, & McClure, 2013).

Other studies have demonstrated that the CAMM may not accurately measure mindfulness. For instance, there have been instances when the CAMM indicated children with mindfulness meditation or yoga experience had a lower mindfulness score than children who did not have any experience with mindfulness meditation or yoga (de Bruin, Zijlstra, Weijer-Bergsma, & Bögels, 2011; de Bruin, Zijlstra, & Bögels, 2014). The reason for this outcome is not known, but researchers have suggested that practicing mindfulness actually makes children more aware of how often they are not mindful (e.g., automatic behaviors, judgmental thoughts, inattention). Thus, following a mindfulness program, children may more accurately report their mindfulness, whereas prior to the mindfulness program their scores may have been inflated.

Problem type. The exploratory analysis of determining whether the effect of Growing Minds on emotion regulation and mindfulness differs by problem type was particularly surprising for mindfulness. The expectation was that either typical children would outperform children in the other groups or that children who were externalizers, internalizers, or both, might 'catch up' to

typical children. Although the relationship was not significant, children in the treatment group who were externalizers and both internalizers and externalizers rated themselves as higher in mindfulness when compared to internalizers and typical children. The results related to teacher-rated emotion regulation were less surprising in that typical children were rated as highest in emotion regulation at post-test, followed by externalizers, internalizers, and both internalizers and externalizers, but only the difference between typical children and both externalizers and internalizers was significant. There were many limitations to the CAMM which may explain why the results for mindfulness were not as expected. For example, the CAMM was validated with older children. As discussed in the *Limitations* section, it is possible that children inaccurately reported because the questions were beyond their understanding. Or, some researchers have suggested that self-reporting is inherently difficult for children who already have gaps in their attention (Eklund, O'Malley, & Meyer, 2017).

Limitations

Measurement. Although the developers of the CAMM demonstrated strong reliability and validity estimates, a limitation of the use of this measure is the discrepancy between the sample used in the validation of the CAMM, and the sample used in this study. The majority of children and adolescents who were included in a study to validate the CAMM did not perfectly match the ethnicity and age of the students in this study. For example, most study participants who were used to validate the CAMM were White, while the majority of students in this study were African American and Hispanic/Latino. Additionally, the CAMM was validated with children ranging in age from 10 to 17, with a mean age of 12. The sample for this study ranged in age from 8 to 13, with mean age of 11. Because the test was not designed for children as young as 8, some limitations may exist regarding how much the 8- and 9-year-old participants understood when answering

questions on the CAMM questionnaire. For example, questions such as, "I get upset with myself for having feelings that don't make sense," may have been confusing for children of this age. Unfortunately, there are no other measures of mindfulness for youth that are validated for children under ten years (Eklund, O'Malley, & Meyer, 2017). Future research might investigate the validation of the CAMM for use with younger children or validation of an alternative measure for young children (<10 years).

In addition to measuring mindfulness, future research may want to assess the role metacognition plays in treatment effects. In theory, mindfulness is a metacognitive exercise because it facilitates the observation of inner emotion and thought processes. In a study that examined the effect of mindfulness on metacognition in children 7-9 years, children demonstrated improvements in metacognitive performance (Flook et al., 2010). It is possible that for children who have developed or practiced metacognitive strategies, the exercise of mindfulness is easier thus leading to greater personality-based mindfulness traits. For this reason, it may be interesting to examine the role of children's metacognitive abilities as a mediator of intervention effects within a mindfulness program.

Teachers are often good observers and have fewer problems answering questions about students in a way that is socially-desirable. However, teacher rating-scales are still susceptible to bias. For example, teachers only experience a fragment of the child's life. Teachers have typically known students for a short period of time in comparison to the child's lifespan and only make observations in an educational context (Gresham et al., 2018). Parents and family members, on the other hand, have known a child for most of his or her life and observe their behavior in more familiar contexts, such as the home environment.

