DEVELOPING SELF-REGULATED LEARNING

WITH TIME MANAGEMENT AND

MINDFULNESS PRACTICE

Sean Kennedy Adcroft

BS, St. Bonaventure University, 1986
MLS, Long Island University, 1995

Mentor
Akane Zusho, PhD

Readers
Héfer Bembenutty, PhD
Rhonda S. Bondie, PhD

DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN
THE GRADUATE SCHOOL OF EDUCATION
OF FORDHAM UNIVERSITY

NEW YORK
2018

COPYRIGHT

ACKNOWLEDGEMENTS

I would like to acknowledge and thank the principal, faculty, and staff of the elementary school involved for their cooperation and generous contribution of time to this study.

I also would like to thank my family and friends for their encouragement, support, and patience during this process.

Finally, I thank the members of my committee, Dr. Héfer Bembenutty and Dr. Rhonda Bondie for their time and expertise. I especially owe a debt of gratitude to my mentor, Dr. Akane Zusho, whose ongoing guidance, encouragement and support over the past six years has made this accomplishment possible. Thank you Dr. Zusho for modeling the best qualities of a teacher - sincere concern for your students, a persistent pursuit of knowledge, and quiet & consistent encouragement that motivates students to fully develop as self-regulated learners and scholars!

DEDICATION

I dedicate this work to the many teachers and students that I have worked with over my lifetime. I thank all of you for helping my continued development as a self-regulated learner. Like many challenges in life, the dissertation process has been daunting at times, though not nearly as much as the health issues faced by my sister, Patrice. I thank her for her example of grit and determination and offer this whimsical advice to all who wonder how to move on in the face of seemingly insurmountable setbacks.

How do you eat an elephant?

One bite at a time.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

LIST OF TABLES

LIST OF TABLES (continued)

LIST OF FIGURES

Abstract

DEVELOPING SELF-REGULATED LEARNING

WITH TIME MANAGEMENT AND

MINDFULNESS PRACTICE

Sean Kennedy Adcroft, PhD

Fordham University, New York, 2018

Mentor
Akane Zusho, PhD

Students have always faced the challenge of focusing their wandering minds. Today, the ubiquitous presence of technology makes this task more difficult. This study sought to help students harness their attention in the face of distraction using Zimmerman's model of self-regulated learning (SRL), mindfulness practice, and the Pomodoro Technique for time management. Eighty-two fifth graders from a suburban elementary school in the Northeastern United States participated in one of four treatment conditions: SRL intervention, Mindfulness curriculum, both SRL and Mindfulness, or neither. Using a pre- /post-intervention design, students completed surveys measuring their level of SRL and perceived stress. Three sub-tests measuring sustained attention were also completed before and after the interventions. It was hypothesized that the SRL intervention would increase students' reported SRL skills, while those in the mindfulness class would report decreased stress and improved sustained attention. Believing that stress can have a moderating effect on SRL, it was believed that students in the SRL and mindfulness class would experience both benefits. Statistical analysis did not support these hypotheses. Limitations of this study as well as possible further research are explored.

CHAPTER I

THE PROBLEM

"The faculty of voluntarily bringing back a wandering attention over and over again is the very root of judgment, character, and will.…An education which should improve this faculty would be *the* education *par excellence*." (James, 1920, p. 228)

Introduction and Statement of the Problem

I begin with a problem faced by students of all ages: channeling one's energy, motivation, and actions to learn despite distractions (internal and external), competing desires, anxiety, or other obstacles. Research indicates that a wandering mind is part of our nature, (Killingsworth & Gilbert, 2010; Mason et al., 2007; Smallwood, 2013). Therefore, as James (1992) wisely observed, the process of bringing our attention back to focus on a specific task is central to education. Today, the number and variety of distractions students face are greater than ever. Technology has greatly increased the availability of distractions which can be consciously sought with the click of a button or imposed upon us through a network of connections that seem beyond our control.

Public schools have seen tremendous changes in their use of computer technology in the past twenty years (De Bruyckere, Kirschner, & Hulshof, 2016). The presence of technology in schools has grown from shared computer labs to placing interactive displays in every classroom, to 1:1 initiatives that assign a computing device to each student. Although some extol the promise of technology for education, others enumerate its pitfalls including cyberbullying, information overload, and the constant distraction it offers (Carter, Greenberg, & Walker, 2017; Mueller & Oppenheimer, 2014; Yamamoto, 2007).

In recent years, there have been dozens of articles and books published on a growing number of negative technological side effects including an over reliance on the internet rendering our brains incapable of deep thought or sustained attention (Carr, 2008; 2011), the constant use of smartphones crippling students' social skills (Turkle, 2013; 2016), and our "always on" connectivity increasing daily stress (American Psychology Association, 2017). Attempts to limit one's exposure to technology are complicated by its increasingly embedded presence in our daily lives as desktops give way to laptops, which give way to tablets, which give way to smartphones, ad infinitum. Rather than try to rid students of access to technology, I believe that we must help students to use technology effectively—including managing its potential to distract.

The current study explored whether two variables might help students to harness students' attention by developing their self-regulated learning skills. One variable was instructing students in a series of mindfulness awareness practices (MAPs), the other was teaching students to use a time management method known as the *Pomodoro Technique*. This chapter will first present current definitions of mindfulness from both Western and Eastern perspectives. The chapter then reviews the framework of self-regulated learning and how MAPs might reinforce students' development as self-regulated learners. The chapter concludes with an explanation of the Pomodoro Technique and the study's research questions.

Focusing Attention in a Distracted World

Mindfulness—East and West

Carmody (2014) noted two branches of mindfulness: one Western, born out of social psychology and the work of Ellen Langer (Langer, 2014); the other Eastern with its origins in Buddhism and adapted for secular use by Jon Kabat-Zinn (Kabat-Zinn, 2005). The chief similarities between these schools of mindfulness are their goals to increase present moment

awareness, develop an open and curious attitude, and increase one's ability to break free of preconceived ideas (Carmody, 2014).

Originally, Langer came to study mindfulness after studying "mindlessness." Langer defined mindlessness as "an inactive state of mind characterized by reliance on distinctions drawn in the past" (2014, p. 11). Langer's research on mindlessness has shown its presence to be ubiquitous. Langer cites a person pumping antilock brakes as an example of mindless behavior since it is based on an understanding of automobile braking prior to the development of newer, antilock braking technology. Langer also conducted multiple studies that evince mindlessness such as over-reliance on global positioning systems (GPS), (Chung, Pagnini, & Langer, 2016); unquestioning obedience to authorities (Chanowitz & Langer, 1981); and a rigid understanding that fails to see novel application of previously presented information (Langer & Piper, 1987).

Langer went on to study mindfulness as the flip side of the mindlessness coin. Langer defines mindfulness as "an active state of mind characterized by novel distinction drawing" (2014, p. 11). Langer (2014) lists three results of mindfulness: present moment awareness, sensitivity to context and perspective, and observing rules as guidelines rather than rigid commandments. Langer believes mindfulness can be developed through intellectual practices that promote active differentiation and flexible understanding.

The Eastern understanding of mindfulness traces its roots over millennia to Buddhism and the Pali word "sati" which can be defined as either "mindfulness" or "awareness" (Carmody, 2014, p. 50). This Eastern understanding of mindfulness stresses non-judgmental attention to the present moment (Kabat-Zinn, 2011). Central to Eastern understandings of mindfulness is the importance of regular meditation. Cullen (2011) credits Kabat-Zinn with developing a secularized form of Eastern mindfulness known as mindfulness-based stress reduction (MBSR).

MBSR is a manualized, eight-week program that requires regular meditation practice and was originally offered to patients suffering from chronic pain but is now available to healthy populations as well (Brown, Ryan & Creswell, 2007). Kabat-Zinn defines mindfulness as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (2005, p. 4).

Despite differences between the Eastern and Western concepts of mindfulness Ie, Ngnoumen and Langer maintain that "the degree of similarities between the two significantly outweighs their differences" (2014, p. 3). Brown and Ryan's description of mindfulness as "an enhanced attention to and awareness of current experience or present reality." (2003, p. 822) fits both the Eastern and Western paradigms.

Mindfulness as an Educational Intervention

Once confined in the United States to an esoteric few, mindfulness has become increasingly mainstream. The number of books and articles written in the United States about mindfulness has grown from fewer than 80 in 1990 to over 600 in 2006 (Brown et al., 2007, p. 211). The growth in scientific articles published on the topic of mindfulness rose from fewer than 25 in 1970 to over 32,000 in 2015 (Van Dam et al., 2017, p. 67).

Mindfulness programs have continued to propagate since the success of Kabat-Zinn's MBSR program. Segal, Williams, and Teasdale (2013) built upon the MBSR program in developing a maintenance program for persons recovering from depression. As the program evolved, mindfulness practice became central to it; therefore, they named their new program Mindfulness-Based Cognitive Therapy (MBCT). In addition to successfully preventing recurrence of depression (Kuyken et al, 2008), the MBCT program has been shown to be effective in diminishing anxiety (Mathew, Whitford, Kenny & Denson, 2010) and reducing

emotional volatility (Arch & Craske, 2006). Semple, Lee, Rosa, and Miller (2010) modified the MBCT program for use with children aged 9- 3 dubbing it MBCT-C. Semple et al. (2010) found that students who participated in a twelve-week MBCT-C program experienced decreased anxiety and fewer behavior problems.

The success of these programs spurred interest in the possibility of developing programs for teaching school aged children the basics of mindfulness practice (Ergas, 2014). Several programs have been developed in the United States including the Hawn Foundation's "MindUp" program, which incorporates mindfulness practice and social and emotional learning (SEL) into a 15-week curricula for students in pre-kindergarten through grade eight; "Mindful Schools", which offers a 12-week program for students in grades kindergarten through twelve; and "Inner Kids", which also offers resources for mindfulness training to students in kindergarten through twelfth grade (Ryan, 2012).

The investigation of how MAPs might be taught in school settings is not isolated to the United States. In the United Kingdom, two English high school teachers, Burnett and Cullen, developed the Mindfulness in Schools Project (MiSP). MiSP is a nine-week mindfulness curriculum based largely on MBSR and MBCT (Jones, 2014). Burnett and Cullen dubbed their original curriculum *.b*; shorthand for "stop, breathe and be" (Kuyken et al., 2013, p. 4). Initial research on the .b curriculum has shown a high level of student acceptance of the program and reductions in student stress and depressive episodes (Kuyken et al., 2013). MiSP has released a second version of its curriculum for elementary aged students under the name *Paws b*.

Each of these curricula teach students simple practices that develop one's ability to pay sustained attention to something with equanimity (Bishop et al., 2004; Desbordes et al., 2015). Common practices include breath awareness, body scans, and mindful eating. Breath awareness

focuses on one's own breath as the object of non-judgmental, sustained attention; whereas a body scan moves attention from head to foot observing the sensations felt in each area (Cullen, 2011). A mindful eating exercise guides a person through the examination of a raisin or piece of chocolate. Participants use several senses to experience the item of food, beginning with a visual inspection, then smelling the item, next, feeling its texture with the fingers, then placing it on the tongue, and, finally, appreciating the taste as it dissolves in the mouth.

Unlike much recent research (Weare, 2013), the current study differs in that it does not simply advocate the use of MAPs on their own but as a larger part of introducing students to a mindful approach to learning. Langer (2016) maintains that a mindful approach to learning promotes greater creativity regarding use of the learned information.

The International Baccalaureate program lists five approaches to learning: thinking skills, research skills, communication skills, social skills and self-management skills. Some IB schools have begun offering mindfulness classes under the self-management category which they note contains, "both organisational skills, such as managing time and tasks, and affective skills, such as managing state of mind and motivation" (International Baccalaureate Organization, 2017). The IB also notes that these five categories are designed to "empower IB students of all ages to become self-regulated learners" (p. 7). Zimmerman (1998) describes self-regulated learners as those students who make "proactive efforts to learn on their own" (p. 73).

Self-Regulated Learning (SRL)

Self-regulated learning (SRL) is a well-researched framework that explains the cognitive, metacognitive, and motivational toolset used by many successful students to plan, perform, and reflect on learning tasks (Pintrich, 2000; Zimmerman, 1990). SRL has been researched for over forty years by scores of researchers (Schunk, 2013; Zimmerman, 2013). One of SRL's strengths

is its wide theoretical base. Zimmerman and Schunk (2008) summarized how SRL can be seen through the lenses of multiple educational theories including operant, phenomenological, information processing, social constructivist, volitional, Vygotskian, and social cognitive.

Although each of the theories has its strengths and challenges, I gravitate toward social cognitive theory's (SCT) emphasis on the agency of the learner (Zimmerman, Schunk, & DiBenedetto, 2017). SCT believes that all persons play an active role in their own learning by observing others in social contexts. This active role resonates with Langer's representation of mindful learning characterized by "the continuous creation of new categories, openness to new information, and an implicit awareness of more than one perspective" (Langer, 2016, p. 4).

Bandura, a seminal social cognitive theorist, (2006; 2012) enumerated four key properties of human agency: intentionality, forethought, self-reactiveness and self-reflectiveness. Bandura (2012) observed that people develop intentions and then plan to achieve them. He also noted that people set goals and motivate their actions through the process of forethought. Further, people regulate their actions by being self-reactive: altering their behavior to comply with goals, values and personal standards. Finally, people reflect on their thoughts and actions and make changes as necessary to reach goals or ideals.

These four key properties are closely paralleled in the SRL model of one of Bandura's colleagues, Dr. Barry Zimmerman. Zimmerman's (1990) model of SRL depicts three cyclical phases—forethought, performance, and self-reflection—each consisting of several subprocesses (see Figure 1). In Zimmerman's model, self-regulated learners analyze the task at hand, motivate themselves to work on this task, set a goal, select appropriate cognitive strategies, monitor their progress toward their goal, adjust their actions as needed, evaluate their completed work and incorporate what they have learned about both product and process when approaching

future tasks (Zimmerman, 2002a). Since each learning experience influences the next Zimmerman notes that the cycle acts as a feedback loop (Zimmerman, 2000).

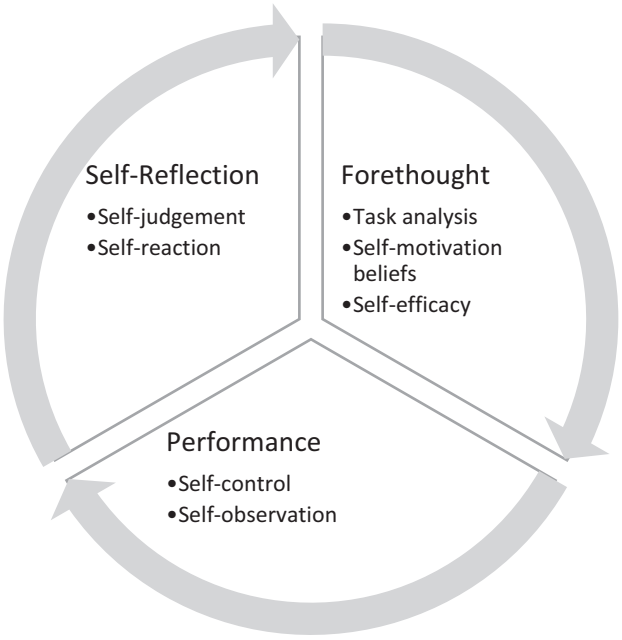

Figure 1. Phases and Processes of Self-Regulated Learning

The SRL process is cyclical in that the self-reflection that concludes one iteration of SRL influences the next iteration of the forethought phase. Adapted with permission (see Appendix A) from Zimmerman (2002b, p. 67).

Zimmerman names different processes within each of these three phases. The forethought phase consists of task analysis, self-motivation, and self-efficacy. During the performance phase one practices self-control to stay on task and self-observation to determine progress toward one's goal and self-judgment to evaluate the results of one's work. These are followed by a student's self-reaction to their efforts. They may be satisfied with their work, thereby increasing the likelihood that they will engage in similar tasks in the future. Conversely, they may react negatively to their work, feeling that they are inherently incapable, and may engage in defensive strategies like procrastination, apathy or task avoidance in the future (Zimmerman, 2002b).

The theoretical framework of self-regulated learning (SRL) provides a well-established model that accounts for how students successfully reach learning goals (Zimmerman & Schunk, 2008). I believe that students can learn to use this framework, along with other cognitive and metacognitive tools, to effectively use technology while managing its potential to distract. My research sought to measure the impacts on SRL of two such tools: mindfulness awareness practices (MAPs) and a time management process known as the Pomodoro Technique.

Time Management and SRL

Among the forethought skills enumerated by Zimmerman, Bonner and Kovach (1996) is time management. Claessens, van Eerde, Rutte, and Roe offered the following definition of time management based upon their review of the literature, "behaviors that aim at achieving an effective use of time while performing certain goal-directed activities." (2007, p. 262).

During my capstone research project, I used a time management process, known as the Pomodoro Technique, with students to help them complete their homework assignments. The Pomodoro Technique organizes time into focused work periods which are typically 25 minutes long. Each work period is followed by a short, five-minute break. Every four work periods are rewarded with a longer break of 15–30 minutes. Cirillo (2013) developed the technique using a kitchen timer shaped like a tomato or *pomodoro* in his native Italian. Cirillo also enumerated five stages for his technique: planning, tracking, recording, processing, and visualizing. I will detail how these stages overlap with Zimmmerman's (1989) three phase SRL model.

Most students that I have taught to use the Pomodoro Technique have found its method of limiting homework to acceptably finite units of time a great help in overcoming their procrastination around the task. They have also found it to be a helpful way of managing their

use of technology while doing schoolwork. Cell phones are turned off during each work period (pomodoro) and can be turned back on during short and long breaks.

Mindfulness and SRL

It is my contention that mindfulness practices can help develop SRL skills. Brown et al. (2007) report that mindfulness helps to develop nonjudgmental self-observation while Jha, Krompinger and Baime (2007) note mindfulness improves sustained attention; both of which play important roles in SRL. Zelazo and Lyons (2012) argue that mindfulness helps develop SRL by assisting brain function in the prefrontal cortex and the amygdala, referring to this as top down and bottom up processes respectively. Self-monitoring is considered a top down process since it requires self-awareness and sustained attention both of which take place in the prefrontal cortex. Stress may have a negative impact on SRL from the bottom up since it takes place in the amygdala. MAPs may improve SRL from the top down by improving sustained attention. MAPS may also improve SRL from the bottom up by reducing rumination and stress (Zelazo & Lyons, 2012). I believe that MAPs may aid in the performance of specific SRL subprocesses during each of Zimmerman's three phases (forethought, performance, and self-reflection).

