EXPLORING THE RELATIONSHIP BETWEEN SELF-REGULATION AND SCHOOL-BASED MINDFULNESS PRACTICES IN AN ADOLESCENT SAMPLE

by

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(Under the Direction of Stacey Neuharth-Pritchett)

ABSTRACT

An exploratory study of the self-regulatory effects of a classroom mindfulness program was conducted using both quantitative and qualitative methods. The pre-test and post-test intervention study took place over a 10-week period in a sixth-grade classroom (N = 39). This was a teacher-implemented program based on Scholastic's MindUP program and the Thich Nhat Hanh tradition. Mindfulness education was implemented on a daily basis in the students' Humanities class. Students learned breathing techniques, meditation, mindfulness-based movements and other activities, and basic neuroscience to help them understand and manage their emotions, learning, and behavior. Data collection included self-report questionnaires for the students about their behavioral, cognitive, and emotional self-regulation, as well as interviews with the teacher and a small subsample of students. Quantitative data were not conclusive but there is an indication that this mindfulness intervention had a positive effect on students' self-regulatory capacities. Qualitative data show a strong positive regard for the program and indicate that students are able to make connections between the mindfulness they learned in the classroom and the rest of their lives.

INDEX WORDS: Mindfulness, Intervention, Sixth grade, Self-regulation, MindUP, Meditation

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DEDICATION

I would like to dedicate my dissertation to all children who have yet to learn the power of mindfulness practice, particularly those in difficult emotional or physical circumstances. It is my hope that those in positions of power will continue to advocate for educating the whole child so that one day all children may be introduced to the gift of their own breath, attention, and intention and find relief from suffering.

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I would like to thank my committee members for their enthusiasm in supporting an unconventional dissertation project. I gained much-needed energy to persevere from my sangha of mindfulness teachers and practitioners in Athens, Georgia and at the Mind and Life Summer Research Institute. Finally, I would like to thank my parents for their unconditional love, my sister for being my best friend, and my husband for all he has done to help me pursue my life's passion already.

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CHAPTER 1

INTRODUCTION

Although there is still a vocal contingency of parents who believe that school should only be about academics, policymakers and administrators acknowledge that there are both ethical and practical reasons for addressing children's well-being in a more holistic sense. "Students as learners cannot be divorced from students as people with social-emotional, physical and mental health needs" (National Resource Council, 2004, p. 157). In this chapter evidence will be presented that students' non-academic needs should be addressed thoughtfully in the academic setting.

Students' mental health is of increasing concern in the United States. Recent research indicates that as many as 21% of U.S. children ages 9 to 17 have a diagnosable mental disorder (National Alliance on Mental Illness). Furthermore, "four million children have a *serious* mental disorder that causes significant functional impairments" (U.S. Department of the Surgeon General) for them. Yet, it has been estimated that in a given year only 21% of children who need mental care get it (National Alliance on Mental Illness).

Another non-academic issue affecting American schools is school violence. Although rates of school violence have actually decreased in recent decades (Virginia Youth Violence Project, National Statistics, Figure 1), public perception about the prevalence of youth violence has been particularly high since 2000 (Muschert, 2007). This public perception is evident in the media which can have severe and extended negative effects on children's subjective and objective experiences of fear (Wilson, 2008).

Bullying is also a non-academic issue receiving serious attention recently. A widely cited definition in bullying literature describes bullying as “a negative action when someone intentionally inflicts, or attempts to inflict, injury or discomfort upon another” (Olweus, 1999, p. 10). For both bullies and those who are bullied, bullying can involve violence and psychological troubles. The interaction of these non-academic difficulties can be detrimental to students’ academic achievement.

Just as non-academic variables can affect academic outcomes, so can academic variables affect students’ non-academic well-being. Parents, teachers, and others involved in children’s lives have begun to recognize that high-stakes tests required at the federal, state, and district levels can have severe negative outcomes for students’ overall wellness. School-related stress and anxiety have taken a prominent place in public conversation, in part because of the cyclical nature of non-academic and academic matters affecting each other.

Schools often have highly specialized policies to deal with the concerns noted above once they arise. These policies include detailed requirements for reporting bullying, high security lock-down procedures once a violent student has been identified, or brief periods of stress-relieving exercises just before a test. Such specialized responses are by their nature fundamentally distinct from one another, which perpetuates the false notion that the problems themselves are isolated and distinct.

On the contrary, the aforementioned nonacademic problems are often closely interrelated with one another and with academic outcomes. The exact relationship between stress and aggression is complex but salient. In one study, experiencing stress from negative life events was correlated with being both a target and an agent of aggression (Felson, 1992). A large national study of children aged 9-15 indicated that there is a strong relationship between literacy

difficulties and psychiatric disorders, in particular anxiety (Carroll, Maughan, Goodman, & Meltzer, 2004).

Schools' tendencies to treat these issues at the last minute (e.g. treating stress just before a test or addressing bullying once it has been reported) limits the time and resources available for preventive measures. To address the imperfections of the current system, new solutions should be explored that are both comprehensive and preventive.

Critics worry that such programs may limit instructional time and might be constrained by limited funding. However, it is likely that creating an environment where students are mentally healthy, emotionally safe, and academically focused may ultimately reduce the time and cost associated with remedial education or disciplinary efforts. This economic perspective has precedent in the realm of early childhood education in which early work by economists calculated that a dollar spent on high quality early childhood intervention saves society seven dollars in later grade retention and special education (Currie, 2001). Subsequently that figure has been criticized because of the variable quality of programming and the difficulty calculating the *discount rate*, or the decreased value that society often places on future benefits. However, there is compelling evidence that preventive programs are beneficial and that the benefits are evident in both economic and personal outcomes (Currie, 2000).

To this end, advocates of social-emotional learning (SEL) share evidence of a national trend toward preventive non-academic learning. According to the Collaborative for Academic, Social, and Emotional Learning (CASEL), SEL "teaches the skills we all need to handle ourselves, our relationships, and our work, effectively and ethically," such as emotional awareness, relationship skills, decision-making, and ethics ("What is SEL?," para. 1). According to CASEL's report on states' SEL standards, the majority of states' infant, toddler, and pre-

kindergarten standards address SEL explicitly but K-12 standards do not (Dusenbery, Zadrazil, Mart, & Weissberg, 2011). Currently only Illinois has free-standing, comprehensive SEL standards for K-12, while New York, Washington, and Kansas are considering or adopting SEL standards. The most common place one can find SEL-related standards is integrated into other academic disciplines, such as in the Common Core Curriculum requirements for Language Arts, which contains speaking and listening skill standards (Gordon et al. 2011). CASEL reports that a growing number of states are moving away from integrating SEL into other academic standards and moving toward free-standing standards focused on at least one dimension of SEL (e.g. Tennessee's Service-Learning standard with a focus on decision-making, goal setting, and communication).

While SEL shows promise to provide the framework and legislative validity needed to enact preventive programs that address students' well-being (Greenberg et al., 2003), SEL itself is too broadly defined a skill set to examine with the detail required of the present psychological study. A more well-defined construct with a more focused and established body of literature is self-regulation. Self-regulation is closely related to social-emotional learning; some researchers propose that there must be a consideration of both together to explain social competence, for example (McKown, Gumbiner, Russo, & Lipton, 2009).

Self-regulation is highly relevant to those non-academic concerns highlighted previously. Self-regulation is one of the key skills lacking in individuals who bully. Without the self-regulatory skills to manage their stress, one study of secondary school students in Hong Kong demonstrated that boys' and girls' who were unable to regulate their stress demonstrated bullying behaviors (Leung & To, 2009). Victims of bullying seem to have poor self-regulation of social skills, as reported by the victims themselves, their teachers, and peers (Fox & Boulton,

2005). Both victims and aggressors of bullying appear to have poor emotional self-regulation (Garner & Hinton, 2010).

A growing number of teachers have attempted to heighten their students' self-regulatory skills and social-emotional competencies using mindfulness training. Mindfulness is often defined as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally (Kabat-Zinn, 1994, p. 4). There are variety of traditional practices such as yoga, tai-chi, walking meditation, and seated breath meditation that are used to teach mindfulness. With children in particular, a variety of nontraditional practices such as theater-based trust games or art-making are also employed to teach mindfulness in an age-appropriate manner.

Statement of the Problem

In this overview, I presented the case that there are pressing non-academic needs in the lives of contemporary K-12 students and that social-emotional learning (SEL) standards have the potential to provide a framework for the policy and theory necessary to address these needs. It is important to address future work in this field with well-defined psychological constructs. Mindfulness, a natural quality of the human experience cultivated through formal and informal practices, has been embraced by some teachers aiming to improve students' SEL capacities.

There has been a recent increase in the number of educational practitioners and researchers exploring the effects of mindfulness practices in the classroom. The increase is evident in the growing number of applied studies and theoretical work on the topic of mindfulness in education, including conferences, publications, and intervention programs. The Mindfulness in Education Network began holding yearly conferences in 2008, while the Omega Institute began holding yearly Mindfulness and Education conferences in 2009. The Association for Mindfulness in Education began holding yearly conferences in 2010 and the community

outreach organization Mindful Schools was founded in 1997 and became a nonprofit in 2010. While this surge in interest has led to some promising preliminary findings, mindfulness training must be measurably effective to earn its place as a permanent fact of classrooms and schools.

To demonstrate the effectiveness of mindfulness training, a psychological construct with a robust body of literature is necessary to assess the effects of mindfulness in a scientifically compelling manner. Self-regulation is one such construct that is well-known to psychologists and educators alike and has received ample scientific exploration over the years.

Problematically, many of the constructs of interest here are by their very nature difficult to define, identify, and assess. How do researchers define mindfulness? What are the elements of mindfulness training programs? How do researchers define self-regulation? And what evidence exists that mindfulness training has self-regulatory benefits for students? Preliminary work has attempted to address these questions but there remain unanswered questions surrounding the application and evaluation of mindfulness training. Educational research also poses the special challenge of limited methodological options. It is very difficult to randomize classrooms to treatment or control groups and difficult to randomize at the individual level.

Research Questions

The purpose of this study is to consider the constructs of self-regulation (organized into behavioral, cognitive, and emotional categories) and mindfulness as they relate to one school's 10-week, in-class mindfulness intervention. The following research questions form the basis of this exploratory study of a sixth-grade private school on the West coast of the U.S. The first group of questions explored students' levels of mindfulness, as measured by a self-report questionnaire. Do mindfulness scores for the class as a whole increase over the course of the 10-week intervention? Do students with differing levels of mindfulness experience have differing

mindfulness score changes over time? The second group of questions explored students' levels of self-regulation, as measured by several self-report questionnaires. Do self-regulation scores for the class as a whole increase over the course of the 10-week intervention? Do students with differing levels of mindfulness experience have different self-regulation score changes over time? The third group of questions explored teacher and student perspectives about the outcomes of mindfulness training, including its relationship to the three components of self-regulation. These research questions were addressed using one-on-one interviews.

CHAPTER 2

REVIEW OF THE LITERATURE

Before addressing the research questions outlined in Chapter One, it is important to examine the existing research on mindfulness, self-regulation, and their relationship to each other. In this literature review, the first two sections will summarize the most common theoretical definitions of mindfulness and self-regulation. Theoretical considerations will be explored to understand the foundational beliefs that researchers of each construct hold. These theoretical definitions will also serve to indicate components of the respective definitions that have yet to be addressed operationally, or have only been addressed in a limited manner. Operational definitions will be examined in large part through understanding the predominant measures used to assess mindfulness and self-regulation, respectively. In the third section, the varied methodologies and findings from mindfulness intervention research are explored, with a focus on studies conducted in classroom settings. These results are organized based on their salutary effects on three types of self-regulation.

Defining Mindfulness

The first scholarly journal devoted to mindfulness was launched in 2010, demonstrating a burgeoning academic interest in an ancient topic of study. Presenters at the National Association for School Psychologists conference (Merrell, Frank, Roach, & Felver-Gant, 2010) demonstrated the growth of scholarly interest in the topic using number of hits from the PsychINFO database to illustrate their point. Articles including the word “mindfulness” written between 2005 and 2009 yielded dramatically more hits than the same search term in all other 5 year search periods dating back to 1980. During the most recent period the search yielded nearly 900 articles, a

substantial increase from all prior 5 year periods available, which each yielded under 200 articles containing the word mindfulness.

While such signs of official recognition from academia signal great progress in the field, many gains must be made before the scholarly study of mindfulness reaches widespread recognition. There is a lack of consensus among researchers about how to operationalize mindfulness (i.e. Black, 2010; Bishop et al., 2004, Langer, 1997; Kabat-Zinn, 1994), how to measure mindfulness (Baer, Smith, & Allen, 2004; Buchheld, Grossman, & Walach, 2001), and how to describe its developmental features and practical applications. Of these concerns, establishing a reputable and consistent definition is perhaps the most important. A theoretical definition lays the foundation from which researchers may build a body of work concerning measurement, development, and other applications. “There is a clear need for conceptual agreement on the meaning of mindfulness, not only to facilitate communication about the construct but, most pragmatically, to create a stable platform of basic and applied research in this still young area of investigation” (Brown, Ryan, & Creswell, 2007, p. 214).

To begin this synthesis, varying cultural, religious, and secular approaches to mindfulness are explored. A summary of major definitions, theoretical considerations, and concerns will be presented. Correlations between mindfulness and psychological and personal outcomes are briefly examined to demonstrate the relationship between mindfulness and well-being. For a higher-order construct such as mindfulness, operational definitions are particularly crucial in moving the field of study forward. Operationalization allows researchers to communicate more precisely about what mindfulness is and formulate testable hypotheses to understand the construct better. The various ways that mindfulness is operationalized and assessed will also be reviewed.

Mindfulness Practices

As a starting point, it is helpful to discuss what is meant by the term *mindfulness practices.* Specifically, the relationship between mindfulness as a state of being and the practices used to engender mindfulness will be discussed, to alleviate confusion between the two concepts. Mindfulness refers to a psychological construct describing attention, awareness, and nonjudgment (Kabat-Zinn, 1994). It can be cultivated through the use of mindfulness practices (also called mindfulness training). These include ancient practices as meditation, yoga, tai chi, qi gong, and mindful walking as well as more recently formalized practices such as mindful eating and mindful listening. Familiarity with these formal practices can lead to the adoption of informal practices whereby one engages purposefully with ordinary tasks using the basic techniques of formal mindfulness practices (e.g. mindful washing of dishes). Although people will sometimes colloquially refer to "doing mindfulness", they are really referring to "doing mindfulness *practices"*.

Eastern, Western, Religious, and Secular Conceptualizations

The English word *mindful* has been used for nearly seven centuries. Its meaning is "bearing in mind or inclined to be aware" (Mindfulness, n.d.). This common usage of the word developed independent of any Buddhist connotation, as did the modern usage of the word by Harvard psychologist Ellen Langer. In the book, *Mindfulness,* Langer (1989) explicitly differentiates her version of mindfulness from the contemplative and eastern traditions. She describes mindfulness as a conscious state in which a learner is aware of both context and content of information. Her work on mindfulness developed independent of the Eastern notion of mindfulness and instead was a result of her Western experiences and perspective. Langer began using the term mindfulness to contrast with her work on the auto-pilot state known as

mindlessness. Langer's mindfulness refers to "the process of drawing novel distinctions" (Langer, 2000, p.1) whereas the definition proposed by Kabat-Zinn (1994) and used throughout this paper, does not promote the active formation of categories. In fact, in the Eastern perspective promoted by Kabat-Zinn, practitioners seek to quiet the dualistic mind which categorizes incessantly. Although Langer claims it is theoretically distinct, her work is frequently comingled with the Eastern perspective in related literature. Langer (1989) states that mindfulness keeps us situated in the present; attention and awareness of the present moment indicate a major philosophical orientation shared by these two perspectives. Langer's and Kabat-Zinn's detailed definitions of the term mindfulness may be theoretically divergent but they both share a focus on present-moment awareness. This shared focus is the rationale for incorporating a few studies on Langer's mindfulness in this synthesis.

Noted educational psychologist Robert Sternberg (2000) has also weighed in on Langer's mindfulness, concluding that it is neither a cognitive ability nor a personality trait, but a cognitive style. A cognitive style is defined as a preferred way of using one's abilities. Sternberg argues that Langer's description of mindfulness vs. mindlessness is comparable to other established cognitive styles, such as reflexivity vs. impulsivity or complexity vs. simplicity (Carroll, 1993). However, as he points out, research on cognitive styles peaked in the 1960s and 1970s and Sternberg attributes the decline of interest to the lack of connection with theory, ineffective measurement tools, lack of generalizability, and similarity with abilities.

Langer's emphasis on active category formation, the Eastern-derived usage of the word mindfulness is primarily receptive. The roots of this usage trace back to Buddhist traditions. In 1881 scholar T.W. Rhys Davids translated the Pāli word, *sati* as mindfulness in the Buddhist Suttas (trans., 1881). Pāli, a Middle Indo-Aryan language is closely related to the Old Indo-

Aryan language Sanskrit, which has an equivalent word, *smṛiti*. Though Davids's translation is widely used, there are some concerns amongst scholars about the accuracy of this translation. Wallace (2006) suggests that the terms "memory" or "recollection" are better at articulating the connection between past, present, and future that is necessary to experience *sati* fully. Nevertheless, the word mindfulness has gained momentum amongst scholars, meditators, and educators to indicate a particular type or orientation of awareness.

Kabat-Zinn's (1994) definition is by far the most frequently cited definition of mindfulness in scholarly literature. It calls for a specific way of paying attention: "on purpose, without judgment, and in the present moment" (p. 4). This seemingly straightforward definition is immensely complex to operationalize and that task is undertaken in a variety of ways described later. Although this definition of mindfulness does pay homage to Buddhist philosophy, it is implemented in a secular manner in Kabat-Zinn's pioneering work to incorporate mindfulness practices into mainstream health care for stress reduction. The same secular approach has been undertaken by those in the education sector, who see Kabat-Zinn's medical research on the topic as something of a model. Before delving into the nuances of definitional variations proposed by academia, it should be noted that similar ideas have been described across cultures and eras, from the ancient Pāli texts to the writings of contemporary philosophers. The concept of mindfulness "shares conceptual kinship with ideas advanced by a variety of philosophical and psychological traditions, including ancient Greek philosophy; phenomenology, existentialism, and naturalism in later Western European thought; and transcendentalism and humanism in America" (Brown, Ryan, and Creswell, 2007, p. 212).

Although meditation has been used for millennia by a variety of religious traditions, it is not inherently a religious practice. Mindfulness and its related practices liked meditation are

universal and relevant to all, regardless of ethnicity, religion, or culture. Interestingly, there is some evidence that spiritual meditation practices might be more effective than secular meditation according to some psychological and physiological outcome measures (Wachholtz & Pargament, 2005). However, the emphasis in the current research will be on Kabat-Zinn's (1994) secular definition and the secular practices that are most relevant and acceptable to promote in educational settings.

Although very widely used, Kabat-Zinn's (1994) definition has garnered some criticism because it does not explicitly address kindness or generosity. There are concerns that it lacks ethical clarity and does little to promote a truly engaged existence in the world, because the perceptions of suffering are heightened without any real call to action (for a discussion, see Vishvapani, 2006). Kabat-Zinn's definition, taken out of context of the rest of his work does seem to promote pure awareness over ethical evaluations. But some scholars consider his work highly compatible with engagement and a commitment to social improvement through cultivating states of heightened awareness in individuals (Vishvapani, 2006).

Cognate Concepts

In a mindful state one will often experience creativity, ethical insight, or deep enjoyment; such states are referred to as cognate concepts. The concept of flow (Csikszentmihalyi & Csikszentmihalyi, 1991), absorption (Tellegen & Atkinson, 1974), and ethics (Fronsdal, 2011) are constructs that are closely related to mindfulness (Bishop et al., 2004). These cognate concepts often go hand-in-hand with mindfulness but they are not synonymous with the construct in its entirety. For example, Bishop and colleagues theorized that about how flow and absorption are related to but not subsumed by mindfulness.

The practices used to cultivate mindfulness and the likely behavioral, cognitive, and emotional outcomes are complicated to disentangle from one another and this can be part of the challenge of differentiating cognate concepts from mindfulness itself. This is true of other higher-order constructs like creativity, for example. Our confusion about where creative cultivation ends and where creative outcomes begin is evident in our casual use of the word. People often conflate eccentricity, prolific creation, artistic proclivities, and novel ideas with the construct of creativity. One may be a practice of cultivation, another, a defining characteristic of the construct, and another simply an outcome.

According to Bishop and colleagues (2004), self-compassion (Neff, 2003), kindness for others, calm, and patience are not appropriate components of a mindfulness definition because these are better described as outcomes of mindfulness. While these ideas may seem at first glance to be too intertwined with mindfulness to be separate, Bishop argues that they should be clearly distinguished from it. They are not prerequisites to practice as many dedicated practitioners can attest. Confounding benefits or outcomes with defining features can harm the utility of the construct. Furthermore, problems can arise when one construct is used to define another. “To be optimally useful, a standardized definition of a construct should not overlap definitions of other constructs” (Williams, 1999, p. 8). Interestingly, the Self-Compassion Scale (Neff, 2003) includes mindfulness, specifically mindful awareness, as a part of the definition of self-compassion. Whereas one might think individuals are compassionate to themselves by ignoring difficult thoughts, Neff makes it a requirement of self-compassion to be aware of those difficulties through a mindfulness factor in her Self-Compassion Scale.

Theoretical Definitions and Distinctions

Attention and awareness. One of the most prominent ideas in the mindfulness literature is that mindfulness has two-components: attention and awareness. Brown and Ryan (2003) built the Mindful Awareness and Attention Scale (MAAS) based on this perspective. Attention connotes specificity (focusing on a particular object or experience) whereas awareness connotes a more diffuse orientation of the mind and senses. Although Brown and Ryan state that importance of receptivity in their discussion of mindfulness, do not go so far as to put receptivity in their definition or their scale. Brown and Ryan state that present-moment orientation is the foundational feature, and it is that feature on which they focus their work.

Attention and orientation. A subtly different two-dimensional model has also been proposed by several researchers (Bishop et al., 2004; Lutz, Slagter, Dunne, & Davidson, 2008). As with the previous two-component model, attention is a defining characteristic. Specifically, attention should be sustained, flexibly switched between objects, and experientially-oriented, as opposed to elaborating on thoughts. The second dimension involves a particular orientation toward one's experiences. A mindful orientation involves adopting a curious and accepting perspective on all that is observed through the heightened sense of attention described above. Although the cultivation of curiosity is indeed an active process it is not active in the same sense as Langer's creation of new categories because it is an active way of *allowing*, instead of an active way of *creating*. "It involves a conscious decision to abandon one's agenda to have a different experience" (Bishop et al, 2004, p.233). The Philadelphia Mindfulness Scale was developed based on this bidimensional definition of attention and orientation (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008).

Contents of the mind vs. behaviors of the mind. Mikulas (2010) presents a distinction between contents of the mind and behaviors of the mind. Contents of the mind include "perceptions, memories, thoughts, and feelings" (p. 1) whereas behaviors of the mind are the processes that "select and construct the contents and that provide awareness of the contents" (p. 1). Specifically, Mikulas identifies three fundamental behaviors of the mind: clinging, concentration, and awareness, pointing out that the conflation of concentration, or single-pointed attention, and awareness, which in contrast is broad or diffuse, is the major problem in the Western applications and definitions of mindfulness. It is important that Westerners adapting this Eastern concept to their own work are clear about which behaviors of the mind are implicated in mindfulness and how the mind's behaviors and contents are relevant to a particular definition or practice. "Mindfulness, as a behavior of the mind, is the active maximizing of the breadth and clarity of awareness. It includes moving and sharpening the focus of awareness within the field of consciousness" (Mikulas, 2010, p.5).

Process vs. property. Is mindfulness a process to be embarked upon, or a property to be embodied? Mikulas (2010) refers to awareness as a behavior or practice of the mind and notes "if mindfulness is understood to be a property/state rather than a process/practice, then this behavior of the mind refers to cultivation of mindfulness rather than the mindfulness itself" (p. 2). The concept of mindfulness as a process or a practice is foundational to his work. The question that still arises is whether or when a practice cultivates a mindful state vs. a mindful trait.