Teachers can have potential cultural and racial biases because of their racial and ethnic differences from their students. There were racial and ethnic differences between the teachers and students in this study. The majority of teachers were White (83%). Evidence of ethnic bias on teacher's ratings of children's behavior has been mixed (Mason, Gunersel, & Ney, 2014). Some studies have found evidence that teachers rate African American students more accurately than White students on ratings of hyperactivity and inattention. However, some compelling evidence has suggested that teachers negatively bias minority children on ratings of hyperactivity (Sonuga-Barke, Minocha, Taylor, & Sandberg, 1993). On the SSIS, specifically, teachers and parents demonstrated bias by reporting more performance deficits and fewer social skills strengths regardless of race (Gresham, Elliott, & Kettler, 2010). Because rating scales can be biased, future studies might examine direct behavioral observations or less biased measures of stress such as cortisol or heart rate.

Both students and teachers were not blind to treatment. For this reason, there may have been bias in student and teacher ratings based on knowledge of having either received or not received the program. It is possible that teachers and students in the treatment group were actively seeking positive effects because of their perception of the program, whereas teachers and students in the control group had a negative bias knowing they were not participating in a potentially beneficial program.

Randomization. Although efforts were made to match the control and treatment groups by equating participants, this study was not randomized. Randomization in experimental research improves internal validity in that differences between control and treatment groups are attributable to chance and assignment of participants to treatment and control groups is not biased. For this study, classrooms were assigned to the treatment or control group by school administrators.

Therefore, it is possible that administrators were biased when assigning classrooms to the treatment and control groups either in favor of treatment effects or against.

Bias may have played a role in the effects of this study, but to determine if non-randomization led to non-equal groups, examination of differences of variables relevant to this study between the control and treatment groups were considered. No differences between control and treatment groups were found for age, gender, student- and teacher-reported problem behavior, mindfulness, or emotion regulation. Also, no differences were found between control and treatment groups' student- and teacher-report of social skills, with one exception: student-reported empathy. The control group had significantly higher empathy at pre-test when compared with the treatment group.

Prior to the study, it was hypothesized that there would be significant differences between schools on many of the variables due to administrator-reported problems prior to the study (i.e. School 1 – primarily externalizing problems; School 2 – primarily internalizing problems). Analysis of baseline data confirmed that there were differences at baseline between the two schools on six variables: significant differences existed in student-reported engagement, self-control, internalizing, and mindfulness and teacher-reported self-control and internalizing. However, there were no differences between the schools in terms of externalizing problems or hyperactivity/inattention. Regardless, because there were several differences between the schools on several variables, the data confirmed the need to spread the treatment and control groups across schools, rather than having one school serve as the treatment group, and the other the control. To verify that this maneuver resulted in more equal groups at baseline, the treatment and control groups were compared at baseline.

Treatment assignment. The analysis of this study occurred at the individual level, yet assignment of treatment versus control was conducted at the classroom level. Individual analysis versus classroom assignment of treatment leads to estimates of treatment effects that are not as precise as estimates from random sampling at the individual level (Hedges & Rhoads, 2010). In addition, because analyses were conducted at the individual level, inferences cannot be made related to the effect of Growing Minds at the classroom level. A more rigorous analytic approach that involves multi-level modeling could have taken into account the nesting structure of the research design (i.e., students within classrooms). However, to analyze a study using multivariate techniques, a much higher sample size would have been required. There is some variability in the suggested number of participants and groups needed to conduct a powerful analysis, however, 30 groups, with 30 participants within each group is thought to be robust against error (Hox, 1998). Recruitment of 30 classrooms with at least 30 students in each classroom was not feasible for this study.

Wait-list control and follow-up. Unfortunately, due to the school's standardized testing schedule and end-of-the-year events, the wait-list control received a shortened version of the Growing Minds program. This study could have been greatly improved with the inclusion of the wait-list control's data as the sample size would have increased, improving the power of the study.

This study was conducted in the late winter/spring from January through May. This timeline was ideal for more accurate teacher-reports of student socioemotional and behavioral functioning because teachers had known students for several months. If the study had been conducted in September, the teachers would not have been able to complete the questionnaires as accurately. However, the drawbacks of completing the study in the late winter/spring were the conflicts with the spring break schedule, standardized testing schedule, and end-of-year activities.