Looking again at Zimmerman's SRL model, one can see how decreased stress, sustained attention and objective reflection could assist in the forethought, performance, and self-reflection phases. Bandura (1982) and Schunk and Pajares (2009) noted that self-efficacy is negatively influenced by stress. Reduced stress should aid the subprocesses of self-efficacy and motivation in the forethought phase. During the performance phase, improved sustained attention should improve student's ability to remain on task. Lastly, a key component of mindfulness is non-judgmental observation (Kabat-Zinn, 2011). I reasoned that such increased objectivity

should help students more accurately judge and adaptively respond to the results of their work during the self-reflection phase of SRL (Zimmerman, 2002b).

Over the past three decades several SRL interventions have been designed and implemented at multiple grade levels (Dignath & Büttner, 2008). More recently, several curriculums have been developed for teaching mindfulness to students in grades K-12 (Zoogman, Goldberg, Hoyt, & Miller, 2014). The purpose of the present study was to investigate if MAPs would, in fact, have a positive impact on students' SRL.

Summary

The mind is naturally prone to distraction (Mrazek, Smallwood, & Schooler, 2012). There is reason to believe that mindfulness practice may reduce the mind's tendency to wander (MacLean et. al., 2010) and support key SRL processes (Zelazo & Lyons, 2012). SRL skills empower students to become independent learners by teaching them how to marshal their cognitive, metacognitive, and behavioral resources to reach their goals. The theoretical framework of self-regulated learning (SRL) was selected as it offers a clear conceptual model of the processes used by successful learners (Brydges et al., 2015; Schober et al., 2007).

Ramdass and Zimmerman (2011) and Bembenutty (2011) have reported that homework offers an excellent forum for developing SRL skills as it offers regular independent learning practice. Two impediments to homework are procrastination and stress (Katz, Eilot, & Nevo, 2014; Katz, Buzukashvili, & Feingold, 2012).

A time-honored practice for overcoming procrastination is breaking a project into smaller, more manageable components (Zahariades, 2017). Cirillo (2013) developed a method of approaching work in incremental units of time with short breaks in between. Since he used kitchen timers shaped like tomatoes to measure these work periods, he named his method the

Pomodoro Technique as pomodoro is Italian for tomato. Having had prior success in using this technique with elementary aged students in after school homework clubs, it is my contention that it might be helpful in the current study.

The second impediment, homework related stress, has been reported by both students and parents (MetLife, 2007). Brown, Nobiling, Teufel and Birch (2011) report that stress reduction is one of the benefits of mindfulness awareness practices (MAPs) in adults, adolescents and children. Additionally, mindfulness has also been shown to increase sustained attention and improve nonjudgmental self-observation (Bishop et al., 2004). As noted earlier sustained attention and nonjudgmental self-observation would benefit students in the performance and self-reflection phases of SRL.

Segal et al., (2013) point out that consistent mindfulness practice is a necessary component of effective MAP programs. It was believed that an online tool for scaffolding SRL and MAPs may have a positive impact on student SRL. A concept map (see Figure 2) was created to envision the possible relations among relevant elements. Due to the size of the current study, the relationships cannot be measured using regression analysis. However, future studies with sufficient numbers of participants may wish to do such analysis.

Four classes of fifth graders were randomly assigned to one of three experimental conditions or a control condition. I delivered eight lessons of the Paws b mindfulness curriculum which was developed and is widely used in the United Kingdom (Mindfulness All-party Parliamentary Group, 2015). I met with students in condition two six times for instruction, introducing them to Zimmerman's three phase model of SRL and how to use an SRL homework diary like that of Schmitz and Perels (2011). This diary scaffolded Zimmerman's three phase model of SRL by asking guiding questions such as is they had set goals for their work or if they

felt satisfied with their work. I delivered ten lessons to students in condition three who received both interventions. The remaining class acted as a control with no intervention.

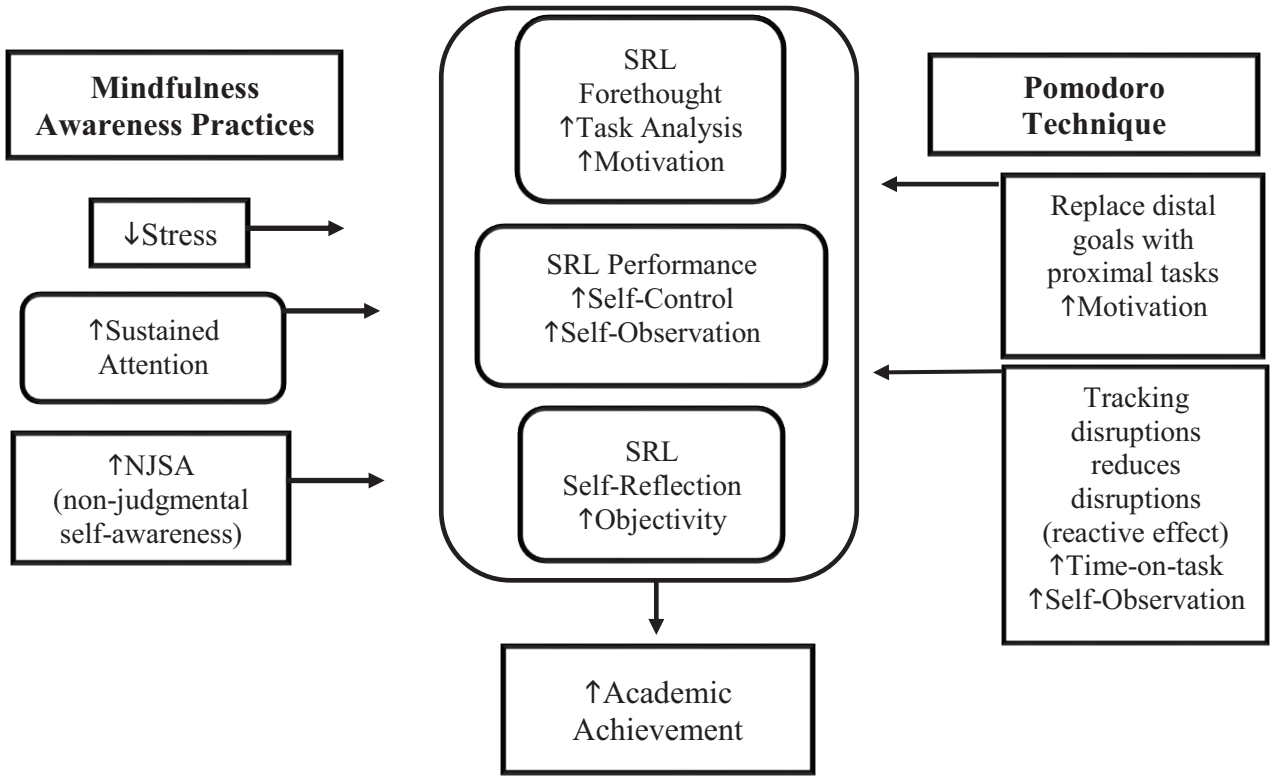

Figure 2. Concept Map of the Interactions Among Mindfulness Practice, Zimmerman's SRL Cycle and the Pomodoro Technique.

Research Questions

The general research questions for this study investigate whether the Paws b curriculum has an impact on student anxiety levels. Does use of the SRLD impact students SRL or procrastination? Does the use of both the SRLD and the Paws b MAPs have an interaction effect on the various dependent variables?

The five research questions can be stated as follows:

1. Does a MAP prior to HW impact students' SRL state during homework sessions?
2. Does the continued use of MAPs impact students' SRL as a trait over time?

3. Does the continued use of MAPs impact students reported stress over time?
4. Does the continued use of MAPs impact students' attention over time?
5. Does the use of both MAP and SRLD impact SRL, reported stress or sustained attention, over time?

The above research questions will be subjected to analysis via the following null hypotheses:

1. The practice of mindfulness prior to HW does not impact students' SRL state during homework sessions.
2. The use of the SRLD does not impact students' use of SRL subprocesses over time.
3. The Paws b MAP curriculum does not impact students' reported stress over time.
4. The Paws b MAP curriculum does not impact students' sustained attention over time. The continued use of the SRLD does not impact students' attention over time.
5. There is no interaction effect between the continued use of both MAPs and SRLD on students' SRL, reported stress, or attention over time.

CHAPTER II

REVIEW OF RELATED LITERATURE

> The first thing I want to say to you who are students, is that you cannot afford to think of being here to receive an education: you will do much better to think of being here to claim one. (Rich, 2005)

Introduction

In her 1977 convocation address at Douglas College, Adrienne Rich explained that students' education would depend on their active participation (Rich, 2005). *Flipped classroom* models, where students are asked to watch a prerecorded lecture in preparation for class, are one current example of how students must be active participants in their education (Butzler, 2016; Moos & Bonde, 2015). Ramdass and Zimmerman (2011) have posited that the regular practice of homework is another such example. Moreover, the need to learn does not end with the completion of formal studies; a fact recognized by the United Nations with its naming "lifelong learning" as one of its millennium development goals (United Nations' Secretary General, 2015).

Educators must equip students with the skills to learn on their own. As Toffler (1970) noted, "Tomorrow's illiterate will not be the man who can't read; he will be the man who has not learned how to learn." (p. 414). Schober et al. have noted that preparing students to be lifelong learners requires the "skills associated with self-regulated learning" (2007, p. 184). Self-regulated learning (SRL) is a theoretical framework that describes the key processes and subprocesses by which successful learners manage their cognitive, metacognitive, and behavioral approaches to learning (Zimmerman, 1986). There has been a great deal of research on SRL since it was the topic of a symposium at the 1986 American Educational Research Association's annual meeting (Zimmerman, 1989; Zimmerman & Labuhn, 2012).

Zimmerman (2000) has pointed out that SRL depends upon one's ability to focus attention during each of three phases of a learning cycle: forethought, performance and self-reflection. Each of these phases requires the learner to attend to different aspects of the learning process. Attention has long been seen as a key component in learning and research has shown a connection between sustained attention and academic achievement (Preston, Heaton, McCann, & Watson, 2009). One of the increasing challenges faced by all learners is maintaining focus amidst a sea of distractions provided and imposed upon us by our technologically connected world (Wang & Tchernev, 2012). Kabat-Zinn (2011) has defined mindfulness as a process of attending to the present moment without judgment. Several studies have shown that repeated mindfulness practice improves attention (Baijal, Jha, Kiyonaga, Singh, & Srinivasan, 2011; Jha et al., 2007; Sanger & Dorjee, 2016). It stands to reason, therefore, that mindfulness practice may improve SRL.

Time management has also been cited as an integral skill within SRL (Zimmerman, 2002a). Zimmerman et al. noted that the efficient and effective use of time could "bolster learning and perceptions of self-efficacy" (1996, p. 25). These researchers further believed that by increasing students' awareness of how they spend schoolwork time, teachers could help them assume more overall regulation of their learning. The current study's "Self-Regulated Learning Diary" (SRLD) was, in part, modeled after Zimmerman et al.'s, (1996) "Study Time Self-Monitoring Form". The SRLD also incorporated aspects of Cirillo's (2013) "Pomodoro Technique", explained in detail later in this literature review.

Overview of the Chapter

In this literature review I will expound upon the main concepts and rationale for this study as laid out in chapter one. First, a definition of self-regulated learning (SRL) will be given

through the lens of social cognitive theory (SCT) as well as a description of Zimmerman's social cognitive model of the SRL process. Next, a review of Western and Eastern definitions of mindfulness will be provided as well as how mindfulness programs have come to be introduced into public school classrooms. Then, the ways in which mindfulness complements the SRL theoretical framework will be elucidated citing studies showing how mindfulness awareness practices (MAPs) may positively impact specific SRL processes and subprocesses. Finally, Cirillo's (2013) Pomodoro Technique time management method will be described noting how it can be used as a structure to support the development of SRL and mindfulness.

Self-Regulated Learning

Self-regulated learning (SRL) is a construct that has been studied for over thirty years (Schunk, 2013). Seeking to describe an effective learning process used by successful students, SRL has had many definitions suggested and several models proposed. Reviewing the field of SRL Boekaerts, Pintrich, and Zeidner stated that in general, "authorities view self-regulation as a systematic process of human behavior that involves setting personal goals and steering behavior toward the achievement of established goals." (2000, p. 751).

Initially, self-regulation was used to describe attempts by students with learning or emotional disabilities to keep their emotions and/or behaviors under control (Zimmerman, 2012). As researchers saw the framework could apply to all learners, they began to elaborate on the components involved. Beginning in the mid 1980's, with research growing out of Albert Bandura's work, the SRL framework sought to describe the various phenomenon involved in learning (Schunk & Usher, 2013).

One milestone in the history of SRL is the 1986 American Educational Research Association's annual conference where Zimmerman hosted a symposium titled, "Development

of self-regulated learning: Which are the key subprocesses" (Zimmerman, 1986). In his article introducing a special issue of *Contemporary Educational Psychology* following the symposium, Zimmerman stated that SRL theorists "view students as metacognitively, motivationally, and behaviorally active participants in their own learning process" (Zimmerman, 1986, p. 308). Over the years theorists have continued to investigate these core aspects of SRL—that students are agents of their own learning and that it is through metacognition, motivation, and behavior, that they self-regulate that learning (Azevedo & Hadwin, 2005; Bembenutty, White, & DiBenedetto, 2016; Kitsantas, Dabbagh, Hiller, & Mandell, 2015; Pintrich & Zusho, 2002).

Various models of SRL grew out of the various psychological schools of thought – behaviorism, phenomenology, information processing, and social cognitive theory (SCT). Despite nuances in definitions promulgated by these schools of educational and psychological research, there are several commonly held beliefs about SRL. Zimmerman (1990) enumerated three common features of SRL: 1) the dependence on feedback loops to gauge learning progress, 2) the interdependent nature of learning and motivation and 3) the use of metacognitive, cognitive and behavioral strategies.

Sitzmann and Ely echo the importance of this last point in their meta-analysis of research definitions of SRL stating that SRL "refers to the modulation of affective, cognitive, and behavioral processes throughout a learning experience to reach a desired level of achievement" (2011, p. 421). This is very close to Albert Bandura's (1989) description of the *triadic reciprocal causation* of SRL. Bandura held that a person contributes to her/his own motivation and action within a system of three dimensions - personal (e.g. affect and cognition), behavioral and environmental (Bandura, 1989).

These three dimensions affect each other, and are affected by each other reciprocally — hence, triadic reciprocal causation (Bandura, 1989). As students attempt to learn, they may regulate their environment by selecting a location free of distractions with all necessary supplies at the ready. This choice of a quiet work place impacts the personal dimension of cognition as it allows an easier implementation of learning strategies - such as repetition, elaboration, or categorization - than a noisy environment might. If a specific behavior, such as creating a chart to organize her/his thinking leads to greater learning, it may, in turn, positively impact another personal dimension, affect, as students enjoy an increase in self-efficacy because of her/his growing mastery of the material (Zimmerman & Bandura, 1994). The current study uses SCT's view of SRL due to the primary role it assigns human agency in the learning process (Bandura, 1986; 2006) and connections of agency to mindfulness practice (McCloskey, 2015; Rechtschaffen, 2014).

Social Cognitive Theory and SRL

Agency is defined as a person's ability to intentionally impact their own life circumstances (Bandura, 2006). Bandura (1989) described three views of agency: mechanistic, autonomous, and emergent reciprocal. A purely mechanistic view of agency sees one's environment as dictating their actions, leaving no room for volition. An autonomous view of agency takes the other extreme portraying humans as completely free agents with their environment having no influence on their actions. SCT holds the view that humans are neither without any choice nor completely autonomous. Rather, humans live within societies that impact and are impacted by each person. Bandura referred to this type of agency as *emergent reciprocal agency* (1989). Such a view of a person's ability to act on their own behalf acknowledges the impact of internal and external forces. As stated earlier, Bandura

acknowledged that intrapersonal, behavioral and environmental forces influence one's choices; referring to this as triadic reciprocal causation (1986; 1989).

Bandura (2006) named four core properties of human agency: *intentionality, forethought, self-reactiveness* and *self-reflectiveness*. Each of these properties is used in sequence as one enacts their agency in the world. Bandura defined intention as "the determination to perform certain activities or to bring about a certain future state of affairs" (1986, p. 467). He noted that intentionality guides and sustains behavior (1986). Forethought is used to envision a future that we hope to bring about. We exercise forethought as a means of motivating ourselves to act upon our plans. Humans practice self-reaction/regulation to put plans into action. Lastly, people are self-reflective, reviewing goals, actions and outcomes, and adjusting as needed to accomplish their goals. Similar core properties of mindfulness meditation will be elucidated later in this chapter. Bandura's core properties of human agency are seen clearly in Zimmerman's (2002b) three-phase model of SRL (see Figure 1).

Zimmerman's Three-Phase Model of SRL

Zimmerman developed a model of SRL that depicts it as a cyclical process consisting of three main phases and several subprocesses recurring in each phase (see Figure 3). Zimmerman (1990) named these phases: *forethought, performance,* and *self-reflection*, each of which is described in detail below. The model assumes that variables within each phase are related and that variables may influence each other across phases (Zimmerman, 2008). Past research has demonstrated that the forethought variables self-efficacy and goal setting were positively correlated with each other during writing assignments (Zimmerman & Bandura, 1994). Zimmerman and Kitsantas (1997) provided evidence that strategic plans used in the performance-phase are causally related to outcome attributions and feelings of satisfaction in the

self-reflection phase. Zimmerman and Kitsantas (1999) also showed that feelings of self-satisfaction during the self-reflection phase were predictive of forethought phase self-efficacy and task interest.

This study posits that some sub-processes within Zimmerman's three phases of SRL may be improved through regular practice of mindfulness meditation. The specific sub-processes that might be so affected are identified in the descriptions of each phase that follow. The reasoning of why mindfulness meditation might aid these specific sub-processes will be elaborated on in the sections on mindfulness below.