State vs. trait. The classic "state or trait" question applies to mindfulness as it does to many other complex psychological constructs like motivation, intelligence, and anxiety. Theorists who see mindfulness as a trait argue that one is either a mindful person or not. On the

other hand, theorists who see mindfulness as a state argue that mindfulness is a way of being that can be learned, cultivated, and selectively activated.

The distinction between state and trait mindfulness is of particular importance to mindfulness interventions. If one holds that mindfulness interventions are efficacious, does that belief spring from a view of mindfulness as a trainable trait or a learnable state? If mindfulness is a state, we should try to promote skills to engender these states in the most applicable school contexts to capitalize on the nature of domain-specificity. If mindfulness is a malleable trait, then global interventions should be favored and we would expect that mindfulness training would have global implications on one's life. These two perspectives each represent an incremental view of mindfulness. If an entity view is adopted, in which ones views mindfulness as a property not a process, mindfulness is seen as a stable state. With this entity/property/trait view, mindfulness interventions may not even be justifiable. The distinction between the incremental views of ability for state and trait mindfulness does affect the wording of assessment measures, but there seems to be little difference in the outcomes of such assessments (Brown and Ryan, 2003).

The Mindful Awareness and Attention Scale (MAAS) began as a trait measure and the items were re-worded to the present tense to create the state version. Brown and Ryan (2003) demonstrated a positive relationship between high scores on the trait version of the MAAS and high scores on the state version of the MAAS. The authors suggest that instead of viewing traits as temporally consistent and incompatible with a construct being a state, that mindfulness is both. It can vary within a person and across people. The authors of the Toronto Mindfulness Scale (TMS) have also explored state and trait versions of their scale, demonstrating that many researchers' ideas about this construct are fluid (Davis, Lau, & Cairns, 2009; Lau et al., 2006).

One inclusive way of looking at the state or trait question is that through practicing the state of mindfulness, we can cultivate it as a state. Another way to get around the either or question is to present a third option. Bishop et al. (2004) suggest that mindfulness more of a *mode* than a state or trait. The word *mode* conveys active engagement with a process. Bishop and colleagues perceive that the word state, on the other hand, conveys constancy, which somewhat negates the usefulness of mindfulness practices.

Operational Definitions

Williams (1999) addresses the importance of operational definitions in understanding a construct more fully:

> An operational definition is not intended to be the ultimate statement of what a construct represents. Instead, its purpose is to increase the precision of assessment and communication related to that construct. It is inevitable that operational definitions will undergo refinement throughout their development. Operational definitions can be refined in at least two ways: (a) some aspect of the definition can be made more explicit, and (b) elements can be added to or deleted from the definition (p. 414).

Assessments. Developing and refining assessments for a given construct is the primary purpose of an operational definition according to Williams. In this section the most commonly used psychometric mindfulness assessments will be examined with particular attention paid to those that have been most rigorously studied. Correlations between mindfulness and other personal characteristics are also examined because of their influence in developing assessments and operational definitions.

The Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008) was developed with the attention and awareness bi-dimensional definition in

mind. One hundred and five items were generated, which were then evaluated by six expert judges and narrowed to 58 items. Internal consistency and factor structure were explored with these items in a five-point frequency Likert scale with undergraduates (n = 204). A two-factor structure was confirmed. The PHLMS was validated with four different populations: a normative sample (n = 559), a general psychiatric sample (n = 52), an eating disorder sample (n = 30), and a university student counseling center sample (n = 78). Like the authors of many other mindfulness assessments (e.g. MAAS, Brown and Ryan, 2003; KIMS, Baer et al., 2004) the authors found that reverse-scored items had higher validity and consistency, and explain that statements reflecting a lack of mindfulness (e.g. "I try to stay busy to keep thoughts or feelings from coming to mind") are easier to rate.

The Mindful Awareness and Attention Scale (MAAS; Brown & Ryan, 2003) is a 15-item questionnaire rated with a six-point Likert scale. In the item selection process only items that described mindless states were retained. A sample item is *I drive places on "automatic pilot" and then wonder why I went there*. The MAAS has a single factor structure and produces a single total score. The authors of a comparison of the PHLMS and the MAAS, suggest the MAAS may also be measuring acceptance in addition to awareness/attention (Cardaciotto et al. 2008).

After validation, two factors were evident in the Toronto Mindfulness Scale (TMS), Curiosity and Decentering (Lau et al., 2006). In this 13-item questionnaire, each item is rated on a five-point Likert scale. A sample Curiosity item is *I was curious to see what my mind is up to from moment to moment.* A sample Decentering item is *I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things 'really' are.* The TMS was adapted to measure mindfulness as a trait by Davis, Lau, and Cairns (2009) by rewording each question to the present tense.

Other prominent measures of mindfulness include the Frieberg Mindfulness Inventory (FMI; Buchheld et al. 2001 & Walach, Buchheld, Buttenmüller, Kleinknecht, & Schmidt, 2006), the Kentucky Inventory of Mindfulness Skills (Baer et al. 2004), the Cognitive and Affective Mindfulness Scale (CAMS; Feldman et al. 2007) and the Southhampton Mindfulness Questionnaire (SMQ; Chadwick et al. 2008). All of these assessments are questionnaires using a Likert-scale format.

The Five Factor Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) is a compilation of items from the MAAS, FMI, KIMS, CAMS-R, and SMQ. The five factors that emerged from Baer et al.'s initial analysis were: 1) nonjudging of experience, 2) describing/labeling with words, 3) acting with awareness/auto pilot/concentration/nondistraction, 4) observing/noticing/attending to sensations/perceptions/thoughts/feelings, and 5) nonreactivity to inner experience. Through the scale development process the pool of items was decreased from 112 to 39. The FFMQ appears to be the most inclusive assessment tool to date, as evidenced by the construction method and the span of factors that emerged in factor analysis. The authors state that by continuing to examine multiple facets of mindfulness separately, we may be able to understand the progressive development of skills that result from mindfulness practice (p. 341).

Mindfulness correlations. Correlational studies can be useful in the early stages of research in a field. The relationships between a higher-order construct and measures of achievement, ability, personal factors, or environment might guide future research, theory, and practice. Descriptive studies of this nature, particularly those dealing with adult populations are described below.

Meditation experience. The relationship between meditation and mindfulness is often taken for granted to be a direct cause and effect relationship; but do meditators actually have higher levels of mindfulness as many would predict? Studies to verify this relationship are crucial to build a robust empirical foundation for mindfulness researchers. Research demonstrates a positive correlation between meditation and mindfulness as measured by both the MAAS and the TMS (Brown & Ryan, 2003; Lau et al., 2006). Baer and her colleagues (2008) examined the five factors of the FFMQ in detail and discovered that the relationship between meditation and well being is directly mediated by four of the five factors of the scale. In this study, large samples of meditating and non-meditating adults were recruited from meditation centers, universities, and the general public. Participants were administered the FFMQ along with several other questionnaire measures of psychological well-being and psychological symptomology. The fifth factor that did not correlate with meditation experience was *acting with awareness*. The authors did report a small effect for age and education on that factor. The unexpected lack of relationship between acting with awareness and mindfulness may indicate that acting with awareness is a skill learned through life experiences.

An exploratory study of the effect of previous meditation experience on learning produced interesting, nonlinear results (Lin et al., 2007). Meditators (n = 450) with various levels of experience were given a series of questionnaires about their experience in a meditation classroom environment as well as questions about their life satisfaction, as a measure of their mindfulness learning outcome. There were significant positive relationships between meditation experience and life/educational outcomes but they were not linear as expected. Most of the findings produced an unexpected pattern with the most experienced meditators in the top position, followed by 1-3 years of experience, 4-6 years, and 6-10 years, and meditators with the

least experience associated with the lowest correlations. Factors associated with this unusual pattern were: 1) social relationships as a motivational factor in education; 2) professional, interpersonal, emotional, and spiritual learning outcomes (i.e. life satisfaction); and 3) the personal emphasis placed on student cohesiveness and individuation in the classroom. Follow-up discussion with participants revealed some potential explanations for this data pattern such as the difficulty of the first year of meditation as one faces thoughts and emotions perhaps for the first time. Once meditators have invested that initial effort, they reap great benefits in life (during the 1-3 years period). From there, growth is slow until the expert (>10 years) stage is reached (Lin et al., 2007). A Buddhist saying seems to corroborate these findings: “Practice one year, Buddha is within your heart. Practice three years, Buddha is within sight. Practice five years, Buddha is beyond reach. Practice ten years, and gain enlightenment with Buddha” (p. 78).

These findings offer caution for those interested in making many mindfulness intervention studies for children that report positive outcomes after a short time of practice. It may be that the variety in mindfulness practices such as mindful eating, mindful walking, and yoga, protect against the frustrations that first year meditators experienced in this study. If that is the case, then it would be interesting to examine whether the pattern of growth is continuous for children or whether it plateaus, as this plateau may have negative implications for schools measuring the efficacy of such interventions.

Personality and affect. Correlations between mindfulness and personality characteristics like positive affect, neuroticism, and conscientiousness have been studied by mindfulness researchers interested in knowing more about characteristics of mindful people (Baer et al., 2008; Brown & Ryan, 2003). Mindfulness as measured by the FFMQ was negatively correlated with neuroticism and positively correlated with psychological well-being. A meta-analysis

(Giluk, 2009) that included this research and 26 other studies concluded that while there are significant mindfulness correlations reported throughout the personality literature, estimates of the size of relationships vary greatly. In that meta-analysis, negative correlations emerged between mindfulness and negative affect and between mindfulness and neuroticism. Positive correlations emerged between mindfulness and positive affect, as well as between mindfulness and conscientiousness. The authors of this meta-analysis highlight the conscientiousness finding as particularly noteworthy because conscientiousness has received relatively little research attention to date. They note that conscientiousness is highly correlated with work success. The authors do not mention the possibility for bringing mindfulness in the workplace as a counterpart to the classroom mindfulness movement, but it seems to hold potential, given the conscientiousness findings reported above.

Psychological diagnoses. A number of studies have examined mindfulness as it correlates with psychological diagnoses. For example, mindfulness is negatively correlated with Attention Deficit Hyperactivity Disorder (ADHD) according to a study by Smalley and colleagues (2009). In this study, adults with ADHD (n = 51) and without ADHD (n = 53) were administered the KIMS (Baer et al., 2004). Using regression analysis the authors conclude that the negative correlation was partially accounted for by two personality dimensions: self-directedness and self-transcendence or a feeling of inter-connectedness. The authors speculated that personality, particularly the two aforementioned traits, may be an overlapping construct that may explain some of the connection between mindfulness and ADHD better.

A study of college students (n = 395; Roemer et al., 2009) indicated that mindfulness is correlated with emotion regulation, even when symptoms of depression, anxiety, and stress are controlled for statistically. This study is one of the few reviewed here that examined mindfulness

using more than one questionnaire measure of mindfulness. The authors used the MAAS (Brown & Ryan, 2003) and the Self-Compassion Scale (SCS; Neff, 2003). The inclusion of the SCS was an attempt to measure the accepting, non-judgmental aspect of mindfulness, because the MAAS focuses on attention.

There is a well-documented body of literature in the field of Mindfulness Based Stress Reduction (MBSR) showing decreases in stress and anxiety after participation in mindfulness training (Grossman, Niemann, Schmidt, & Walach, 2004). Not surprisingly, low scores in mindfulness are correlated with the presence of stress, anxiety, and depression (Brown & Ryan, 2003). Brown and Ryan found that there was a modest negative relationship between cardiopulmonary stress and MAAS, indicating the potential physiological significance of mindfulness.

A lack of dispositional mindfulness is implicated in pathological gambling behaviors (Lakey, Campbell, Brown, & Goodie, 2009). It is known that mindfulness is in large part an attentional capacity and there is a noteworthy link between attention problems and gambling problems (Littman-Sharp & Jain, 2002). To counter such addictions, early work with a therapeutic technique based on MBSR, called Mindfulness Based Cognitive Therapy adapted specifically for Problem Gambling (MBCT-PG) has shown promise as treatment for one gambler in a case study (de Lisle, Dowling, & Allen, 2011).

Interpersonal relationships. There is evidence that mindfulness, as measured by the MAAS (Brown & Ryan, 2003), correlates positively with a secure attachment style (Cordon & Finney, 2008). Specifically, adults with secure attachment experiences were significantly more mindful than adults with insecure attachments. The authors suggest that attachment style may explain some of the variation in why mindfulness interventions work better for some people than

others. They proposed that people with secure attachment and high levels of mindfulness might have an easier time making mindfulness gains given their solid baseline mindfulness levels. However, it is also possible that mindful individuals may reach a ceiling of mindfulness abilities or experience slower gains than do less mindful individuals.

Langer's mindfulness, as measured by the Personal Outlook Scale (2001), has a significant positive correlation with marital satisfaction. This correlation is stronger than perceived spousal similarity, which is normally considered a strong marker for marital satisfaction. Another study found similar positive relationships between mindfulness and relationship satisfaction. Specifically, they noted that trait mindfulness predicted a lower stress response whereas state mindfulness predicted positive communication quality (Barnes, Brown, Krusemark, Campbell, & Rogge, 2007).

Mindfulness: Discussion and Implications for Current Research

The difficulty in ascertaining a single, all-encompassing definition with adequate theoretical and operational considerations is evident in this complex review of mindfulness. "For all the efforts to arrive at a consistent and concise definition of mindfulness, it remains elusive for the breadth of its application. In the clinical setting, the concept of mindfulness quickly loses precision (Fulton, 2009, p. 408)". While the K-12 classroom is not a clinical setting per se, the teacher-student relationship echoes the provider-patient relationship that is the basis of clinical treatments. Fulton's perspective may be useful to the advocates and researchers in the field of mindfulness in the classroom, setting forth on a path less traveled than that of their counterparts in psychotherapy or medicine. In the classroom a broad definition may be warranted. The most salient features of a definition that arise from this review are that mindfulness can be embodied

in both contextual states and traits. Aspects of awareness, attention, and orientation should be involved in a comprehensive definition, such as Jon Kabat-Zinn's.

The interdisciplinary nature of mindfulness makes research dialogue in this young field difficult. The newly dedicated journal, *Mindfulness* attempts to bridge those gaps in theory and practice evident amongst researchers and practitioners from different fields. From the synthesis of ideas a unified operational definition will hopefully emerge, one that is related to a psychometrically sound tool of assessment that can be tailored for the needs of specific populations including children. Perhaps a variation on Kabat-Zinn's definition could be developed for use with children who may not know the word "nonjudgmentally" or understand the phrase "present moment".

The depth of the correlational literature exploring mindfulness and relationships, personality, and meditation experience was surprising to find. Correlational research in mindfulness may provide some less common, but much-needed, empirical support for bringing mindfulness into the classroom. When we understand what personal and environmental characteristics co-exist with mindfulness we can strategically craft classroom practices that nurture the development of mindfulness.

Finally, the discussion of the historical, cultural, and religious relevance of mindfulness brings us to the important question of the appropriateness of teaching mindfulness in public K-12 classrooms. Although many of its modern roots can be traced back to Buddhism, mindfulness describes a fundamentally human capacity that is highly relevant to teaching students to think and to learn. Hart (2004) addresses the issue eloquently:

> Opening the contemplative mind in schools is not a religious issue but a practical epistemic question... Inviting contemplative study simply includes the natural human

capacity for knowing through silence, pondering deeply, beholding, witnessing the contents of consciousness and so forth.

Defining Self-Regulation

Self-regulation refers to all the ways that one tries to adapt and control his or her functions, states, and inner experiences (Vohs, 2004). It is a broad psychological construct but researchers have applied the term specifically to behavioral (Carver & Scheier, 2001), emotional (Gross, 1998), and cognitive (Binswanger, 1991) aspects of the human experience, each in relative isolation from another. Some researchers examine these aspects of self-regulation in a more cohesive sense but focus on a specific domain such as athletics (Kitsantas, Zimmerman, & Cleary, 2000) or learning (Zimmerman, 1986). Prominent work in educational psychology focuses mostly on self-regulated learning with a specific interest in the traditional concept of academic (cognitive) learning, as opposed to behavioral or emotional aspects of the self (Zimmerman & Schunk, 2001).

In the synthesis below, research on child and adolescent self-regulation will be explored. A discussion of the relationships amongst self-regulation, metacognition, and executive function help differentiate these closely-related constructs. Correlational studies of self-regulation shed light on what individual qualities and environmental conditions are most closely related to self-regulatory capacities and these correlations are discussed here to broaden the definitional understanding of the construct. Developmental understandings of the nature of self-regulation can guide the design and implementation of interventions to speed or aid self-regulatory development. The diverse and evolving research in self-regulation has led to widely varying interventions and assessments, which are reviewed for common features below.

Development of Self-Regulation

There is considerable controversy about whether young children are developmentally capable of self-regulatory behaviors (Kochanska, Coy, & Murray, 2001). Much of the disagreement is based on differing views of what self-regulation is. Kopp (1982) used the dictionary definitions of the words “control” and “regulate” to differentiate behaviors in children less than and greater than 18 months old. Control is defined as “holding in check” whereas regulate has to do with “controlling by rule or adapting to requirements”. Because an infant younger than 18 months is not able to reflect, Kopp considers the very young child’s compliance or self-initiated inhibition fundamentally different than true self-regulation. Kopp proposes an intermediary between control and self-regulation which she calls self-control. She states that self-control and self-regulation differ in degree more than in definition; both relate to representational thinking and recall memory. However, self-regulation implies more adaptability and use of strategy. An example of the two stages is represented by the difference in a child responding to a parent’s request to pick up toys and a child who has self-initiated toy cleanup and reports it proudly to his or her parents.

However, increasingly other researchers acknowledge that acts such as compliance and self-soothing are not just precursors to self-regulation but exhibitions of self-regulation itself, albeit in an early form. Around their first birthday, children exhibit clear signs of compliance with their mother’s requests (Kochanska et al., 2001). Compliance is considered an early form of self-regulation “because it requires the capacity to initiate, cease, or modulate one’s behavior in accord with parental standards” (p. 1091). Kochanska, Coy, and Murray examined two types of compliance, “committed” (i.e. eager) and “situational” (i.e. reluctant) in different contexts where their mothers request that they initiate or inhibit an action. “Do” commands, or commands to

initiate or sustain an action, elicited more situational compliance than “don’t” commands, or commands to inhibit an action. “Don’t” commands elicited more committed compliance, a signal of mature self-regulation. This longitudinal study of children *(n* = 101) in various laboratory experiments with their mothers, also demonstrated interesting developmental effects. Committed compliance increased steadily from ages 1 to 3 with the most growth happening around the second birthday. This behavior was particularly well-established in the “don’t” context compared to situational compliance; it is easier for children to refrain from an action than to initiate one. In the “do” context, on the other hand, growth in using the two forms of compliance happened at a relatively similar, moderate pace. Although it is a less desirable or mature form of self-regulation, the authors still considered situational compliance a demonstration of developmental progress towards self-regulation, particularly in very young children.

In the early school years children begin to transition from private speech to inner speech (Piaget, 1929). Observations of young children playing showed that in make-believe play, children self-regulate using private speech with much more frequency than when teachers regulate their actions in a controlled behavioral task (Krafft & Berk, 1998). It is through such self-directed language that self-regulation is formed, which highlights the importance of making room for and promoting make-believe play. The transition from private to inner speech typically happens between ages 4 and 8, but when presented a new or difficult task, even adults revert back to private speech.

One of the most compelling reasons to take an open-minded perspective on identifying the starting point for self-regulation is evident when we consider the behavior of adults in an unfamiliar setting or having a particularly frustrating day. If one does not act in a self-regulated manner all the time, it does not necessarily mean that person lacks the capacity for self-

regulation overall. “Self-regulation is not a state that, once attained, applies across all content domains or activity settings” (Henderson & Cunningham, 1994). However, this adds to the complexity of the picture for researchers and practitioners trying to understand and affect self-regulation effectively.

Self-Regulation and Education

Children’s skills and abilities often do not match their achievements. One explanation for this missing link in school functioning is self-regulation (Schunk, 2005). There is a large body of correlational research suggesting that high-achieving students and self-regulatory students are often one and the same (for a review, see Zimmerman, 1990). If there is causality underlying this relationship, the direction is not fully evident. However, research suggests that self-regulatory capacity paves the way for academic competency, and not the reverse. Children’s self-regulation upon entry into kindergarten predicts their adaptive self-regulatory behaviors in the classroom, regardless of classroom or teacher quality (Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009). It is also clear that underachievement and poor self-regulatory skills often go hand in hand. Underachieving students are those who have significantly lower achievement scores (e.g. grades) than their ability scores (e.g. IQ scores) would predict. These students may be impulsive, set lower academic goals for themselves, and have poor self-assessment abilities which are markers of low self-regulation (Borkowski & Thorpe, 1994).

Self-regulation can benefit children in non-academic ways as well. Self-regulation indicates an awareness of proper social behaviors and interactions (Henderson & Cunningham, 1994), a key aspect of development, adjustment, and education. Grade retention is often due to behavioral or social problems, but has negative long-term social effects (Wu, West, & Hughes,

2010). Interventions to aid in self-regulation may be an alternative to either grade retention or social promotion.

In the typical classroom, students are often told to wait: wait their turn, wait for help, or wait to share an answer. Delay of gratification, an essential feature of self-regulation (Mischel & Shoda, 1989), appears to predict children's future successes in early adulthood. In Mischel's (1972) well-known experiments with 4-year olds and marshmallows, children were exposed to a variety of different conditions that tested the impact of various thoughts on their ability to delay gratification. For example, given the choice to have one marshmallow now or two marshmallows later, children might be asked to think about the marshmallows, think about something sad, or think about something fun. The overwhelming finding was that children are more successful at delaying gratification if they can distract themselves from the temptation of immediate gratification using pleasant thoughts. In a follow-up experiment, these preschool children did not appear to have the strategy knowledge to hide the objects of temptation from their own view when given the chance. These findings together suggest that the mechanisms of self-regulation are accessible from a young age but that it takes practice and explicit teaching of strategy to learn how and when to implement those mechanisms.

There is a notable lack of research on situations where delayed gratification may be adaptive. Making choices in favor of immediate social, emotional, or behavioral gratification is an under-appreciated strategy for well-being. It may even be conceived of as a form of self-regulation itself when a child decides, for example, to take a lower grade on a homework assignment in favor of spending some much needed recreational time playing with a sibling, particularly if this is a strategic move on the child's part. A teenager living in a very unstable and loud home environment might make a very reasonable calculation that it is more important to

sleep when that opportunity presents itself, even if it means there might not be time for homework for a few days. While that does not seem to be a wise choice in the traditional educational sense, this teenager is essentially delaying the gratification potential of a good homework grade because of their immediate and long-term health needs. These kinds of decisions, while not ideal, will inevitably face every individual at multiple points in their lifespan. Educators who consider the social and emotional needs of their students and teach them how to honor their own well-being are taking into consideration both the long-term and short-term well-being of the developing child (Noddings, 2003).

Theoretical Definitions

Top-down and bottom-up self-regulation. One conceptualization of self-regulation differentiates top-down and bottom-up processes (Boekaerts, 1997; Boekaerts & Niemivirta, 2000). Top-down self-regulation happens when values, interest, and rewards influence a student's decisions. Students' own goals (e.g. to learn about something they enjoy, earn a reward) frequently guide the choices made in the classroom and in life. Bottom-up self-regulation happens when a student receives environmental feedback indicating that his or her safety, belonging, or another aspect of well-being is not at a desired level. For example, imagine a student who is so focused on social well-being that work is conducted carelessly. Although Boekaerts presents bottom-up self-regulation driven by social considerations as predominantly negative for a student's learning, it can provide positive self-regulatory benefits as well. In a well-managed learning community, elements of social belonging and personal identity can and should have a positive impact on a student's behavioral, cognitive, and emotional self-regulation. The "well-being track" (Boekaerts & Corno, 2005) does not need to be a separate track from the

learning track. The authors acknowledge this but fail to consider the nuanced implications of well-being in the overall model of top-down and bottom-up self-regulation.