To be flexible with school schedules, only data for the first treatment group were collected. Another limitation of this study was that follow-up effects were not collected for the treatment group, which would have helped to determine if the effects of Growing Minds on variables such as cooperation and hyperactivity/inattention maintained after several weeks.

Intervention fidelity. There are no clear guidelines on acceptable levels of treatment fidelity (Noell, Gresham, & Gansle, 2002; Smith, Daunic, & Taylor, 2007). The complexity of treatment fidelity makes it difficult to determine which intervention components lead directly to positive outcomes. For example, a study with 70% intervention fidelity that also includes components that directly lead to positive outcomes may still be effective. However, a study with 80% treatment fidelity may not lead to positive outcomes, if essential components are not included (McIntyre, Gresham, DiGennaro, & Reed, 2007). Through a direct observation of treatment implementation for 20% of the Growing Minds sessions, the program was implemented with 82.5% fidelity. It is unknown which components of the Growing Minds program leads to positive change, therefore it is difficult to determine if 82.5% intervention fidelity is acceptable. Thus, future studies of Growing Minds should investigate the impact of individual program components in an effort to determine which components are the most influential on various aspects of children's social and emotional functioning and behavior. During direct observations of treatment implementation, researchers noticed that many components were not completed due to time restraints. Developers of the Growing Minds program may consider restructuring the manual to account for shorter sessions or lengthening the sessions in order to account for all the intervention components prescribed in the manual.

Influence of other unknown factors. The influence of outside practice on treatment effects is unknown and is a potential problematic confounding variable. Teachers across the six

treatment classrooms reported a very large range of mindfulness practice outside the classroom. One classroom only conducted four total sessions outside of Growing Minds practicing mindfulness with students, while another classroom conducted 56 sessions. Growing Minds suggests to teachers that they complete short 1- to 2-minute mindfulness exercises about four times a day during the ten weeks of the program. This would result in a total of 20 sessions, or 40 minutes, per week and 200 sessions or 400 minutes during the ten weeks. The teachers followed this suggestion for practice with their students significantly under this suggestion. Future research may focus on the reason teachers were unable to practice with students at the suggested rate or, explore whether or not it was difficult for teachers to record the sessions due to their high frequency. The data collected by teachers is potentially unreliable information and should be interpreted with caution. Additionally, the effect of this outside treatment on program outcomes is unknown.

Another unknown and potentially confounding variable is the influence of concurrent programs or social-emotional/behavioral interventions during the implementation of Growing Minds. Data were not collected from schools on other social-emotional or behavioral programs or interventions that were being conducted simultaneously with Growing Minds. Therefore, it is not known whether or not another intervention or program influenced the results.

There is also a potential influence of classroom-level effects such as the classroom teacher. In one of the classrooms that was chosen as a control, the teacher resigned very shortly before the study began. This could have had a potential influence on the results of the study in more than one way. The teacher who resigned could not rate the students in her class at pre- and post-test; therefore, a social worker who had known the many of the children for several years collaborated with the new teacher to rate children. Although it is presumed that the social worker and new classroom teacher accurately rated children, the situation was not ideal. In addition, the modified

procedure was different for the remaining classrooms in which teachers had known the children for at least 4-5 months. Additionally, the classroom that was affected by the teacher's resignation was in the control group. It is likely that classroom management and routines were severely disrupted by the introduction of a new teacher and it is possible more opportunities arose for children to demonstrate negative behaviors that would have subsequently been captured by teacher-ratings.

This study included a diverse population of students but did not specifically examine the role of culture or culturally-responsive practices within the Growing Minds curriculum. Because Growing Minds is primarily implemented with students within urban contexts where many students are racially, and culturally diverse, future studies of this program should consider the role of culture in the program. The developers of the Growing Minds curriculum may want to consider how to ensure both the instructors, and the curriculum as a whole, include culturally responsive practices.

Social desirability and comprehension. Although children were told that their answers would be anonymous and that they should answer questions as honestly as possible, there was still some possibility that student-ratings were subject to social desirability. During administration of questionnaires, the child's teacher was in the room, although was encouraged not to circulate the room. Children understood they were part of a research study and that their answers would not be shared with school staff or family, but it is still possible that children did not answer truthfully. Another possibility was that children did not understand directions or the questions from the questionnaire. Children in the study ranged from 8-13, so some may not have accurately answered questions because of their young age or their cognitive limitations. In addition, because children

knew that adults would not be reviewing their work, it is possible that some children did not answer carefully.