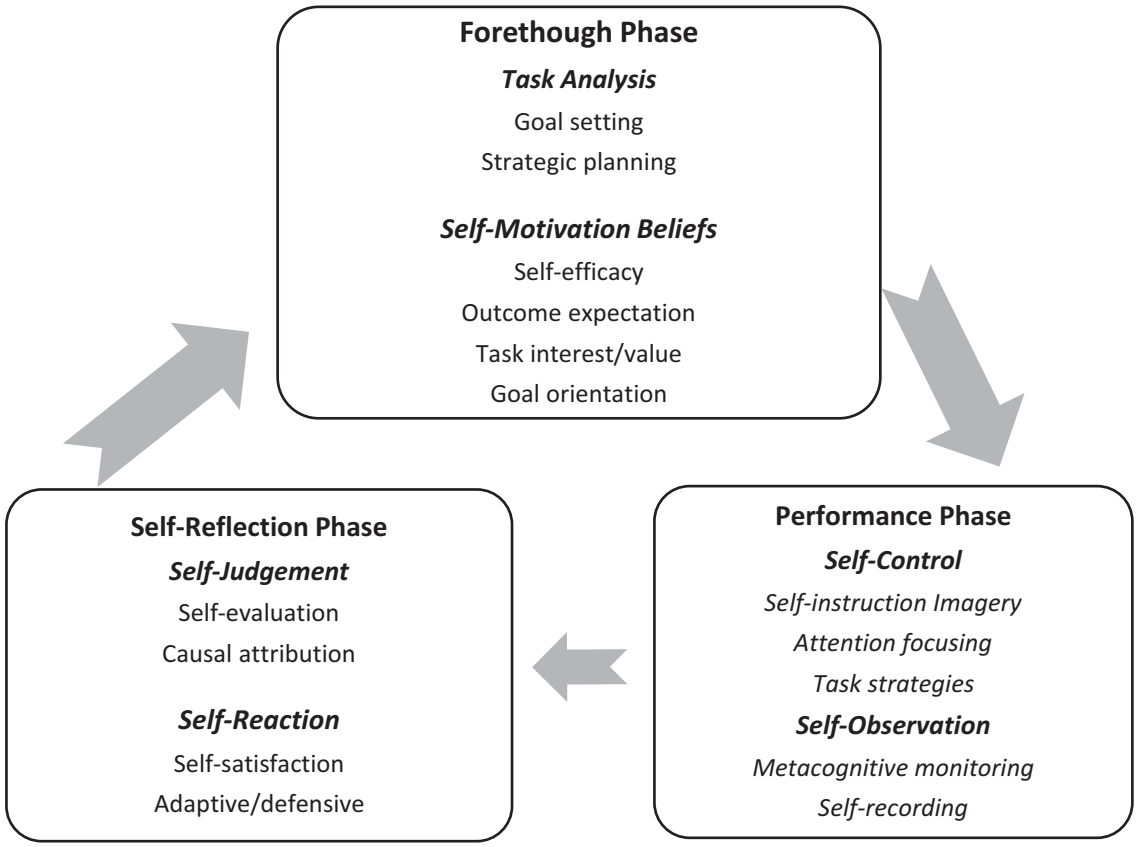

Figure 3. Phases, Processes, and Subprocesses of Self-regulated Learning.

The SRL process is cyclical in that the self-reflection that concludes one iteration of SRL influences the next iteration of the forethought phase. Adapted with permission from Zimmerman (2002b, p. 67).

Zimmerman (2012) noted the importance of two key qualitative dimensions to self-regulation: *proactive* and *reactive learning.* He explained that proactive learners emphasized the forethought stage of learning while reactive learners emphasize the self-reflective phase of learning. This is akin to the adage that a "stitch in time may save nine" (Fuller & Ramsay, 1819). Differences between how a proactive and reactive learner approach each phase of the SRL cycle are included in the descriptions of each phase below.

Forethought. The forethought phase is where the pupil first engages a learning task. Here the successful student utilizes task analysis by setting goals and using strategic planning to determine the best approach for the assignment at hand (Zimmerman, 2002b). Schunk (2001) reported that proactive learners set more specific, challenging, and proximal goals than reactive learners. According to Schunk (2001), the results of such proactive strategic planning were increased motivation and achievement. Self-motivation beliefs are also part of the forethought phase (Zimmerman, 2002b). A person's motivation to engage in a learning task is impacted by several components including *outcome expectations, task value, goal orientation,* and *self-efficacy* (Zimmerman, 2008). Outcome expectations indicate how likely a learner feels that a task's completion will result in a desired outcome—such as making the dean's list. According to Zimmerman (2012) proactive learners hold more optimistic outcome expectations. Task value indicates the level of importance the task holds for the learner. The greater the value the learner believes a task to have, the more motivated a learner will be when facing it. If a learner feels an assignment is merely "busy work" she/he will be less motivated to engage in it (Pintrich, 2004). Goal orientation theory holds that learners have either an external, performance goal orientation or an internal, mastery orientation. A performance orientation draws motivation from external acknowledgements of learning such as grades or praise. A mastery orientation, on the other

hand, is motivated by an internal joy in learning for learnings' sake (Pintrich, 2000). Zusho and Edwards note that a mastery orientation usually accompanies SRL, noting "an almost one-to-one correspondence exists between SRL and mastery [goal orientation]" (2011, p. 26).

Lastly, self-efficacy indicates a learner's belief in her/his capability to successfully perform a task (Bandura, 1982). Research has shown that self-efficacy is context specific—a person with a high self-efficacy for her/his mathematical ability may or may not have an equally high self-efficacy for her/his ability to write well (Schunk & Pajares, 2009). Research has also shown that self-efficacy impacts a learner's willingness to begin a task as well as to persevere when confronted by obstacles or setbacks (Schunk & Usher, 2013). Proactive learners have reported higher levels of self-efficacy than reactive learners (Zimmerman & Bandura, 1994).

Performance. The performance phase of Zimmerman's SRL model includes the major processes of *self-control* and *self-observation*. During this phase the learner focusses her/his attention on the task at hand and enacts the task strategy that she/he had decided upon in the forethought stage. The process of self-control may involve several sub-processes such as time management, imagery, self-instruction, task strategies and attention focusing (Zimmerman, 2002a). She/he may use imagery to help guide themselves in the performance of the task (as an athlete might first imagine sinking a free throw immediately before releasing the ball) or they might utilize self-instruction—reminding themselves of the steps in a process: inhale, focus on the back rim, exhale, release the shot, follow through (Zimmerman & Kitsantas, 1997). Students may learn task strategies from teachers, friends or parents (Gonzalez-DeHass & Willems, 2016). Strategies may be subject specific, such as using a period of free writing when beginning a new assignment to help overcome writer's block, or more general, such as a student beginning their homework with the subject they find most challenging. Attention focusing is a sub-process that

learners do repeatedly as they attempt to sustain their attention on the work at hand. Attention focusing may be aided by choosing a location free of distraction and is one of the sub-processes that prior research has shown to benefit from mindfulness practice (Baird, Mrazek, Phillips, & Schooler, 2014; Mrazek et al., 2013, 2014).

Self-observation is used throughout the performance stage to help the learner know if they are progressing toward their established goals (Zimmerman, 1989). Sub-processes of self-observation include *self-experimentation* and *self-monitoring* (Zimmerman, 2000). A student engages in self-experimentation when they compare their results using different study methods, such as working alone vs working with a friend. One example of self-monitoring is offered by Zimmerman, Bonner and Kovach (1996) who encouraged students to self-record the start and finish time of study sessions to gain a more accurate understanding of total study time. This is also an example of instilling time management. Proactive students are more likely to engage in such systematic forms of self-observation as recording their behavior in such logs.

Self-observation is another of the SRL sub-processes that this study proposed might be improved by mindfulness meditation practice. Eastern mindfulness practices often consist of nonjudgmental self-observation (Bishop et al., 2004; Miller, Fletcher, & Kabat-Zinn, 1995), as will be elaborated on below.

Self-Reflection. The final stage of Zimmerman's SRL cycle is when a learner takes stock of the activity they have just completed using the processes of *self-judgment* and *self-reaction* (Bandura, 1986). One form of self-judgment is self-evaluation, a sub-process where a learner compares their own work to an established standard to see if they fell short, met, or exceeded the standard. Proactive learners regularly judge their results by comparing them with goals set during the forethought phase. Reactive learners, on the other often have not set

learning goals and so are left to judge their results by comparing them with peers which can have a negative impact on future efforts (Zimmerman, 2012).

Another sub-process of self-judgment is causal attribution. Causal attribution theory notes that humans seek to determine the cause of perceived successes or failures along three dimensions: locus, stability, and control (Weiner, 2014). Locus of causality is determined on an internal/external spectrum. The cause of failure or success may be internal to a person, as when a learner acknowledges a failure to prepare for an exam, or external, should the test be perceived as biased and unfair. Causal stability describes whether a cause is viewed as stable/permanent or unstable and changeable. For example, height may be gauged to be a fairly stable cause for lack of certain basketball ability; however, with practice, foul shooting ability may improve. Finally, causal control has overlap with both locus and stability. A controllable cause is one which a person may change, while an uncontrollable cause (e.g., the weather) lies outside the power of the agent (Weiner, 2014).

During the causal attribution sub-process the learner looks to assign the reason for her/his success or failure (Zimmerman, 2000). They may judge an outcome to be within or outside their locus of control. To illustrate, one may attribute the outcome of a test to the amount of time spent preparing for it. Conversely, they may see the outcome as outside their locus of control, claiming that the test unfairly asked questions about material that the teacher never taught. Once she/he has concluded this self-judgment, the learner advances to the final sub-process of the self-reflection stage, self-reaction. Based upon her/his self-judgment a learner will either experience self-satisfaction or dissatisfaction. Based upon her/his affect he/she will then react adaptively or defensively to this judgment. According to Zimmerman (2012) proactive learners more often react adaptively, with a desire to learn from their efforts and adapt her/his cognition,

metacognition and behavior for the next learning cycle to increase her/his chances of future achievement. Reactive learners engage in maladaptive practices such as procrastinating the pursuit of the next learning task or failing to improve upon performance by wrongly assigning blame to an "unfair test" or "biased teacher".

Self-reaction is the last of the sub-processes proposed to benefit from mindfulness practice in this study. Eastern mindfulness promotes a nonjudgmental mindset that strengthens practitioners' ability to observe their actions less reactively and, consequently, more accurately (Brown et al., 2007). Next, definitions of mindfulness from both a Western and Eastern perspectives will be examined.

Mindfulness

I have posited that SRL may benefit from consistent mindfulness practice. Once an esoteric topic, reserved to monasteries, research on mindfulness has grown dramatically over the past twenty-five years—with the number of books and articles written about mindfulness in the United States increasing from less than 80 in 1990 to over 600 in 2006 (Brown et al., 2007, p. 211). Two views of mindfulness have developed in the United States over the past four decades. Hart, Ivtzan, and Hart (2013) pointed out that one understanding of mindfulness comes from the teachings of Langer and her associates while the other centers on the work of Kabat-Zinn and his associates. Hart et al. (2013) offer the labels of *creative mindfulness* for Langer's work and *mindfulness* for Kabat-Zinn's work. Carmody (2014) refers to these distinctions as *Western* and *Eastern* understandings of mindfulness, respectively, dependent upon their point of origin and focus. These later labels will be used for the remainder of this paper. Overviews of Western and Eastern schools of mindfulness are outlined below.

Western Understanding of Mindfulness

The Western school of mindfulness centers around the work of Ellen Langer and other social psychologists who emphasize the importance of a learner's ability to draw novel distinctions in each situation rather than relying on past knowledge or heuristics (Hart et al., 2013). Langer's exploration of mindfulness was a response to her earlier work examining a lack of thoughtful engagement in one's present environment. Langer used the word "mindlessness" to describe "an inactive state of mind characterized by reliance on distinctions drawn in the past" (2014, p. 11).

Research has shown individuals engage in many activities mindlessly, including mindless eating (Kristeller & Epel, 2014), mindless reading (Chanowitz & Langer, 1981), and mindless learning (Reber, 2014). Langer (2016) believes that much of the education system primes students to accept information unquestioningly, as absolute fact, in other words mindlessness. Langer (2000) named three "myths about learning" that she feels encourage mindlessness among students. (a) Drilling and memorization of facts is often promoted as a memorization aid. However, Langer (2000) holds that such overlearning can lead to automaticity at the cost of creativity or the ability to question context and perspective. (b) Paying constant, fixed attention, improves focus. Langer (2016) points out that constant, fixed attention results in habituation and a loss of attention over time. Instead, she promotes looking for novelty or differences in the object of one's concentration to maximize our attention. (c) Teaching students to delay gratification in order to complete schoolwork is often promoted as a necessary tool of self-regulation (Bembenutty & Karabenick, 1998; Zhang & Maruno, 2010). According to Langer (2000), this sends the message that schoolwork is inherently unenjoyable.

Langer (2014) has listed several causes of mindlessness including repetition, premature cognitive commitment, belief in limited resources and contextual influence. An example of

mindless behavior due to repetition is the touch typist who cannot recall the main idea of a letter after typing it at a high speed. Chanowitz and Langer (1981) describe premature cognitive commitment as the acceptance of information without question that quickly becomes rigidly held as fact. Chanowitz and Langer note that this can occur when information is deemed irrelevant at the time of its initial reception. One can see examples of mindless behavior due to limited resources whenever a large snowfall is forecasted. Throngs of people descend upon grocery stores even if their refrigerators are already fully stocked. Mindlessness influenced by context has also been called priming. Priming is a psychological phenomenon whereby pre-existing attitudes or stereotypes are triggered by situational context (Bargh, Chen, & Burrows, 1996).

In response to her research on mindless behavior, Langer came to describe its opposite as mindfulness. Langer defines mindfulness as "an active state of mind characterized by novel distinction drawing" (2014, p. 11) and demonstrated that mindfulness can be fostered in various ways (Kang, Gruber, & Gray, 2014; Langer & Moldoveanu, 2000). In several experiments with retirement home residents Langer and her colleagues found evidence that increasing the complexity and number of mindful decisions each resident was asked to make daily improved mood, memory, and alertness (Langer & Rodin; 1976; Perlmuter, & Langer, 1983).

Langer has shown that two kinds of mindfulness can be fostered: *situational* and *dispositional mindfulness.* Situational or momentary mindfulness can be fostered by making conditional rather than absolute statements such as "a home can qualify as collateral for a loan" rather than "a home qualifies as collateral for a loan" (Langer & Piper, 1987). Dispositional—or long lasting—mindfulness can be developed by encouraging close examination of an issue, exposing students to ambiguity, and helping others to look at issues from multiple perspectives (Reber, 2014). When accomplished, Langer believed mindfulness resulted is specific

characteristics including: (a) openness to novelty; (b) alertness to distinction; (c) sensitivity to context; (d) continuous creation of new categories; (e) present moment awareness (f) awareness of multiple perspectives (Langer, 2014; 2016).

Eastern Understanding of Mindfulness

The Eastern understanding of mindfulness originates in ancient Buddhism over 2500 years ago (Ie et al., 2014). The word "mindfulness" is a translation from the ancient Pali word "sati" which can also be translated as "awareness" (Carmody, 2014, p. 50). The four foundations of mindfulness were enumerated in the Satipatthana Sutta, an early Buddhist text (McCown, 2014). The first foundation is the mindfulness of body, particularly the breath, which is often used as an object of focus during mindfulness meditation. The second foundation is the mindfulness of feelings which are described as pleasant, unpleasant, or neutral. Rather than trying to change a feeling from unpleasant to pleasant, mindfulness of feelings is simply being aware of whatever the current feeling is and being open to experiencing it. The third foundation is the mindfulness of mind-including states such as distraction and concentration. During meditation one focusses on a specific object, such as the breath. When one's attention wanders, one becomes aware that one has become distracted and returns focus to the breath. The fourth foundation is the mindfulness of dharmas which are categories of factors that affect the quality of the practice of mindfulness and are beyond the scope of this chapter (McCown, 2014). Kabat-Zinn described the dharma as "an innate set of empirically testable rules that govern and describe the generation of the inward, first-person experiences of suffering and happiness in human beings" (2003, p. 145).

Kabat-Zinn (2011) has noted that it is important to acknowledge the origins of many of the current secularized forms of mindfulness-based interventions (MBI) to better teach and apply

them. It is Kabat-Zinn's work in creating a secularized form of mindfulness training in 1979 that is credited with laying the foundation for many of the MBI programs used in clinical and educational settings today (Cullen, 2011). It is also Kabat-Zinn's definition of mindfulness that is most widely cited, "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (2005, p. 4).

Kabat-Zinn (2011) created an 8-week manualized program for the relief of stress and pain known as mindfulness-based stress reduction (MBSR). The success of MBSR has also led to the creation of several other mindfulness-based interventions including mindfulness-based cognitive therapy (MBCT), mindfulness-based relapse prevention (MBRP), compassionate mind therapy (Bach, Hayes, & Levin, 2015) and the .b and Paws b mindfulness curricula used in the current study (Hennelly, 2011). Further details about MBSR, MBCT and Paws b are provided below. One of the core aspects of MBSR and similar programs is the insistence that those teaching such programs must regularly practice mindfulness meditation (Burke, 2009; Huppert & Johnson, 2010; Segal et al., 2013). It is only in this way that a teacher can truly guide students in the practice of mindfulness (Nhat Hanh & Weare, 2017; Rechtschaffen, 2014).

Shapiro and Carlson (2017) named three core elements of mindfulness meditation that are relevant to SRL: *intention*, *attention*, and *attitude*. Setting an intention or reason when one is meditating, is a central part of the original teachings of mindfulness practice (Shapiro & Carlson, 2017). Kabat-Zinn noted that setting an intention is key to motivation and reminds one "from moment to moment of why you are practicing in the first place" (1990, p. 32). Attention is another key component of mindfulness meditation and takes two forms: open awareness and focused attention. Open awareness is a monitoring of all body sensations, while focused attention is a single-minded attention to a specific object, often one's breath (Brown & Ryan,

2003; Lutz, Slagter, Dunne, & Davidson, 2008). Finally, attitude refers to how one relates to what arises during meditation. Kabat-Zinn (1990) describes the attitudes one holds during meditation as crucial. He stressed the importance of attitudes of openness, non-judgment, loving-kindness, patience and compassion as playing a key role in developing one's ability to respond with equanimity. How these elements of intention, attention, and attitude relate to SRL will be explained later in this chapter.

Western and Eastern Schools of Mindfulness: Differences and Similarities

Western and Eastern schools of mindfulness have distinctly different points of origin, which continue to influence how each understanding is taught and practiced. Western mindfulness has roots in social psychology and takes a pragmatic approach to the benefits of practicing mindfulness to achieve specific cognitive ends (Hart et al., 2013). Specific techniques, such as consciously looking for novel elements in a situation or setting facts within a conditional context (Langer, 2014), can aid a person in achieving: (a) openness to novelty; (b) alertness to distinction; (c) sensitivity to context; (d) continuous creation of new categories; (e) present moment awareness (f) awareness of multiple perspectives (Langer, 2014; 2016).

Eastern mindfulness takes a more holistic approach both in its teaching and its practice, although specific exercises such as body scans, mindful breathing and mindful eating can be used by anyone. The practice of mindfulness is not something that one does solely within specific contexts to achieve a greater state of awareness, but rather mindfulness practice, from the Eastern perspective, is a way of living one's entire life (Kabat-Zinn, 2011). The results of practicing mindfulness include: (a) increased compassion, (b) non-judgmental acceptance, (c) present moment awareness, (d) the cultivation of happiness, (e) non-judgmental attitude, (e) right action, and, ultimately, (f) decreased human suffering (Nhat Hanh & Weare, 2017).