Cognitive regulation and self-regulated learning. Is cognitive self-regulation a disposition? Or is it a skill that students apply to certain cognitive tasks? Boekaerts and Corno (2005) argue that these two explanations can co-exist. The most applicable body of research on cognitive self-regulation comes from the theory of self-regulated learning. In the context of learning, self-regulation is a term used to designate "the degree that individuals are metacognitively, motivationally, and behaviorally active participants in their own learning process" (Zimmerman, 1986). Goals are an important feature of self-regulated learning. Implicit in the idea of self-regulated learning is the notion that goals must be set and strived for and that different goal orientations affect self-regulated learning differently (Pintrich, 2000). Self-regulated learning requires a balance between learning goals and ego-protective goals, which means that if a student chooses not to continue striving for a goal that he or she once strived for, there may be some ego-protective mechanism (e.g. playing dumb, create an excuse) operating. This does not necessarily represent a failure of self-regulation. In fact, Boekaerts and Niemivirta (2000) attribute these kinds of choices to emotional self-regulation, but not self-regulated learning. The fact that the study of self-regulation has been narrowed down to "self-regulated learning" in some circles is an understandable refinement in line with educational psychologists' primary interest in learning. However, self-regulated learning deemphasizes the academic and personal influences of non-achievement-related goals like safety, belonging, and social support (Boekaerts & Corno, 2005).

Although Paul Pintrich's work grew from a social-cognitive framework and is identified primarily with the topic of self-regulated learning, it also included elements of other theories

(Zimmerman & Schunk, 2001). There are four possible elements of self-regulation in Pintrich's view: forethought/planning/activation; monitoring; control; and reaction/reflection (Pintrich, 2004). These phases need not happen chronologically or independently and indeed, may not all be necessary for self-regulated learning to happen. Pintrich suggested that there is a specific "area" of self-regulation related to each phase; planning can be achieved through cognitive self-regulation, monitoring through motivational self-regulation, control through behavioral self-regulation, and reflection, through contextual self-regulation (e.g. a student's perception of the noise level of the classroom).

Behavioral self-regulation. Behavioral self-regulation is defined as "the manifestation of executive function skills in overt, observable responses in the form of children's gross motor actions" (Ponitz, McClelland, Matthews, & Morrison, 2009). In an observational study of kindergarten students in their classrooms, this definition included specific executive function skills such as attentional focusing, working memory, and inhibitory control. Carver and Scheier (2000) approach behavioral self-regulation from these broad questions: "What is the most useful way to think about how people create actions from intentions and desires? Once people have decided to do something, how do they stay on course?" (p. 41). Like cognitive self-regulated learning, this perspective is built on the notion that goals are a key element of behavior.

To explain the gap between the purely cognitive construction of goals, and the manifestation of behavior, Carver and Scheier describe the opposing functions of two feedback loops. A discrepancy-reducing loop works to diminish discrepancies between goals and conditions. In this case, behavior is not necessarily carried out for its own sake but is undertaken only to eliminate a discrepancy between one's real self and ideal self. A discrepancy-enlarging feedback loop works to increase discrepancies between goals and conditions; one may actively

work against becoming the kind of person who is seen as lazy, thereby becoming a super-achiever.

Emotional self-regulation. Researchers interested in emotional self-regulation often describe their interest as *emotion regulation*, which is a broad and complex term, despite its shorter phrasing. Emotion regulation refers to changes associated with activated emotions (Cole, Martin, & Dennis, 2004). "That could entail changing the emotion itself (e.g. changes in intensity or duration; Thompson, 1994) or changing environmental or psychological processes (e.g. memory, social interaction)" (Cole et al., 2004). In this sweeping definition, the authors include two possibilities: that emotions can both regulate and be regulated. Eisenberg and Spinrad (2004) caution that this definition needs re-consideration; if emotion regulation includes all of the intentional and unintentional behaviors that stem from a given emotion, the scope is too broad to be useful. Instead, they suggest that the term emotion regulation be used only to describe regulation *of* emotions.

Tice & Bratslavsky (2001) consider emotion regulation a specific type of self-regulation. Emotion and self-regulation are essential features of a well-functioning human existence (Baumeister, Zell, & Tice, 2007). A well-adjusted child with high academic ability and many learning and self-management strategies will inevitably come to school feeling sad someday. How he or she manages that sadness and the demands of the school day can make a profound difference in his or her ability to learn, socialize, and otherwise participate in society.

There is strong evidence of cross-cultural similarities among different emotions. Differences in frequency, intensity, and cause, from one culture to another can often be explain as variations in the same universal set of emotions. However, there is still evidence of culture-specific emotional qualities (Holodynski & Friedlmeier, 2006). While the nuanced relationship

between culture and emotional self-regulation is still uncertain, researchers do know a great deal about how one very specific, personal culture affects emotion regulation – that is, the family culture.

Modeling, conversation, relationship quality, and emotional climate all influence children's development. Specifically, research indicates that a positive emotional climate at home is linked to high self-regulatory skills in children. Evaluation of negative emotional climates is mixed but sad/distressed home climates tend to produce children with higher self-regulatory skills than home climates that are angry/hostile (Thompson & Meyer, 2007).

In their 2007 work, Baumeister, Zell, and Tice ask: how does emotion affect self-regulation? Although the deleterious effects of negative emotion on self-regulatory capacities are real and important, emotion is not necessarily bad for self-regulation. In their view, emotion as an aid to self-regulation makes sense from an evolutionary perspective; if emotion was maladaptive, natural selection would have favored people with weaker emotional systems. Instead, evolution has preserved the emotional system. There are many ways that emotion can help the behavioral and cognitive self-regulatory systems. Emotions can signal a discrepancy between where one is and where one ought to be or where one would ideally like to be. Sensing fine distinctions in emotions then allows one to catch these discrepancies earlier, and make moderate changes to meet the desired standards set by self or others (Higgins, 1987). Similarly, the emotional signal one receives from meeting standards or goals gives an individual important feedback. Even before reaching goals, making progress towards those goals can be signaled effectively by one's emotional responses, thereby making continued progress more likely due to the positive neurochemical feedback that a pleasant emotion stimulates (Carver & Scheier, 1990).

Unless deliberate actions are undertaken to replenish the self-regulatory system, self-regulation is a finite resource (Muraven, Tice, & Baumeister, 1998). One such method of replenishing the self-regulatory system that has been tested in an experimental setting, is to induce a positive mood (Tice, Baumeister, Shmueli, & Muraven, 2007). In a research study comprised of four conditions, the authors presented college students with two different "ego-depleting tasks" used to challenge self-regulation. Between the two tasks the researchers presented some participants with positive mood inducing stimuli, such as comedy video or a gift of candy. For all four variations on the study, with differing challenge tasks and differing mood boosting stimuli the results were consistent. The participants who received the mood boost performed better on the second challenging task than those in the control condition without any mood boost. They also did better than participants in one condition during which a sad mood was induced. Positive mood seems to be closely related to improving self-regulatory capacity.

Self-regulation's relationship with metacognition and executive functioning. Self-regulation, executive functioning, and metacognition are notoriously difficult constructs to disentangle (Pintrich, 2000). The subtle differences among these terms are partially explained by the different fields of study from which each has arisen (Harris, Reid, & Graham, 2004). The term executive functioning is most prevalent amongst neuroscientists, while metacognition is prevalent among cognitive scientists, and self-regulation is the phrase of choice for educational psychologists. Although these constructs have much in common, the terms are not synonymous. All three systems originate in the prefrontal cortex (Ardila, Pineda, & Rosselli, 2000) and all three relate to aspects of self-awareness and self-management. Examining the ways that researchers have tried to understand their relationships with one another up to this point may be helpful in differentiating them from one another.

Like self-regulation, executive function is difficult to define (Zelazo, Müller, Frye, & Marcovitch, 2003). Researchers on the topic generally agree that it includes most or all of the following elements "goal setting and planning, organization of behaviors over time, flexibility, attention and memory systems that guide these processes, self-regulatory processes such as self-monitoring" (Meltzer, 2007). "Hot" and "cool" executive functioning processes refer to those processes that are emotionally or motivationally powerful, and those that are abstract or non-emotional, respectively. This distinction is also evident in the brain regions recruited for these two types of tasks; hot executive function tasks call on the ventral prefrontal cortex while cool executive function tasks call on the lateral prefrontal cortex (Zelazo et al., 2003). Much of the research on executive functioning has focused primarily on cool, inhibitory processes, and has neglected what must necessarily come before inhibition, that is, representation and planning. Zelazo and Frye (1997) suggest that executive functioning in children is driven by rules and private speech. They hypothesize that executive functioning is one and the same as emotional self-regulation and sometimes executive functioning *involves* emotional self-regulation.

There is similar difficulty in defining metacognition, which is literally translated as *understanding of understanding*, (Schraw, 2000). Theorists often discuss it in terms of interactions of three processes: regulatory control, performance monitoring, and task monitoring. In this view, self-regulation may seem to be a component of metacognition, rather than a stand-alone construct. However, this relationship has not yet been agreed upon conclusively and looking at correlational or descriptive work does not clarify the picture completely. Although students with a high degree of metacognitive awareness tend to perform well on cognitive tasks, research suggests that metacognition is sufficiently independent from intelligence and academic performance so that inferences about metacognitive skills cannot be made from measures of

intelligence or cognitive performance (Schraw & Sperling-Dennison, 1994). Promoting a different hierarchical relationship, Harris, Reid, and Graham (2004) explain that "self-regulation is seen as going beyond metacognition because it incorporates affective/emotional, motivation, and behavioral monitoring and self-control processes" (p. 170).

Individual and environmental correlates of self-regulation. Educational and developmental researchers are rarely able to conduct research in a purely experimental setting, thereby necessitating correlational research. Much can be learned about self-regulation by studying children with low self-regulation and by studying children with high self-regulation. What common characteristics are found amongst children in each group? The following review attempts to present the most interesting and salient correlates of self-regulation in the individual, the classroom, and the home - a child's first and longest learning environment.

***Gender*.** Evidence suggests that girls either have more willingness or ability to self-regulate than boys (Kochanska et al., 2001). This trend is more salient for social and behavioral self-regulation than for cognitive self-regulation (1996). Authors of a study on the well-established gender differences in emotional expressivity propose that these differences may be accounted for by underlying differences in self-regulatory capacities. After observing 81 mother-infant dyads, the authors concluded that infant boys seemed to have fewer self-regulatory mechanisms and demanded maternal care to alleviate their frustrations more frequently than infant girls (Weinberg, Tronick, Cohn, & Olson, 1999). However, it is also widely recognized that much of what is attributed to "natural" differences in gender is actually socially constructed (Hall & Bucholtz, 1995). This means that many of the differences between girls' and boys' self-regulation are at least in part a result of upbringing and socialization. Biological explanations such as varying hormone levels or brain structures are plausible explanations for self-regulatory

gender discrepancies, although scientific exploration on this matter is preliminary to date (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008).

Family, home, and parenting. There is a strong relationship between parental traits and children's abilities to self-regulate. Correlations between high-quality mothering and child executive functioning were examined in a longitudinal study on infants from 12 to 26 months old (Bernier, Carlson, and Whipple, 2010). The aspects of high-quality parenting identified for study were maternal sensitivity, rated on an observational home visit scale, maternal mind-mindedness, or the degree to which a mother makes reference to her child's mental and emotional states during free play, and maternal autonomy support. The authors assessed child executive functioning using assessments designed for 2 year olds and adapted them for use with younger children where necessary. A sample task was a simplified categorization task requiring children to place small animal toys in the "baby box" and their bigger counterparts in a "mommy box". All three aspects of parenting were correlated with high executive functioning to varying degrees but autonomy support, such as scaffolding, showed the strongest relationship to executive function outcomes.

Teaching methods. Some teachers report frustration and worry that the parents of their students have unrealistically expectations for their child's self-regulatory capacity at a given age (Boyer, 2009). In a qualitative study of this topic, Boyer examined preschool educators' perspectives about self-regulation with the goal of helping parents understand their children's gradual self-regulatory growth. This phenomenological research uncovered four themes in the teachers' data. First, a theme citing concerns about developmental progression indicates teachers' observations that parents often have unrealistically high expectations for their preschoolers, such as setting their own bedtime and having adult-like control over their

emotions. The second theme indicates that teachers structure the preschool environment to simultaneously emulate the well-functioning home environment and an educational environment. These dual goals and the chaos of having many students in the classroom led teachers to believe that “the preschool environment is a more complex environment [than the home] in which to learn and practice self-regulation and emotion regulation skills” (p. 178). The third theme encompasses the various methods teachers use to “proactively guide development of self-regulation and emotion regulation”. These methods include promoting multiple perspectives, and modifying rules to meet the needs of different activities and children. Lastly, the teachers reported awareness of their own role as “emotion mentors” responsible for acknowledging emotional needs and modeling appropriate emotional expressions. This unique research shows that teachers’ have a useful contextual understanding of self-regulation which can be used to address parental misunderstandings strategically.

As children progress through elementary school, peers become an increasingly large influence, on which teachers can capitalize for the sake of self-regulatory growth. Offering choices, opportunities to control challenge, opportunities for self- and peer evaluation, instrumental support through self and peers, and providing nonthreatening, mastery-oriented feedback are suggested classroom characteristic to promote self-regulated learning (Perry, VandeKamp, Mercer, & Nordby, 2002). In a practitioners’ journal, Bodrova and Leong (2008) recommend to kindergarten teachers that it is important to teach self-regulatory skills to all children, because it is a skill that can and should be practiced and cultivated. Additionally the authors emphasize that teachers can promote self-regulation by allowing children to practice making and adapting rules, both in free play and for the classroom. Lastly, teachers can provide tangible and visible reminders about self-regulation to their students.

Interventions and trainings. It is beyond the scope of this paper to review all existing self-regulation interventions, even if confined to those that are academically-related. However, because the goal of the current project is to understand how children participating in a mindfulness intervention develop self-regulation, a brief examination of intervention research is in order. In educational research, particularly with such a complex construct as self-regulation, there are multi-directional influences between assessment, theory, and intervention (Boekaerts & Corno, 2005). Even though theorists have yet to come to an exact agreement on the structure and functions of self-regulation, it is remarkable that most self-regulatory interventions have had positive effects and have shown evidence of transfer across domains, time, and contexts (Schunk & Ertmer, 2000). Research strongly suggests that even short interventions, imbedded in the context of specific academic lessons and activities are effective for general self-regulatory development (Perels, Gürtler, & Schmitz, 2005). Real-world interventions and laboratory trainings to enhance self-regulation are summarized here (for a review, see Boekaerts & Corno, 2005).

Self-regulation interventions are sometimes used to replace a maladaptive behavior or thought with an adaptive one. Cognitive-behavioral modifications come from the fields of school psychology and counseling. In a cognitive-behavioral intervention called Stress Inoculation Therapy, Meichenbaum (1975; Meichenbaum & Deffenbacher, 1988) suggested that students be taught to replace anxiety-based worries with specific, productive, empowering questions like "What could I do different here?" Visualizations or mental simulations have also been implemented as a means of self-regulatory training. When students envision themselves taking specific steps toward successful completion of a goal they are more likely to achieve it (Taylor & Schneider, 1989).

Teaching self-regulatory skills or strategies directly can be a preventive approach. Specific study skill training can be considered a form of self-regulation training, particularly when it emphasizes the important pre- and post- stages of planning and evaluation. Self-regulatory models are sometimes embedded in textbooks, either in the form of anecdotal examples or structural components of the book like direct instructions to “pause and summarize what you just read” (Boekaerts & Corno, 2005). Mindfulness practices are another specific set of skill that can be taught explicitly. In addition to having behavioral and cognitive self-regulation benefits like the aforementioned interventions, mindfulness practices can also teach students to evaluate their emotional states, thereby promoting emotional self-regulation.

Finally, Boekaerts and Corno (2005) highlight the creative approaches they term “second-generation interventions”. These interventions, based on sociocultural theory, place a strong emphasis on interactions and the environmental aspects of the school culture. In these formative interventions teachers gradually and responsively modify the learning environment in consideration of the self-regulatory growth of their students. This work requires teachers and researchers to work together to tailor appropriate interventions for specific groups of students or specific subject matter. Collaborative learning can provide opportunities for students to explicitly and implicitly model self-regulation for their classmates and if implemented strategically, could be considered a self-regulatory intervention of sorts. Teachers modeling their learning process and then asking students to repeat the process for themselves is a form of cognitive apprenticeship known as reciprocal teaching (Palincsar, 1989). The approaches in this category are less obviously characterized as interventions. As part of an overall plan to teach students about self-regulation, these programs with embedded instructions about self-regulation can be

particularly useful because they provide many possibilities to situate the self-regulation training in authentic subject matter and complex social structure.

Operational Definitions of Self-Regulation

Throughout its history, assessments of self-regulation have evolved to keep up with the predominant theoretical ideas about the construct. The focus on cognitive strategies and the stable nature of SRL were evident in the earliest self-regulation assessments of the 1970s and 1980s. In the 1990s assessments began to reflect the predominant theories on the domain-specific nature of SRL and the importance of motivation in SRL theories. In the 2000s SRL theories have increasing considered the importance of social and emotional factors and this is reflected in assessments. There is also a trend towards assessing self-regulation as a dynamic and ever-evolving process to be studied in real-life learning contexts (Boekaerts & Corno, 2005). There are three general methods used to evaluate self-regulation: interviews, think-aloud protocols, and questionnaires (Rizzo, Steinhausen, & Drechsler, 2010).

Interviews are useful for identifying what processes students are aware of and what processes happen subconsciously (Zimmerman & Martinez-Pons, 1988). Some argue that interviews actually measure verbal intelligence or articulateness but Zimmerman and Martinez-Pons (1986) discount this critique. They found that low-achieving students had much to say about their strategy usage. In Zimmerman and Martinez-Pons's (1988) study of 80 tenth-grade students, six different theoretical learning contexts were presented to each student and their strategies and methods for learning in that environment were solicited by structured interview. A sample interview question is, "Most students find it necessary to complete some assignments or prepare themselves for class at home. Do you have any particular methods for improving your study at home?"

A different view of student self-regulation is available by having students narrate their progress in a demanding task. Such think-aloud protocols have garnered support for their innovation (Zimmerman, 2008). Recent researchers have used this method to evaluate students in modern “hypermedia learning environments”. In these environments students must constantly self-moderate whether or not to click on hyperlinks, navigate to new sites, or expose themselves to other potential distractions such as pop-up illustrations or graphs in this process of learning. (Greene & Azevedo, 2007) used middle- and high-school students’ narration of their learning with a CD/internet lesson on the human circulatory system to gain an understanding of self-regulation in the face of hundreds of links and illustrations. Their analysis of the interviews determined 5 categories of responses: planning, monitoring, strategy use, task difficulty, and motivation.

A final approach to evaluating student self-regulation is to administer questionnaires, either to caregivers or students. The scale Rating Student Self-Regulated Learning (RSSRL; Zimmerman and Martinez-Pons, 1988) asks teachers to rate the frequency of a specific student’s use of help-seeking strategies and in-class behaviors among other things. The Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1991; Pintrich, Smith, Garcia, & McKeachie, 1993) and the Learning and Study Strategies Inventory (LASSI; Weinstein, Palmer, & Schulte, 1994) have each been developed to measure specific motivational and strategy aspects of college learning. The LASSI has three subscales specifically related to self-regulated learning: concentration, time management, and self-testing and study aids. Meltzer and colleagues (2004) created an assessment tool for use with younger students, ages 9-18 called the MetaCOG. Although it claims to measure metacognition specifically, this instrument is made up of three student questionnaires and two teacher questionnaires which

together account for many self-regulatory skills. A sample statement from the Metacognitive Awareness Questionnaire administered to students is *Before I write, I plan out my ideas in some ways that work for me (outline, list, map).* Students are asked to rate how true each statement is for them on a five-point Likert scale for this questionnaire as well as the other two questionnaires they are administered.

The SelfReg (Rizzo et al., 2010) takes an innovative approach to the assessment considerations necessitated by young children. A common critique of self-report assessments for children is that they do not take into account a child's difficulty considering abstract concepts. Similar to the interview strategy employed by Zimmerman and Martinez-Pons (1988), the SelfReg presents questions in a specific context instead of only asking an open-ended question. The SelfReg describes an everyday scenario and two different children's behavioral responses illustrated by pictures, written, and read aloud by the questionnaire administrator. The question, "What about you?" is then presented, followed by a question specific to that scenario such as, "Do you shout out an answer in class without raising your hand?" to which children respond on a Likert scale. After the pool of items was narrowed from 112 to 28 items, the final version was validated on a sample of 8 to 10 year old children (n = 107). The authors' hypothesized that behavioral/emotional self-regulation would be differentiated from cognitive self-regulation in the factor analysis. Interestingly, the factorial analysis that succeeded the validation study indicated a strong overlap between the factors; subsequently a CFA with a single factor was conducted, indicating a very good fit for seven of the nine proposed scales (Kerr & Zelazo, 2004). The scales that remained in the final version of the SelfReg were named Emotion, Motivation, Motor Activity, Inhibition, Speed of Processing, Distractibility, and Sustained Attention. The two scales which did not end up the final version were Organization/Planning and Monitoring. The authors

made a strong recommendation to use and study the SelfReg with children even younger than 8. Their research had to take into consideration that the average child in Australia starts school at age 7 and it is necessary to have some familiarity with classroom procedures before taking the assessment.

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) asks students to consider the context of a situation before evaluating emotion regulation capacities. This approach is similar to what Rizzo et al. (2010) did with the SelfReg; children are asked to consider specific situations in each answer, although they are not given a chance to report their goals. It is apparently assumed that school success either is or should be the goal of each student. The span of the DERS is broader than the name describes, in fact, it could also be considered a mindfulness assessment because the first two features it purports to measure invoke awareness and acceptance, two common features of mindfulness definitions. The dimensions measured are (a) awareness and understanding of emotions (b) acceptance of emotions (c) the ability to engage in goal-directed behavior/refrain from impulsive behavior (d) access to effective emotion regulation strategies.

Parents have a different perspective on their child's self-regulatory capacities than teachers do and therefore many of the parent questionnaires approach self-regulation more broadly than the cognitive and SRL approach that teacher questionnaires tend to take. The Strength and Difficulty Questionnaire-Self-Report (SDQ; Goodman, 1997) is a 25-item screening questionnaire that asks parents to assess their children on five scales: conduct problems, inattention/hyperactivity, emotional symptoms, peer problems, and prosocial behavior. Goodman compared his SDQ to the Child Behavior Checklist (CBCL; Achenbach, 1991). In the comparison Goodman found high correlations between the SDQ and the CBCL, strong maternal

preference for the shorter SDQ, and better predictive capacity for the SDQ on inattention/hyperactivity (SDQ; 1999). One strong feature of the CBCL, which may contribute to the frequency of its use, is that different versions are available for different populations and age groups. Like the MetaCOG, The Behavioral Rating Inventory of Executive Functioning (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000; Gioia, Isquith, Retzlaff, & Espy, 2002) purports to measure one of the closely related "sister constructs" of self-regulation, namely, executive functioning. There are subscales related to emotional, behavioral, and cognitive regulation, although those terms are not explicitly used. This scale was developed for use by parents, teachers, or other caregivers with a simple three-point Likert scale rating child behaviors on their frequency of occurrence.

Self-Regulation: Discussion and Implications for Current Research

The disparate nature of the research lines in behavioral, cognitive, and emotional self-regulation is striking. Theories in each of these areas are well-developed but a unified theory still does not exist.