Implications and Future Directions

Cooperation. Teachers reported that children in the treatment group had significantly higher levels of cooperation than the control group, and that this effect did not depend on gender. These findings are consistent with previous research that found that children who received mindfulness were more prosocial and more accepted by peers than those in an active control (Schonert-Reichl et al., 2015). Results suggest that Growing Minds may have particular utility at increasing social cooperation.

Hyperactivity/inattention. Teachers also reported that males who participated in Growing Minds had significantly lower levels of hyperactivity/inattention at post-test when compared with males in the control group. Growing Minds' goal is to create calmer and kinder classrooms. This finding suggests that Growing Minds may not only lead to greater cooperation but may also be beneficial at decreasing hyperactivity and inattentiveness, particularly for male children.

Universal intervention. The data collected in regard to question 6, indicated an effect on emotion regulation favoring typical children over children who are both internalizers and externalizers. In addition, typical children were rated as being higher in emotion regulation than any of the other groups. The exploratory nature of this analysis suggests results should be interpreted with caution and further research is needed to understand differences in the impact of Growing Minds on typical children and children with various problem types such as externalizing and internalizing problems.

Growing Minds and other similar universal mindfulness programs are implemented at the classroom level where there are typical children and children with socioemotional or behavioral

problems. The findings specific to emotion regulation suggest that typical children benefit more than children who have both internalizing and externalizing problems, but they do not benefit children significantly more than children with externalizing or internalizing problems. Estimated marginal means of post-test emotion regulation indicated that children in the treatment group who were externalizers or internalizers at pre-test, had levels of emotion regulation that were not significantly different from typical children. In fact, externalizers in the treatment group had nearly identical levels of emotion regulation as typical children at post-test. These results indicate that Growing Minds may help children, particularly those with externalizing problems, begin to 'catch up' in a way with their typical peers when it comes to emotion regulation skills. For internalizers, their levels of emotion regulation at post-test indicate no significant differences, however, when compared with the control group, internalizers in the treatment group actually had higher levels of emotion regulation. Further research is needed to understand the differential effects on children with externalizing, internalizing, or both problems. Universal programs target typical children, but mindfulness programs that demonstrate utility at helping children with and without socioemotional or behavioral problems would improve its versatility and effectiveness at the Tier 1 level. This is particularly true for racial minority children living in urban contexts who are at-risk for a number of potential poor outcomes and are in environments where resources are limited.

Effect of gender. Previous studies of mindfulness programs found that boys showed greater improvements in social skills and self-management and greater decreases in aggressiveness when compared to girls. In other studies, girls who received mindfulness were rated by teachers as having fewer anxiety problems and boys were rated as having greater increases in self-control (Gould et al., 2012; Parker et al., 2014). This study adds to the growing set of research on differences in the effects of mindfulness programs depending upon gender. Although significant

effects were not found for internalizing problems or self-control, males in this study did appear to benefit more from the Growing Minds program when it came to hyperactivity/inattention.

In addition, in examining the effect of gender across control and treatment groups, gender often accounted for a portion of the variance on many of the post-test variables. For example, teacher-reported problem behaviors, emotion regulation, and self- and teacher-reported social skills all had a significant effect of gender at post-test for children across the control and treatment groups. Gender accounted for 10% of the variance in self-reported social skills and 7% of the variance in teacher-reported social skills. These findings suggest that future studies of mindfulness may want to control for the effect of gender on variables such as problem behavior, emotion regulation, and social skills.

Effect of age. Results from the analyses indicated a significant effect of age for self- and teacher-reported social skills variables and emotion regulation. This effect applied across the treatment and control groups. More research is needed regarding the interaction between treatment group and age to determine whether not age serves as a moderator for treatment effects.