Kabat-Zinn's construct of mindfulness accentuates metacognitive processes and therapeutic interventions that aim to decreases physical and psychological distress (Hart et al., 2013).

Despite these differences, there are similarities between Western and Eastern mindfulness. Kabat-Zinn (2003) speaks of a fundamental "spirit of perpetual and persistent inquiry" in mindfulness. This description has some similarities to Langer's view of Western mindfulness, "the continuous creation of new categories, openness to new information, and an implicit awareness of more than one perspective" (Langer & Moldoveanu, 2000. p. 4). Also, Brown and Ryan's description of mindfulness as "an enhanced attention to and awareness of current experience or present reality" (2003, p. 822), fits both Eastern and Western paradigms.

In their meta-analysis of clinical psychology utilizations of MBSR, Keng, Smoski and Robbins (2011) note that there are two essential elements of such programs: present-moment awareness of one's experience with a nonjudgmental and accepting attitude. These elements are also highlighted as key aspects by Langer and associates (Hart et al., 2013). Langer, herself, has noted that "the degree of similarities between the two significantly outweighs their differences" (Ie et al., 2104, p. 3). Though Langer's work has been rooted in educational research since the 1970's (Langer, 2014), the path to educational implementation of Kabat-Zinn's work has taken a more circuitous route through implementations of mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT).

Carmody (2014) pointed out that both Western and Eastern concepts of mindfulness hold several characteristics in common including: present moment awareness, openness to novelty, and awareness of multiple perspectives. Hart et al. (2013) concluded that there are three aspects of Langer's and Kabat-Zinn's conceptions of mindfulness that overlap to some extent: their definitions, their positive effects on health and well-being, and their reliance on self-regulatory

mechanisms. This importance of self-regulation is relevant to the current study, which proposes to establish a link between mindfulness practice and SRL.

According to Carmody (2014) the chief similarities between these schools of mindfulness are their goals to increase present moment awareness, develop an open and curious attitude, and increase one's ability to break free of preconceived ideas. Given these desirable qualities, it may come as no surprise that several mindfulness curricula have been introduced to public schools in the United Sates (Ryan, 2012). The next section traces how these curricula evolved.

How Secular Mindfulness Programs Came to Schools

The mindfulness programs now being offered in many K-12 school settings have their origins in the secular adaptations of Eastern mindfulness meditation described above (Renshaw & Cook, 2017). How did such programs come to be developed? Two of the most prominent secularized programs to be developed from the Eastern tradition of mindfulness are MBSR and MBCT (Cullen, 2011). Each of the programs is cited as part of the lineage of mindfulness programs now used by several school based mindfulness programs (Renshaw & Cook, 2017; Zenner, Herrnleben-Kurz, & Walach, 2014). An overview of each of these programs follows.

Mindfulness-based stress reduction (MBSR). Kabat-Zinn (2011) developed MBSR, a manualized, group mindfulness program to help those suffering from chronic pain. Kabat-Zinn had been a longtime practitioner of Buddhism who came to believe that some tenets of mindfulness practices could benefit patients suffering from chronic pain (Kabat-Zinn, 2003). Sensitive to concerns about mixing religion and science, Kabat-Zinn (2011) created a secularized form of mindfulness which he dubbed mindfulness-based stress reduction (MBSR). Kabat-Zinn and colleagues carefully collected data on the effects of MBSR knowing that they would have to

apply scientifically rigorous methodology if the program's efficacy was to be taken seriously (Kabat-Zinn, 2011; Miller et al., 1995).

The manualized eight-week program consists of weekly two-hour group sessions during which participants learn about mindfulness, sit for a group meditation, and share their experiences in using techniques such as body scan, sitting meditation, or yoga. The program also requires home practice of one of these three techniques for 45 minutes a day, at least six days a week for eight weeks (Miller et al., 1995). MBSR also requires informal practice where one engages in a mindful practice such as mindful eating, mindful walking, or mindful discussion during different weeks of the eight-week program. Lastly, participants are also required to attend a day-long mindfulness retreat lasting six-hours at the culmination of the program (Davidson & Kabat-Zinn, 2004). MBSR was originally offered through an outpatient stress reduction clinic at the University of Massachusetts Medical Center in 1979 (Kabat-Zinn, 2003). Kabat-Zinn (2003) has reported that his two purposes in developing the MBSR program, were: (a) to relieve suffering; (b) to create a replicable model that could be used by others. Results from his original research on the effectiveness of MBSR (Miller et al., 1995) as well as subsequent research on MBSR's efficacy (Grossman, Niemann, Schmidt, & Walach, 2004) as well as its widespread application (Hart et al., 2013) are evidence that he has achieved these purposes.

Multiple studies have shown the MBSR program to effectively improve participants' health and well-being including pain and anxiety reduction (Keng et al., 2011; Miller et al., 1995) decreased depression, improved sleep (Biegel, Brown, Shapiro, & Schubert, 2009), and enhanced immune function (Davidson & Kabat-Zinn, 2004; Keng et al., 2011). Keng et al. (2011) sum up a key aspect of MBSR across multiple studies: present-moment awareness of one's experience with a nonjudgmental and accepting attitude. These echo the core Eastern

concepts of mindfulness: intention, attention, and attitude noted earlier. Delving more deeply into how mindfulness practices might aid those suffering from recurring episodes of clinical depression, Segal et al. (2013) developed a program that incorporates aspect of MBSR and cognitive therapy.

Mindfulness-based cognitive therapy (MBCT). Cognitive therapy has successfully been used to treat depression since the mid-1980s with efficacy of treatment reaching levels comparable to pharmaceuticals (Segal et al., 2013). However, research also shows that 50% of persons diagnosed with an initial episode of depression suffer at least one more episode (American Psychiatric Association, 2000). The MacArthur Foundation's Psychobiology of Depression and Affective Disorders Research Network reached out to Segal to develop a maintenance form of cognitive therapy to mitigate the high recurrence rate (Segal et al., 2013).

Segal worked with colleagues Williams and Teasdale to develop such a cognitive therapy maintenance program. Together they sought to understand two underlying questions which they believed would be the key to developing an effective program: "What are the important psychological mechanisms involved in depressive relapse?" And, "how are these modified during the course of acute cognitive therapy?" (Segal, et al., 2013, p. 25). They came to understand that the answer to the first question was twofold: ease of access to negative material (thought, memories, and attitudes) and a tendency by some to ruminate on this negative material. Those suffering from depression become caught in a viscous cycle in which negative thoughts lead to negative moods which, in turn conjure further negative thoughts (Segal et al., 2013).

The answer to the second question was that during cognitive therapy patients were taught to change thought content, replacing negative thoughts with positive ones. However, Segal et al. (2013) came to understand that a key, interim process, known as *decentering*, played a decisive

role in stopping negative ruminations. Decentering is the process whereby patients stop focusing and engaging upon their negative thinking. Instead, they adopt a perspective where "negative thoughts and feelings could be seen as passing events in the mind that were neither necessarily valid reflections of reality nor central aspects of the self." (Segal et al., 2013 p. 36). Their research showed that rather than an interim process, decentering was central to protecting patients from future episodes of depression.

This insight allowed Segal, Williams, and Teasdale the ability to look beyond the traditional tools of psychotherapy to develop a maintenance program that would accomplish this key decentering purpose. Teasdale saw similarities between such a process and a central aspect of Buddhist meditation, learning to relate "to thoughts as thoughts" (Segal, et al., 2013, p. 37). Kabat-Zinn sums up the effect decentering can have in his book, Full Catastrophe Living, "The simple act of recognizing your thoughts as thoughts can free you from the distorted reality they often create and allow for more clear-sightedness and a greater sense of manageability in your life." (1990, pp. 69-70).

What they discovered was that mindfulness practice allowed one to gain *metacognitive insight*, the realization that thoughts may simply be "events in the mind" rather than reflections of reality or truth (Teasdale, 1999, p. 147). Segal, Williams and Teasdale (2002) noted that metacognitive insight could be fostered experientially through mindfulness practice as an act of de-centering. Many mindfulness meditation practices focus attention on the breath and returning attention to the breath whenever one becomes aware that attention has wandered from it. Rather than pursuing thoughts that arise during such practices, the thoughts are acknowledged and released as if they were clouds in passing the object of attention, the sky (Segal et al., 2013).

Segal, Williams and Teasdale first came into contact with the work of Kabat-Zinn through a colleague, Marsha Linehan who had developed a mindfulness program to help patients suffering from borderline personality disorder and who spoke with them about a manualized MBSR program developed by Kabat-Zinn. Intrigued by the idea of an intensive, eight-week program Segal et al. purchased Kabat-Zinn's latest book, *Full Catastrophe Living* and, upon reading it, decided to approach the author at his Stress Reduction Clinic at the University of Massachusetts Hospital (Segal et al., 2013).

Visits to the stress reduction clinic confirmed the value that mindfulness practice could have on the key element of decentering. However, Segal, Williams and Teasdale still intended the bulk of their maintenance program for reducing the recurrence of depression to focus on cognitive therapy attentional control training. Early implementations of such a program, however, did not prove as effective as hoped in helping patients with a history of depression (Segal et al., 2013). The researchers came to understand that specific elements not originally adopted from Kabat-Zinn's MBSR program needed to be added. These included having instructors in their depression relapse prevention program practice mindfulness themselves and expanding the use of decentering beyond thoughts to include physical feelings and emotions. The final version of their program included mindfulness practice as a central, rather than ancillary, component. Consequently, the program carries the title mindfulness-based cognitive therapy (Segal et al., 2013). Subsequent research has shown that MBCT has proven as effective as antidepressant medication in preventing recurrence of depression among those with at least one prior documented episode of clinical depression (Kuyken et al., 2008).

Mindfulness-based educational initiatives (MBEI). A number of MBEI have arisen from the MBSR and MBCT work done by Kabat-Zinn, Segal, Williams, and Teasdale.

Rechtschaffen (2014) notes that these have taken three forms: those that focus on providing mindfulness training to teachers to promote their own self-care; those that offer direct service to students; and those that offer a curriculum for teachers to use in instructing students.

MBEI developed for school settings strive to expose students to key aspect of mindfulness such as the importance of intention, attention, and attitude in practicing mindfulness (Kuyken et al., 2013; Thomas & Atkinson, 2016). Rechtschaffen (2014) points out that mindfulness supports the larger social and emotional learning (SEL) curriculum that has been proposed for K-12 schools since the late 1960's. SEL programs strive to promote five core characteristics: self-management, (b) self-awareness, (c) social awareness, (d) relationship skills, and (e) responsible decision making. Rechtschaffen (2014) further notes that mindfulness has usually been presented to schools in one of three ways: (a) training and self-care for teachers, (b) a direct service to students, or (c) as packaged curriculum.

Training and self-care for teachers. There are several mindfulness programs that reach out to teachers with the philosophy that the job of teaching is difficult and demanding. Teachers need to be supported so that they can successfully meet the challenges of their jobs. These programs hold that the work of a mindful teacher will naturally create a better learning environment for their students. Programs that support teachers in this way include: Inner Resilience Program, CARE for Teachers, SMART in Education, and Parker Palmer's Courage and Renewal Programs (Rechtschaffen, 2014).

Direct service to students. Several mindfulness programs offer direct services to students taught by an experienced teacher who also has their own mindfulness practice. The advantage of such services includes knowing that mindfulness is being taught with fidelity—especially to the requirement established by MBSR of the instructor being a practitioner. The disadvantage is that

such programs have an ongoing cost and, therefore, typically are not accessible to all schools. Programs that offer direct service model to students: Mind Body Awareness Project, Holistic Life Foundation, Mindful Schools, the Lineage Project (Rechtschaffen, 2014).

Packaged mindfulness curriculum. A growing number of packaged mindfulness curricula are now available to schools. Such programs include materials such as lesson plans, audio recordings, PowerPoint presentations, and student workbooks. The advantage of such programs is that they can be lower in cost than hiring a direct service provider and they are available to use throughout the school year. Most, though not all, of these programs require the teacher to have their own mindfulness practice and to receive training in the delivery of the curriculum (Rechtschaffen, 2014). Curriculum based mindfulness programs include: Mind Up, .b, Paws b, Learning to BREATHE, and Stress Reduction for Teens. The .b and Paws b curricula was used in the current study.

Mindfulness and SRL

There are several aspects of mindfulness that dovetail with SCT's model of SRL including the importance of individual agency and role various cognitive functions play in SRL.

Agency. Bandura (2006) listed four core properties of human agency: *intentionality, forethought, self-reactiveness* and *self-reflectiveness.* Explained earlier in this chapter, each of these properties has a similar counterpart within the three core elements of mindfulness meditation: intention, attention, and attitude (Shapiro & Carlson, 2017).

First, both SCT and mindfulness see intentionality as core aspects. Bandura (1986) believed intentionality was crucial in guiding and motivating behavior. Bandura described forethought as a means of extending agency into the future. As has been noted earlier in this chapter, forethought is named as the first phase of Zimmerman's (2002a) SLR model. It is

during the forethought phase that motivation is summoned to sustain the learner. This integral role of forethought as sustaining the learner in SRL shares some similarities with the concept of intention in mindfulness meditation. Shapiro and Carlson use similar language to describe the concept of intention as it pertains to mindfulness, describing intention as knowing one's "aspiration and motivation for practice" (2017, p. 14). Kabat-Zinn (1990) also notes that setting an intention prior to mindfulness meditation helps to direct and sustain the practitioner.

Next, SRL's "self-reaction" is the point at which planning turns to action (Bandura, 2006). In Zimmerman's (2002b) SRL model such action would be placed in the performance phase during which self-regulation is called upon to monitor the decided action and keep it on course. Shapiro and Carlson (2017) note that paying attention during mindfulness meditation involves both concentrative and receptive attention. Concentrative attention is akin to the focused-attention sub-process Zimmerman (2002a) describes during the performance phase, where one attempts to sustain attention on the task at hand. Receptive attention in meditation allows one to notice that attention has wandered from concentrative focus (Shapiro & Carlson, 2017). Such a process resembles Zimmerman's (2002a) description of self-monitoring which lets one know if they are making progress toward their goal during the performance phase of SRL. Zimmerman (2002a) described the performance phase as requiring self-monitoring and focusing one's attention. Schunk (1997) noted that self-monitoring in elementary students was a key aspect of self-regulated learning and was shown to improve the learning process. This skill may even extend further as Winne (2010) notes that self-monitoring is necessary in all phases of SRL.

Finally, Bandura describes self-reflection as the process that allows humans to review the efficacy and soundness of their thoughts and actions and to make "corrective adjustments if

necessary" (2006, p. 165). Acknowledging the key role that self-reflection plays in the self-regulatory process, Zimmerman (2002b) named the third phase of his SRL model self-reflection. The sub-processes of self-judgment and self-reaction take place during this phase. A non-judgmental mindset would facilitate an adaptive, rather than defensive, reaction during self-reflection. Such a mindset would more likely lead to improvements in learning during the next SRL cycle (Panadero & Alonso-Tapia, 2014; Zimmerman, 2000). In related research, Baird et al. (2014) found that mindfulness practice improved the accuracy of introspection after a two-week training period. Similarly, the importance of openness and objectivity are stressed as attitudes one should have when practicing mindfulness meditation (Shapiro & Carlson, 2017). Thus, the mindfulness tenets of intention, attention, and attitude all seem to support integral processes of SRL.

As noted earlier in this chapter, Bandura (2006) defined agency as a person's ability to intentionally impact their own life circumstances. He named the process by which a person influenced and was, in turn, influenced by their affect, cognition, behavior, and environment triadic reciprocal causation. Key to this triadic model in SRL is the existence of a feedback loop, a process through which individuals compares her/his performance to a known standard or goal (Cleary, 2015). The presence of a feedback loop allows a person to adjust their strategies and actions to better achieve said goal. Zimmerman (2000) noted this feedback loop is not only triadic, it is also open-looped. An open-looped system differs from a closed-feedback loop which has a static goal against which progress is judged. An open-loop allows for the learner to proactively raise her/his sights to a higher goal. This ability to increase a previously selected goal further emphasizes the learner's agency within the learning process. Similarly, Pintrich

(2004) noted that the belief in the learner's active participation in the learning process is one of the key hallmarks of SRL.

Personal agency is also an important concept within mindfulness, (Ergas, 2015; Ritchhart & Perkins, 2000; Roeser & Peck, 2009). Rechtschaffen (2014) has noted that one of the key goals of mindfulness practice is to facilitate a person's agency by empowering them to respond to events, rather than react to them.

Olendzki (2014) enumerates five different levels of mental operation in Buddhism, two of which have relevance here. The first is a rudimentary level of mental function where one is awake but lacking any metacognition. Olendzki notes that this may be comparable to Langer's (1993) notion of mindlessness. The second level of mental function includes additional mental systems including the ability to "direct and sustain awareness" (Olendzki, 2014, p. 66). He goes on to say that this intentionality "contributes substantially to the sense of agency, and is our primary tool for problem solving" (2014, p. 66).

Cognitive functions. Aside from the important role that agency plays in both SRL and mindfulness, there is evidence that certain cognitive functions believed beneficial to SRL may be improved by regular mindfulness practice (Bandura, 1982; Chiesa, Calati, & Serretti, 2011; Ergas, 2015; Vickery & Dorjee, 2016). Specifically, mindfulness has been shown to improve sustained attention (Rice & Liu, 2017; Semple, 2010), switching capability (Roeser & Peck, 2009), inhibitory control (Sahdra et al., 2011), and working memory (Chambers, Lo, & Allen, 2008; Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010). These improvements align with several of the processes and sub-processes of SRL (see Table 1).

Table 1

Cognitive Skills and Corresponding SRL Processes and Sub-Processes

Cognitive Skills	SRL Process	SRL Sub-Processes
Sustained Attention	Self-Control	Attention focusing
Task Switching	Self-observation	Metacognitive monitoring
Inhibitory control	Self-Control	Attention focusing
Working Memory	Task Analysis	Goals Setting
	Self-observation	Metacognitive monitoring

Sustained attention. Sustained attention or vigilance is defined as the ability to "maintain consistent focus over time" (Rice & Liu, 2017, p. 397). The importance of sustained attention is evidenced in all realms of life. In the classroom, students are regularly asked to maintain focus on lectures; in airports air traffic controllers monitor multiple radar screens; and on the battlefield soldiers keep watch at key posts. Given the importance of sustained attention it has been the object of research since the 1940's when the performance of British navy radar operators was the object of study (Thomson, Besner, & Smilek, 2015). Several cognitive tests have been developed to measure sustained attention; among the most commonly used type is the sustained attention to response task (SART). SART tests require a repeated motor response to a regularly presented series of stimuli (e.g. numbers, sounds or shapes) but to periodically withhold a response when a specific number, sound or shape appears (Manly et al., 2016). A SART test was used as one of the subtests of measuring sustained attention in the current study. Several studies have found evidence that mindfulness improves sustained attention (Baird et al., 2014; Chiesa et al., 2011; Rice & Liu, 2017; Semple, 2010). Zimmerman (2000) cites the importance of sustained attention as an example of self-control necessary for SRL.