One concept from the emotional self-regulation literature, the idea that emotions can be cultivated strategically to replenish the general self-regulatory system, seems particularly applicable to the current research. Promoting student well-being is inherently appealing but demonstrating that well-being can be achieved by way of emotional awareness and regulation may provide empirical evidence indicating specific ways it could be promoted. Evidence from the self-regulation literature suggests that teachers should help students access their emotions, but also train them to cultivate positive emotions. To maximize self-regulation, significant attention should also be paid to harnessing negative emotions, because emotional distress impairs self-regulation (Baumeister et al., 2007). In the current research the teacher included

lovingkindness meditation as part of her students' regular mindfulness training and she also placed a high value on teaching students how to recognize and name both positive and negative emotions.

Developmental research reviewed here suggests that while aspects of self-regulation are evident in early childhood, scientific consensus has not solidified on whether these are pre-cursors or self-regulation itself. However, in early elementary school self-regulation increases drastically and reaches adult-like performance around age 12 (Bronson, 2000). The current project explored the self-regulatory development of sixth-grade students. By this age the developmental progress of self-regulation should be well under way.

Boekaerts and Corno (2005) recommend that researchers triangulate their assessment of students' self-regulation using multiple measures. Parent, teacher, and student input can all be valuable in the process of triangulation but difficult to implement because of practical limitations. After exploring self-regulation measurements and theory it is evident that obtaining teacher and student perspectives is the most practical approach for the current research project. While student self-report offers unique insight into self-regulatory development, teacher evaluations by way of grades and behavioral referrals offers a professional outside perspective to supplement students' self-revaluations. Practical limitations make teachers better candidates for outside evaluators than parents because there are more parents to contact with more disparate expectations and experiences than a single teacher. Although there has been little research on the SelfReg assessment by Rizzo, Steinhausen, and Dreschler (2010), this scale incorporates relevant theory, has strong content validity, and the format of questions is highly developmentally appropriate. Students' cognitive self-regulation will be inferred using student grades behavioral self-regulation will be inferred using behavioral referrals provided by each school.

Self-Regulatory Effects of Mindfulness Training

Because of the proposed three part conceptualization of self-regulation used in this study, the findings from other researcher's work on mindfulness, children, and self-regulation are organized according to findings related to three aspects of self-regulation: behavioral self-regulation, cognitive self-regulation, and emotional self-regulation.

Behavioral Self-Regulation

Behavioral self-regulation is perhaps the most immediate type of self-regulation that comes to mind when one pictures a classroom. A well-behaved student body is necessary to engage in most academic learning. This section focuses on studies of mindfulness interventions that measured students' changes primarily in terms of behavioral self-regulation. Classroom management of children with ADD, ADHD, and general attention problems are recurring themes in this body of literature.

Attending behaviors and behavior referrals.

Direct observation. Some of the earliest explorations of mindfulness practices with children were a series of empirical adaptations of Benson's Relaxation Response (RR; Benson, 1975) that took place in the 1980s. RR is not affiliated with any particular meditation practice; the instructions for implementation simply state to progressively relax the body then breathe, with focus on the breath. Like MBSR, RR has roots in the medical field and an emphasis on the physiological aspects of stress relief. In one study (Redfering & Bowman, 1981) 18 children in two inclusive public school classes for children with behavioral concerns (ages 8-11) were compared. The control class listened to tape recorded "resting" instructions for thirty minutes, while the treatment class listened to a recorded session of the RR curriculum. The study lasted for five days, during which blind ratings from classroom observers identified attending and non-

attending behaviors for each child during a thirty-minute time sampling procedure. Non-attending behaviors decreased significantly for the treatment (RR) group when compared to the control (rest) group.

Wilson and Dixon (2010) conducted an ABA study with 12 first- and second-grade students in a private elementary school. Attending behaviors such as looking in the right direction or complying with classroom activities were rated by trained observers every 10 seconds for 30 minutes. Baseline observations took place five times over two weeks. The 15-minute daily mindfulness training was implemented over five days, with observations taking place daily after mindfulness training. The return to baseline conditions included just two observations over two weeks. The results showed a clear picture of increased attending behaviors during intervention, whether looking at mean or median. The average percent of attending behaviors across the class was 68% at baseline and rose to 87% during intervention.

Observations of classrooms of children in first- through third-grade yielded 10 who were on task less than 80% of the time and whose parents consented to allow them to be part of an intervention study (Peck, Kehle, Bray, & Theodore, 2005). These students participated with a kids' yoga video comprised of a 30-minute session of breathing, yoga postures, and relaxation. The comparison group did not have any documented attention problems and was comprised of a composite of observations of non-treatment children participating in regular class work. The treatment program lasted for three weeks, with twice weekly sessions. Post-test measures of the control and treatment children's time-on-task showed that program effect sizes were large for the treatment group. Effects remained moderate during the three-week follow up. The authors neglect to mention the possibility that novelty may have accounted for the perceived effectiveness of the treatment. Alternatively, the Hawthorne effect, which states that being

observed can cause participants to alter their behavior, may account for some of the treatment group's improvements over such a short intervention.

Parent/teacher perspectives and behavioral referrals. Direct, observational measures of behavior are highly labor-intensive. Furthermore, what matters most for a child's individual outcomes, particularly educational outcomes, may be whether he or she is perceived as behaving properly. Many mindfulness programs measure their efficacy in reduction of teacher reports of misbehavior using checklists and principal referrals. Behavioral benefits of mindfulness practices may even be stronger than when compared to exercises specifically designed to aid with behavior, such as behavioral charting (Oldfield, 1986).

A small study of 8 to 13 year old boys with ADHD and medication were randomly assigned to either a 20 session yoga treatment group (n = 11) or a control group doing cooperation and communication activities (n = 8). Yoga sessions were delivered in a clinical setting and were comprised of four parts: breathing, yoga postures, progressive muscular relaxation, and concentration on a word or shape. The sample size limited the study's ability to make fine distinctions between the control and treatment group. Nonetheless, from pre- to post-test there was a statistically significant improvement ratings on the Conners' Parent Rating Scales-Revised: Long (Conners et al., 1997), a measure of parental perspective of behavior (Jensen, 2004).

First-, second-, and third-grade students (n = 228) participated in the Attention Academy, a bimonthly mindfulness training for 6 months during their 45 minute Physical Education class. Half the group served as a control group and participated in regular PE class activities. This program included four components: mindfulness discussion, seated breathing exercises, yoga, and a sensory activity such as mindfully smelling aromatherapy oils. Of the 4 measures obtained,

two had particularly interesting results that were statistically different from the control group: teacher ratings of ADD behaviors using the ADD-H Comprehensive Teacher Rating Scale (ACTeRS; Ullmann, Sleator, & Sprague, 1997) and the subtest that measured selective attention in the TEA-Ch (Renner et al., 2008). Measures of test anxiety and sustained attention produced insignificant results (Napoli, Krech, & Holley, 2005).

The Hawn Foundation's MindUP Program (formerly Mindful Education, ME) is based on classical mindfulness and CASEL's social emotional learning framework. Instead of promoting a specific curriculum, as many programs do, MindUP/ME was conceived as an *approach* to teaching. MindUP covers fifteen themed lessons with two-three daily meditation sessions and one day involving deeper explorations of each theme (40-50 min.) Selection and implementation of activities is flexible; suggestions are provided but teachers make the ultimate decision on what is appropriate for their students. Pedagogically, this is a sound approach, as it promotes differentiation and building connections amongst students. However, this program design presents notable methodological challenges for researchers interested in studying MindUP in a rigorous manner.

Despite the potential difficulty, a preliminary study of the first iteration of the ME Program curriculum yielded positive behavioral results (Schonert-Reichl, 2008). This pre-test/post-test study of 246 fourth- through seventh-grade students showed significant improvement for the half of the participants who were assigned to the treatment group on teacher-rated behaviors: attentional control, aggression, behavior dysregulation, and social competence. While the researchers acknowledge the limitation of having interventionists rate their participants, they do not discuss the confounding nature of the teacher's own exposure to

mindfulness. Study of and exposure to mindfulness practices may make the teacher's perspective of students more positive regardless of actual outcome.

The Yoga Ed Program was implemented in an urban K-8 charter school in L.A. with 310 of 435 students submitting pre-test and post-test questionnaires (Slovacek, Tucker, & Pantoja, 2003). This program is tailored to the needs of three different age groups: K-2nd grade when children focus on physical awareness, 3rd-5th grades when children focus on emotional awareness, and 6th-8th when children focus on community awareness. The students with the highest participation ratings on a 4 point scale of compliance in yoga classes had the lowest rates of discipline referrals. This is no surprise, given that these students who participated the most may be highly motivated and cooperative in many areas of their education. The authors reported no pre-posttest analysis of referral ratings, implying that there was no pre-post treatment effect only a strong correlation between participation and general behavior.

Another mind-body training was developed specifically for use in a primary school study school in Hong Kong (Chan, Cheung, & Sze, 2008). It consisted of forty 30-minute bi-weekly sessions that started with music and drawing to calm down. Then a rhythmic series of 13 movements accompanied by song was begun. Unlike most other mindfulness programs, there was no emphasis on breath techniques in this program. Behavioral results indicated that Total Problems and Internalizing scores on the Teacher's Report Form of the Child Behavior Checklist (CBCL-TRF; Achenbach, 1991) decreased throughout the training for the treatment group but not for the control group. Of the programs reviewed, this program had the least emphasis on the traditional practices of mindfulness. Neither orientation to breath nor orientation to experience were explicitly taught. It is interesting then to note the success of this very basic program. This implies that in order to positively affect behavioral self-regulation, it may not be necessary to

implement a traditional mindfulness intervention, if a simple mind-body movement series might suffice.

Flook and others (2010) used the Behavioral Rating Inventory of Executive Functioning (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000) as the primary outcome measure in their study of the InnerKids program. The BRIEF's parent/teacher questionnaire has two indices with several scales attributed to each. To fit with the organization of this paper, the results of this study will be reported in two sections, with the Behavioral Regulation Index results here, and the Metacognition Index results reported in the section on cognitive self-regulation. In this study second- and third-grade students (n = 64) were randomized into control and treatment groups for eight weeks of bi-weekly InnerKids sessions. Each session had three sections: sitting meditation, activities exploring that week's learning objective (e.g. sensory awareness, awareness of other people), and a final section of a body scan relaxation lying down. Although there were no significant group main effects between the control and treatment groups from pre- to post-test, baseline levels of Global Executive Control moderated the effect of treatment. Examining the three individual subscales of the Behavioral Regulation Index, both parents and teachers reported that students in the program improved their ability to shift attention.

Norlander, Moas, and Archer (2005) did not use the term mindfulness in the design of their program, although the stretching and relaxation they advocate has much in common with mindfulness practices like meditation and yoga. In this study both objective and subjective assessments of noise were gathered in control and treatment classrooms to discern whether there was a positive (quieting) effect of their program. Ninety-five late elementary and early adolescent Swedish students in six classrooms had twice-daily 5-10 minute sessions over four weeks. The participants in the treatment group (n = 84) were led through a repeating series of

seated stretches and then a guided relaxation in their chairs counting inhalations. A major flaw of this study is that no information is given on what the control group (n = 11) did, but presumably they simply continued with their normal routine. Measurements were taken from a noise monitor in four-minute intervals for 40 minutes before training on three days and after training on three different days; results indicated a decrease in objective noise for the treatment group but not the control group, however levels of significance were not reported. Subjective experience of noise was rated on a 7-point Likert scale by teachers and students before and after each treatment. Interestingly there were no significant results to report in this domain. This is somewhat counterintuitive, as subjective reports of mindfulness practices often refer to not being bothered by the hustle and bustle of life as much as before.

If behavioral self-regulatory outcomes are desired, we can garner from the research above that there are a variety of mindfulness activities that show promise, and most studied so far have been from the category of "hybrid" programs. Interestingly, it is in the behavioral self-regulation mindfulness research that there is the most noticeable absence of use of the word mindfulness and the more complex, introspective practices. Neither the Norlander, Moas, and Archer (2005) study nor Benson's Relaxation Response (Benson, 1975) specifically refer to the major components of mindfulness as defined by Kabat-Zinn; there is no reference to cultivating open, receptive, or non-judgmental states. The cognitive and emotional self-regulatory benefits discussed below are more powerful findings that represent something more unique to the cultivation of truly mindful states.

Cognitive self-regulation

Behavioral regulation may be a necessary prerequisite for cognitive regulation. After all, without the ability to sit still can a child really engage in the majority of academic work? But

being well-behaved does not necessarily indicate attention or cognitive growth. Attention is the foundation of most of the functions we undertake in daily life. Motivations, decisions, actions, and even enjoyment can only be experienced when one is aware of what is available for enjoyment (Cooley & Morris, 1990). These skills, grouped under the heading cognitive self-regulation have great relevance to administrators with pressing expectations to improve student grades and test scores. Recall skills, attention, and the multitude of abilities termed executive functioning are all reported positive outcomes of mindfulness training.

Executive functioning. The study by Flook et al. (2010) with second- and third-graders reviewed above also reported significant cognitive findings from the Behavior Rating Inventory of Executive Function (BRIEF; Gioia et al., 2000). Although the scale has "behavioral" in the name, unlike most of the behavioral measures discussed above, which are mostly about compliance, the BRIEF assesses complex underlying cognitive processes affiliated with executive functioning. The Metacognitive Index of the BRIEF is made up of five scales, out of which two produced improved significantly with mindfulness training. These two scales measure *monitoring of attention* and *initiating attention*. Taken in consideration with the significant findings on shifting attention on the BRIEF's Behavioral Regulation Index, these findings paint a thorough picture of the skills attributed to mindfulness practices. "First, bringing attention to the breath (initiate), then watching the breath and noticing whether the attention has wandered (monitor), and when the mind wanders bringing attention back to the breath (shift)" (Flook et al., 2010).

Attention skills. Another method to assess attention is with direct measures of attention skills, such as those used in psychological laboratory studies. Several studies in this category were conducted on college students but they provide more empirically rigorous forms of

measurement than the questionnaires so often employed in K-12 research. In Tang and Posner's (2009) study, short term exposure to a meditation technique called Integrative Body-Mind Training (IBMT), led to gains on a measure of attention. IBMT does not require any physical postures as in yoga but it could be considered a hybrid technique, as it is comprised of relaxation, breath work, and imagery. In the treatment condition, college students (n = 40) who did IBMT for 20 minutes per day over five days had improved scores on the Attention Network Test, when compared to the control group (n = 40) who spent the same amount of time relaxing.

Another study (Sarang & Telles, 2007) of adult participants reported positive effects of a yoga-based relaxation technique administered to Indian adults (n = 40) in a group environment. The two yoga sessions were delivered in a group format and participants already had an average of 15 years of experience with the specific techniques that were used. The techniques were cyclic meditation, in which yoga postures are interspersed with frequent supine relaxation periods; and supine rest in *savasana*, known as corpse pose in yoga, in which one lies flat on the floor with legs and arms outstretched and eyes closed. Control participants (n = 29) read a book of their choice for the same amount of time. Performance on a letter cancellation task, identifying target letters in a page full of letters in limited time, was improved for participants in the treatment condition immediately after each yoga technique but was particularly heightened by cyclic meditation.

Napoli, Krech, and Holley's (2005) evaluation of the Attention Academy yielded positive attentional results. The selective attention measures of the Test of Everyday Attention for Children (TEA-Ch; Renner et al., 2008) improved significantly from pre- to post-test, although the sustained attention segment of the test did not. It is possible that selective attention is a

preliminary mindfulness outcome and that sustained attention would develop secondarily, after a sustained mindfulness practice.

Most mindfulness intervention studies examine the effects of on-site mindfulness training. What happens when students adopt or adapt the onsite training to their own practices? Jensen and Kenny (2004) found that boys with ADHD who developed a home yoga practice to supplement the clinical administration of yoga received had a significant improvement in scores on the Test of Variable Attention (TOVA; Greenberg & Waldman, 1993). Boys who only participated in the yoga training at school did not show significant TOVA improvements. This may indicate the importance of frequent practice, the power of total number of hours spent practicing, or the necessity of commitment from participants in order to find strong benefits.

Academic improvement. One of the strongest cases one can make in support of a school-based mindfulness program is to show that there are not only behavioral and attentional improvements, but academic improvements from a given intervention program. Studies of at least two programs have shown some GPA effects from mindfulness training. YogaEd participation is correlated with higher GPAs for middle school participants (Slovacek, Tucker, & Pantoja, 2003). As mentioned earlier, the methodology of this study, particularly the lack of a control group for comparison, makes it hard to draw strong conclusions from this correlation but it does suggest that yoga has the potential for positive effects on a child's academic performance. Benson's Relaxation Response, also mentioned in the previous section, has correlations between GPA and duration of practice as well. In a study (Benson et al., 2000) of middle school students with access to RR over several years of schooling, those who were in at least two semester-long classes where the RR curriculum had been enacted had higher GPAs than those with access to zero or one encounters. Although there may be benefits from very short encounters with

mindfulness training, there is likely a tipping point, whereby after a critical threshold has been reached, positive effects are much stronger.

A study of children with behavior and learning problems showed that GPA was improved more by mind-body training than after-school tutoring. The controlled study showed that after 40 sessions of mind-body training in an after school program the experimental group's GPAs had improved significantly compared to the control group receiving tutoring. This finding has important implications for academic support programs as well as after-school programs that may mistakenly target academic practice as the most salient way to improve academic performance (Chan, Cheung, & Sze, 2008).

While many of these innovative mindfulness programs accrue early support in upper-class public and private schools, this is not the ideal research locale to demonstrate generalizability. A better measure of an intervention's global effectiveness is to test it in low-SES public schools, as this is a more representative sample of the nation's demographic distribution. The Mindful Schools program originated with classes in a private school, which administrators then expanded to public schools in the community. This public outreach organization, Mindful Schools, now provides mindfulness trainings in the low-SES public schools of Oakland, California. A pilot study (Biegel & Brown, 2011) was conducted on 2nd and 3rd graders in a school with a 76% free and reduced lunch population. Effects on academic achievement, engagement, attention, relatedness, teacher self-efficacy, and behavior problems were explored using qualitative and quantitative methods. The program was implemented three times per week, over five weeks, for 15-minute sessions daily. Although statistical significance was not reported in the summary, the data indicate notable improvements in attention, as measured by the ANT-C (G. Biegel, personal communication, January 1, 2011). Notably, even

after a program of such short duration, scores on the ANT-C and an unspecified measure of social skills remained stable at three-month follow-up testing.

Emotional Self-Regulation

As discussed in the introduction, many schools, districts, and states now recognize that to serve students well, curricula need to attend to not only the relatively overt constructs of behavioral and cognitive self-regulation, but the subtler aspects of student well-being, many of which are in the realm of emotional self-regulation.

Self-concept. Schonert-Reichl and Lawlor's (2010) study evaluated the first 9 weeks of the ME/MindUP program with 139 students in fourth- through seventh-grade in six classes. Outcomes for the treatment group were compared against a control group of 107 students from other classes and schools in the area. Teachers provided their perspective on each student compared to other children in the same grade via the Teachers' Rating Scale of Social Competence (Kam & Greenberg, 1998). At post-test, teachers of the intervention group rated these students higher than control group teachers rated their students. This finding was true for all four subscales but the effect size was particularly large for the subscale, Social Emotional Competence. The study discerned several differences in the emotional quality and regulatory capacity of the treatment participants when compared to the control group. The School Self-concept subscale and General Self-concept subscale were used from the Self-Description Questionnaire (Marsh, 1988). A Group X Age Group interaction effect for General Self-concept indicated that fourth- and fifth-grade students had increased scores on this measure while their peers scores decreased. Conversely, while sixth- and seventh-grade students in the treatment group had decreased General Self-concept scores, their peers in the control group experienced an increase. The authors speculate that this is due to the heightened sense of self-awareness

common in early adolescents and caution that the introspective nature of the program may have somehow intensified the difficult sense of self-consciousness for the older students. They acknowledge that with a long-term practice, it is possible that the negative effects may dissipate.

Oldfield (1986) studied the effects of Relaxation Response (RR) training on fourth through sixth grade students identified by their teachers as disruptive. Students in the treatment group (n = 10) did 90 minutes of individual training in RR and then were schedule to do 15 minute of RR daily in a specified "relaxation room". Control students (n = 11) were trained on behavior charting and then scheduled to do 15-minutes of behavior charting daily in a specified "behavior charting room". Individual scores on self-concept for the control group increased 23-53% whereas their control counterparts experienced increases of only 21-26%. While it is a major flaw of the study that neither tests of significance nor effect sizes were reported, the comparison of change scores between the groups is interesting and paves the way for future research with mindfulness and self-concept. A different study of RR, with high school students, examined self-esteem, a broader construct than self-concept (Benson, Kornhaber, Kornhaber, & LeChanu, 1994). All the within-group results showed either a statistical trend or statistical significance for each group during exposure to RR for 15 minutes at the beginning of health class, three times weekly for one semester. Furthermore, the group that started with treatment and ended with a follow-up, continued to experience increases in self-esteem. The authors do not address this interesting finding in their discussion, but it seems to indicate that the program had lingering positive effects, even after formal training had ended.

Affect. In the MindUP/ME study there were several significant findings related to affect. Optimism, as measured by the nine-item Optimism subscale from the Resiliency Inventory (Song, 2003), increased moderately, but significantly from pre- to post-test for the intervention

group. One might reasonably hypothesize that the findings from the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) would show a corresponding decrease in negative affect to accompany a rise in positive affect. However, interestingly, in this study only positive affect changed from pre- to post-test when compared with the control group. There was no measurable alleviation of negative affect (Schonert-Reichl & Lawlor, 2010).

The Learning to BREATHE mindfulness curriculum for adolescents was tested on a class of seniors at an all-girls private school. This program, built around 6 themes (i.e. body awareness, working with feelings), was administered biweekly during health class over 21 weeks. Although several questionnaires about emotion and emotion regulation were administered in this pilot study, only one had statistically significant outcomes when compared with the control class (juniors). Analysis of the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) showed that, compared to control participants, treatment participants experienced a significant reduction in negative affect and increases in a subscale of questions added by the study's authors to address feeling calm/relaxed/self-accepting (Broderick & Metz, 2009).

In the EEG study conducted by Chan, Han, and Cheung (2008) participants in the classical music condition, and the TRBT (mindfulness) condition both experienced increased positive emotion, demonstrated by increased left-sided anterior activation. Along with attention, the authors neglect to mention another important skill which is implicated in anterior cingulate cortex functioning; emotional stability (Bush, Luu, & Posner, 2000). Perhaps mindfulness meditation has a dual function in emotional wellness: promoting positive emotions and strengthening the brain's ability to maintain emotional stability.

Stress, anxiety, and depression.

Stress. Day and Sadek (1982) implemented a study of daily 10-minute RR practice with fifth grade Lebanese students, comparing 31 treatment participants to 31 control group members who did an unspecified "reading activity" in a separate room. Before and during the 6 week study, heavy fighting was taking place between Syrian troops and Christian militia in the region. There was a significant treatment effect, by way of decreased general stress, as measured by the General Anxiety Scale for Children and for decreased test anxiety, as measured by the Test Anxiety Scale for Children (Sarason, Davidson, Lighthall, Waite, & Ruebush, 1960). At the three-week follow-up, the treatment effect was no longer evident, perhaps due to the lack of RR practice, or perhaps due to the increased levels of violence in the Civil War that surrounded the children.

In a study (Ramadoss & Bose, 2010) of an intervention called Transformative Life Skills, implemented to children (n = 217) in juvenile prisons, a significant positive effect on perceived stress was noted between pre- and post-test. The program was a 60-minute program with "check in", yoga, breathing, and "check-out" components. Greater reductions in stress scores were evident for the children who attended five classes, than for those who received less than five classes. Like many other studies reviewed here, these findings imply that frequency and/or regularity of practice is a key element to creating positive personal change.

Anxiety. Stueck and Gloeckner (2005) studied the impact of a regular 60-minute yoga program with German 5th grade students (n = 48) with high anxiety levels. Although the intervention in this study was referred to as yoga, it does not seem to differ from a hybrid programs for children that include elements of meditation, movement, games, and community-building in a typical session. For the treatment group, aggression and helplessness decreased

significantly from pre- to post-test and stress coping abilities increased. At follow up, emotional balance was still significantly higher for the treatment group and anxiety was significantly lower.