Researchers have not observed a significant effect of age on outcomes after a mindfulness program, but much research is still needed (Gould et al., 2012; Zoogman et al., 2015). Mindfulness is a meta-cognitive activity that is likely to be internalized by older children better, based on what we know about children's cognitive development (Piaget, 1969). Future studies might investigate whether or not older children become more mindful than younger children as a result of participating in a mindfulness program or intervention.

In this study, it is unknown why age had a significant effect on post-test social skills and emotion regulation and no significant effect for problem behaviors and mindfulness for children across the treatment and control groups. It is possible that as children develop, greater differences

are seen between the social skills and emotion regulation of children of varied ages whereas there are more similarities than differences in how children and teachers rate externalizing, internalizing, hyperactivity/inattention, and mindfulness at different ages. Based on the findings from this study, researchers investigating the impact of mindfulness programs may want to control for the effect of age for social skills and emotion regulation variables.

Self-report. Surprisingly, children in the treatment group rated themselves as lower in pro-social skills and mindfulness, when compared to the control group. One possible explanation is that because mindfulness allows children to practice meta-cognitive skills such as reflection of internal thoughts and emotions, children in the treatment group had greater awareness of their social behavior and mindfulness (or lack thereof) after the Growing Minds program. An interesting direction for future research may include a study that determines if children who experience a mindfulness program rate themselves more negatively at post-test because of their greater awareness of negative internal thoughts and emotions or greater awareness of their difficulty with staying in the present moment with a non-judgmental attitude.

Dosage. Well-being is thought to continually improve the longer a person engages in mindfulness practice (Shapiro, Oman, Thoresen, Plante, & Flinders, 2008). Therefore, it is possible that the length (dosage) of the intervention was not long enough for students to demonstrate improvements in social skills, problem behavior, emotion regulation, and mindfulness. In fact, researchers are beginning to see strong distinctions between the impact of long- versus short-term mindfulness practice. Goleman & Davidson (2017) refer to these distinctions as the deep versus wide path. The wide path refers to widely accessible programs that give participants short-term practice that leads to positive improvements. But, the deep path, which results from long-term (i.e. several years) mindfulness meditation practice, is thought to lead to long-lasting changes in our

personality traits; this is further evidence that the longer a person practices mindfulness, the greater the change. A ten-week program, like Growing Minds, teaches mindfulness practices that children can use in their everyday life and may help them to manage stress and improve attention, but the effects of such a program on socioemotional and behavioral constructs may not reveal themselves until children have had a longer time to practice. Therefore, mindfulness programs, like Growing Minds, should consider ways to facilitate mindfulness practice beyond the core program implementation period.

Growing Minds expects that teachers will continue practicing mindfulness with students after the completion of the program, but perhaps it would be helpful to put distinct procedures into place that help facilitate this process. Some possibilities are incorporating several maintenance sessions after the program is complete or providing teachers with training after the program that focus on helping maintain the mindfulness practice in the classroom. Additionally, the schools, or Growing Minds, may consider providing children with more advanced mindfulness programming each school year that reinforces what they already have learned in the ten-week program. To some extent, it is not surprising that children who received Growing Minds did not significantly differ on constructs such as emotion regulation and internalizing problems in just ten short weeks. As stated previously, more time and practice with mindfulness may have led to expected changes on more socioemotional and behavioral outcomes.

Active control. Future research of mindfulness programs, such as Growing Minds, may want to consider including an active control group to determine if the mindfulness program works better than a novel activity. Novel activities could include listening to relaxing music or participating in a health class. By including an active control, researchers can be more certain that mindfulness is an active element leading to change rather than attributing the change to something

more latent in the program such as soothing sounds or the calm demeanor of the mindfulness instructor. Several studies have found that mindfulness works no better than novel activities such as tango dancing or building an Egyptian sarcophagus (Britton et al., 2014; MacCoon et al., 2012; Pinniger et al., 2012). It might be interesting to compare the effects of Growing Minds with an active control, such as another SEL program where an outside educator comes into the classroom. Knowing which Tier 1 programs in schools work best to support students socioemotionally and behaviorally helps schools with often limited resources prioritize the programs that will lead to positive results.