Switching capability. Task switching /switching capability refers to how easily one can stop performing one task and begin performing another (Manly et al., 2016). Bishop et al.

(2004) noted that mindfulness practice helps to develop the ability to switch attention form one object of focus to another. Over one- hundred years earlier James (1900) observed that voluntary attention could not be sustained for long, as mind wandering occurs regularly. One must constantly bring back one's attention to their original point of focus through "distinct pulses of effort" (p. 101). Zimmerman and Kitsantas (2005) acknowledged the issue of mind wandering when they included it in their "Self-efficacy for Learning" form. Roeser and Peck hypothesize that contemplative practices like yoga and mindfulness "strengthen the self-regulatory functions of shifting and sustaining the focus of awareness" (2009, p. 129).

Inhibitory control. According to the U.S. Department of Health and Human Services (2012) inhibitory control consists of resisting distractions and giving a more considered response. Inhibitory control is considered a key aspect of executive function (EF; Garner, 2009). Mindfulness research conducted by Sahdra et al. (2011) suggests that response inhibition benefitting executive control and self-regulation can be enhanced through meditation training. Similarly, Friese, Messner, and Schaffner (2012) showed that as little as five-minutes of mindfulness meditation could restore depleted reserves of inhibition control.

Effeney, Carroll, and Bahr note that EF is associated with the "coordination, regulation and optimization of the cognitive processes necessary for formulating goals, planning how to achieve them and carrying out those plans effectively" (2013, p. 774). Garner (2009) points out that several key EF skills overlap with SRL including inhibition control. It would be reasonable to expect that improvement in inhibition control would also benefit SRL.

Working memory. Baddeley defined working memory as "the brain system that provides temporary storage and manipulation of the information necessary for such complex cognitive tasks as language comprehension, learning, and reasoning" (1992, p. 556). Working memory has

been cited as a key mental capacity for EF (Garner, 2009). Pintrich and Zusho (2002) noted that given the important role working memory plays in all cognitive processes, limitations on working memory might negatively impact all aspects of SRL. There is evidence that working memory is improved by mindfulness meditation (Chambers et al., 2008; Jha et al., 2010).

Improvements in these cognitive functions may also work collectively to benefit SRL. Lutz et al., (2009) named three ways in which meditation may help self-regulation during the performance phase: 1) increase self-monitoring ability; 2) improve ability to disengage from distraction once aware of it; 3) improve ability to redirect focus on chosen object.

In sum, there appear to be sufficient theoretical connections between mindfulness and SRL and enough past research on specific cognitive functions enhanced by mindfulness practice to justify the current study. The growing interest in mindfulness (Van Dam et al., 2017), as evidenced by the growth of published research on this topic (see Figure 4), has created an environment in which many schools are considering the inclusion of mindfulness as part of an SEL curriculum (Rechtschaffen, 2014). This provides a unique opportunity for the reintroduction of the established theoretical framework of SRL which, I believe, is an excellent partner to mindfulness curricula.

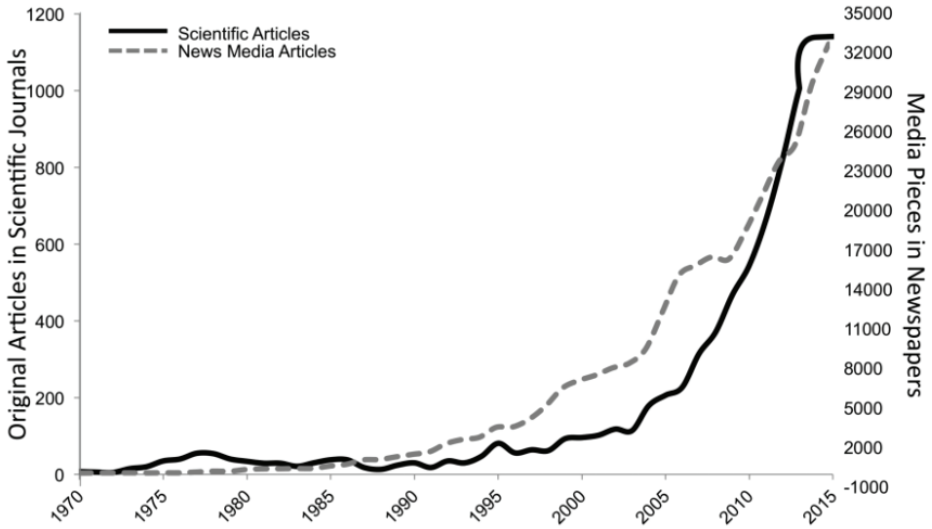

Figure 4. Scientific and News Media Articles on Mindfulness and/or Meditation by Year: 1970-2015

Empirical scientific articles (black line) with the term mindfulness or meditation in the abstract, title, or keywords, published between 1970 and 2015 were searched using Scopus. Media pieces (dashed gray line) with the term mindfulness or meditation, published in newspapers, using a similarity filter to minimize double-counting, published between 1970 and 2015 were searching using LexisNexis. Van Dam et al., 2017, p. 37. Used by permission.

Another key element of this study was the use of the Pomodoro Technique, a time management method. Zimmerman et al. (1996) point out the importance of time management for self-regulated learning. I close this chapter with an explanation of that technique, which I have found to be very helpful throughout my academic career.

The Pomodoro Technique

The Pomodoro Technique is a time-management method that utilizes a multi-step process for increasing project focus, overcoming procrastination, and improving work over time (Cirillo, 2013). Each pomodoro is a sustained work block of 25-minutes and is followed by a three to five-minute break. After every four pomodori a longer break (15 - 30 minutes) is taken. At the end of a work day one reflects on the work accomplished and what remains to be done.

Each 25-minute block of work is referred to as a pomodoro, the Italian word for tomato. Cirillo arrived at this name since he originally used a kitchen timer shaped like a tomato to count his units of work (Cirillo, 2007). Cirillo drafted nine rules to maximize the efficiency of each pomodoro (see Appendix B). He also named five stages to the technique that one should utilize throughout the course of a workday: planning, tracking, recording, processing, and visualizing. These five stages are done at different times of the day and serve different purposes. The five stages align well with the three phases of SRL outlined by Zimmerman (1990): forethought, performance, and self-reflection (see Table 2).

Table 2

Alignment of Stages of Self-Regulated Learning and of the Pomodoro Technique

Model		
Self-Regulated Learning Phase	Pomodoro Technique	Description
Forethought	Planning/Goal Setting	Both SRL and PT emphasize planning prior to working - List tasks to be done & estimate # of pomodori needed for each task
Performance	Tracking	While working SRL emphasizes the need for self-monitoring. PT has one keep count of any interruptions to one's work and the number of pomodori completed
Self-Reflection	Recording	SRL outlines a phase of self-reflection when one practices metacognition about one's learning process; PT has one compile an archive of daily observations
	Processing	PT additionally has one transform the raw data of pomodori and interruptions into information to aid reflection on the process
	Visualizing	PT has one present the information in a format that facilitates understanding and clarifies paths to improvement

Planning

The first stage of Cirillo's (2013) technique is planning. Cirillo advocates the use of two different worksheets for long-term and daily planning. The *Activity Inventory* worksheet (see Appendix C) is provided by Cirillo (2013) for long term planning. One lists all work that needs to be done in the foreseeable future on this worksheet. One also estimates the number of pomodori each task will take. At the start of each workday, one reviews how much time they have available for project work and sets the number of pomodori available. Then, one decides which activities to transfer from the *Activity Inventory* worksheet to a *To Do Today* worksheet (see Appendix D) based on the time available. Cirillo notes that such planning eases anxiety about the workday and serves as a motivation to begin the work at hand. The setting of short term goals is also supported by Bandura (1997) who noted that such proximal goals helped to sustain motivation toward long term goals.

The use of these sheets is a clear example of the SRL process of strategic planning which takes place during the forethought phase (Zimmerman, 2002a). Zimmerman, Bonner and Kovach (1996) believed that by increasing students' awareness of how they spend schoolwork time, teachers could help them assume more overall regulation of their learning. Zimmerman et al. (1996) also provided a worksheet to help scaffold this skill. The current study's "Self-Regulated Learning Diary" (SRLD, Appendix E) was, in part, modeled after this "Study Time Self-Monitoring Form" (see Appendix F). The SRLD also incorporated aspects of Cirillo's (2013) technique, having students use count down timers to facilitate their staying on task and to help them overcome initial inertia when doing homework.

Tracking

The next step in Cirillo's (2013) method is tracking one's efforts; recording each pomodoro (unit of work) as it is completed on the daily *To Do* worksheet. One also keeps track of *internal* and *external* interruptions occurring during each pomodoro. Cirillo (2013) defines an internal interruption as any impulse—mental or physical—that makes itself known during a work period (e.g. feeling thirsty and wanting to get a drink or remembering another task that needs one's attention). External interruptions arise from the other persons or the environment (e.g. a text message from a friend or a power failure causing the lights to go out). Cirillo's suggests acknowledging the interruption by addressing it quickly or jotting it down on the daily worksheet to address later and then returning to work. The method improves focus by urging the user to work on only one task at a time. When/if they are tempted to shift their attention, they instead jot down the interrupting idea to work on later. In this way they reduce the possibility of procrastination caused by facing myriad decisions which may weaken self-regulation (Vohs et al., 2014).

It is interesting that Cirillo's process of tracking resembles a meditation technique called *noting.* During meditation, when one becomes aware that attention has wandered from the object of focus, one is instructed to note the interruption mentally (e.g. label the distraction as hunger or thinking) and then returning to the object of focus (Puddicombe, 2016).

Cirillo's tracking phase aligns with the subprocesses of metacognitive monitoring and self-recording which both take place during the performance phase of Zimmerman's (2002a) SRL model (see Table 2). The importance of these subprocesses within SRL has been documented by Schmitz and Perels (2011) who demonstrated the power that metacognitive monitoring and self-recording can have in improving student SRL. Using a scaffolded

homework diary Schmitz and Perels elicited what Shapiro (1984) called a *reactive effect of self-monitoring*. Shapiro (1984) explains that self-monitoring, which is often used to observe behavior for purposes of establishing a baseline, has been shown to change behavior. The current study adapted Schmitz and Perels work to create an online, scaffolded homework diary in hopes of causing a reactive effect regarding SRL practices.

Recording, Processing and Visualizing

The three remaining stages of Cirillo's Pomodoro Technique—recording, processing, and visualizing—aligns with Zimmerman's third phase of the SRL process, self-reflection. Cirillo (2013) recommends performing each of these tasks at the end of the work day to learn from the data gathered throughout the day to improve future performance. Self-reflection plays a similar role at the end of each SRL cycle (Zimmerman, 2002b).

The recording stage comes at the end of the work session where Cirillo (2013) recommends reviewing the daily to do worksheet and transferring information from it to a daily *Records* worksheet (see Appendix G). In addition to listing completed activities, one also lists the original estimate of how many pomodori it would require, as well as the actual number needed and, finally, the difference between the estimate and actual number. As one transfers this data, one is processing the information, "transforming raw data into information" (Cirillo, 2013, p. 9). Cirillo's final stage is visualizing where one reflects on the data "to present the information in a format that facilitates understanding and clarifies paths to improvement" (2013, p. 9).

In many ways the use of the Pomodoro Technique can be seen to scaffold SRL. The technique can theoretically be seen to utilize both cognitive behavioral and social cognitive theories. From a CBT standpoint, the setting of a pomodoro timer becomes the antecedent to the

desired behavior-focused effort on homework; the short break between pomodori acts as a reward (Zimmerman & Schunk, 1989). By looking at the Pomodoro Technique through a social cognitive theory lens, we can see that the technique facilitates the performance phase of SRL when students self-monitor distractions and record them during each pomodoro.

Summary

This review of the literature has described SRL from a SCT perspective. This view places a key role on human agency, our ability to influence our own path. This includes our ability to self-regulate our learning. I focused on Zimmerman's model of SRL which depicts a three-phase, cyclical process consisting of forethought, performance and self-reflection (2002b). An explanation of each phase and its processes and sub-processes was then provided.

Next, the two schools of mindfulness which have generated a growing number of secular research studies were reviewed (Van Dam et al., 2017). The Western school of mindfulness centers around the work of Ellen Langer whose mindfulness research has focused on counteracting a common form of cognitive disengagement she has termed mindlessness (Langer & Piper, 1987). The Eastern school of mindfulness grows out of Jon Kabat-Zinn's MBSR program which is a secularized form of Buddhist meditation practices (Kabat-Zinn, 2011). Several mindfulness programs have followed an MBSR model including several being used in K-12 schools throughout the United States (Ryan, 2012). School mindfulness programs focus on mindfulness practices that increase student awareness of their mental and emotional states and facilitate social and emotional learning (Rechtschaffen, 2014).

The literature review then cites several studies showing how Eastern mindfulness practices support SRL. Specifically, mindfulness practices can improve attention, awareness,

and objectivity. These qualities can benefit the SRL processes of attention focusing, metacognitive monitoring, self-evaluation, and causal attribution.

The chapter closed with a description of the Pomodoro Technique, a time management method that also supports SRL through its promotion of self-monitoring, avoidance of distraction, record keeping and self-reflection. The current study investigated the effects of the Paws b mindfulness curriculum and a structured online homework diary that makes use of the Pomodoro Technique on students' SRL, stress, and sustained attention.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Participants and Setting

Participants were elementary school students enrolled in the fifth grade of a high performing, high socio-economic status (SES), suburban school in the northeastern United States. Students ranged in age from 10 to 11 years old. I obtained parental and student consent for 86 students (44 female). Unfortunately, due to various absences I obtained complete pre- and post-assessment scores on all three measures for only 59 students (24 male).

I selected students in grade five for several reasons. Prior research has shown that upper elementary grade students are capable of learning SRL skills (Schunk, 1998; Stoeger & Ziegler, 2005). Also, there is an increased level of homework and greater rigor in academics beginning in this school's sixth grade. The school's Director of Guidance had also told me that teachers in the upper elementary school had expressed concerns about the level of stress students were experiencing. Therefore, it seemed desirable to help students develop MAP and SRL skills (including time management) to prepare them for the dual challenges of increased amount and rigor homework as well as to provide a tool for handling reported stress.

Before sending out letters soliciting participants, I met with school district officials to gain approval to conduct the intervention. Permission was granted by the District Superintendent, Assistant Superintendent for Curriculum, Director of Guidance, and the Elementary School Principal. Fordham's Institutional Review Board (IRB) also approved the study's design. Letters sent to parents included an explanation of the study, a consent form, and an invitation to either of two presentations I made on the nature of my research.

Measures

The proposed study used one complete scale and several subscales of two standardized measures to collect baseline and post intervention data: (a) White's (2014) Perceived Stress Scale for Children (PSSC), (b) subscales from Vandevelde and Van Keer's (2011) Children's Perceived use of Self-Regulated Learning Inventory (CP-SRLI), and (c) subscales from the Test of Everyday Attention for Children, Second Edition (TEA-Ch 2). To collect data on SRL skills and meditation practice throughout the study, students were asked to make entries in an online SRL homework diary (SRLD) using Google Classroom and Google Forms. The hope was to collect daily data that could be examined using statistical trend analysis. Each of these data sources is described below in detail.

Perceived Stress Scale for Children (PSS-C)

White (2014) developed the PSS-C to address the need for a brief assessment for perceived stress in children noting that the lack of such a simple, brief assessment presented an obstacle to related research. The PSS-C is modeled after Cohen's (1994) widely used Perceived Stress Scale (PSS). Like the PSS, the PSS-C is a self-report, asking users to respond to a limited number of questions (10 in the case of the PSS, 14 in the PSS-C) using a Likert scale. Areas of perceived stress include time pressure, academic performance, and quality of friendships.

The PSS-C consists of 13 scored items using a 5-point Likert scale to indicate the level of agreement with a stated phrase ranging from 1 (*not at all*) to 5 (*very much*). Seven of the statements are reverse-phrased to reduce response bias (e.g. "In the last week how often did you feel happy?"). In a reverse-phased item a higher score indicates the reverse of the measured trait of stress. Therefore, such items need to be reverse scored such that a higher score conveys a consistent indicator of more stress. Reverse-scoring is accomplished by reversing the scale so

that a response of 1 (*very much)* receives five points and a response of 5 (*not at all)* receives one point.

The paper form of the PSS-C uses simple line drawings of faces ranging from very sad to very happy in a Likert scale. Students are to circle the face that indicates their level of agreement with each statement. I modified the original by using the numbers one to five in place of the line drawings to administer the survey by computer.

A factor analysis was done to test the construct validity of the questionnaire. The 13 items were loaded on one factor—perceived stress. Using SPSS, Varimax rotation was selected to maximize the loadings of variables with a strong association with the factor while minimizing those with weaker associations. I then deleted questionnaire items with a corrected item-total correlation of < |0.4| as recommended by Rattray and Jones (2007). The same items were deleted from the post-test scores resulting in the correlational scores (see Table 3).

Table 3

Component Matrix

Questionnaire Item	Pre-Test Correlation	Post-Test Correlation
In the last week, how often did you feel scared or nervous?	.75	.74
In the last week, how often did you feel rushed or hurried?	.70	.70
In the last week, how often did you feel you had enough time? *	.63	.67
In the last week, how often did you feel worried about grades?	.69	.69
In the last week, how often did you feel rushed worried about being too busy?	.57	.50
In the last week, how often did you feel you had enough friends? *	.46	.61

*Indicates items that were reverse scored.

Initial testing on all 13 items yielded a Cronbach's $\alpha = .63$ at pre-test and $\alpha = .70$ at post. Testing reliability on the six items found to correlate > |.4| using factor analysis resulted in

improved Cronbach's of α =.72 at pre-test and α=.73 at posttest. These scores fall within the recommended guidelines of > .3 and < .8 indicating good construct validity without items being seen to be repetitions of each other (Rattray & Jones, 2007).