Promoting social-emotional learning, specifically social-emotional resiliency, was the goal of a research study examining Mindfulness-Based Cognitive Therapy for Children (Semple, Lee, Rosa, & Miller, 2010). MBCT-C is a group intervention designed to reduce depressive relapse administered in 90-minute weekly sessions over 12 weeks. The children (n = 25) practiced the traditional MBSR exercises of breath meditation, body scan, and yoga modified for children to include games and frequent activity changes. Because only a few of the children had clinically elevated self-reported anxiety levels at pre-test, the treatment effects were limited. However, there were six children at pre-test with high anxiety levels and that number dropped to only three at post-test. The nature of this research indicates that the clinical view of emotional well-being resiliency is more in favor of the incremental view of mindfulness than an entity view, which is heartening for the educational system.

Biegel, Brown, Shapiro and Schubert (2009) studied a clinical population of adolescent psychiatric outpatients (n = 102). The study's purpose was to discern whether MBSR reduced anxiety and improved self-esteem for these troubled adolescents. After a traditional 8-week MBSR program, modified slightly for adolescents, the treatment group showed significant improvements on both state and trait measures of anxiety compared to the control group, who continued with treatment as usual consisting of therapy and/or medication as their doctors prescribed.

Depression. A study of an MBSR adaptation for simultaneous use with parents (n = 27) and children (n = 31) explored the potential for regulating depressive symptoms. Informal practices, like taking a Mindful Minute to breathe deeply during a busy day, but not formal

practices, predicted improvement in depressive symptoms in adults. Interestingly, the reverse was true for improvement on an attention task; formal practice mediated that improvement while informal practice did not. Further exploration of the different but important functions of both formal and informal practice, may help teachers, parents, and students understand why and when each should be cultivated (Goldin, 2008).

There are many studies of people with either clinical diagnoses or normal presentation, but what about people in between the two categories? A study of young people (18-29 years old) with mild self-reported depression measured the effects of yoga on their self-reported depression. They attended a bi-weekly Iyengar yoga course for 5 weeks. The course had an emphasis on relieving depression through specially selected postures known to improve depression (i.e. backbends, inversions). The authors explicitly stated that they placed no emphasis on home practice. There was a statistically significant pre- to post-treatment effect for the yoga group but not for the control group. At the end of treatment the yoga group also had higher levels of morning cortisol, commonly associated with high self-esteem and low levels of depression (Myers, Sternlieb, Woolery, & Zeltzer, 2004).

Mindfulness Training: Discussion and Implications for Current Research

One difficulty with mindfulness research is that the holistic nature of mindfulness does not lend itself well to empirical study. An almost infinite combination of emphases on movement, stillness, kindness, breath, and sound are evident in the limited number of studies reviewed here. In an ideal world we would try to distinguish effects due to these myriad areas of attention by using carefully controlled environments. However, because the real world is not the ideal world for research, the current research focused on an intervention using a combination of these facets. The teacher implementing the intervention in this study focused on a combination of

breathing techniques, emotion-naming practices, and *lovingkindness*. Although there is a wealth of information about how breathing-oriented mindfulness training benefits learners, there is less known about the other two practices.

Conclusion

It is evident from the theory, research, and practice reviewed here that the nature of mindfulness, self-regulation, and their relationship to one another is incredibly complex. Certain general agreements are evident in the three categories of literature reviewed. Mindfulness can be thought of as both a state and a trait. It is defined by elements of attention, awareness, and orientation although the researchers cited disagree about the varying emphasis that should be placed on each component, and occasionally include other elements in their definition. Self-regulation can be broken down into three categories: behavioral, cognitive, and emotional and develops throughout childhood, reaching a near adult-like capacity in early adolescence. This psychological construct is closely related to other *self* constructs but is ultimately unique in its focused on orientation and maintenance of one's behavior/cognition/emotions. Understanding how mindfulness training affects self-regulation is a new field of study that offers varying models for research based on varying training lengths and intensities. Evidence suggests quite strongly that even short, infrequent mindfulness training can have measurable positive outcomes although there is little agreement about how best to assess these outcomes. Many questions remain, only some of which will be explored in the current study.

CHAPTER 3

METHOD

This chapter describes the participants, data collection procedures that included questionnaires and interview data, and analyses conducted in this study.

Sample and Participant Selection

Students were recruited from a private K-8 (Kindergarten to Eighth Grade) school on the west coast of the United States from a class of 42 sixth graders. Participants (n = 39) were recruited with informational letters sent home by the Humanities teacher at the beginning of the school year. The letters were attached to parental permission forms which yielded a return rate of nearly 93%. This high response rate demonstrated the commitment of families at the school and their openness for their children to learn more about mindfulness practices. According to the Humanities teacher, parents were perceived to be highly involved and supportive of progressive educational approaches.

Participants were sixth-grade students (M_{age} = 11.51 years, SD = .36, age range: 10.81-12.63 years) with 14 males and 25 females. Two students reported living in a household with one adult, 33 students lived with two adults, and four students live in a household with three adults. The majority of students reported living in a home where one language was spoken (n = 31) while less than a quarter reported that they lived in a home where two languages were spoken (n = 8). Students were asked several questions about their previous familiarity with mindfulness at pre-test data collection and 23 reported that they had never practiced mindfulness before, while others reported previously instruction in yoga (n = 7) and martial arts (n = 7). Two students reported that they had previously studied multiple practices which included yoga and martial

arts. No official information about socioeconomic status or race was collected on the students or their families as the school did not collect this information on students. The classroom teacher in this study did, however, report that she would consider the children in her classroom to be from middle-class families.

Context

Willow Tree School [psuedonym] is a private, secular school for approximately 300 students in grades Kindergarten to 8. The school endorses a progressive educational philosophy with classes of students that range from 18-22 students. The students in this study switched between two sixth-grade teachers' connected classrooms—the Math and Science teacher in one classroom, and the Humanities teacher in the other. Mindfulness was a regular and core component of the sixth-grade students' Humanities curriculum where students studied a combination of Language Arts and Social Studies.

The MindUP Program

Scholastic's MindUP program offers teachers the flexibility to incorporate key philosophical attributes of mindfulness into the school day without following a rigid program outline. MindUP recommends that the "Core Practices" of belly breathing and attentive listening be practiced three times per day. In this study, the teacher varied the type of practice beyond the recommendation, also instructing the students on *lovingkindness,* mindful movements, or invoking a happy memory. She typically did a Core Practice with the students twice a day. The students practiced an opening mindfulness exercise at the beginning of each 40-50 minute Humanities class. Humanities class is held five days per week with two sessions per day Monday-Thursday. On the fifth day, the students attend Humanities class just one time. These mindfulness practices were around one minute each but the teacher, Renee [pseudonym],

frequently referred to mindfulness during her teaching practice and also taught the in-depth lessons provided by MindUP. The MindUP curriculum was comprised of 15 lessons that sequentially addressed the topics of building focus, exploration of the senses, cultivating positive attitudes, and taking action in the world. A sample lesson plan is included in Appendix A.

Thich Nhat Hanh Tradition

The Humanities teacher in this study, Renee, was a member of the Order of Interbeing and ordained as a member of the core community of this lineage. She studied extensively with Thich Nhat Hahn and the teachings she received were incorporated into her classroom instruction. Plum Village is a meditation practice center in France founded by Thich Nhat Hahn, a Vietnamese Zen Buddhist monk, displaced during the Vietnam War. According to the official Plum Village website (www.plumvillage.org), "Thich Nhat Hanh's key teaching is that, through mindfulness, we can learn to live in the present moment instead of in the past and in the future. Dwelling in the present moment is, according to Nhat Hanh, the only way to truly develop peace, both in one's self and in the world" (*About Our Teacher*, Key Teaching, para. 1). The Thich Nhat Hanh community does not provide a set program of lessons for teaching children about mindfulness. Rather, the teacher incorporated her orientation and philosophical grounding with other mindfulness activities where she drew from the knowledge of child-appropriate activities she internalized at Plum Village to supplement the activities recommended by MindUP. "Thich Nhat Hanh (2011) inspires educators to move beyond merely teaching peace to actually 'being peace'" (p. 57-58). In response to classroom issues that arose, the teacher implemented lessons she created on "Being Present Through Breath Awareness", "Being Present Through Body Awareness", "Peace", and "Making Healthy Decisions & Mindful Speech" (see Appendix A).

Procedure

The first round of data was collected during the second week of school in the fall of the 2012. Assent forms were distributed to students at that time and students were invited to ask any questions about the study. Pre-test data collection took place over a two-day period. Questionnaires were administered in the students' classroom. Nonparticipating students were given the choice different activities to do in one of two other rooms connected to the main classroom. Data were collected from students in small groups of 4-6. Questionnaire packets were placed on the center of each table and children were asked to write their names on the cover and wait for the examiner to begin the data collection session. Questions were read out loud and students were instructed to answer at the pace of the researcher, who would read each question and answer any questions that arose.

A second round of data was collected in mid-November. Due to a family emergency, Renee was out of the classroom for two weeks during the study, which may have affected the implementation of the program due to the lack of continuity in the practices. At post-test, students were reminded of the assent they gave during the first round of data collection and that they could choose not to participate during the second round of data collection. All students elected to continue participation. Data were collected over a two-day period with questionnaires administered in the same classroom amongst small groups of 4-6 students. Questionnaires were once again distributed with a request to answer questions at the pace of the reader. Additional interview data were also collected during this second data collection period. These interview data are described in greater depth below.

Measures

A selection of questionnaires and interviews were used to understand the students' self-regulatory capacities and their experience of their classroom mindfulness training. Additional information was also collected from the participants on some key background variables such as familiarity with mindfulness practices, languages spoken, and number of adults living in the home. Detailed descriptions of the measures used in this study are described below.

Self-Reg

The *Self-Reg* (Rizzo et al., 2010) has two broad domains and comprises seven subscales. The behavioral/emotional domain has four subscales: emotion, motivation, motor activity, and inhibition. The cognitive domain has 3 subscales: speed of processing, distractibility, and sustained attention. The instrument has a single factor structure and high ecological validity in the format of questioning. Children are presented with a concrete scenario that represents something that might happen in their daily lives. The forced choice adaptation used for this study, required students to select which of two students they had most in common with in a given situation. The original version of the Self-Reg, administered only at post-test, presents students with a general question following the scenario and asked to rate their typical behavior on a five point Likert scale. Published findings on internal consistency indicate subscale scores ranging from .69 to .83 for the various subscales and .92 for the entire scale overall, demonstrating good internal consistency. For the current study, the Cronbach alpha coefficient was .83 for the Likert version of the scale and .96 for the forced choice adaptation. This 28-item scale took approximately 20 minutes to complete and was administered using a pencil-and-paper version.

MindUP Evaluation Toolkit

The official MindUP evaluation packet was administered to students at the beginning and end of the study. Although there were no reported validation studies on these scales, this study may contribute to the body of literature on the effects of MindUP. These scales provide additional information about students' emotional self-regulation (Thoughts & Feelings Questionnaire, My Life Questionnaire, About Me Questionnaire), behavioral self-regulation (Thoughts and Feelings Questionnaire, and Day-to-Day Experiences Questionnaire) and mindfulness (Day-to-Day Experiences Questionnaire). In this study the My Life and About Me questionnaires were combined into one scale titled Me and My Life. The Cronbach alpha coefficients for each of these scales were either acceptable or strong. The Day to Day Experiences questionnaire included 14 items and had a Cronbach alpha of .84. The scale is not subdivided into any subscales. The Thoughts and Feelings questionnaire contained had a Cronbach alpha of .87. It contains a subscale titled Empathy that contains seven items and a subscale titled Perspective than contains seven items. The Me and My Life questionnaire was comprised of 19 total questions had a Cronbach alpha of .85. It contained an Optimism subscale with nine items, an Emotion Control subscale with five items, and the My Life subscale with four items.

Child and Adolescent Mindfulness Measure (CAMM)

The CAMM (Greco, Baer, & Smith, 2011) was administered to evaluate the mindfulness of members of each group. Published internal consistency for this scale reports a Cronbach alpha of .80 and with this sample, the alpha was .79. Factor analyses conducted during the development of this scale led to identifying a single factor structure underlying this 10-item scale. The content of these items covers "present-moment awareness, as well as judgmental and

nonaccepting responses to thoughts and feelings" (p. 609). All items in this scale described actions contrary to a mindfulness perspective therefore all items were reverse scored.

Student Interviews

Six students were selected for individual interviews with the researcher. The interview participants were selected from approximately 25 students whose parents gave permission for their children to participate in audio-recorded interviews. In conjunction with the researcher, the teacher selected three students from each class to be interviewed. The teacher was asked to select students who might have a broad range of opinions about or familiarity with mindfulness. The teacher was also encouraged to choose students who would be most comfortable and open in an interview setting. Finally, the teacher was asked to select a diverse group of students that represented many backgrounds. All children were Caucasian with the exception of one student who had a multi-racial background. The teacher provided data on the ethnicity of the students who participated in the interviews.

Oliver was a boy with a quiet voice and demeanor. He reported that his father did mindfulness practices in his home office several days a week. Annie was a petite girl who was also bubbly and confident during our interview. Jade, a girl with short hair, a serious demeanor, and a physical appearance slightly more developed than her peers also participated in the interview. Bella was a student of mixed ethnic origin. She was very thoughtful about choosing her words during our interview but also had a carefree and happy demeanor and spoke of smiling as part of her mindfulness practice. Ryan was a sixth-grade boy who was very articulate and very active during our interview. He spoke of his high energy level and the challenges that presented for him in the typical quiet mindfulness activities. Marie was a tall girl with a long blonde ponytail and a quiet confidence. She chose to sit on floor pillows next to me and shared

information about having participated in classroom mindfulness as a younger child and even having spoken publicly in support of it.

Interviews were conducted with Robert Weiss's suggestion in mind that the interviewer should "present a caring and concerned attitude, expressed within a well-planned and encouraging format" (as cited in Gubrium & Holstein, 2001). Students were given a choice of being interviewed in one of two smaller rooms connected to their main classroom. Within each room they were given a choice of where to sit to promote comfort and ease of conversation. Each interview was approximately 10 minutes long and followed a semi-structure interview protocol which follows:

1. How would you describe mindfulness to a friend?
2. Do you have a favorite mindfulness practice that you have learned from Renee?
    a. If so, describe it to me.
    b. Why do you think this is such a useful practice?
3. Why do you think Renee wants you to do mindfulness in *school*?
4. Have you ever used any mindfulness practices from Renee's class outside of school?
    a. If so, tell me about it.
    b. Where were you, what were you doing, how did it work?
5. What else would you like to say about learning mindfulness in Renee's class?

Teacher Interview

The teacher in this study, Renee, was a female Indian-American in her early 30s who had previous experience teaching school in India. Before the interview took place, the teacher signed a consent form to participate and to be audio-recorded. The interview took place during the students' lunch period and lasted approximately 25 minutes. The interview was conducted mid-way through the last day of data collection and followed a semi-structured interview protocol based on the following questions:

1. How do you define behavioral self-regulation in your students?
2. What growth, if any, have you seen in students' abilities to behaviorally self-regulate?
    a. What feedback have you received from students about this topic?
    b. What feedback have you received from parents about this topic?
    c. What feedback have you received from other school employees about this topic?
3. How do you define cognitive self-regulation?
4. What growth, if any, have you seen in students' abilities to cognitively self-regulate?
    a. What feedback have you gotten from students about this topic?
    b. What feedback have you gotten from parents about this topic?
    c. What feedback have you gotten from other school employees about this topic?
5. How do you define emotional self-regulation?
6. What growth, if any, have you seen in students' abilities to emotionally self-regulate?
    a. What feedback have you gotten from students about this topic?
    b. What feedback have you gotten from parents about this topic?
    c. What feedback have you gotten from other school employees about this topic?
7. How do you think students' individual background characteristics relate to the efficacy of classroom mindfulness?

Interviews were audio-recorded and minimal notes were taken by hand to maximize the researcher-subject rapport. After interviews were completed the audio files were transcribed and names were replaced with pseudonyms. The specific methods of interview analysis that were used are discussed in the Research Design and Analyses section.

Research Design and Analyses

This was a non-experimental study, examining the developmental trajectory of a group of children receiving a mindfulness intervention as part of their general classroom activities. This type of work is considered *curricular mindfulness,* defined in opposition to *extra-curricular mindfulness training*. Extra-curricular mindfulness training involves presenting mindfulness-related practices as an optional club or other after-school activity. Because of the difficulty in securing a population that would lend itself to more methodologically rigorous study design, the current non-experimental design will have limited generalizability. However, this 10 week longitudinal study offers descriptive and correlational findings that may lead to interesting new areas of study.

The following research questions were addressed using a combination of quantitative and qualitative methodology. Hypotheses are presented as well as information about what methodological approach was used to test each hypothesis. All quantitative analyses were conducted using SPSS version 21 software.

RQ 1a: Do sixth grade students' levels of mindfulness change over the course of a 10-week mindfulness training program as measured by a self-report questionnaire (CAMM)? This research question was explored using the pre- and post-test results of the CAMM. The hypothesis was that CAMM scores would be significantly higher at post-test than pre-test.

RQ1b: Do sixth grade students' with more previous mindfulness experience have greater mindfulness growth over the course of a mindfulness training program than students with less previous mindfulness experience, as measured by a self-report questionnaire (CAMM)? The hypothesis was that previous experience would lead to greater gains. A t-test was conducted to

compare the mindfulness (pre-test CAMM scores) of students overall and the mindfulness of students with different levels of experience from pre-test to post-test.

RQ 2a: Do sixth-grade students' levels of self-regulation change over the course of a 10-week mindfulness training program as measured by a series of self-report questionnaires? This question was explored using the pre- and post-test results of the following questionnaires. Day To Day, Thoughts and Feelings, Me and My Life, and the forced choice adaptation of the SelfReg. The hypothesis was that post-test scores on these measures would be significantly higher than pre-test scores. A variety of independent samples t-tests were conducted to explore the differences from pre-test to post-test.

RQ2b: Do students with more previous mindfulness experience have greater self-regulation growth over the course of a mindfulness training program than students with less previous mindfulness experience, as measured by a series of self-report questionnaires? The hypothesis was that previous experience would lead to greater gains. A one-way analysis of variance was conducted to explore the effect of previous experience on self-regulation scores.

RQ3a: How do students perceive mindfulness training and its effects on their lives?

RQ3b: How does the classroom teacher perceive the relationship between mindfulness training and her students' lives?

The second component of analyses involved qualitative data gathered in a series of one-on-one student interviews with six different students and one teacher interview. Interview data were analyzed using the thematic analysis approach. Specifically, an inductive approach was implemented; themes were determined after the interviews had taken place. To uncover themes, answers to each question were grouped together and examined for similarities using color coding. If a particular type of answer was given by two or more out of the six participants it was

considered a theme and given a name. The highlighted words were used to create the “Key terms” column. To select quotations for the “Characteristic response” column, the primary inclusion criteria was brevity, to adhere to the chart format. Other noteworthy responses were reported in-text in the description that followed the chart. Analysis of the teacher interview was a combination of both deductive and inductive approaches. Her answers were examined first with an eye toward the three types of self-regulation, and then they were re-analyzed to look for other themes.

CHAPTER 4

RESULTS

Results from the self-report scales used in the study are presented and analyzed statistically to explore their practical significance and the effectiveness of the intervention over 10 weeks. In addition, analyses are performed examining categorical variables such as the number of mindfulness practices in which students engaged and their relationship to the outcome variables and whether or not the student had previous exposure to mindfulness practices. Summaries of student and teacher interviews are presented. Inductively generated themes drawn from the student interviews are presented in table format. The chapter concludes with a summary of the overall findings.

Quantitative Findings

The first research question focused on the effects of the intervention on children's mindfulness. Specifically, mindfulness was measured by the self-reported questionnaire, the Child and Adolescent Mindfulness Measure (CAMM). Two analyses were conducted. The first analysis examined the overall effectiveness of the intervention and the second examined differences at post-test for students who had no experience and those who had experience with mindfulness prior to learning mindfulness in this class. A paired samples t-test was conducted to evaluate any change in students' mindfulness over the period of the study as measured by the CAMM. There was not a statistically significant change in CAMM scores from pre-test (M = 25.44, SD = 5.70) to post-test (M = 25.83, SD = 5.83), t (35) = -.47, p = .64.

Next, a paired-samples t-test was conducted to compare the mindfulness of students with previous mindfulness training to the mindfulness scores of students without previous training at

the two different time points. Students with no previous mindfulness experience or with one previous mindfulness experience were grouped together (n = 21) and students with more experience made up a second group (n = 15). There was no statistically significant change in scores from pre-test (M = 25.44, SD =5.70) to post-test (M = 25.88, SD =5.73), t (35) = -.472, p = .64. Analyzing student differences on their self-reported previous experience with specific types of mindfulness did not uncover significant differences between groups.

However, when students were asked simply, “Have you heard of mindfulness before?” students were grouped in a way that better accounts for general instruction on mindfulness they may have received at school or at home throughout their childhood. Students who said yes (n = 33) were compared to students who said no (n = 6). There was not a significant difference in the pre-test mindfulness scores of students with previous mindfulness familiarity (M = 25.81, SD =5.158) and those without previous mindfulness familiarity (M = 22.00, SD = 6.985), t (37) = 1.581, p = .122. These findings suggest that the students in this study began sixth grade with seemingly similar levels of mindfulness. However, an independent-samples t-test comparing post-test mindfulness scores of students with mindfulness familiarity to the scores of students without familiarity indicated a statistically significant difference in students’ scores. Specifically, students with previous awareness had higher post-test scores on the mindfulness measure (M = 26.90, SD = 5.00) than students without previous awareness (M = 20.50, SD = 6.62), t (34) = 2.713, p = .01.

A second research question assessed students’ levels of self-regulation prior to and following the 10-week exposure to school-based mindfulness. A tool from the MindUP Evaluation Toolkit included the following three measures which assess various aspects of self-regulation used for these analyses. In this study those measures were titled Day to Day

Experiences, Thoughts and Feelings, Me and My Life. Additionally, the forced choice adaptation of the SelfReg was administered at both time points and responses were analyzed as an indicator of students' self-regulation. Analyses were conducted for the overall intervention from pretest to posttest and then subsequent analyses were also conducted looking at potential differences among students who either had prior experience or did not have prior experience to mindfulness.

For the group as a whole, there was a statistically significant increase in scores on the Empathy subscale from the Thoughts and Feelings questionnaire from pre-test ($p = .028$). The effect size for this difference ($\eta^2 = .13$) approaches the guidelines for a large effect. There was also a statistically significant increase on the Satisfaction subscale from the Me and My Life questionnaire from pre-test ($p < .001$). No other pre- to post-test changes from the MindUP Evaluation Toolkit were statistically significant. A summary of these analyses is presented in Table 1.

Next a one-way analysis of variance was conducted to explore the impact of prior mindfulness experience on self-regulation score outcomes. Participants were divided into three groups according to how many types of mindfulness practices they experienced before the intervention (Beginner=zero practices; Novice=one practice; Experienced =two practices). No significant results were found for the MindUP Evaluation Toolkit questionnaires and therefore they are excluded. On two subscales, post-hoc analyses indicated that experienced students scored significantly different from beginners or novices at post-test. These differences were found on two different subscores of the SelfReg. On the Behavioral Regulation Domain on the Likert version the experienced students scored higher (better) than the other two groups, $t\ (32) = 2.48$, $p = .018$. However, on the Motor Activity Subscale of the forced choice version

experienced students actually scored lower than their peers in the other two groups, t (34) = 2.23, p = .032. These surprising findings are addressed in the Discussion section of this chapter.