Comparison of effect sizes. Klingbeil et al.'s (2017) meta-analysis of mindfulness broke down overall effect sizes by therapeutic process and outcome domains. Therapeutic process domains included mindfulness (g=0.51), attention (g=0.29), emotional or behavioral regulation (g=0.32), and metacognition and cognitive flexibility (g=0.40). Effect sizes within these domains were generally small, with the exception of mindfulness, which was moderate. For outcome domains, effect sizes were also generally in the small range and included similar constructs to those examined in this study such as internalizing problems (g=0.37), externalizing problems (g=0.30), and social competence and prosocial behavior (g=0.37). These combined effect sizes are the result of several years of research using various measurement tools and various approaches to teaching mindfulness to youth within both clinical and school settings.

In this study, significant positive treatment effects were generally in the small range. For example, treatment effects were significant for teacher-reported cooperation with a partial η^2=0.03. Treatment effects for teacher-reported hyperactivity/inattention was in the small to moderate range with a partial η^2=0.05. The effect of the Growing Minds program on emotion regulation was small and in the positive direction (partial η^2=0.01), however, the effects were not

significant. In these areas, the effect sizes were generally comparable to the findings of the combined effect sizes of other studies of mindfulness with youth. However, in other domains, the results of this study were not comparable with other process and outcome domains combined effects in areas such as mindfulness, student-reported prosocial skills, and student-reported problem behaviors.

Summary of recommendations. This was the first empirical examination of the Growing Minds program. This study provides some insight into the effects of the program but should ideally be considered within the context of additional research. Future directions of research could include more direct measures of children's behavior so that results do not rely on student- and teacher-reports, which can be biased and are also time consuming for participants. Additionally, because there was so much variation on outside practice, consideration should be given to the potential effect of practice outside the Growing Minds lessons on various outcome variables. The program may also want to consider revising its curriculum so that the manualized lessons can be completed within the 20 minutes allotted for the program. Much of the intervention infidelity was attributed to the instructor running out of time to complete the lesson. And, the program may want to consider collecting data several weeks after the completion of the program to see if effects are maintained months later.

Because of the troublesome nature of the measure of mindfulness used in this study, particularly for this age of children, an alternative measure designed for young children and which examines program effects on metacognition, may be beneficial. There were significant differences between control and treatment groups on levels of cooperation and hyperactivity/inattention, with the treatment group demonstrating higher cooperation and lower hyperactivity/inattention. Direct observations of children's cooperative behavior, as well as their hyperactive and inattentive

behaviors by outside observers could verify treatment effects, as well as provide valuable information to the program developers on links between treatment effects and the curriculum. Research that also examines specific program components may also be beneficial to see if there are certain components that are more effective than others, in the chance that the program can actually be shortened, or certain skills be targeted over others. And, the program developers may want to consult with cultural brokers within the districts they work to determine if there are parts of the program that can be modified based on the population of students with which the program is being implemented.

Conclusion

Growing Minds is a program that resulted in significantly higher teacher-ratings of cooperation and lower hyperactivity/inattention for children who participated in the program. There were no significant differences between control and treatment groups on student-reported social skills, problem behavior, and mindfulness and no significant differences on teacher-reported empathy, engagement, self-regulation, internalizing problems, externalizing problems, and emotion regulation. However, despite non-significant differences, the direction of difference, in many cases, was consistent with the hypothesis. For example, teachers reported that children who participated in Growing minds were higher in engagement, self-control, and emotion regulation and lower in externalizing and internalizing, compared to the control group.

Based on previous research of mindfulness programs, which showed that outcomes after a mindfulness program improved over time and with more practice, it is possible that the trend in favor of the treatment group may have continued to improve as a result of time and greater practice. However, based on the current study, this cannot be determined. Future studies of Growing Minds should examine longitudinal effects of the program. In addition, students may benefit from their

teachers being specifically trained to maintain mindfulness practice after the conclusion of the program.