Children's Perceived use of Self-Regulated Learning Inventory (CP-SRLI)

Citing the need for an SRL assessment specifically for elementary aged students, Vandevelde and Van Keer (2011) developed the CP-SRLI. Although they acknowledge the inherent weaknesses of self-report measures (primarily reporter bias), Vandevelde and Van Keer sought a measure that would be easy to administer to large groups of students and that would measure the multiple aspects of SRL outlined by Pintrich's (2004) four-phase model. The measure also considers Zimmerman's (1990) conceptualization that self-regulated learners are "metacognitively, motivationally, and strategically active participants in their own learning" (Vandevelde & Van Keer, 2011, p. 3).

The measure consists of 74 statements with which students indicate their level of agreement/disagreement using a five-point Likert scale ranging from 1 (*Not at all like me*) to 5 (*Very much like me*), with higher scores indicating similarity to their own practices. Clusters of statements form subscales for task orientation, planning, motivation, self-efficacy for self-regulated learning, learning strategies, motivational strategies, monitoring, persistence, and self-evaluation (Vandevelde, Van Keer, & Rosseel 2013).

The measure was specifically created to measure the SRL of upper elementary school students using nearly 800 fifth and sixth-grade students in two rounds of testing. Vandevelde, Van Keer, and Rosseel (2013) used a three-step process to assure content and construct validity. First, five SRL researchers reviewed all survey items to ensure they represented all named areas of SRL. Next, a primary school teacher panel reviewed each item for reading level suitability.

Finally, cognitive interviews were conducted with fourteen students to ensure their understanding of the surveys. The cognitive interview process consists of having participants read questions aloud with an interviewer asking questions to verify the participant's understanding of the question as well as the reasoning for their answer (Karabenick et al., 2007; Woolley, 2006). Vandevelde, Van Keer, and Rosseel (2013) used a four-step cognitive interview process: (a) participants were asked to read the questions aloud; (b) explain the question; (c) read the possible answers, and (d) explain their answer. Internal consistency was validated using structural equation model-based internal consistency coefficients.

Due to time constraints and the focus of this study, rather than using the entire CP-SRLI, the study used a total of 20 items from five subscales: task orientation, planning, monitoring, persistence, and self-evaluation (product and process; see Appendices H and I). I chose these specific subscales as they closely relate to subcomponents of Zimmerman's (1990) three-phase model of SRL. Monitoring and persistence are evidenced in Zimmerman's forethought phase while self-evaluation is a sub-component of the self-reflection phase (1990).

The Cronbach's alpha for the pre- and post-intervention CP-SRLI is quite good with all 20 items included (α = .84 and .86 respectively). Broken into its subscales, however, the reliability falls considerably for both pre- and post-intervention data (see Table 4).

Table 4

Cronbach's Alpha Scores of Reliability for CP-SRLI Sub-Scales

	TO	Planning	Monitoring	Persistence	Prod-SE	Proc-SE
Cronbach's α pre-test	.46	.25	.50	.68	.76	.58
Cronbach's α post-test	.49	.44	.51	.77	.71	.52

Note: TO = Task Orientation; Prod-SE = Product Self Evaluation; Proc-SE = Process Self Evaluations

Pre- and post-intervention scores improve slightly when items are dropped from some of the subscales (see Table 5). The specific questions that were dropped include: question 2 (If I get a similar math problem to one I have already done, I ask myself, "How did I approach it last time? Was that a good approach?"); question 4 (If I find my math work difficult, I allow more time for it.); and question 20 (I ask myself, “How do I feel about it – fun, difficult, boring, interesting?”). This resulted in each subscale having two items per scale, and thus being termed an index and not a scale.

Table 5

Cronbach’s Alpha for CP-SRLI Sub-Scales With Items Deleted to Improve Reliability Score

	TO	Planning	Monitoring	Persistence	Prod-SE	Proc-SE
Cronbach’s α pre-test	.53	.44	.50	.68	.76	.66
Cronbach’s α post-test	.50	.50	.51	.77	.71	.65

Note: TO = Task Orientation; Prod-SE = Product Self Evaluation; Proc-SE = Process Self Evaluations

Differences between the reliability of the full CP-SRLI assessment vs the reliability of its subscales may be due to the age of the participants. Assor and Connell (1992) suggested that younger students may not have a fully stable perception of their own competence due to their rapid pace of development. Students hay have been developmentally less able to differentiate the nuanced aspects of SRL while still practicing SRL on a gross level.

A factor analysis was conducted to examine the construct of SRL assessed by the questionnaire. The 20 items loaded on a single factor, labeled self-regulated-learning. Using SPSS version 24, Varimax rotation was selected to maximize the loading factors of items reflecting SRL. I then deleted questionnaire items loaded with a corrected item-total correlation of $< |0.4|$. The same items were deleted from the post-test scores resulting in the correlational scores shown in Table 6.

Table 6

CP-SRLI Component Matrix

Questionnaire Item	Pre-Test Loading	Post-Test Loading
Before I start my math homework, I ask myself: 'What is it about? What do I already know about it?' (TO1)	.42	.44
Before I start my math homework, I read the instructions carefully. (TO2)	.55	.71
If I get a similar math problem to one I have already done, I ask myself, "How did I approach it last time? Was that a good approach?" (TO3)	.53	.54
If I notice something isn't working out with my math homework, I try a different approach. (MT2)	.48	.61
During my math homework, I ask myself, "What part is difficult? What do I have to practice some more?" (MT4)	.64	.55
Even if I would rather do other things, I make myself start my math homework. (P1)	.62	.62
Even if my math homework is difficult or boring, I do my best. (P2)	.58	.56
Even if I would rather do other things, I finish my math homework. (P3)	.58	.69
If I get distracted while doing my math homework, I immediately try to continue working. (P4)	.50	.68
I go over my answers again. (SPROD 1)	.73	.56
I check that I haven't forgotten anything. (SPROD 2)	.73	.54
I check if I have done everything that was asked for. (SPROD 3)	.61	.64
I ask myself, "Have I done it the right way? (SPROC 1)	.66	.64
I ask myself, "Did that way of doing my math homework work well?" (SPROC 2)	.56	.42

Next, reliability was tested using Cronbach's alpha. Initial testing on all items yielded a Cronbach's α = .84 at pre-test and α = .86 at post. Testing reliability on the 14 items was found to correlate > |.4| using factor analysis resulted in improved Cronbach's of α =.85 at pre-test and α =.85 at posttest. These scores fall within the recommended guidelines of > .3 and < .8 indicating good construct validity without items being repetitions of each other (Rattray & Jones, 2007).

Test of Everyday Attention for Children, Second Edition (TEA-Ch2)

The TEA-Ch2 is a battery of paper and computer based performance tests. The battery is comprised of several sub-tests which uniquely measure separate aspects of attention (Manly et al., 2016). The TEA-Ch2 has been shown to be reliable with internal consistency scores ranging from moderate (>.5) to excellent (>.9). Continuous performance tests were developed to assess sustained attention as opposed to impulsivity (Arble, Kuentzel, & Barnett, 2014).

The current study used three recently updated sub-tests for sustained attention: Vigil, Sustained Attention to Response Test (SART), and Simple Response Test (Simple RT). Markowska (2013) explains that sustained attention is the ability to wait over a long period of time "for the appearance of a particular stimulus called the signal while at the same time ignoring the others called the noise" (2103, p. 335). In line with Bishop et al.'s conceptualizing (2004) that mindfulness meditation trainings would have a positive impact on increasing sustained attention, attention was operationalized as scores on these sub-tests for sustained attention.

All three subtests were administered over computer in a lab accommodating each of the four classes one at a time. Total administration time took approximately 45 minutes including instructions and practice.

Vigil is an auditory test of sustained attention. Children were instructed to listen to a series of tones and to mentally count how many they heard. A differently sounding start sound and end sound bookended each series of tones. Participants then entered their count after each of ten sets of tones. This type of assessment is sometimes known as an "oddball test" as one is trying to sustain attention through a series of the same tone and then quickly react when a different/oddball tone is played. This type of assessment has been used in prior studies on the

effects of mindfulness meditation on attention (Delgado-Pastor, Perakakis, Subramanya, Telles, & Vila, 2013; Kaunhoven & Dorjee, 2017).

SART and Simple RT ask students to respond to visual cues presented on a computer monitor in a game-like interface. The SART subtest has students sit at a computer and place their fingers on the keyboard's spacebar. Students were to press the spacebar each time they saw a colored shape appear on the monitor, except when that shape was a triangle.

The Simple RT subtest required students to again sit at a computer with a finger of their preferred hand on the keyboard's spacebar. Students were instructed to focus on the center of the monitor and to press the spacebar as quickly as possible whenever a blue blob appeared on the screen. If a student pressed the spacebar prematurely, a "?" would appear on the screen. Premature responses required students to start the subtest over from the beginning.

Napoli, Krech and Holley (2005) used an earlier version of the TEA-Ch to investigate the impact of mindfulness training on sustained and selective attention. Although they found no correlation between mindfulness and attention at the time, I thought that the latest version of the assessment, the TEA-Ch 2, with different subtest measures for sustained attention, might yield different results. As Markowska (2013) notes one of the reasons that there are still questions about the impact of meditation on mindfulness is the lack of replication of studies in this area.

Cronbach's alpha scores for these subtests are not able to be obtained as the computerized version yields cumulative reaction times and overall accuracy ratings rather than raw data. It is noted, however, that the creator of TEA-Ch2 points out that "some aspects of attention (e.g. vigilance) are addressed via tasks that require a single response to one target occurring in a long trial. Accordingly, such tests may have attenuated reliability" (Manly et al., 2016, p. 145).

Procedure

The present study was conducted in compliance with the American Psychological Association (APA, 2010) code of ethics. Prior to data collection permission was obtained from the chosen school district's Superintendent of Schools, Director of Guidance, and Principal of the participating school. Permission to conduct research involving minors was also obtained from Fordham University's Institutional Review Board (see Appendix J).

Informational meetings were held with the building principal and classroom teachers whose students would be involved in the study. I solicited student participation through email and hard copy sent to parents and students in English and Spanish (Appendices K and L). I also held two presentations (one evening and one daytime) explaining the study to parents and students before the start of the intervention. I received consent for a total of 86 participants. The MAP and SRLD instruction were held within established health classes which prevented random assignment of students to each condition. However, a random number generator was used to randomly assign each of the four health classes to each of the conditions: SRLD, Paws b MAP curriculum, both interventions, or neither condition (control group).

I delivered all intervention lessons as well as all pretest measures and most post-test measures. A school psychologist assisted in the collection of sustained learning post-test measures for two of the four groups. Each intervention group lesson lasted approximately 45 minutes and was delivered once a week. Students in the SRLD intervention group were taught about Zimmerman's SRL model, shown how to use the Pomodoro Technique time management method, and learned how to make entries in the self-regulated learning diary (SRLD) over the course of nine lessons. Students in the MAP intervention group received instruction from the Paws b Mindfulness in Schools Project (MiSP) curriculum over the course of 12 lessons.

Students in the third intervention group received both preceding interventions over the course of 15 lessons at times meeting twice a week. Those students in the remaining group acted as a control, receiving the lessons in their health curriculum.

All four groups completed intervention assessments before and after the interventions for measuring SRL, stress, and sustained attention. SRL was measured using Vandevelde and Van Kerr's (2011) CP-SRLI. The PSSC was used to measure stress. Three subtests from Pearson's TEA-Ch2 were used to measure sustained attention: Vigil, Simple RT, and SART.

I used a quasi-experimental, factorial design to compare the effect of class condition (independent variable) upon three dependent variables. The class conditions were use of SRLD, the SRL scaffold and Pomodoro Technique (X_1) and the Paws b MAP curriculum (X_2). The three dependent variables were student SRL, sustained attention, and perceived stress. Group A learned to use the SRLD for homework completion. Group B learned MAPs through the Paws b curriculum. Group C received both interventions, and Group D received neither, acting as the control (see Figure 5).

Group A	O_1	O_2	O_3	_____	X_1	_____	O_1	O_2	O_3
Group B	O_1	O_2	O_3	_____	X_2	_____	O_1	O_2	O_3
Group C	O_1	O_2	O_3	_____	$X_{1\&2}$	_____	O_1	O_2	O_3
Group D	O_1	O_2	O_3	_____			O_1	O_2	O_3

Figure 5. Nonequivalent Control Group Design

O indicates each measurement taken. O_1 = CP-SRLI; O_2 = TEA-Ch; O_3 = PSS-C. X indicates an intervention. X_1 = SRLD; X_2 = Paws b MAP curriculum. The horizontal line indicates that participants were not assigned to groups randomly. (Creswell, 2014).

CHAPTER IV

RESULTS

Preliminary Analyses

Prior to running tests of hypotheses, several preliminary analyses were conducted. In this section, I review procedures related to cleaning the data, testing model assumptions and calculating descriptive statistics.

Data Cleaning

All variables were reviewed to assure the appropriate use of numerical codes and values. Data were next examined for missing values. Since the pre- and post-assessment dependent variables were collected over a course of days, some students did not complete all measures. Attempts were made to have absent students complete the measures for pre-test assessments. However, a medical emergency prevented me from collecting post-intervention measures from any students who had missed the initial data collection. Data short codes were harmonized for consistency between pre- and post-intervention assessments.

The Perceived Stress Scale for Children (PSS-C) contains several reverse-phrased items. Field (2013) notes that reverse-phrased items may reduce response bias by requiring participants to pay close attention to each question. The PSS-C consists of 13 items scored on a Likert scale from one to five to indicate the level of agreement with a stated phrase ranging from 1 (*not at all*) to 5 (*very much*). Seven of the statements are reverse-phrased to reduce response bias (e.g. "In the last week how often did you feel happy?"). In a reverse-phased item a higher score indicates the reverse of the measured trait of stress. Therefore, such items needed to be reverse scored such that a higher score conveys a consistent indicator of more stress. Reverse-scoring

was accomplished by reversing the scale so that a response of 1 (*very much*) receives five points and a response of 5 (*not at all)* receives one point.

Model Assumptions

Laerd (2015) notes that different types of statistical analyses rely upon different assumptions concerning the data. It is important, therefore, to know which method of analysis will be used to examine the data to determine if it meets all necessary assumptions for that specific method and, if it does not, to address any shortcomings in the data set.

The first consideration in determining the statistical test to be conducted is to ask how many outcome variables exist (Field, 2013). Since the current study has three dependent variables, several possible statistical tests can be ruled out including the t-test, Analysis of Variance (ANOVA), or regression. Next, the type of variables must be considered. The current study has continuous, rather than categorical dependent variables. The PSS-C and the children's perceived self-regulated learning inventory (CP-SRLI) both use Likert scales for student responses. According to Carifio and Perla (2007) Likert scales can be treated as continuous rather than categorical variables allowing for parametric analysis using such techniques as the F-Ratio. This leades to either ANOVA or multivariate analysis of variance (MANOVA). The third dependent variable, sustained attention, was measured using subtests of Pearson's Test of Everyday Attention for Children, 2nd edition (TEA-Ch 2). The subtests scores for sustained attention are scale scores and can likewise be treated as continuous variables.

The third consideration in determining the appropriate statistical analysis is the number of predictor or independent variables. The current study had one, categorical, independent variable: the intervention condition which each group received. Conditions were: lessons using the Paws b mindfulness curriculum, lessons in self-regulated learning and use of a diary to promote

SRL— referred to here as the self-regulated learning diary (SRLD), a group that had both interventions, and a control group which had no interventions. Lastly, the current study used a pre/ post-test design; measuring each group on the three dependent variables before and after the intervention or, in the case of the control group, after the length of time taken to deliver the interventions. This combination of multiple, dependent, continuous variables, one categorical independent variable, and a pre/post design determined the use of a repeated measures MANOVA for data analysis (Lani, 2017).

According to Laerd (2015) there are ten assumptions about the data that must be met to use MANOVA: (a) use of continuous dependent variables, (b) level and measurement of variables, (c) independence of observations, (d) absence of univariate and multivariate outliers, (e) normality, (f) absence of multicollinearity, (g) linearity, (h) adequate sample size, (i) homogeneity of variance-covariance matrices, and (j) homoscedasticity.

The three TEA-Ch 2 subtests, Vigil, SART, and Simple RT, measure reaction times and error rate to indicate sustained attention. Reaction times were measured in milliseconds while errors were counts of discrete attempts, as such the TEA-Ch 2 subtests are continuous dependent variables. The PSS-C and the CP-SRLI both used five-point Likert scales to measure perceived stress and self-regulated learning respectively. As noted earlier Likert scales can be treated as continuous rather than categorical variables (Carifio & Perla, 2007) therefore, the assumption of continuous dependent variables was met by the current study.

The current study had one independent variable consisting of four categorical, independent groups. As stated earlier, there were three different interventions plus a control group. The interventions were: instruction in mindfulness awareness practices using the Mindfulness in Schools Project's Paws b curriculum, instruction in self-regulated learning

concepts and use of a homework diary to promote SRL (referred to in this study as the SRLD), and instruction with both interventions. The assumption of independence of observation was met by using four health classes each consisting of different students.

Extreme values for any variables, or univariate outliers, were examined using tests of skewness. Table 8 reports the skewness of the study's variables. The values were within the +3 to −3 cutoff range, and thus were considered acceptable.

Table 7

Skewness Statistics for All Scales

Scale	*Skewness*	*SE*
PSS-C Pre-intervention	.40	.27
PSS-C Post-intervention	.43	.27
CP-SRLI Pre-intervention	-.48	.27
CP-SRLI Post-intervention	-.56	.27
Sus. Att. Pre-intervention	.12	.31
Sus. Att. Post-intervention	.17	.31

Note. PSS-C = Perceived Stress Scale for Children; CP-SRLI = Children's Perceived Self-Regulated Learning Inventory; Sus. Att. = Sustained Attention, measured by three subtests of the Test of Everyday Attention for Children: Vigil, SART, and Simple RT.

Multivariate outliers were examined by calculating the Mahalanobis distance for each case variable. The Mahalanobis distance values were evaluated with a chi-square distribution at the p-value of .001, and degrees of freedom equal to the number of independent variables (1 in this case). In this study, one multivariate outlier was discovered having a p-value of .00048. That record was removed from the data set prior to further analyses.

Normality was tested using the Shapiro-Wilk test. Since the study used a pre/post intervention design with three dependent variables and four conditions, there were a total of

twenty-four statistics for normality (see Table 8). Two of these twenty-four conditions failed the test for normality with a p-value < .05.