Table 1

Pre-Test to Post-Test Changes on the MindUP Evaluation Toolkit Questionnaires

Scale	Subscale	Pre-Test		Post-Test			
		Mean	*SD*	Mean	*SD*	*95% CI*	*t*
TAF	Empathy	21.17	4.51	22.49	4.67	[-2.47, -.15]	-2.30*
TAF	Perspective Taking	18.47	5.26	18.94	5.99	[-2.05, 1.11]	-.61
DTD	n/a	33.80	8.81	34.39	7.86	-3.00, 1.82]	-.50
MAMF	Optimism	26.25	5.22	26.86	4.90	[-1.89, .67]	-.97
MAMF	Emotion Control	10.98	2.43	10.61	3.41	[-.59, 1.34]	.80
MAMF	Satisfaction	13.04	2.99	15.50	3.11	[-3.34, -1.58]	-5.67*

Note. TAF = Thoughts and Feelings; DTD = Day to Day; MAMF = Me and My Life
* $p < .05$.

Table 2

Analysis of Variance Results from the SelfReg for Students with Exposure to Various Numbers of Mindfulness Practices at Post-Test

	Beginner Mean (*SD*)	Novice Mean (*SD*)	Experienced Mean (*SD*)	*F*
		Cog. Reg. Domain		
SelfRegFC	20.57 (2.73)	21.42 (2.18)	20.00 (0.00)	.64
SelfRegLS	27.86 (4.74)	27.07 (6.46)	33.00 (7.07)	1.00
		Behav. Reg. Domain		
SelfRegFC	29.00 (3.30)	29.28 (2.33)	26.50 (.71)	.80
SelfRegLS	31.70 (6.27)	34.38 (5.90)	44.00 (2.83)	4.03*
		Distractibility Subscale		
SelfRegFC	6.91 (1.02)	7.28 (.91)	7.00 (1.41)	.62
SelfRegLS	9.96 (2.30)	8.64 (2.65)	10.50 (2.12)	1.43
		Speed of Processing Subscale		
SelfRegFC	6.32 (1.25)	6.71 (.83)	6.50 (.71)	.56
SelfRegLS	9.38 (2.29)	9.29 (3.05)	12.00 (2.83)	.98
		Inhibition Subscale		
SelfRegFC	7.45 (.96)	7.36 (.84)	7.00 (0.00)	.25
SelfRegLS	7.82 (2.22)	8.07 (2.13)	9.50 (2.12)	.56
		Motivation Subscale		
SelfRegFC	7.43 (1.40)	7.64 (.75)	7.50 (.71)	.14
SelfRegLS	7.24 (1.97)	7.93 (2.40)	9.50 (.71)	1.28

		Sustained Attention Subscale		
SelfRegFC	7.34 (1.15)	7.46 (.88)	6.5 (.71)	.73
SelfRegLS	8.67 (1.88)	9.14 (1.99)	10.50 (2.12)	.94
		Motor Activity Subscale		
SelfRegFC	6.45 (1.10)	6.92 (1.21)	4.00 (0.00)	5.96*
SelfRegLS	9.57 (2.06)	10.35 (2.41)	13.50 (.71)	3.16
		Emotion Subscale		
SelfRegFC	7.78 (.53)	7.36 (.93)	8.00 (0.00)	1.80
SelfRegLS	7.77 (2.35)	8.54 (2.15)	11.50 (2.12)	2.64

Note. FC=Forced Choice version; LS=Likert Scale version;*p<.05

Discussion of Quantitative Findings

Accounting for previous mindfulness experience using self-report was problematic. Asking students about where they had heard the word mindfulness before did not lead to information sharing about previous classroom mindfulness experience. The most significant grouping of students in terms of their mindfulness score outcomes was when they were grouped by how they answered the simple question “Have you heard of mindfulness before?” Students who were familiar with the word mindfulness had significantly higher post-test scores on the CAMM than students without mindfulness familiarity. This may indicate that a baseline level of familiarity is needed for a short duration intervention such as this to have a measurable effect on mindfulness.

The self-regulation findings for the class as a whole indicated that students had higher Empathy subscale scores as well as Satisfaction subscale scores at post-test than they did at pre-

test. These subscales are from the Thoughts and Feelings questionnaire and Me and My Life questionnaire respectively. Because Renee placed such a strong emphasis on the emotional components of mindfulness, by talking about naming emotions, considering others' feelings, and practicing gratitude, this finding is not particularly surprising. Further evaluation of self-regulation data using ANOVA indicated that when SelfReg domains and subscales were analyzed according to students' prior experience with mindfulness, the experienced students had better scores on the Behavioral Regulation domain from the Likert version of the test, but worse scores on the Motor Activity subscale from the Forced Choice version. Several things could account for this discrepancy. First, it should be noted that the Likert version of the test is the published and validated measure. The forced choice format led to difficulties in analyses because for some variables there was no variance in the answer range. It is possible that the experienced students who seem to have good behavioral regulation, given the Likert results, reported low motor activity regulation on the forced choice questionnaire because they were more aware of their difficulties with motor activity than the other students. That is, if the highly self-regulated child in the forced choice question was "too good" these self-aware and reflective students may have felt dishonest in identifying with them. The beginner and novice students, who may be less skilled at behavioral regulation, may not have even thought twice about affiliating themselves with the highly self-regulated sample child because they have intentions of "being good" but less awareness about how hard it really is for them.

Qualitative Findings

Quantitative methodology was used to address the third set of research questions in this study, which posed questions about the teacher's and students' perspectives on mindfulness and self-regulation. Six students were selected by their teacher to participate in the qualitative portion

of the study. Summary of their interview data is found below in both a narrative description and also in Table 3. Student responses to each of the questions in the semi-structured interview vary based on the participants' responses to each question. The number of responses for each question in terms of themes is indicated in Table 3. In addition, information was collected from the teacher who implemented the intervention. A summary of that data is also provided below.

Student Interviews

Students supplied responses to their perceptions of mindfulness. In responding to the question of how they would describe mindfulness, students supplied a range of perceptions. All six of the students described mindfulness as a tool for stress relief or relaxation. For example, Bella noted, "The way I would describe mindfulness is like you breathe, laugh, and do exercises to make you like calm down and be like less stressed." Another theme that arose in three out of six responses was emotion regulation. Oliver said, "It's kinda like medicine for your brain. And if you're brain is all sick or its angry or something you can do mindfulness and it's like, it's medicine." Finally, two out of six respondents talked about mindfulness's relationship with the present moment. For example, Ryan said "I always just think of it as sort of stopping time, because so much we're running around in our daily life."

Students were also asked why they thought mindfulness was being taught as part of school experience. In their answers, two of the three forms of self-regulation emerged. All six students referenced cognitive regulation by talking specifically about the attentional and academic benefits of mindfulness. Ryan explained, "[Our teacher] thinks when we go to high school and college and when have tests that determine if we get into a college or not we can use the tools that she taught us to water helpful seeds and that will help us get better grades and be more successful." Emotion regulation was also mentioned as a school-related benefit by three out

six participants. Annie stated, “Last year when there was something I didn’t know, I would pretend to get a drink of water or something to try to not answer it. But I think mindfulness, it’s made me a bit more confident but it’s helped me—instead of just backing away it’s helped me face down those fears and that’s been pretty helpful.” Finally, stress relief was mentioned by three out of six students, all of whom used the word “stress” specifically.

Instead of asking the students leading questions about self-regulation, a term with which they are likely unfamiliar, students were asked more generally what the hardest part about being a sixth grader is. Only four students were asked this question, because of the semi-structured nature of the interviews. Interestingly, no students brought up social difficulty, which is popularly considered to be a defining feature of early adolescence. Instead, their answers fell into the two closely related thematic categories of “work expectations” and “time management”. All students talked about work expectations by mentioning higher expectations than they have been exposed to in their prior school experiences. Annie said, “At my old school there was a lot of partner work so usually you didn’t have to do that much work on your own and this is a bit more, some of the stuff’s more independent.” All four students also alluded to the difficulties of time management inherent in the larger work load they have in sixth grade. Marie said, “Last night I got upset because I didn’t understand something. I got kind of upset because it was due on Friday and then I had to do it all today.”

Students were asked if there were any times they had done mindfulness exercises outside of school, and to describe the situation if so. Once again emotion regulation emerged as a theme with four out of six students mentioning how they used mindfulness to deal with difficult emotions arising from arguments with siblings or friends. Oliver explained the non-academic benefits like this “But sometimes it’s not related to homework. Sometimes it’s like on the

weekend I'm really tired and I want to like take a break…" He goes on to describe a long scenario in which his brother monopolizing the television and how he used mindful breathing to work through his anger instead of fighting. Two out of six students talked about using mindfulness in sports or in their everyday eating, which fell under the theme of "optimizing experience." Ryan talked about how his soccer coach used relaxation and visualization techniques that he didn't present as mindfulness exercises, but that Ryan perceived as mindfulness exercises. "Sometimes when I'm trying out for a team that's the best players in the region it's so intimidating…It's a way to just imagine or visualize what the perfect try-out or the perfect game."

Students were asked about their favorite mindfulness exercise or practice. Many of these fell into the category called "sensory awareness exercises" in which sensory experiences like eating, yoga, or the sense of touch are used to enhance mindfulness. The other category was named "cultivation of positive states" and included practices that two students described that related to practicing gratitude and practicing happiness.

Finally students were given the chance to talk about anything else they would like to share on the topic of mindfulness. One student declined to answer and four of the remaining five all made positive remarks about mindfulness. Bella said, "Mindfulness affected my life. I don't yell as much as I did last year at my old school. It helps me with my family when I try to be nicer." Annie suggested that other schools should have mindfulness. "All my friends they don't really have mindfulness at their school, but I think it'd be cool if people at their school before class just had like a second of mindfulness." The fifth student, Ryan, voiced some concerns with how mindfulness was taught but gave the caveat that he thought mindfulness should still be a part of school and not "just extra-curricular". Specifically, he mentioned the uncertainty he faced

at the beginning of the year about how long this part of the class would last. For improvement he suggested, “just letting kids know that this isn’t going to be the whole year. So that you know I might as well pay as much attention as I can…Tell people, ‘we’re going to do this for 15 different lessons so focus as much as you can because we won’t be doing this the whole year.” Marie ended our session by clarifying that “Mindfulness doesn’t really just help you with just school work it can also be social stuff. If you’re having a hard time with friends you can calm down.”

Table 3

Inductively Developed Thematic Categories from Student Interviews

Thematic category	Key terms	Characteristic response	Number of responses
Q1. How would you describe mindfulness to a friend?			
Stress relief	Calm down, relax, let go.	“if you have homework that’s due, just letting that go”	6/6
Emotion regulation	Hard time, angry, emotions	“it’s a way to focus your emotions and keep them in check”	3/6
Present moment	Stopping time, connect with present	“it’s a way to be connected with the present”	2/6
Q2. Why do you think your teacher wants you to practice mindfulness / why is			

mindfulness a part of *school*?

Cognitive regulation	Study, learning, between classes, focus, tests	"My mind is in science class so if I took a mindful moment it could help me readjust my mind into this class."	6/6
Stress relief	Stress, tests, homework	"Sometimes school's really stressful."	3/6
Emotion regulation	Fears, confident, angry, tense	"Most schools don't have the privilege of doing mindfulness and it makes the classroom way more tense."	3/6

Q3. What is the hardest part about being a sixth grader?

Work expectations	All the work, on task.	"All the projects they give us."	4/4
Time management	Due dates, at once.	"Trying to spread out [the work] without procrastinating."	4/4

Q4. Can you give me an example of a time you've used a mindfulness practice outside of school?

Emotion regulation	Mad, upset, feelings, brother, sibling, friend	"I was in a fight with someone…but I took a few	4/6

		breaths and I was calm and we solved the issue."	
Optimizing experiences	Imagine, visualize, focus	"[When eating,] mindfulness helps me focus on the taste."	2/6
Q5. What is your favorite mindfulness practice?			
Sensory awareness exercises	Pebble, eating, body, movement	"I love the mindful eating one!"	5/6
Cultivation of positive states	Happiness, smile, gratitude	"Sometimes I will smile, secretly."	2/6

Teacher Interview

The classroom teacher, Renee, was interviewed about the three components of self-regulation and how she thought the components related to her students' mindfulness practices. She was also asked to reflect upon the MindUP curriculum and about the effectiveness of classroom mindfulness in general.

Behavioral self-regulation. Renee said this about behavioral self-regulation, "In terms of classroom management it's the most important one. The way I introduce it is to be able to take a pause so you respond instead of react and you make better decisions." When asked for evidence of how that plays out in her classroom she shared an anecdote from a parent of a student with mild Asperger's Syndrome about the student recognizing that he needs to take care of himself. "He said, 'Mom, I need to go breathe now. I need to go breathe with my pebbles and come downstairs later."

Cognitive self-regulation. The teacher described cognitive self-regulation as,

> Not getting frustrated when you don't understand something. Being able to take the time to pause and reflect and trust in your ability to be able to problem solve. What's happening in sixth grade, that big developmental shift is they're moving from concrete to abstract thinking. And mindfulness can be delivered in a very concrete way but then it loses the depth, right? [She gestures at students' mindfulness drawings on the wall.] Just look at the differences between what kids have taken away. Their higher order thinking skills are varied. So that's gonna make the take-aways at this age group really varied.

She went on to share feedback from parents about mindfulness seems to help create "an environment more conducive to learning" and "a space where they feel like they can learn. Setting a classroom tone of patience and support was an important facet of how mindfulness and cognitive self-regulation interact in Renee's classroom.

Emotional self-regulation. When talking about emotional self-regulation, Renee emphasized the importance of naming emotions.

> I always talk about it like the weather and that things change by to really stop, take a breath, and know what's happening. Mindfulness involves the awareness to know what's happening and then to investigate why it's happening. I talk a lot about seeds and how if you water the seeds of mindfulness it brings you more awareness but you can also water the seeds of kindness or water the seeds of anger, it's really up to you. Giving them the language to name what's happening is huge.

One way that Renee tries to help students develop emotional self-regulation is by teaching them tools for cultivating positive states. "We talk about ways to shift emotions as a strategy [for emotional self-regulation]…For some kids it's hard to focus on breathing. But they can focus on things they're grateful for." She shared anecdotal evidence of emotional self-regulation by

mentioning a student who used an open-ended writing assignment to apologize to her younger brother for being rude to him. In the letter she named what was happening to her amygdala, demonstrating that the neuroscience of the MindUP curriculum was helping her make sense of her emotions.

In her opinion, an effective classroom mindfulness program should give kids "a whole battery of things that they can do." MindUP meets that requirement because "it communicates that mindfulness is a lot more than that [breathing]… Breathing does not work for everyone. It's important not to be prescriptive. So many of these [other] programs are prescriptive." Renee emphasized that a teacher's own relationship to the practice is critical for developing students' trust in the practice. To illustrate this, she talked about her students' frustration with another teacher at the school who taught about mindful listening but didn't listen to them. With a solid practice of their own, teachers are more likely to understand that "mindfulness is not a panacea" and that it is ineffective and counterproductive to force students into practicing.

Summary

Overall, statistically significant findings were limited. However, in examining specific subgroups of children who had prior mindfulness experience, differences were found indicating that this may be a key factor in understanding the efficacy of classroom mindfulness training, particularly for programs of a relatively short duration. Students who reported studying multiple mindfulness practices scored higher on two measures of behavioral self-regulation (the Behavioral Regulation domain of the SelfReg and the Motor Activity subscale). Students who were familiar with the term mindfulness also had significantly greater mindfulness scores after the 10-week training period, suggesting that their prior familiarity may have helped make the program more efficacious for them.

The interview data support the effectiveness of the intervention by using students' voices as well as anecdotes from the teacher to understand how these practices seem to influence decisions students make related to expressing and regulating their behavioral, cognitive, and emotional experiences. Interviews also provided insight on teacher and student opinions about ways to optimize mindfulness training including a student recommendation to clarify with students the length of a given training program and a teacher recommendation for other teachers to emphasize their personal practice and experiences with their students. This caveat is important for teachers or school systems considering a program like Scholastic's MindUP because it suggests that although materials are available in an inexpensive mass-produced format, there is no guarantee that the program will have the same effectiveness for every teacher who implements the curriculum.

CHAPTER 5

DISCUSSION

The quantitative and qualitative findings presented in Chapter 4 indicate some sixth grade students receiving in-class mindfulness training may have experienced increases in their levels of mindfulness and specific types of self-regulation throughout the course of the 10-week intervention. There is evidence that students with previous mindfulness familiarity and experience were affected differently by this classroom mindfulness intervention than their less-experienced peers. Findings related to each research question will be discussed within the context of the contemporary literature on mindfulness and interventions.

The first set of research questions posed in this study examined students' levels of mindfulness over the course of a 10-week mindfulness training program. Mindfulness changes, as measured by the Child and Adolescent Mindfulness Measure (CAMM), were first explored for the class as a whole. It was hypothesized that students' mindfulness would increase over time, however there was no statistically significant change in CAMM scores from pre-test to post-test. The second question related to mindfulness examined whether students with differing numbers of previous out-of-class mindfulness experiences had greater growth than their less-experienced peers. It was hypothesized that the training would be more effective for students who had experience with more mindfulness practices (e.g. yoga, karate). However, findings did not reveal any statistically significant difference between groups when looking at the number of mindfulness practices a student had previously studied. Results varied depending on how students were grouped; when students were grouped on their self-reported familiarity with the word "mindfulness" there were statistically significant findings. Students who were familiar with

the word “mindfulness” had significantly higher CAMM scores compared to mindfulness novices at post-test but not at pre-test.

One potential explanation is that the background variable, “Heard of Mindfulness”, was the only substitute present for assessing students’ previous in-class mindfulness experience. Interviews revealed that many students in the class had previously done classroom mindfulness but that was not reported on the information sheet, presumably due to the way questions were asked. If the “Heard of Mindfulness” variable actually indicated students’ familiarity and experience better than the other background variables, then the findings may be the result of ease of transfer or achieving a necessary baseline for effectiveness. It is possible that the transfer of skills between classroom mindfulness experiences was easier for students than the transfer from out-of-class experiences like weekend yoga classes, back to the classroom. Literature on skill transfer in general shows that transfer is possible across different contexts but depends on how much two tasks share cognitive elements (Reder, Anderson, & Simon, 1996; Singley & Anderson, 1989). Children who are taught to practice “being in the moment” in yoga class, for example, may quickly connect that to being told at school to “focus on what you’re doing”. It is also possible that the out-of-class mindfulness training that students reported receiving via yoga and martial arts is too varied in its quality and depth of mindfulness instruction to be a reliable indicator of which students have significant mindfulness familiarity and which students do not. There has been little work exploring mindfulness interventions’ effectiveness for students with varying levels of prior experience; it is possible that minimal level of knowledge is necessary for a given intervention to be effective, a concept which is recognized in the mathematics intervention literature (e.g. Codding et al., 2007).

No students scored in the very highest score range of the CAMM so the lack of difference between groups of students with different backgrounds was not due to a ceiling effect. However, it is possible that there is a ceiling effect with regard to students' developmental capacity. For example, perhaps other mindful sixth grade students score in the same range in which these students scored at pre-test and there are developmental reasons why they might not easily score higher. This is purely speculative, as the CAMM is a new scale and age-typical scores have not been established. The explorations of the CAMM conducted in the present study serve in part to address call from the scale developers (Greco, Baer, & Smith, 2011) to examine the tools' effectiveness at measuring students' development while undergoing mindfulness training.

The second set of research questions explored students' levels of self-regulation over the course of the mindfulness intervention. Self-regulation was measured using a variety of self-report questionnaires including the Day To Day questionnaire, the Thoughts and Feelings questionnaire, the Me and My Life questionnaire, and two versions of the SelfReg. It was hypothesized that self-regulation scores for the class as a whole would increase from pre-test to post-test. This hypothesis was confirmed for subscales related to Empathy and Satisfaction but not for other measures of emotional self-regulation or any of the measures of behavioral or cognitive self-regulation. The second part of this research question examined whether students with a greater number of mindfulness experiences had greater growth than their less-experienced peers. It was hypothesized that students with more mindfulness experience would have greater gains in self-regulation during the course of the intervention. Students were grouped according to the number of out-of-class mindfulness practices they reported prior experience with (zero, one, or two). Students in the "experienced" group (two practices) scored significantly different from their beginner and novice peers at post-test on two on different subscores of the SelfReg. These

two subscores were the Behavioral Regulation domain from the Likert version of the test and the Motor Activity subscale from the forced choice version of the test.

These findings are consistent with previous research that suggests some aspects of self-regulation are amenable to change after short-term interventions. Of the three forms of self-regulation, behavioral self-regulation may be said to have the strongest physical and physiological connections. There is evidence that physiological changes can take place quickly, even with a mindfulness intervention of short duration. Barnes, Davis, Murzynowski, and Treiber (2004) found that in a three month study of twice daily mindfulness meditation, changes of the treatment group's blood pressure and heart rate were significantly higher than the control groups. Childrens' behavior and physiology are closely linked (Kagan, Reznik, & Snidman, 1987; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). Because behavior is the most concrete or physical of the three forms of self-regulation discussed here it may be the first form to show effects or the easiest for students to self-identify effects in.

The third set of research questions in this study addressed how individuals involved in this intervention viewed the relationship between mindfulness training and self-regulation. These questions were addressed qualitatively using individual interviews with six students as well as the teacher. The students were not asked directly about self-regulation because of concerns about the developmental appropriateness of the idea and because of an attempt to ask more open-ended questions that mimic natural conversation. Themes were inductively generated during analysis. Student interviews indicated that students have a sophisticated awareness of themselves and their mindfulness practices. Information shared during interviews revealed that students used techniques learned in class to navigate academic and non-academic challenges in their out-of-class lives with surprising frequency. All six students interviewed reported having used

mindfulness practices outside of class. The classroom teacher shared anecdotes that illustrated how she believed students' self-regulation had been affected by the mindfulness intervention. Such anecdotes are valuable both from a theoretical standpoint and with an eye toward future research. This qualitative feedback may be useful to help researchers understand what components of self-regulation make the strongest impression on teachers and design research to assess these components more rigorously.

One potentially useful aspect of this research for others interested in studying the effects of similar interventions is the conceptual grouping of the behavioral, cognitive, and emotional outcomes grouped together under the umbrella of self-regulation. Behavioral self-regulation, cognitive self-regulation, and emotional self-regulation have long existed as terminology and have large bodies of literature demonstrating their unique contributions to the overall construct of self-regulation. However, linking the three terms together may be useful for educators and researchers looking to examine student outcomes holistically without feeling overwhelmed by educational or technical language. By understanding that children self-manage in the behavioral, cognitive, and emotional aspects of their experience, teachers can begin to recognize when a student is competent at one area but not another and instruct them on transfer, or when another student may have difficulties in all three areas and need extra attention devoted to their self-regulatory growth.

Limitations

A noteworthy limitation of the present study is the imprecision inherent in measuring complex psychological constructs like self-regulation and mindfulness. These measurement issues mean that results should be interpreted with caution. Although the current study provides limited evidence of self-regulatory benefits using a specific set of self-report instruments, it is

possible that with different measure there would be more significant outcomes. However, the complexity of both understanding and measuring self-regulation, mindfulness, and related constructs will continue to be challenging for many decades to come and researchers should continue to explore these constructs using a variety of methods.

It should also be noted that although findings with statistical significance were limited, teachers, like medical doctors, often hold themselves to the maxim of "do no harm" and during the course of this intervention students' self-regulation capacities were not depleted or slowed appreciably. A teacher like Renee with a deep respect for and familiarity with mindfulness practices may ethically incorporate them into her classroom without doing harm to students self-regulation and still retain the benefit of planting the seed of ideas and practice that may help the student later in life.

Due to the small sample size of this study, the lack of statistical significance on some aspects of measurement should be interpreted with caution. It is possible that with a larger sample size greater effects may become more evident. It is recommended that the study be replicated with a larger sample size before serious decisions about the program's effectiveness are made.

Because MindUP is a flexible approach to implementing mindfulness, and one which the teacher in this study combined with her personal practice in the Thich Nhat Hahn tradition, there is the possibility of a mismatch between the program and the evaluation used here. The Thich Nhat Hahn tradition teaches more about lovingkindness and ethical matters than the MindUP program. A deeper study of this specific school's implementation of mindfulness training may have been able to discern benefits that came from the Thich Nhat Hahn influence more than the MindUP program. Such in-depth examination was beyond the scope of this study which used a

limited number of mostly quantitative measures for the sake of time and convenience for this school. This indicates once again that results should be interpreted with caution.