Additional research is also needed to understand Growing Mind's specific utility as a universal, or Tier 1, intervention. This study suggests that the effects of Growing Minds favor typical children versus those with both externalizing and internalizing problems, evidence that Growing Minds may not be intense enough to help children with both externalizing and internalizing problems. However, considering no differences at post-test were found for children in the treatment group who were typical, externalizers, or internalizers suggests Growing Minds has strong utility as an intervention targeted for classrooms of students, rather than a targeted small-group intervention for children with socioemotional problems. Children who were externalizers at pre-test had levels of emotion regulation that were the same as typical children. Future research might examine if the Growing Minds program helps externalizers and internalizers 'catch up' to typical children in terms of their emotion regulation skills.

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APPENDIX A

Growing Minds Curriculum

Lesson	Lesson Name
Lesson 1	Mindful Awareness
Lesson 2	My Breath as My Anchor
Lesson 3	My Wandering Mind
Lesson 4	Understanding My Brain
Lesson 5	Noticing Generosity
Lesson 6	Noticing Sensations in My Body
Lesson 7	Releasing Tension in My Body
Lesson 8	Mindful Behavior and Autopilot Behavior
Lesson 9	My Stress Profile
Lesson 10	Mindful Eating
Lesson 11	Mindful Smelling
Lesson 12	Sight as My Anchor
Lesson 13	Focusing on Movement
Lesson 14	The Power of Kind Thoughts
Lesson 15	The Nature of Thoughts
Lesson 16	Being Mindful in Stressful Situations
Lesson 17	Emotions Come and Go
Lesson 18	Kindness and Compassion
Lesson 19	Gratitude
Lesson 20	Settings Intentions for Practice

Note. Adapted from "Growing Minds Upper Elementary Curriculum: Cultivating Emotional and Social Skills 2nd Edition". Copyright 2005 by Growing Minds.

APPENDIX B

Growing Minds Lesson Attendance Log (SAMPLE)

Teachers, please record the name of students who are absent at the beginning of each Growing Minds lesson. It's very important that you record as accurately as possible.

Teacher Name: _____
Grade: _____ Room#: _____

Lesson 1	Date:
Students Absent During Growing Minds Lesson:	

Lesson 2	Date:
Students Absent During Growing Minds Lesson:	

Lesson 3	Date:
Students Absent During Growing Minds Lesson:	

Lesson 4	Date:
Students Absent During Growing Minds Lesson:	

APPENDIX C

Teacher Log for Mindfulness Practice with Students Outside of Growing Minds Lessons

Teachers, please indicate when you were able to practice Growing Minds with your students outside of the 15-minute Growing Minds lesson. It's very important that you record as accurately as possible.

Teacher Name: _____
Grade: _____
Room #: _____

Date	Time	Duration (mins.)	Name of the Mindfulness Exercise

CURRICULUM VITAE

JESSICA B. WILLENBRINK

EDUCATION

Anticipated 2018 **Ph.D. Educational Psychology**
University of Wisconsin – Milwaukee
Specialization in School Psychology, accredited by the American Psychological Association & approved by the National Association of School Psychologists

2013 **M.S. Educational Psychology**
University of Wisconsin – Madison

2008 **B.A. Elementary Education and Learning and Behavior Disorders**
Bellarmine University, Louisville, Kentucky

PSYCHOLOGY INTERNSHIP

2017-2018 **Pre-Doctoral Internship in Psychology**
The School at Columbia University, New York, New York
Pre-doctoral APPIC internship accredited by the American Psychological Association

PSYCHOLOGY PRACTICUM

2016-2017 **Therapy/Treatment-Focused Advanced Practicum**
Family Options Counseling, Milwaukee, WI

2015-2016 **School-Based Psychology Advanced Practicum**
Milwaukee Public Schools, Central Region Evaluation Team

2014-2015 **School-Based Psychology Practicum**
Milwaukee Public Schools, K-12 School-Based Placement

TEACHING EXPERIENCE

2014-2017 **Instructor, University of Wisconsin – Milwaukee**
- Positive Psychology: Applications to Culture, Learning, and Development (Ed Psy 220)
- Introduction to Learning and Development (Ed Psy 330)
- Infant and Early Childhood Assessment (Ed Psy 575)

2010-2013 **Special Education Teacher, Milwaukee Public Schools**

2007 **Student-Teacher, Jefferson County Public Schools, Louisville, Kentucky**

RESEARCH EXPERIENCE

2016-2017 **Research Assistant, University of Wisconsin-Milwaukee**
Assisted Dr. David Klingbeil with a single-case design study examining the effectiveness of a Minnesota Reading Core intervention targeting 1st graders' reading fluency. Administered Curriculum Based Measures of reading fluency and delivered the reading intervention to students.