Table 8

Tests of Normality

Dependent Variable	Condition	*W*	*df*	*p*
Pre-Perceived Stress	Mindfulness	.87	6	.23
	Control	.93	14	.33
	SRLD	.94	18	.31
	Both Interventions	.93	18	.17
Post-Perceived Stress	Mindfulness	.98	6	.94
	Control	.84	14	.02*
	SRLD	.97	18	.79
	Both Interventions	.96	18	.61
Pre-SRL	Mindfulness	.91	6	.41
	Control	.87	14	.05
	SRLD	.97	18	.79
	Both Interventions	.97	18	.86
Post-SRL	Mindfulness	.95	6	.76
	Control	.93	14	.34
	SRLD	.86	18	.01*
	Both Interventions	.95	18	.38
Pre-Sustained Attention	Mindfulness	.93	6	.55
	Control	.93	14	.29
	SRLD	.96	18	.54
	Both Interventions	.94	18	.25
Post-Sustained Attention	Mindfulness	.94	6	.67
	Control	.97	14	.92
	SRLD	.93	18	.19
	Both Interventions	.97	18	.73

Note. W = Shapiro-Wilk statistic. * $p < .05$

Laerd (2015) recommends taking the square root of each point to see if this normalizes the data. This was done and transformed data were then tested for normality using Shapiro-Wilk. The results are shown in Table 9. The same two conditions failed the test for normality again with a p-value < .05. Given that some of the data are skewed, the results indicated should be treated with some caution.

Table 9

Tests of Normality With Transformed Data

	Condition	*W*	*df*	*p*
Pre-Perceived Stress	Mindfulness	.87	6	.21
	Control	.93	14	.35
	SRLD	.95	18	.35
	Both Interventions	.94	18	.26
Post-Perceived Stress*	Mindfulness	.97	6	.86
	Control	.85	14	.02*
	SRLD	.97	18	.75
	Both Interventions	.97	18	.79
Pre-SRL	Mindfulness	.90	6	.37
	Control	.85	14	.02*
	SRLD	.95	18	.35
	Both Interventions	.96	18	.68
Post-SRL	Mindfulness	.96	6	.82
	Control	.92	14	.20
	SRLD	.85	18	.01*
	Both Interventions	.93	18	.22
Pre-Sustained Attention	Mindfulness	.94	6	.67
	Control	.93	14	.34
	SRLD	.95	18	.42
	Both Interventions	.95	18	.39
Post-Sustained Attention	Mindfulness	.94	6	.67
	Control	.98	14	.97
	SRLD	.91	18	.10
	Both Interventions	.97	18	.85

Note. W = Shapiro-Wilk statistic. * $p < .05$

Table 10 shows the Pearson correlation and *p* values for SRL, Stress, and Sustained Attention scores before the intervention. There was no multicollinearity between SRL and stress, SRL and sustained attention, or between stress and sustained attention.

Table 10

Pre-Intervention Correlations Among Dependent Variables.

Variables	1	2	3
1. SRL	—		
2. Stress	.18	—	
3. Sustained Attention	.29*	-.03	—

Note. $N = 57$; * $p < .05$

Table 11 shows the Pearson correlation and *p* values for SRL, stress, and sustained attention scores post intervention. Again, there was no multicollinearity between SRL and stress, SRL and sustained attention, or between stress and sustained attention respectively.

Table 11

Post-Intervention Correlations Among Dependent Variables.

Variables	1	2	3
1. SRL	—		
2. Stress	.09	—	
3. Sustained Attention	.20	-.04	—

Note. $N = 57$

There was a linear relationship between SRL, stress and sustained attention scores for each group, as assessed by scatterplot. According to Laerd (2015) one of the assumptions of the one-way MANOVA is that there are at least as many cases in each group of the independent variable as there are number of dependent variables. The current study has three dependent variables and would, therefore, need to have at least three participants in each group. The number of participants in each of the four between-subjects' groups were: Mindfulness ($n = 6$);

SRL (n=18); Both Interventions (n = 18); Control group (n = 14). The number of cases per group ranges from 6 to 18 verifying that the current study meets the minimum size requirement.

Equality of covariance matrices is the next assumption that was verified by running a Box's M test. According to Laerd (2015) the Box's M test is very strict, requiring a level of significance of $p < .001$. The results of Box's M test were $M = 35.97$; $F = .69$ with $df1 = 42$ and $df2 = 5811.80$ and $p = .93$. Therefore, the assumption of homogeneity of variance-covariances matrices was met.

Homoscedasticity, the final model assumption for the use of MANOVA, was tested using Levene's test. The results for pre- and post-intervention scores of the dependent variables are shown in table 12. The results show the assumption of homogeneity of variance/ homoscedasticity has not been violated, $p > .05$ for each dependent variable.

Table 12

Levene's Test of Equality of Error Variances on Pre- and Post-Intervention Scores

	Pre				*Post*			
	F	*df1*	*df2*	*p*	*F*	*df1*	*df2*	*P*
SRL	.20	3	52	.90	.71	3	52	.55
Stress	.69	3	52	.56	.68	3	52	.57
Sustained Attention	.46	3	52	.71	1.45	3	52	.24

Note. Levene's test measures the null hypothesis that the error variance of the dependent variable is equal across groups.

Validity and Reliability of Measures

The validity and reliability of measures were analyzed using factor analyses and Cronbach's alpha. These scores were reported in the Methods section of this report. These scores fell within the recommended guidelines of > .3 and < .8 indicating good construct validity without items being seen to be repetitions of each other (Rattray & Jones, 2007).

Descriptive Statistics

Descriptive statistics including the number of respondents, mean, and standard deviation for each of the scales utilized in the study are presented in Table 13. Higher scores indicate greater agreement with the concept being measured. Table 14 provides the correlation coefficients among the three dependent variables.

Table 13

Mean Scores and Standard Deviations of Pre- and Post-Intervention Dependent Variables as a Function of Experimental Group

		SRL-Pre		SRL-Post		Stress-Pre		Stress-Post		Sus. Att.-Pre		Sus. Att.-Post	
Group	*N*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Paws b	6	3.05	.52	3.30	.40	2.78	.60	2.64	.79	9.72	2.32	10.33	2.01
SRLD	18	3.47	.61	3.68	.62	2.66	.77	2.51	.66	9.35	2.10	9.94	1.87
Paws b & SRLD	18	3.70	.52	3.42	.60	2.90	.87	2.61	.74	10.76	1.91	9.87	2.02
Control	14	3.54	.59	3.36	.62	2.64	.74	2.42	.81	11.83	2.15	10.45	2.93
Total	56	3.52	.59	3.48	.60	2.75	.77	2.53	.72	10.46	2.24	10.09	2.19

Note. SRL= Self-regulated learning measured by the Children's perceived self-regulated learning index (CP-SRLI); Stress measured by the Perceived stress scale for children (PSS-C); Sus. Att. = Sustained Attention measured by subtests of the Test for everyday attention for children, version 2 (TEA-Ch 2).

Table 14

Pre-Intervention Correlation Coefficients for Relations Between Three Dependent Variables.

Variables	1	2	3
1. Stress-Pre	—		
2. SRL-Pre	.18	—	
3. Sustained Attention	-.03	.29*	—

Note. N =57; *p < .05; Stress measured by the PSS-C = Perceived Stress Scale for Children; SRL measured by the CP-SRLI = Children's Perceived Self-Regulated Learning Inventory; Sustained Attention measured by three subscales of the Test of Everyday Attention for Children, 2nd edition.

MANOVA

A repeated-measures MANOVA was conducted to compare the effect of three intervention conditions on the dependent variables: perceived stress, self-regulated learning, and sustained attention. The three conditions were: (A) the Paws b curriculum, (B) instruction about SRL and use of an SRL diary, and (C) both conditions. There was also a control group (D) which completed all dependent variable measures before and after the interventions but received no special instruction. Results are shown in table 15. No score reached the p < .05 level of statistical significance.

Table 15

Multivariate Effects

Effect	Pillai's Trace	*F*	*Hypothesis df*	*Error df*
Condition	.19	1.17	9.00	156.00
Time	.10	1.82[a]	3.00	50.00
Time * Condition	.29	1.88	9.00	156.00

Note. [a] Exact statistic

Primary Analyses

The main results of the present study are organized according to the following research questions:

1. Does a MAP prior to HW impact students' SRL state during homework sessions?
2. Does the continued use of MAPs impact students' SRL as a trait over time?
3. Does the continued use of MAPs impact students reported stress over time?
4. Does the continued use of MAPs impact students' attention over time?
5. Does the use of both MAP and SRLD impact SRL, reported stress or sustained attention, over time?

Research Question 1

Does the practice of mindfulness prior to homework impact students' SRL state during homework sessions? To address the first research question, which aimed to assess the impact of mindfulness meditation practice on SRL state during homework, an online diary was used by two of the groups, the SRLD group (B) and group (C) which received SRLD and Paws b interventions. The SRLD for students in group C differed from the SRLD for students in group B in that the SRLD for group C included a guided mindfulness mediation. My original plan was to examine data from these online diaries for each student using trend analysis. However, the number of diary entries was insufficient for trend analysis. The total number of students making entries was 29 (9 from group B and 20 from group C) with the number of entries per student ranging from one to six for a total of 67 entries. Therefore, I ran a T-test comparing the pre- and post-intervention SRL scores for the nine students in group B who made SRLD entries and for the 20 students in group C who made entries in the SRLD with guided meditation. Descriptive statistics for these students are shown in table 16. The results show that the difference in mean

pre- and post-intervention scores failed to reach a significant level for either those who used the SRLD alone ($p = .76$) or those who used the SRLD with mindfulness meditation ($p = .40$).

Table 16

Descriptive Statistics for Students From Groups B and C Using the SRLD vs Those Who Did Not for Pre- and Post-Intervention SRL Scores

		Pre-Intervention		Post-Intervention	
Dependent Variable	*N*	*M*	*SD*	*M*	*SD*
SRLD	9	3.66	.43	3.71	.37
SRLD and Meditation	20	3.46	.68	3.32	.60

Note. SRL = Self-regulated learning measured by the Children's Perceived Self-Regulated Learning Inventory (CP-SRLI).

Research Question 2

Does the use of the SRLD impact students SRL subprocesses over time? This second question was examined using the pre- and post-intervention data from the CP-SRLI scores for each group - the two groups who had been taught to use the SRLD were the SRLD group and the group that received both interventions. CP-SRLI scores for all four groups were examined for construct validity using confirmatory factor analyses using varimax rotation. Six of the twenty items had correlation scores below |.4| and were removed. Additionally, for pre-intervention scores the Kaiser-Meyer-Olkin measure of sampling adequacy was .81 above the recommended value of .6, and Bartlett's test of sphericity was significant (χ^2 (91) = 333.06, $p < .001$). For post-intervention scores the Kaiser-Meyer-Olkin measure of sampling adequacy was again .81, above the recommended value of .6, and Bartlett's test of sphericity was significant (χ^2 (91) = 375.11, $p < .001$). The final fourteen items included in data analysis are listed in Table 17.

Table 17

Rotated Component Matrix for Pre- and Post-Intervention Scores

Item	Pre-Score	Post-Score
I go over my answers again.	.73	.56
I check that I haven't forgotten anything.	.73	.54
I ask myself, "Have I done it the right way?"	.66	.64
During my math homework, I ask myself, "What part is difficult? What do I need to practice some more?"	.64	.55
Even if I would rather do other things, I make myself start my math homework.	.62	.62
I check if I have done everything that was asked for.	.61	.64
Even if I would rather do other things, I make myself start my math homework.	.58	.69
Even if my math homework is difficult or boring, I do my best.	.58	.56
I ask myself, "Did that way of doing my math homework work well?"	.56	.42
Before I start my math homework, I read the instructions carefully.	.55	.71
If I get a similar math problem to one I have already done, I ask myself, "How did I approach it last time? Was that a good approach?"	.53	.54
If I get distracted while doing my math homework, I immediately try to continue working.	.50	.68
During my math homework, I ask myself, "What part is difficult What do I need to practice some more?"	.48	.61
Before I start my math homework, I ask myself, "What is it about? What do I know about it?"	.42	.44

Note. Extraction Method: Principal Component Analysis.

A one-way MANOVA was run to determine the effect of three types of intervention on SRL, perceived stress and sustained attention. The CP-SRLI was used as a measure of SRL, the PSS-C was used as a measure of perceived stress, and three subtests of the TEA-Ch 2 were used to measure sustained attention. All tests were administered before and after the interventions which lasted approximately eight weeks. Four established health classes were each randomly assigned the following interventions: (A) instruction using the Mindfulness in Schools Project's

Paws b curriculum; (B) instruction using an overview of SRL theory plus how to use an online SRL Diary; (C) both interventions; or (D) no intervention (control). Means and standard deviations for each group for SRL before and after the interventions are shown in Table 18.

Table 18

Descriptive Statistics for CP-SRLI Scores Pre- and Post-Intervention

		Pre-Intervention		Post-Intervention	
Condition	*N*	*M*	*SD*	*M*	*SD*
Mindfulness	6	3.05	.52	3.30	.40
SRLD	18	3.47	.61	3.68	.62
Both	18	3.70	.52	3.42	.60
Control	14	3.54	.59	3.36	.62

Table 19 displays the multivariate and univariate analyses of variance for the three dependent variables. There was not a statistically significant difference between the groups on the combined dependent variables either before or after the interventions. Between groups F (9, 156) = 1.17, $p > .05$; Pillai's Trace = .19. Within groups F (9, 156) = 1.88; Pillai's Trace = .29. Pillai's Trace was used due to unequal group sizes as per Laerd (2015).

Table 19

Multivariate and Univariate Analyses of Variance for Dependent Variables

	Multivariate			Univariate								
				CP-SRLI			PSS-C			Sustained Attention		
Source	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2
Condition	1.17	.32	.06	1.05	.38	.06	.33	.81	.02	1.77	.17	.09
Time	1.82	.16	.10	.00	.99	.00	4.81	.03	.09	.65	.42	.01
C x T	1.88	.06	.10	3.57	.02	.17	.13	.94	.01	2.76	.05	.14

Note. Multivariate *F* ratios were generated from Pillai's trace statistic.

A one-way MANOVA was run to determine the effect of three different interventions on SRL, stress, and sustained attention. Three interventions were implemented: (A) the Paws b curriculum of mindfulness training, (B) lessons on the SRL framework as well as instruction in the use of a SRL homework diary, and (C) a class that received both interventions. There was also a fourth condition (D) which acted as a control having no interventions. Preliminary assumption checking revealed that data were mostly normally distributed, as assessed by Shapiro-Wilk test ($p > .05$); there were no univariate or multivariate outliers, as assessed by boxplot and Mahalanobis distance ($p > .001$), respectively; there were linear relationships, as assessed by scatterplot, no multicollinearity between SRL and stress ($r = .18$, $p = .10$); between SRL and sustained attention ($r = .29$, $p = .03$); or between Stress and Sustained Attention ($r = -03$, $p = .82$) respectively.

There was homogeneity of variance-covariance matrices, as assessed by Box's M test ($p = .99$). Although, the within subjects scores for SRL in groups A and B, did increase from pre- to post-intervention; the difference did not reach statistical significance ($p = .38$); additionally, scores for groups C and D were higher at pre-intervention than post-intervention

contrary to the hypothesis (see Table 18). The differences between the groups on the combined dependent variables was not statistically significant, F (9,156) = 1.17, p =.32; Pillai's Trace = .19; partial η^2 = .06.

Research Question 3

The third research question examined whether learning about mindfulness through the Paws b curriculum impacted students perceived stress over time. The pre- and post-intervention data from the PSS-C for each group was examined for groups A and B, who had been taught using the Paws b curriculum and the SRLD interventions as well as group C and D who were taught using both interventions and who acted as the control group respectively.

First, as noted in the Methods section, PSS-C scores for all four groups were examined for construct validity using confirmatory factor analyses using Varimax rotation. A factor analysis was done to test the construct validity of the questionnaire. The 13 items were loaded on one factor: perceived stress. Using SPSS, Varimax rotation was selected to maximize the loadings of variables with a strong association with the factor while minimizing those with weaker associations. Questionnaire items with a corrected item-total correlation of < 0.4 were deleted as recommended by Rattray and Jones (2007). The same items were deleted from the post-test scores resulting in the correlational scores shown in table 20.

Table 20

Correlational Scores for Items Analyzed on the PSS-C Following Factor Analysis

Questionnaire Item	Pre-Test Correlation	Post-Test Correlation
In the last week, how often did you feel scared or nervous?	.75	.74
In the last week, how often did you feel rushed or hurried?	.70	.70
In the last week, how often did you feel you had enough time? *	.63	.67
In the last week, how often did you feel worried about grades?	.69	.69
In the last week, how often did you feel rushed worried about being too busy?	.57	.50
In the last week, how often did you feel you had enough friends? *	.46	.61

Note. *Indicates items that were reverse scored.

Next, the means and standard deviations of PSS-C scores prior to and following the interventions for each established group were examined (see Table 21). As noted above, there was not a statistically significant difference between the groups on the combined dependent variables either before or after the interventions. Between groups F (9, 156) = 1.17, p = .32; Pillai's Trace = .19. Within groups F (9, 156) = 1.88; Pillai's Trace = .294, p = .06. Pillai's Trace was used due to unequal group sizes as per Laerd (2015). Although the mean scores show a dip in perceived stress for each group between the pre- and post-intervention treatments, the univariate between groups score for PSS-C showed this did not approach a level of significance (p = .81).

Table 21

Descriptive Statistics for PSS-C Scores Pre- and Post-Intervention

		Pre-Intervention		Post-Intervention	
Condition	*N*	*M*	*SD*	*M*	*SD*
Mindfulness	6	2.78	.60	2.64	.78
SRLD	18	2.69	.77	2.51	.66
Both	18	2.90	.87	2.61	.74
Control	14	2.64	.74	2.42	.81

Note. Higher scores indicate a higher level of perceived stress.

Research Question 4

The fourth question explored the effect of each condition on students' sustained attention over time. The means and standard deviations of sustained attention scores prior to and following the interventions for each established group were examined (see Table 22). As noted above, there was not a statistically significant difference between the groups on the combined dependent variables either before or after the interventions. Between groups F (9, 156) = 1.17, p > .05; Pillai's Trace = .19. Within groups F (9, 156) = 1.881; Pillai's Trace = .294. Pillai's Trace was used due to unequal group sizes as per Laerd (2015). Although the mean scores show a slight improvement in sustained attention for the Paws b and SRLD groups, as well as slight dips in sustained attention for the group that received both interventions and the control group, the univariate between groups scores for sustained attention showed these did not approach a level of significance (p = .17).