Another measurement issue that arose in this study related to the background questions students were asked at the beginning of the study. Students were asked about their familiarity with the word “mindfulness” and about specific mindfulness-related activities they had engaged in outside of school. It was expected that if students were familiar with the word “mindfulness” from previous in-school experience, they would reveal that in the open-ended question “Where have you heard about mindfulness before?” This did not seem to happen; in interviews it was discovered that many students were familiar with mindfulness from earlier grades at Willow Tree Day School or at other schools in the area they had previously attended, it is possible that they might have another word for this state or set of practices including “quiet time” or “meditation”. It would have been helpful to have more precise information about students’ prior mindfulness experience to more accurately group students by experience level in analyses.

A caveat in interpreting these neutral and positive findings related to Scholastic’s MindUP program relates to a teacher’s prior knowledge of mindfulness. Although Scholastic has been commended in the mindfulness community for providing a high-quality, low-cost mindfulness curriculum, it will certainly have widely varying effects based on the personal characteristics of the teacher-implementer. Renee, for example has a long history of personal mindfulness practice and this knowledge helped her bring the MindUP curriculum to life in her classroom in a way that was meaningful to her. This conveyed an authenticity to the students that was lacking in at least one other mindfulness-oriented teacher at the school that the students characterized negatively. Teachers interested in implementing a similar program should consider

wisdom Renee shared in her interview that teachers own relationship to mindfulness will affect students' experiences at least as much as the specifics of the intervention they implement.

Directions for Future Research and Practice

Future research on mindfulness and self-regulation might build on the conceptual grouping of the three types of self-regulation studied here: behavioral, cognitive, and emotional. Researchers should consider strategically tiered data collection to account for the varying rates at which each type of self-regulation might develop. It is also possible that each type of self-regulation has an ideal type or types of instrument and that with input from academic achievement scores, teachers, parents, and even children's peers, the field could build a more accurate picture of the range of students' self-regulation.

Because self-regulation is a particularly complex construct that this type of research lends itself to longer longitudinal study. Long-term studies on mindfulness interventions' effectiveness might explore how long beneficial effects of an intervention remain after a return to baseline conditions. They might also look at the developmental trajectory of children participating in long-term interventions. Do children receiving prolonged mindfulness training achieve developmental milestones such as metacognitive awareness or frontal lobe maturity earlier than peers?

Future research might also help determine the self-regulatory benefits of mindfulness interventions for younger children. Although mindfulness research is more common with older students, other researchers (Napoli, Krech, and Holley, 2005; Wilson & Dixon, 2010) have studied mindfulness in early elementary settings but none have taken a comprehensive approach to understanding the full range of self-regulatory outcomes. Furthermore, if the differing growth patterns for students with mindfulness familiarity or experience are taken into account, early

educators should consider at the least familiarizing students with the basic concepts of mindfulness. This investment may pave the way for more in-depth interventions that might be presented to the children in their later school years.

A larger study might compare the effects of different aspects of this treatment in a more controlled manner. For example, a teacher willing to withhold treatment might conduct all attention practices with one class or section of students and all lovingkindness practices with another class or section.

Although transfer of skills across domains is possible, it is recommended that curricular mindfulness such as the intervention used in this study be explored more in the hopes it will facilitate transfer across school situations. A meta-analysis of 51 educational interventions led its authors to conclude that skills taught in intervention are most effective when taught within the context and domain that match the target situation (Hattie, Biggs, & Purdie, 1996). An in-class or curricular approach allows students to see the connection between the skills they cultivate in a mindfulness practice and the academic and non-academic components of their immediate school experience.

In conclusion, teachers and schools should consider adopting curricular mindfulness training programs for their students. There is mixed evidence of their effectiveness at building students' self-regulatory skills but the preliminary results from this study are predominantly neutral or positive. Academic life is intimately intertwined with students' social and emotional needs. Mindfulness training for children is a rapidly expanding new area of practice and research that offers teachers a wealth of resources for training students to manage their behavioral, cognitive, and emotional responses to themselves and to the world at large.

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APPENDICES

APPENDIX A

MindUP Documents

1. Sample Lesson Plan
2. List of Lesson Topics

1. Sample Lesson Plan

Mindful Listening

What Is Mindful Listening?

From the buzz of a cell phone to the wail of a siren, sounds are all around us. Mindful listening helps us choose which sounds to focus our attention on and helps us to be thoughtful in the way we hear and respond to the words of others.

Why Practice Mindful Listening?

Research suggests that students become more focused and responsive to their environment by participating in mindful listening activities, such as Audio Alert in this lesson. In fact, training our brains to concentrate on specific sounds helps heighten our sensory awareness. As students monitor their own auditory experience—noting what they choose to focus on and/or respond to—they build self-awareness and self-management skills. Mindful listening also lays the groundwork for social awareness and effective communication—an important part of the Common Core Standards.

Being able to listen in a focused way to what others say and to home in on details such as tone and inflection gives a listener a clearer notion about the meaning of the words and a better idea for how to respond. This work helps prepare students for following directions, resolving conflicts through discussion, building friendships, and listening critically to news, ads, and other media messages.

What Can You Expect to Observe?

"Students really make an effort tune in to details of the sounds they hear and point out the nuances of sounds that make them distinct. They'll apply mindful listening to observing the way people speak to one another—in particular, identifying the tone of someone's voice and monitoring their own."

—Eighth-grade teacher

mindful listening lesson 4

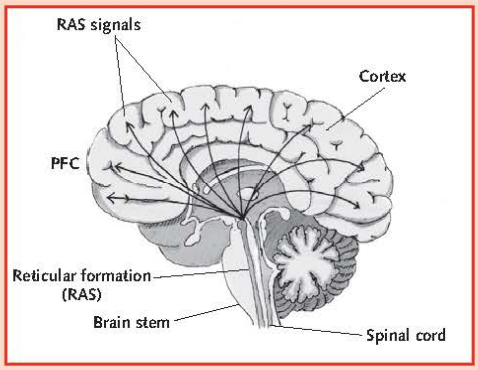
Linking to Brain Research

What Is the RAS?

An intricate network of long nerve pathways lies within the core of the brain stem. This reticular formation, also called the reticular activating system (RAS), helps regulate many basic body functions and connects the brain stem to the prefrontal cortex (PFC) and other parts of the brain. The RAS helps keep the brain awake and alert and is the brain's attention-focusing center. Sensory stimuli (visual, auditory, tactile, olfactory, taste) continually arrive via the spinal cord and are sorted and screened by the RAS. The sensory input deemed relevant by the RAS is routed on to its appropriate destination in the conscious brain. What's irrelevant is blocked.

The RAS is critically important because the brain cannot process the millions of bits of sensory information coming in at once! A student sitting in a classroom likely has competing sensory experiences—the voice of her teacher, the vibration of a cell phone, the sight of a friend walking by the classroom, the aroma of food from the cafeteria. It's easy to imagine how these stimuli might cause her to shift her attention from the classroom to what she hopes to eat for lunch. A mindful, focused student is able to reassure herself that lunch period will come after math and to redirect her attention to the task at hand.

Athletes, musicians, scholars, and other "focused" people have "trained" their RAS to choose the most pertinent sensory stimuli. With practice focusing on specific details, students can train their RAS to be more effective. Such practice is especially important for students who have trouble focusing their attention on their work, instructions, or social cues. Sensory awareness activities in this lesson and the others in this unit provide your students with repeated RAS-strengthening practice.



The RAS serves as an "executive personal secretary" to the PFC, forwarding on only what's immediately relevant.

Clarify for the Class

Make a model of the RAS using a kitchen strainer, fine sand, and gravel. Demonstrate how a strainer allows only some things to pass through. Similarly, the RAS holds back unimportant sensory input, but lets relevant information pass on to the PFC.

Discuss: What kinds of sensory input do you think are filtered out by the RAS? (background noise, feeling clothes on body, smell of your own home, etc.) Give examples of situations where you noticed these things. What did you think was happening in your brain at those times?

Getting Ready

Listen Up!
Students record descriptions of sounds they heard during the Audio Alert lesson.

GOALS

- Students train their attention on specific sounds and try to identify those sounds.
- Students learn how mindful listening skills can help them communicate more successfully.

MATERIALS

- various common objects for creating sounds or a set of sound effects downloaded from the Internet (search for "free sound effects")
- Audio Alert/Present Scent activity sheet (p. 154)

CREATING THE OPTIMISTIC CLASSROOM

Classroom Management Tell students, "The tone of your voice can say as much as the words you speak." Ask students if they can detect the mood of a friend, family member, or teacher by carefully listening to the tone of that person's voice. Help them understand that the tone we use gives our words an emotional charge that can strengthen or hurt our relationships. Encourage students to be mindful of the way they communicate their feelings through speech. Pair up students and have them practice modulating their tone in three different ways using the phrase "I can't talk right now" and then discuss the feelings each tone conveyed.

mindful listening

4 understand the purpose

Tuned in to Learning
Having students create a file of free online sound effects is a great way to incorporate technology into this mindful listening lesson.

MINDUP Warm-Up

Mindful Listening Practice

Build background for this lesson with an auditory-kinesthetic rhythm exercise. Give students a rhythmic clapping and snapping pattern to follow (e.g., clap, clap, snap, clap, snap, clap). Call on students to create their own easy rhythms (three to five beats), then ask them to try increasingly challenging patterns (six to eight beats).

When students are able to come up with unique patterns and repeat the patterns of their peers, organize the class in groups of six to ten and have them play a rhythmic listening game, seated in a circle. Give each group a basic pattern or have the group come up with its own. One at a time, students present a variation on the basic pattern and repeat their new version, cuing the group to repeat their pattern the third time. Suggestions:

- Limit the variations to six or eight beats to avoid too much complexity.
- Model how to make the variation rhythmically interesting by dividing or omitting beats, for example.
- In between turns, encourage the group to return to the original pattern, so it remains fresh in students' minds.

Discuss: What did you have to do in order to keep track of the pattern? How is this kind of listening similar to or different from the kind of listening you do in class? in conversations with friends?

Leading the Lesson

Audio Alert

Engage

What to Do

Review mindfulness and the parts of the brain from Unit 1, as needed. Initiate a discussion about listening.

- Let's consider why listening is important—for school, for friendships & family, for pleasure (music) and for safety.
- Do you think listening is a skill or a talent? What might be the difference?
- When there's lots of noise around you, what do you do to help you pay attention to just one sound, like a friend's voice on a cell-phone call? What are some times when you are able to eliminate distractions and focus on a single important sound?

Explain that together, the class will participate in an inquiry experience that will help students develop mindful listening.

Why It's Important

There are many sounds surrounding us most of the time. Usually we aren't mindful of every sound, because our brain helps us focus our attention by screening the sounds our ears pick up and bringing to our attention only the ones that are important. That filter in our brain is the Reticular Activating System (RAS). Listening mindfully can help us reinforce the work of the RAS.

Explore

Ask students to close their eyes and sit comfortably while you, or a chosen student, either stand out of sight with objects or cue up sound effects you've downloaded.

- Listen as mindfully as you can to the sound I make—and focus on it. If you think you know what it is, record your answer on the Audio Alert Activity Sheet.

One at a time, make each sound. Possible actions:
–drop a hardcover book on a counter top.
–shuffle a deck of cards
–set off a vibrating cell phone ring tone
(Sound effects online may include a skateboard coasting, a waterfall, or the rattle of a roller coaster.)

Give students time to record their answers on the Audio Alert activity sheet. Encourage them to include specific descriptions of each sound—noting that each sound may include more than one distinct sound.

When the listening exercise is complete, allow students to share their descriptions and predictions. Then reveal the identity of the sound-makers.

By concentrating on specific sounds, you can train your RAS to listen very carefully. That strengthens the pathways to the prefrontal cortex—so you can get the information you're listening for more efficiently.

You are more in control of your own thought processes if you are more aware of the constant sensory input that your brain experiences.

mindful listening

connect to learning

From the Research

Novelty, humor, and surprise in lessons expedite students' attentive focus, and the use of these strategies results in more successful encoding of data into the memory circuits. (Koutstaal et al., 1997)

Reflect

Initiate a class discussion. Make sure students understand that they were using brain energy to identify each sound and to concentrate on the distinct parts of each sound.

- In what ways is this experience different from the way we typically listen to sounds? If you lost your focus on the sounds, explain what you think got in the way.
- How might this kind of listening affect your brain?
- How was trying to identify sounds good practice for mindful listening?

Record student responses on chart paper.

When you're really listening well, you get the information you need without being distracted. Then you can decide how best to respond.

MINDUP In the Real World

Career Connection

Is mindful listening ever a matter of life and death? Sometimes YES! Every day, doctors practice mindful listening on the job. Not only do they need to listen carefully to their patients' bodies—hearts, lungs, and abdomens—but also to the patients themselves. What brings the patient to the doctor? What symptoms is he or she experiencing? Doctors work hard to learn the skill of active, attentive listening. Once the patient's medical history is recorded, the doctor can ask informed questions and order the right tests that will lead to the correct diagnosis and effective treatment. In the hospital, mindful listening saves people's lives.

Discuss with students how this and other careers depend on mindful listening. Examples include 911 operators, customer service representatives, and guidance counselors.

Once a Day

Resist the urge to immediately answer a question from a student or colleague. Savor the time to reflect and develop a thoughtful response.

Connecting to the Curriculum

Mindful listening supports students' observation of their own learning processes and promotes awareness in the content areas and in literature.

Journal Writing

Encourage your kids to reflect on what they've learned about mindful listening and to record questions to explore at another time. They may also enjoy responding to these prompts:

- Use a T-chart to show the differences between mindful listening and everyday listening.
- Pick a word or a phrase and mindfully listen for the word or phrase during lunch. Explain why you think you did or did not hear the word or phrase during lunch with your friends.
- Select a class or an activity during which you have difficulty concentrating. Determine to listen mindfully for one class period or during one activity. What did you do to stay focused? Describe your experience.
- Tell about a time when being a mindful listener helped you or someone else in a difficult or dangerous situation.

the optimistic classroom™ journal

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SCIENCE & HEALTH

Protect Your Hearing!

What to Do

If your school owns or can borrow a decibel meter, have students take decibel measures and create a chart of school sounds, such as slamming lockers in the hall between classes, cafeteria or gym noise, and so on. If you are unable to locate a decibel meter, have students create a "meter" of their own. The fire alarm bell could represent the loudest sound, while the closing of a paperback book could be the softest. Have students chart school sounds between these two extremes. Check out excellent graphics and a video at www.dangerousdecibels.org/hearingloss.cfm.

What to Say

As we've been learning, we're surrounded by sounds and some of these can really hurt our ears—permanently. Damage to the sensitive hair cells in our ears can be done by the loudness or pressure of something we hear. For example, a typical conversation is 60 dB—not enough to cause damage. But listening to music on your earbuds at a high volume (100 dB) for even 15 minutes a day can cause permanent damage in a short period of time.

Why It's Important

Doing an activity to heighten students' awareness of the dangers of noise will encourage them to value and protect their hearing.

LANGUAGE ARTS

What Sounds Similar in These Expressions?

What to Do

Have students share a common phrase in several different languages and listen closely to compare the versions. Encourage students to use the second language they are studying or a home language other than English. You may also want to have students write the phrases and compare the written versions. You may be able to identify similar word roots.

What to Say

How do you say "Good morning" in the second language you're studying or in a language you know other than English? . . . Let's listen to the sounds of each and notice if there are any similarities among these expressions. What's unique about each one? Let's take a closer look at the phrases by writing them on the board.

Why It's Important

Comparing common phrases in several languages helps broaden students' understanding of language structure, knowlege of the world, and awareness of cultural similarities and uniqueness.

mindful listening

extend the lesson

LANGUAGE ARTS

Sounds Remembered

What to Do

Ask students to copy the following list and write the sounds they associate with each word. Allow students to add to the list.

calm	anger	excite
comfort	agitate	entertain

Model how to use the sounds with the words to write a 5-line poem focused on mood and sound. For example, for "anger," students may suggest *cry, shout, yell, scream, slam.*

What to Say

What sounds come to mind when you feel calm? How about angry? Are they sounds from a certain experience you've had in a specific place? . . . Let's gather some more sound details. Close your eyes and imagine yourself in the scene you pictured for one of the words on the list. What are you hearing? Make a list or word web to record the sound words and descriptions. . . . Now let's put those ideas together in a powerful way in five short descriptive lines.

Why It's Important

Sounds are often linked to strong emotions, and in writing, well-used sound words can give immediacy to emotions. Using mindful listening as a tool for elaboration can help create moments of emotional intensity in descriptive and narrative writing.

SOCIAL-EMOTIONAL LEARNING

To Interview Is to Listen Well

What to Do

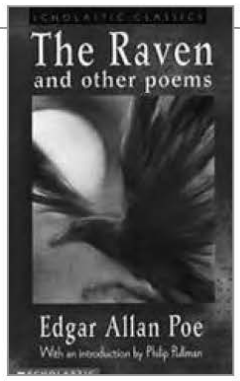
Have students prepare to interview an important adult in their lives, such as a grandparent or coach. Have them write out three or four questions about that person's life (e.g., What was your most challenging decision as a teenager? What is your favorite childhood memory?). Review pointers about how to listen well. Set a time for students to share what they learned by paraphrasing the most interesting part of the interview. Then have them write down the key idea or event and tell why that resonated most.

What to Say

Important people in our lives can often tell us stories about the life experiences that helped shape who they are. Let's discuss how to ask questions that will help you get interesting and informative answers—and how to be an excellent listener.

Why It's Important

A thoughtful question is a tool to help us listen mindfully. Listening and reflecting on others' life experiences can help us decide how to act mindfully in similar situations.



Literature Link

The Raven and Other Poems

by Edgar Allan Poe
(2000). New York: Scholastic.

Edgar Allan Poe, a classic wordsmith, used rhythm and other sound elements to elicit emotion. Invite students to read aloud these classic poems and listen to the way the word choice and rhythm create a spooky, chilling mood. These poems can serve as a counterpoint to other poems students have read that elicit very different moods and emotions.

Connect this book to attentiveness, auditory discrimination skills, creative expression through writing, and understanding what another person is trying to communicate.

More Books to Share

Adoff, Jaime. (2002). *Song Shoots Out of My Mouth: A Celebration of Music.* New York: Dutton Juvenile.

Creech, Sharon. (2001). *Love That Dog.* New York: HarperCollins.

Miller, Sarah. (2007). *Miss Spitfire: Reaching Helen Keller.* New York: Simon & Schuster.

the optimistic classroom™ library

2. List of Lesson Topics

Using MindUP in the Classroom

MindUP comprises 15 lessons arranged into four units:

Unit I: Getting Focused (Lessons 1–3)
Introduce brain physiology and the concept of mindful attention; establish daily Core Practice
Lessons: 1. How Our Brains Work, 2. Mindful Awareness, 3. Focused Awareness: The Core Practice

Unit II: Sharpening Your Senses (Lessons 4–9)
Experience the relationship between our senses, our moving bodies, and the way we think
Lessons: 4. Mindful Listening, 5. Mindful Seeing, 6. Mindful Smelling, 7. Mindful Tasting, 8. Mindful Movement I, 9. Mindful Movement II

Unit III: It's All About Attitude (Lessons 10–12)
Understand the role of our mind-set in how we learn and progress
Lessons: 10. Perspective Taking, 11. Choosing Optimism, 12. Appreciating Happy Experiences

Unit IV: Taking Action Mindfully (Lessons 13–15)
Apply mindful behaviors to our interactions with our community and the world
Lessons: 13. Expressing Gratitude, 14. Performing Acts of Kindness, 15. Taking Mindful Action in the World

The framework is designed to strengthen students' sense of social and emotional well-being while creating a cohesive, caring classroom environment. Because the concepts build on one another, you'll find it most productive to teach the lessons in sequential order.

Lesson Structure

You'll notice that each lesson follows the same format:

Introduction to the Lesson Topic...identifies and explains the subject of the lesson, frames why it's important, and includes teacher testimony from a MindUP user.

Linking to Brain Research... explains how each lesson relates to the neuroscience. This section provides background for you, which you may want to share with students to help them gain a progressively more sophisticated awareness of how their brains work.

Clarify for the Class... includes guidelines for making brain research concepts accessible to students at various grade levels.

Getting Ready... identifies what the lesson entails as well as learning goals for the lesson. Also listed are materials and resources required for leading the lesson.

MindUP Warm-Up... helps the class prepare for the lesson itself by introducing and discussing subject matter in an easygoing, open-ended way that relates content to students' lives.

Leading the Lesson... offers a step-by-step approach that engages students in the inquiry, helps them explore the topic, and encourages them to reflect upon and discuss their insights and experiences. The lesson layout also establishes concrete links to the learning process and classroom issues at the middle grade level.

Connecting to the Curriculum... offers specific opportunities for students to bend their minds around language arts, math, social studies, science, health, physical education, the arts, and social-emotional learning. These optional across-the-curriculum learning experiences expand the lesson and offer alternative approaches to content.

Special Features

Creating the Optimistic Classroom... offers classroom management strategies for reaching English language learners, special needs students, and general learners in order to maximize the effectiveness of the lesson.

MindUP in the Real World... connects lesson content to a career or undertaking, expands the discussion beyond the classroom setting, and grounds the ideas in a concrete application.

Once a Day... suggests ways for teachers to apply lesson content to everyday situations involving students or colleagues.

Journal Writing... gives students an opportunity to reflect on motivation, actions, and their consequences, so they can learn to mediate and understand their actions. According to Susan Kaiser Greenland, journaling allows students to use what they've learned to create happier, more successful lives for themselves (2010). We recommend that you provide students with a notebook to create a journal that they can personalize with decorations of their choice, using this personal record to document responses within Greenland's general framework of

- What I Noticed
- What It Means
- What I Learned

Literature Link... recommends four books that extend the learning.

APPENDIX B

Contact Documents

1. Recruitment letter to parents

2. Parental consent form (questionnaire)

3. Minor assent form (questionnaire)

4. Addendum to parental consent (interview)

5. Minor assent form (interview)

1. Recruitment letter

August 1, 2012

Dear Parent/Guardian of [SchoolName] student,

Hello, my name is Sarah Whitaker and I'm a doctoral student in Educational Psychology at the University of Georgia. I'm conducting my dissertation research on how mindfulness training, as conducted in [teacher's] class, affects children's development of self-regulation. I'll be looking at three components of children's self-regulation: behavioral, cognitive, and emotional. If your child participates I will administer several questionnaires at the beginning and end of the fall semester 2012. I will also collect basic grade and test score information about all participants.

Your child is invited to participate in this study because he or she is already a regular participant in mindfulness training in [teacher's] class. Your child will be eligible to participate in this study only if you give your permission and your child gives his or her assent by signing a form in school.

The professor supervising me is Dr. Stacey Neuharth-Pritchett, also from the Educational Psychology Department at University of Georgia. You can contact her at sneuhart@uga.edu or (706)542-4110 if you have questions or concerns about this research. You can also contact me directly at the phone number or email listed at the bottom of this letter.

Thank you,

Sarah K. Whitaker, M.A.
University of Georgia
Educational Psychology Department
Applied Cognition and Development Program
skw@uga.edu
(859)797-5917

2. Parental permission form (questionnaire)

[NAME OF SCHOOL] PARENTAL PERMISSION FORM

I agree to allow my child, _____, to take part in a research study titled, "Understanding How Children Develop Self-Regulation" which is being conducted by Ms. Sarah Whitaker, from the Educational Psychology Department at the University of Georgia under the direction of Dr. Stacey Neuharth-Pritchett. My child's participation is voluntary which means I do not have to allow my child to be in this study if I do not want to. My child can refuse to participate or stop taking part at any time without giving any reason, and without penalty or loss of benefits to which she/he is otherwise entitled. If I decide to withdraw my child from the study, the information that can be identified as my child's will be kept as part of the study and may continue to be analyzed, unless I make a written request to remove, return, or destroy the information.