2015-2018 **Student Researcher, University of Wisconsin-Milwaukee**
Quasi-experimental group-design study investigating the effects of a mindfulness program on pro-social skills, problem behavior, and emotion regulation for 180 third through sixth grade students and their teachers in two urban schools.

2013-2014 **Research Assistant, University of Wisconsin-Milwaukee**
Managed Dr. Kyongboon Kwon's research regarding emotional socialization in the peer group; researched and assisted in developing questionnaire protocols; administered questionnaire to more than 400 students in local schools; collected, organized, and entered data.

SCHOLARLY PUBLICATIONS

Klingbeil, D.A., Renshaw, T.L., **Willenbrink, J.B.**, Copek, R.A., Chan, K., Haddock, A., Yassine, J., & Clifton, J. (2017). Mindfulness-based interventions with youth: A comprehensive meta-analysis of group design studies. *Journal of School Psychology*.

Klingbeil, D.A., Fischer, A., Renshaw, T.L., Bloomfield, B., Polakoff, B., **Willenbrink, J.B.**, Copek, R.A., & Chan, K. (2017). Effects of Mindfulness-Based Interventions on Disruptive Behavior: A Meta-Analysis of Single-Case Research. *Psychology in the Schools.*

Kwon, K., **Willenbrink, J.B.**, & Hanrahan, A. (2017). Peer-assessed emotional expressivity: Association with status in the peer group. *The Journal of Early Adolescence.*

CONFERENCE PRESENTATIONS

Willenbrink, J.B. & Marek, E. (2017, October). Mindfulness: A Summary of the Research and Practical Strategies to Use in the Classroom. Workshop presented at *Teach 21, The Institute for 21st Century Teachers at The School at Columbia University*, New York, NY.

Copek, R.A. & **Willenbrink, J.B.** (2017, February). Simultaneous Mindfulness Instruction for Students and Teachers: A Pilot Study. Paper presented at the annual conference of the *National Association of School Psychologists*, San Antonio, TX.

Willenbrink, J.B. & Copek, R.A. (2017, February). Effects of a Mindfulness Program on Students and their Teachers. Paper presented at the annual conference of the *National Association of School Psychologists*, San Antonio, TX.

Kwon, K. & **Willenbrink, J.B.** (2015, March). Children's affiliation-based peer group as emotional context: Relation to children's social behavior. Poster presented at the *Biennial Meeting of the Society for Research on Child Development*, Philadelphia, PA.

Kwon, K., **Willenbrink, J.B.**, Becker, C., Loewecke, J., Oberschlake, A. (2015, February). The Relation Between Emotion Regulation and Academic Functioning. Poster presented at the annual conference of the *National Association of School Psychologists*, Orlando, FL.

Renshaw, T., Klingbeil, D.A., & **Willenbrink, J.B.** (2015, February). Meta-analysis of mindfulness-based interventions for youth and caregivers. Paper presented at the annual conference of the *National Association of School Psychologists*, Orlando, FL.

Willenbrink, J.B., Kwon, K., Loewecke, J., Oberschlake, A. (2015, February). Effects of Emotionality and Emotional Regulation on Social Behavior. Poster presented at the annual conference of the *National Association of School Psychologists*, Orlando, FL.

HONORS AND AWARDS

2016	Robert Kuehneisen Teachers for a New Era Scholarship
2016	The Syndey G. Hambling '37 Scholarship
2015	Federal Employee Education & Assistance Fund Scholarship
2004	Monsignor Horrigan Scholarship
2004	Kentucky Educational Excellence Scholarship

OTHER PROFESSIONAL AND LEADERSHIP EXPERIENCE

2014-2015	School Psychology Student Association, Vice President
2009-2010	Milwaukee Art Museum, Education Gallery and Studio Assistant
2008-2009	AmeriCorps VISTA, Community Organizer