- The reason for the study is to find out the effects of mindfulness practice on children's development of self-regulation. Self-regulation is how children initiate, manage, and relate to their behaviors, thought processes, and emotions.

- One potential benefit of this study is that students may learn more about themselves due to the reflective nature of the questionnaires used in this study. In the future educators may learn more about potential benefits of mindfulness training and schools and organizations may be able to help students develop self-regulation more effectively.

- If I allow my child to take part, my child will take a series of surveys at the beginning and end of the semester. Each of these two data collection periods will be approximately 90 minutes long and will be administered in two 45 minute sessions. If I allow my child to take part in this research, the researchers will analyze information from my child's academic and behavioral records (e.g. attendance, grades, standardized test scores) which will be collected based on the discretion of the Director of the school. If I do not want my child to take part then she/he will be allowed to continue with regular school activities.

- A random selection of 6-8 students will also be invited to participate in one-on-one interviews with Ms. Whitaker about their experience with mindfulness in December. These interviews will take place within the school in a location to be specified by [teacher]. These interviews will take approximately 10-15 minutes.

- No more than minimal risk is expected in this study. To alleviate any potential discomfort due to answering questions about their thoughts, feelings, and behaviors, students will be reminded that they may skip any questions they feel uncomfortable answering. My child can quit this study at any time. My child's grade will not be affected if my child decides not to participate or to stop taking part in this study.

- Any individually-identifiable information collected about my child will be kept confidential unless otherwise required by law. If the researchers use any direct quotes from my child's interview in any professional presentations or publications, the researchers will alter or delete any information that could identify the quotation as my child's. My child's identity will be coded, and all individually identifiable data will be kept in a secured location.

- Ms. Whitaker will answer any questions about the research now, or during the course of the project, and can be reached by telephone at 706.542.4110 or email at skw@uga.edu. If I would like to see copies of the questions that will be asked, I may contact Ms. Whitaker. I understand that I may also contact the professor supervising the research, Dr. Stacey Neuharth-Pritchett, at 706.542.4110 or sneuhart@uga.edu

- I understand the study procedures described above. My questions have been answered to my satisfaction, and I agree to allow my child to take part in this study. I have been given a copy of this form to keep.

Please check yes or no to **both** of the following statements:

I give my permission for my child to participate in the **questionnaire portion** of this study.

Yes_____ No_____

I give my permission for my child to participate in the **interview portion** of this study, if he or she is randomly selected.

Yes_____ No_____

_____ _____ _____
Name of Parent Signature Date

_____ _____ _____
Name of Researcher Signature Date

Please sign both copies, keep one and return one to the researcher.

Additional questions or problems regarding your child's rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia 30602; Telephone (706) 542-3199; E-Mail irb@uga.edu.

3. Minor assent form (interview)

April 1, 2012

Minor Assent Form

Dear Participant,

You are invited to participate in my research project titled, "Understanding How Children Develop Self-Regulation." Through this project I am learning about how boys and girls learn to manage their emotions, behaviors, and thoughts.

If you decide to be part of this, you will take a series of surveys and also play one computer game at the beginning and end of the semester. Your participation in this project will not affect your grades in school. I will not use your name on any papers that I write about this project. I hope to learn something about self-regulation that will help other children in the future.

If you want to stop participating in this project, you are free to do so at any time. You can also choose not to answer questions that you don't want to answer.

If you have any questions or concerns you can always ask me or my teacher. Her name is Dr.Stacey Neuharth-Pritchett and her email address is sneuhart@uga.edu and her phone number is (706)542-4110.

Sincerely,

Sarah K. Whitaker, M.A.
Educational Psychology Department
University of Georgia
skw@uga.edu
(706)542-4100

I understand the project described above. My questions have been answered and I agree to participate in this project. I have received a copy of this form.

_____ _____

Signature of the Participant Date

Please sign both copies, keep one and return one to the researcher.

Additional questions or problems regarding your rights as a research participant should be addressed to:
The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia 30602; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

4. Addendum to parental permission form (interview)

[SCHOOL NAME] PERMISSION FORM
Addendum to Research Project: "Understanding How Children Develop Self-Regulation"

Dear Parents of _____:

I am Sarah Whitaker from the Department of Educational Psychology at the University of Georgia. My major professor, Dr. Stacey Neuharth-Pritchett, Department of Educational Psychology (706-542-4247, sneuhart@uga.edu), and I are writing to communicate further about the study "Understanding How Children Develop Self-Regulation". You have already given your permission for your child to participate in this study; we are writing you now to let you know that your child has been selected to participate in the interview associated with this study and we would like to seek your permission to audio record the interview.

The interview will take 10-15 minutes and will be conducted during the school day at a time and place that [teacher] deems appropriate. The interview will be audio-recorded, transcribed, and then destroyed. All of your child's individually identifiable information and audio-recordings will be kept confidential, unless otherwise required by law.

Your child's participation is completely voluntary. Your child may refuse to participate or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. There are no more than minimal risks associated with this research. To alleviate potential discomfort due to answering questions about their thoughts, feelings, and behaviors, students will be reminded that they may skip any questions they feel uncomfortable answering.

By signing this letter you are agreeing to allow the researcher to audio-record your child's research interview, if your child chooses to participate. Please keep a copy of this letter for your records. The researcher can be contacted for any further questions about the research, now or during the course of the research. Thank you for your consideration.

Sincerely,

Sarah K. Whitaker, M.A.
Educational Psychology Department
University of Georgia
skw@uga.edu
(706)542-2160

_____ _____ _____
Parent Name Parent Signature Date

Please sign both copies, keep one and return one to the researcher.

Additional questions regarding your rights as a research participant should be addressed to the IRB Chairperson, University of Georgia, (706) 542-3199; IRB@uga.edu .

5. Minor assent form (interview)

November 14, 2012

Minor Assent Form

Dear Participant,

You are already a participant in my research project titled, "Understanding How Children Develop Self-Regulation." Through this project I am learning about how children learn to manage their emotions, behaviors, and thoughts. I am writing to ask if you would be willing to participate in another part of the study, the *interview* portion.

If you choose to participate in an interview with me, we will take 10-15 minutes and sit together in a quiet place near your classroom. I will ask you about your experiences with mindfulness and whether mindfulness practices have affected you at home or at school. I will record the audio (sound) part of our interview but not video (images). Then I will write down everything that both of us said during the interview and delete the audio recording. At no time will your name be attached to the recording or the written record; I will always use the code number I gave you for this study.

There are no right or wrong answers during this interview, I am just interested in what you really think! Your participation in this project will not affect your grades in school. I will not use your name on any papers that I write about this project. I hope to learn something about self-regulation that will help other children in the future.

If you want to stop participating in this project, you are free to do so at any time. You can also choose not to answer questions that you don't want to answer.

If you have any questions or concerns you can always ask me or my professor. Her name is Dr.Stacey Neuharth-Pritchett and her email address is sneuhart@uga.edu and her phone number is (706) 542-4110.

Sincerely,

Sarah K. Whitaker, M.A.
Educational Psychology Department
University of Georgia
skw@uga.edu
(706)542-4100

I understand the project described above. My questions have been answered and I agree to participate in this project. I have received a copy of this form.

_____ _____

Signature of the Participant Date

Please sign both copies, keep one and return one to the researcher.

Additional questions or problems regarding your rights as a research participant should be addressed to:

The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia 30602; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

APPENDIX C

Instruments

1. MindUP Evaluation Toolkit

2. Child and Adolescent Mindfulness Measure (CAMM)

3. Self-Reg

MindUP Evaluation Toolkit: Day-to-Day Experiences Questionnaire

The following sentences describe the ways some people might feel going about their daily activities. For each sentence indicate how well it describes you by circling the number that describes how often it is true for you.

		Almost NEVER	Rarely	Sometimes	Often	Almost ALWAYS
1.	I don't notice my feelings until they have passed.	0	1	2	3	4
2.	I drop things because my mind is somewhere else.	0	1	2	3	4
3.	I find it hard to stay focused on what's happening in the present moment.	0	1	2	3	4
4.	I walk quickly to get where I'm going without noticing how I get there.	0	1	2	3	4
5.	I don't notice my body feels tense until it hurts really bad.	0	1	2	3	4
6.	When I learn a new name I forget it quickly.	0	1	2	3	4
7.	Every day I do a lot of things "on auto pilot".	0	1	2	3	4
8.	I rush through things at school without being attentive to them.	0	1	2	3	4
9.	I rush through things at home without being attentive to them.	0	1	2	3	4
10.	I try to do two things at once.	0	1	2	3	4
11.	I walk into a room and then wonder why I went there.	0	1	2	3	4
12.	I can't stop thinking about the past.	0	1	2	3	4
13.	I can't stop thinking about the future.	0	1	2	3	4
14.	I snack without being aware how much I'm eating.	0	1	2	3	4

MindUP Evaluation Toolkit: Thoughts and Feelings Questionnaire

The following sentences describe ways some people might feel about themselves, their lives, or others. For each sentence indicate how well it describes you by circling the number that describes how true it is for you.

		NOT AT ALL like me	Rarely like me	Sometimes like me	Often like me	ALMOST ALWAYS like me
1.	I often feel sorry for people who don't have the things I have.	0	1	2	3	4
2.	It's easy for me to understand why other people do the things they do.	0	1	2	3	4
3.	I feel sorry for other people when they are having problems.	0	1	2	3	4
4.	When I seem someone being picked on, I feel bad for them.	0	1	2	3	4
5.	I try to understand my friends better by imagining how they think about things.	0	1	2	3	4
6.	When I'm mad at someone, I try to understand how they feel.	0	1	2	3	4
7.	I feel sorry for kids who are sad or in trouble.	0	1	2	3	4
8.	I try to understand how other kids feel before I decide what to say to them	0	1	2	3	4
9.	When I see someone being treated mean, it bothers me.	0	1	2	3	4
10.	Even when I know I'm right, I listen to what other people think.	0	1	2	3	4
11.	In general, I have strong feelings about what happens around me.	0	1	2	3	4
12.	Before I say something bad about someone, I try to imagine how I would feel if I were that person.	0	1	2	3	4
13.	I care about the feelings of others.	0	1	2	3	4
14.	I think there are different ways to think about a problem.	0	1	2	3	4

MindUP Evaluation Toolkit: Me and My Life Questionnaire

The following sentences describe how some people might feel about themselves and their lives. For each sentence, indicate how well it describes you or something you would say by circling the appropriate number.

		NOT AT ALL like me	Rarely like me	Sometimes like me	Often like me	ALMOST ALWAYS like me
1.	I have more bad times than good.	0	1	2	3	4
2.	More good things than bad things will happen to me.	0	1	2	3	4
3.	I start most days thinking I'll have a bad day.	0	1	2	3	4
4.	I am able to see the good things about my life.	0	1	2	3	4
5.	I'm bored by my life.	0	1	2	3	4
6.	I think things in my life will get worse in the future.	0	1	2	3	4
7.	I am optimistic about my school life.	0	1	2	3	4
8.	I am optimistic about my social life.	0	1	2	3	4
9.	When something bad happens to me, I think that it will last a long time.	0	1	2	3	4
10.	Little things going wrong make me upset.	0	1	2	3	4
11.	I make the same mistakes in life over and over.	0	1	2	3	4
12.	I get impatient when I have to wait for something.	0	1	2	3	4
13.	I make decisions before I think about the consequences.	0	1	2	3	4
14.	I stay calm during crises.	0	1	2	3	4
15.	In most ways my life is close to the way I would want it to be.	0	1	2	3	4
16.	Things in my life are excellent.	0	1	2	3	4
17.	I am happy with life.	0	1	2	3	4
18.	So far I have gotten the important things I want in life.	0	1	2	3	4
19.	If I could live my life over, I would do things the same.	0	1	2	3	4

MindUP Evaluation Toolkit: One Last Question Today!

In the space below, list things in your life that you are thankful for, or that make you happy. List as many things as you can!

Child and Adolescent Mindfulness Measure

How true is each of these statements for YOU? Circle one answer for each statement.

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1. I get upset with myself for having feelings that don't make sense.

Never True **Rarely True** **Sometimes True** **Often True** **Always True**

---

2. At school, I walk from class to class without noticing what I'm doing.

Never True **Rarely True** **Sometimes True** **Often True** **Always True**

---

3. I keep myself busy so I don't notice my thoughts or feelings.

Never True **Rarely True** **Sometimes True** **Often True** **Always True**

---

4. I tell myself that I shouldn't feel the way I'm feeling.

Never True **Rarely True** **Sometimes True** **Often True** **Always True**

---

5. I push away thoughts that I don't like.

Never True **Rarely True** **Sometimes True** **Often True** **Always True**

---

6. It's hard for me to pay attention to only one thing at a time.

Never True **Rarely True** **Sometimes True** **Often True** **Always True**

---

7. I think about things that happened in the past instead of thinking about things that are happening right now.

Never True **Rarely True** **Sometimes True** **Often True** **Always True**

---

8. I get upset with myself for having certain thoughts.

Never True **Rarely True** **Sometimes True** **Often True** **Always True**

---

9. I think that some of my feelings are bad and that I shouldn't have them.

Never True **Rarely True** **Sometimes True** **Often True** **Always True**

---

10. I stop myself from having feelings that I don't like.

Never True **Rarely True** **Sometimes True** **Often True** **Always True**

The SelfReg

Pascal, Joel, and Ethan are playing a board game. Pascal has just made the winning move…

  	
Joel gets angry and knocks over the board.	Ethan is disappointed but goes on with his day.

What about you? Who are you more like when you lose a game?

Joel **Ethan**

Explain if needed:

Do you keep calm when you lose a game?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Alessandro and Lukas are supposed to be doing their homework.

 	
Alessandro keeps getting distracted by other things.	Lukas stays with his homework until it is done.

What about you? Who are you more like when you're supposed to be doing homework?

Alessandro **Lukas**

Explain if needed:

Do you get distracted from your homework?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Dominic has invited Fabian and Nick to his birthday party. Dominic chooses three other kids to play a game but Fabian and Nick were not been chosen.

Fabian tries to keep his good mood by telling himself he'll probably be picked next time.	Nick immediately gets into a bad mood. He leaves the room and shuts the door.

What about you? Who are you more like when are not chosen for a game?

Fabian **Nick**

Explain if needed:

Do you get in a bad mood if you are not chosen for a game?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The teacher has assigned a short essay to write in 15 minutes in class.

Ellen writes two sentences and then has trouble finishing.	Liza writes the whole time until she's finished.

What about you? Who are you more like when you have an in-class assignment?

Ellen **Liza**

Explain if needed:

Are you able to stick with something for a long time?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The twins' birthday is approaching and presents are waiting on the kitchen table.



Damon waits until his birthday.	Dimitri tries to peek to see what's inside.

What about you? Who are you more like when you have presents?

Damon **Dimitri**

Explain if needed:

Do you wait without peeking when you have a present?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The children have some especially difficult math work. Anna and Daria are both having trouble.


Anna patiently keeps on trying.	Daria gets frustrated and gives up.

What about you? Who are you more like when you're working on something hard?

Anna **Daria**

Explain if needed:

Do you keep trying to solve a problem for a while, even if it's difficult?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Sonia and Rachel want to watch a special show on TV. Their parents won't let them because it's already bedtime.



1. Sonia gets angry and can't calm herself down.	2. Rachel is a little upset but is able to calm herself down quickly.

What about you? Who are you more like when you aren't allowed to stay up late?

Sonia **Rachel**

Explain if needed:

Do you have trouble calming yourself down if your parents won't let you do something you want to do?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Ivan and Nico don't like to do their homework.


Ivan does his homework right after school to get it over with.	Nico waits until the very last minute.

What about you? Who are you more like when you don't want do something you have to do?

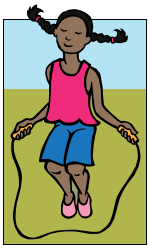
Ivan **Nico**

Explain if needed:

Do you do your homework right away?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Alina and Naomi have to read a story for school. They both think it's boring.

 	
Alina will only read it if her parents promise her something afterwards.	Naomi will read it no matter what.

What about you? Who are you more like when you have something boring to read?

Alina **Naomi**

Explain if needed:

Do you need a reward in order to do boring things?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Raul and Marco go shopping with their families.

 	
Raul sneaks away to explore on his own.	Marco stays right with his family.

What about you? Who are you more like when you're out shopping with your family?

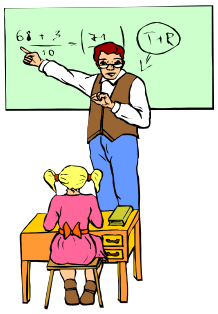
Raul **Marco**

Explain if needed:

When your family is out and you have been asked to stay with them, do you stay with them?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Sophie and Isabelle are sitting in the classroom.



Sophie doesn't have a problem sitting still and facing forward.	Isabelle has a hard time sitting still.

What about you? Who are you more like when you are in class?

Sophie **Isabelle**

Explain if needed:

Do you sit still during class?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The teacher asks the students an interesting question about their lives.

Irina raises her hand and waits to be called on.	Tamara shouts out an answer without being called on.

What about you? Who are you more like when you want to speak in class?

Irina **Tamara**

Explain if needed:

Do you shout out answers without being called on?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Phoenix and Alejandro are late. They should have been at home an hour ago.

	
Phoenix runs straight home without looking where he's going.	Alejandro stops and looks both ways at every intersection and is careful getting home.

What about you? Who are you more like when you're in a hurry?

Phoenix **Alejandro**

Explain if needed:

Do you remember to stay safe when you're in a hurry?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The children are doing their homework.

	
Jeremy only makes an effort if an adult is watching and praising him for it.	John will make an effort even if there is no adult around to see it.

What about you? Who are you more like when you need to work hard?

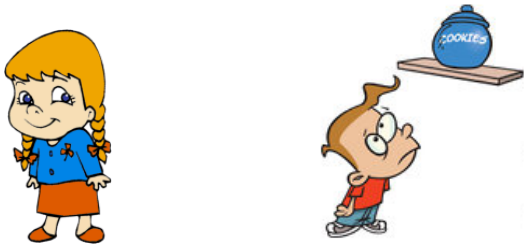
Jeremy **John**

Explain if needed:

Do you make an effort, even if there is no one watching or praising?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Violet and Evelyn want to try dessert as their father is making it but he tells them they have to wait until after dinner.



Violet waits patiently until after dinner.	Evelyn tries to figure out a way to get dessert early.

What about you? Who are you more like when you want something?

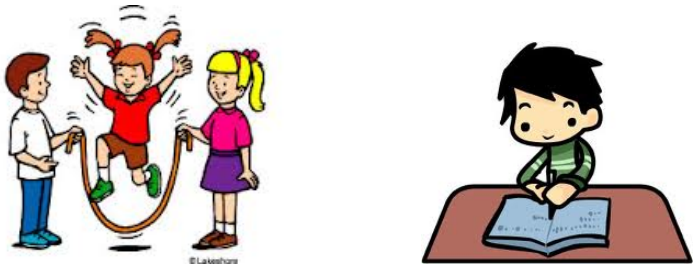
Violet **Evelyn**

Explain if needed:

Can you wait patiently when you want something?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The teacher says: "Once you have finished these two math problems you can go for a break!"



Laura is soon playing outside with her friends.	Julie is still solving her problems inside.

What about you? Who are you more like when you have work to finish before playing?

Laura **Julie**

Explain if needed:

Do you still have work to finish while others are taking a break?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Samira and Rebecca found a new game they want at the store. Their parents don't let them get it.

Samira accepts it and stays calm.	Rebecca gets visibly upset.

What about you? Who are you more like when you can't get what you want?

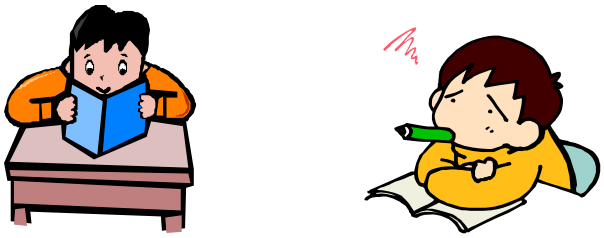
Samira **Rebecca**

Explain if needed:

Do you stay calm if your parents don't let you buy something you want?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The children have to memorize a poem for school.



Brandon needs about as much time as other kids in his class to learn something new.	Dylan thinks he needs much more time than other kids in his class to learn something new.

What about you? Who are you more like when you have something new to learn?

Brandon **Dylan**

Explain if needed:

Do you need more time than others in your class to learn something new?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Simon and Benjamin are doing their homework. There are other kids playing outside.

Simon has difficulty getting his homework done. He keeps being distracted by the children playing outside.	Benjamin is not disturbed by the children playing outside.

What about you? Who are you more like when you're working and others are playing?

Simon **Benjamin**

Explain if needed:

Do you get easily distracted by noises while working?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The children are making masks in art class.

James cuts himself because he was working so fast.	Allan takes his time and gets finished.

What about you? Who are you more like when you are making crafts?

James **Allan**

Explain if needed:

Do you hurt yourself when you are in a hurry?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The children are supposed to answer questions the teacher puts on the board.

 	
Morgan thinks that other children in her class understand everything more quickly than she does.	Anja thinks that she understands everything as quickly as other children in her class.

What about you? Who are you more like when you have questions to answer?

Morgan **Anja**

Explain if needed:

Do you understand things about as quickly as other children in your class?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The kids are reading for homework.

 	
Katie is following the story easily and remembering what she read.	Misha reads some and then notices that she forgot what she just read.

What about you? Who are you more like when you are reading?

Katie **Misha**

Explain if needed:

Do you follow and understand what you read?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The children are at Bettina's birthday party. Bettina tells Erin and Kathy what presents she got. Other children next to them are speaking and laughing.

 	
Erin listens carefully and hears everything Bettina says.	Kathy is too distracted by the other kids and misses part of what Bettina says.

What about you? Who are you more like when there is a lot going on around you?

Erin **Kathy**

Explain if needed:

Are you able to listen to stories for a long time without being distracted?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

It's raining so Ruby and Mila can't go outside to play.

 	
Ruby is constantly on the move.	Mila entertains herself quietly.

What about you? Who are you more like when you have to stay inside?

Ruby **Mila**

Explain if needed:

Are you very active and energetic when you're at home inside?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The children are in class.

Myer frequently chats with his neighbor instead of paying attention.	Andreas rarely chats with his neighbor; he pays attention well.

What about you? Who are you more like when you are in class?

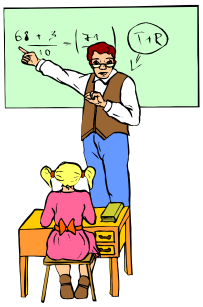
Myer **Andreas**

Explain if needed:

Are you able to keep from chatting with your neighbors in class?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The teacher writes some important information on the board and asks the children to write it down for tomorrow.



Jana notices right away and writes it down.	Valerie has been daydreaming and doesn't even notice she missed it.

What about you? Who are you more like when the teacher puts important information up?

Jana **Valerie**

Explain if needed:

Do you daydream and miss things happening around you?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

Patrick and Luke are doing work in the classroom. Patrick finishes before Luke.

Patrick needs about as much time as other kids to finish his work.	Luke needs much more time than other kids to finish his work.

What about you? Who are you more like when you have in-class work?

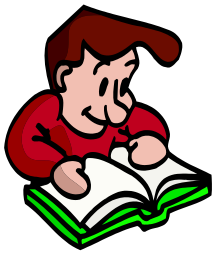
Patrick **Luke**

Explain if needed:

Do you need more time than others to finish your in-class work?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**

The teacher tells the students to listen to the lesson he's giving.



The teacher rarely has to tell Michael to pay attention.	The teacher has to tell David to pay attention a lot.

What about you? Who are you more like when you're asked to pay attention?

Michael **David**

Explain if needed:

Do teachers tell you to pay attention?

Almost Always **Quite Often** **Sometimes** **Rarely** **Almost Never**