Table 22

Descriptive Statistics for Sustained Attention Scores Pre- and Post-Intervention

		Pre-Intervention		Post-Intervention	
Condition	*N*	*M*	*SD*	*M*	*SD*
Mindfulness	6	9.72	2.32	10.33	2.01
SRLD	18	9.35	2.10	9.94	1.87
Both	18	10.76	1.91	9.87	2.02
Control	14	11.83	2.15	10.45	2.93

Note. Higher scores indicate longer sustained attention.

Research Question 5

The fifth and final question explored the effect of receiving both interventions on SRL, stress and sustained attention over time. The pre- and post-intervention data for group C (receiving both Paws b and SRLD interventions) was extracted and analyzed separately using a paired samples T-test. Mean scores and standard deviations are reported in Table 23. The mean SRL and mean sustained attention scores increased slightly from pre- to post-test but not at a statistically significant level (SRL $p = .09$; Sustained Attention $p = .33$). The mean perceived stress score decreased from pre- to post-intervention but, again, not at a statistically significant level ($p = .10$).

Table 23

Descriptive Statistics for Group C (Receiving Both Paws b and SRLD Interventions) for Pre- and Post-intervention SRL, Stress, and Sustained Attention Scores

		Pre-Intervention		Post-Intervention	
Dependent Variable	*N*	*M*	*SD*	*M*	*SD*
SRL	22	3.41	.71	3.59	.16
Stress	21	2.71	.81	2.52	.78
Sustained Attention	19	9.47	2.11	10.11	1.94

Note. SRL = Self-regulated learning measured by the Children's Perceived Self-Regulated Learning Inventory (CP-SRLI); Stress measured by the Perceived Stress Scale for Children (PSSC); Sustained Attention measured by three sub-tests of the Test of Everyday Attention for Children, 2nd edition (TEA-Ch2).

Contrary to expectations, there was no evidence that lessons on mindfulness using the Paws b curriculum and lessons on Zimmerman's SRL framework with a scaffolded SRL homework diary had an impact on students SRL, stress or sustained attention.

Ancillary Analyses

The three subtests of the TEA-Ch 2 required lengthy administration as they needed to be given back-to-back, requiring a large block of time, the scheduling of which was challenging to accommodate. The sub-tests also required scheduling a computer lab as the assessments are all given on computer. Due to these facts, it was more difficult to have all students involved in the study complete the pre- and post-intervention subtests for sustained attention. Consequently, the N for this measure was quite low ($N = 56$). This number became even smaller when filtering out those students who had not taken all the pre- and post-measures for SRL and stress. In such cases the *N* diminished to a low of 6. For these reasons, an ancillary analysis was done on SRL

and perceived stress, leaving out the measure of sustained attention. This increased the smallest number of participants in any group to 18.

A second MANOVA was run using the CP-SRLI and PSS-C scales that measure SRL and perceived stress respectively. The descriptive statistics including the number of respondents, mean, and standard deviation for CP-SRLI and PSS-C scores are presented in Table 24. Higher scores indicate greater agreement with the concept being measured.

Table 24

Mean Scores and Standard Deviations of Pre- and Post-Intervention SRL and Stress as a Function of Experimental Group

		SRL-Pre		SRL-Post		Stress-Pre		Stress-Post	
Group	*N*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Paws b curriculum	18	3.25	.68	3.43	.59	2.93	.75	2.79	.88
SRLD	21	3.37	.71	3.57	.77	2.71	.81	2.52	.78
Paws b & SRLD	22	3.49	.71	3.38	.65	2.84	.81	2.66	.68
Control	19	3.41	.68	3.26	.63	2.72	.77	2.44	.75
Total	80	3.39	.69	3.41	.66	2.80	.78	2.60	.77

Note. SRL = Self-regulated learning measured by the Children's Perceived Self-Regulated Learning Inventory (CP-SRLI); Stress measured by the Perceived Stress Scale for Children (PSSC).

The results showed no statistically significant differences between the groups on the combined dependent variables either before or after the interventions. Between groups F (6, 152) = .45, p = .84; Pillai's Trace = .04. Within groups F (2, 75) = 4.10; Pillai's Trace = .10.

The descriptive statistics show a slight increase in SRL scores between pre- and post-intervention for the Paws b and SRLD groups and a slight decrease in the same for the

group that received both interventions and the control group. However, the univariate between groups scores for SRL showed these did not approach a level of significance (p = .87).

Additionally, although the mean perceived stress scores decreased slightly between pre- and post-interventions for all four groups, the univariate between groups scores for perceived stress showed these did not approach a level of significance (p = .61).

Tables 25 and 26 show the Pearson correlation and p values for CP-SRLI and PSS-C scores before and after the intervention respectively. Pearson's correlation test shows there was no statistically significant association between SRL and stress in either pre- or post-intervention data. This further analysis with a larger N confirms that there were no statistically significant findings even when the TEA-Ch 2 scores for sustained attention were removed.

Table 25

Correlation Coefficients for Relations Between SRL and Stress Measures Pre-Intervention (N =82)

Measure	1	2
1. SRL Pre-Intervention	—	
2. Stress Pre-Intervention	.20	—

Table 26

Correlation Coefficients for Relations Between SRL and Stress Measures Post-Intervention (N =82)

Measures	1	2
1. SRL Post-Intervention	—	
2. Stress Post-Intervention	.06	—

CHAPTER V

DISCUSSION, LIMITATIONS, AND CONCLUSIONS

The purpose of the present study was twofold. As noted in the introductory chapter, the ability to learn, unlearn, and relearn has been called a key literacy skill for the twenty-first century (Toffler, 1970). Past research indicates that self-regulated learning (SRL) promotes this ability through an important set of skills whereby learners engage in a self-reflective cycle adjusting future learning efforts based upon past learning experiences (Zimmerman, 2002b; 2011). Direct instruction and scaffolding supports have proven successful in the development of SRL skills (Abrami et al., 2008; Cooper, Horn, & Strahan, 2005; Schmitz & Perels, 2011). The current study sought to foster SRL skills using a homework diary (referred to here as an SRLD) that asked periodic, self-reflective questions (e.g. "If I could ask my teacher one question about my math homework, what would it be?"). One purpose of the study was to investigate how use of this SRLD impacted the development of SRL skills over time.

The second purpose of the study was to investigate how mindfulness practice might impact student's SRL. Past research shows that mindfulness practice has been shown to increase sustained attention (MacLean et al., 2010; Semple, et al., 2010) and promote non-judgmental self-awareness (Kabat-Zinn, 2005), both of which are key aspects of SRL (Zimmerman, 2000). There is also evidence that mindfulness practice may reduce stress (Saltzman & Goldin, 2008; van de Weijer-Bergsma, Langenberg, Brandsma, Oort, & Bögels, 2014), which has shown a negative correlation with SRL (Trevisani, 2015). Several mindfulness curriculums developed for school aged children are being introduced into K-12 schools (Ryan, 2012). The current study examined how the Paws b mindfulness curriculum might benefit students SRL skills.

Given mindfulness's promotion of self-reflection and past research (Boekaerts, 2006; Langer, 1989), it was thought that regular mindfulness meditation immediately prior to

homework might assist students in the use of the SRLD. Therefore, one of the two groups shown how to use the SRLD, was asked to listen to a brief guided mindfulness meditation immediately prior to homework sessions. It was also thought, based on past research that mindfulness practice might help reduce students' stress over homework (Cicero, 2013; Galloway, Conner, & Pope, 2013). Finally, it was thought that regular mindfulness and SRL practice might improve SRL by increasing sustained attention (Howell & Buro, 2010; Rice & Liu, 2017; Zimmerman, 2000).

This chapter includes four sections. Section one is a review of the findings. Section two highlights the implications for the field of education and educational practices. Section three presents the limitations of the study and future directions for research. Section four provides a brief conclusion to the study.

Summary and Review of Findings

Established fifth grade Health classes were used as the experimental and control groups. Each of the four Health classes was randomly assigned to the following four conditions: (A) instruction using the Mindfulness in Schools Project's Paws b curriculum; (B) instruction using an overview of SRL theory plus how to use an online SRL Diary; (C) both interventions A and B; or (D) no intervention (control). All students were assessed prior to and following the interventions with measures for SRL, perceived stress, and sustained attention using subscales from Vandevelde and Van Keer's (2011) Children's Perceived use of Self-Regulated Learning Inventory (CP-SRLI), White's (2014) Perceived Stress Scale for Children (PSSC), and subscales from the Test of Everyday Attention for Children, Second Edition (TEA-Ch 2), respectively.

The first hypothesis investigated whether the practice of mindfulness immediately prior to homework would impact students' temporary SRL state during homework sessions. There is

a long debate about whether SRL represents a short-term state or more permanent trait within individuals and across subject areas (Schmitz & Perels, 2011; Winne & Perry, 2000). Currently, it is believed that rather than being a ubiquitous trait, SRL is specific to each learning task (Cleary, Callan, & Zimmerman, 2012; Zimmerman, 2002a); though there is also evidence that SRL may have qualities of both a trait and state (Winne & Perry, 2000). By collecting data near the actual event, using what Winne and Perry (2000) would describe as an *event measure,* it was hoped that evidence could be added to the trait vs. state discussion.

Prior research has shown that students can learn phases of the SRL cycle to improve their learning (Zimmerman, Bonner, & Kovach, 1996). Research has also shown that keeping a structured homework diary improved students' SRL skills (Grossman et al., 2004; Schmidt, Perels, & Schmitz, 2010). Students in the current study first learned about Zimmerman's three phase model of SRL (Zimmerman, 1992). Then, they received instruction in using an online homework diary scaffolded to support self-reflection, mirroring Zimmerman's model (referred to as the SRLD throughout this study). To address the first research question, which aimed to test the impact of mindfulness meditation practice on SRL state during homework, an SRLD was provided for two of the four experimental groups, one group having received instruction about SRL and how to use an SRLD and another group that received both the SRL lessons and the Paws b mindfulness curricula. The plan was to examine data from these online diaries using trend analysis as done in previous work by Schmitz and Perels (2011). Unfortunately, very few students used the online diaries with resulting in an insufficient dataset for trend analysis. Instead, I used a T-test to compare the pre- and post-intervention SRL scores of students who made at least one entry into the SRLD from group B and those who made at least one entry from group C whose SRLD included a guided mindfulness meditation. The results showed no

statistically significant change in either group B (p = .76) or group C (p = .40). These results may have been due to the very small number of SRLD entries indicating a lack of regular mindfulness and SRL skills practice. It is acknowledged that an incentive to promote compliance with making consistent SRLD entries may be necessary at this age level.

The second through fourth hypotheses explored changes in the three dependent variables over the length of the intervention. Since there were multiple dependent variables, a one-way MANOVA was run to determine the effect of the three interventions on SRL, perceived stress and sustained attention. The CP-SRLI was used as a measure of SRL, the PSS-C was used as a measure of perceived stress, and three subtests of the TEA-Ch 2 were used to measure sustained attention. All tests were administered before and after the interventions which lasted approximately eight weeks.

Hypothesis two explored whether the regular use of the SRLD impacted SRL as a reliable trait in students over time. The CP-SRLI was used to measure SRL before and after the series of intervention lessons. The CP-SRLI is a self-report questionnaire designed specifically for use by children aged 10 to 13 modeled after the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich, Smith, Garcia, and McKeachie (1993). As a self-report questionnaire, the CP-SRLI measures SRL as an aptitude or long-lasting trait, rather than as an isolated event (Winne & Perry, 2000; Vandevelde & Van Keer, 2011).

The descriptive statistics and results of MANOVA comparing pre- and post-intervention CP-SRLI scores were examined for each group. There was no statistically significant change in SRL scores between pre- and post-intervention (p = .38) indicating no improvement in students' self-regulated learning during this time. Therefore, there is no support that neither direct SRL instruction nor use of the SRLD had the desired effect of increasing students' SRL skill adoption.

The third research question examined whether the mindfulness curriculum impacted students perceived stress over time. Stress was measured using the PSS-C. Once again, students in each of the four groups completed the measure before and after their respective interventions. As noted above, there was not a statistically significant difference between the groups on the combined dependent variables either before or after the interventions ($p = .38$). The univariate between groups score for perceived stress also failed to reach a level of significance ($p = .81$).

The fourth hypothesis explored the effect of each intervention on students' sustained attention over time. Sustained attention is described as the ability to "maintain consistent focus over time" (Rice & Liu, 2017, p. 397). Over one-hundred years earlier James (1900) correctly observed that voluntary attention could not be sustained for long, that as one's mind wanders, one must constantly bring back one's attention through "distinct pulses of effort" (p. 101). Past research has shown gains in sustained attention following training in mindfulness awareness practices (Chambers et al., 2008; Thomas & Atkinson, 2016). Further, Lutz et al. (2009) have found that mindfulness meditation not only improves sustained attention, but it can also aid in three other areas associated with self-regulated learning: the ability to self-monitor, the ability to let go of a distraction once aware of it, and the ability to refocus on the primary object of attention. It seemed reasonable to expect, therefore, that sustained attention would be impacted by those groups who received instruction in mindfulness practices (A and C above). However, the univariate between groups scores for sustained attention showed there was no statistically significant change between pre- and post-intervention scores ($p = .17$).

The fifth, and final question examined the effect of the combination of the Paws b curriculum and the SRLD on both stress and SRL over time. It was thought that having mindfulness combined with a scaffolded SRLD for those students in the both interventions group

would be most likely to improve SRL scores while reducing stress. As has been laid out in the introduction and literature review, there is reason to believe that the combined intervention of mindfulness and lessons on the SRL process might work together synergistically.

Research has indicated that mindfulness practice decreases stress (Grossman et al., 2004; Zelazo & Lyons, 2012) and that stress is negatively correlated with academic performance (Kaplan, Liu, & Kaplan, 2005). It was reasoned in chapter one that by decreasing stress, mindfulness practice could have what Zelazo and Lyons (2012) called a "bottom up effect" on cognitive processing. The phrase "bottom up effect" relates to the effect of mindfulness on the amygdala which is physically located below the brain's prefrontal cortex where executive functioning occurs. By calming the amygdala, the prefrontal cortex can engage in self-monitoring and sustained attention (Zelazo & Lyons, 2012).

As noted earlier, there is also reason to believe that mindfulness practice may impact subprocesses specific to SRL. Brown et al. (2007) report that mindfulness helps to develop nonjudgmental self-observation, which should aid the self-judgment subprocesses of the self-reflection phase in Zimmerman's model of SRL (2002b). Additionally, improvements in sustained attention due to mindfulness practice (Thomas & Atkinson, 2016) should aid students in their ability to focus on the task at hand during the performance phase of SRL. Finally, Lutz et al. (2009) have found that mindfulness meditation can also aid in the abilities to self-monitor, to let go of a distraction once aware of it, and to refocus on the primary object of attention—all subprocesses within the performance phase of SRL. Here too, there were no statistically significant differences between pre- and post-intervention scores for mean SRL, mean sustained attention, nor mean perceived stress scores.

In summation, statistical analysis of each of the five hypotheses yielded no evidence that reached a level of statistical significance ($p < .05$) to support the alternative hypotheses. Given the argument laid out in the opening chapter as well as past research which appears to support the premise that direct SRL lessons and the use of a structured SRL diary can positively impact SRL; and that regular mindfulness practice can reduce stress and increase sustained attention, the findings beg the question, "What happened?"

I believe that two main facets may account for the current study's inability to detect support for the proposed hypothesis. First, based upon the small number of entries made in the SRLD, it is likely that students did not consistently practice the use of either SRL or mindfulness when doing their homework. Further, there is no evidence that suggests that those students who had lessons in the Paws b mindfulness curriculum alone (without use of the SRLD) practiced mindfulness between weekly lessons. The literature on mindfulness clearly indicates that home practice is an important factor in the effectiveness of mindfulness interventions (Huppert & Johnson, 2010; Segal et al., 2013; Vickery & Dorjee, 2016). The lack of such daily practice, may have lessened the potential benefits regarding reduced stress and/or increased sustained attention. The second area of concern is that the subtests of the TEA-Ch 2 used to measure sustained attention are designed for individual administration to one student at a time (Manly et al., 2016). Due to time constraints of the current study, these subtests were administered to groups of 15–20 students at a time in a computer lab setting. The accuracy of the resultant scores may have suffered because of the administration conditions. Unfortunately, a search for a reliable sustained attention measure designed for group administration prior to the study yielded no results. These shortcomings are further discussed in the limitations section below.

Implications

The current study found no support for the benefits of SRL nor mindfulness interventions despite the fact that past research has provided evidence for both (Kitsantas & Zimmerman, 2009; MacLean et al., 2010; Mrazek et al., 2014; Schmitz, Klug, & Hertel, 2013). Limitations of the study, named below, need to be addressed if future research is to support the hypothetical connections laid out in the current study. The literature review has value in offering theoretical support for a connection between mindfulness and SRL by articulating how known benefits of mindfulness (Biegel et al., 2009; Thomas & Atkinson, 2016; Zelazo & Lyons, 2012) may impact specific subprocesses within Zimmerman's (2002b) SRL model. Such a hypothetical connection remains a relatively untested area of research (McCloskey, 2015). Zenner, Herrnleben-Kurz and Walach (2014) found that most studies of mindfulness have investigated its impact using a mindfulness framework such as mindfulness- based stress reduction (MBSR) or mindfulness-based cognitive therapy (MBCT). Using an SRL framework to investigate mindfulness may offer new insights to the study of SRL and mindfulness.

Although the current study does not confirm past work, I believe this is due more to methodological shortcomings rather than a fundamentally flawed hypothesis. As stated earlier, my first hypothesis had sought to investigate the impact of regular use of a scaffolded SRL diary which, for one of the two groups using it, also included a guided mindfulness meditation practice. Vettese, Toneatto, Stea, Nguyen, and Wang (2009) conducted a literature review of 98 mindfulness intervention studies seeking to understand the impact of home practice of mindfulness exercises. They found that only 24 of the studies looked at the effects of home practice. Methods for tracking home practice ranged from a single question in an end of study survey regarding practice regularity to daily logs that participants were asked to keep. However,

only six of these studies reported practice consistency rates which ranged from 68% to 97%. I had understood their shortcoming in data collection to be simply due to the lack of a mechanism for collecting data. I therefore assumed I had addressed the prior studies' data collection shortcomings by simply asking students in two of the groups to complete an online diary that scaffolded SRL skills (see Appendix E) each night they had homework. Since homework was assigned four nights per week, it was hoped that this would result in many SRLDD entries.

What I did not consider was that all the studies reviewed by Vettese et al. (2009) consisted of adult populations who had high intrinsic motivation to engage in home mindfulness practice. Several of the studies utilized mindfulness programs to address acute or chronic medical conditions such as cancer. Working with fifth grade students who were being asked to voluntarily complete the SRLD amounted to asking students to complete "extra homework". As I only saw groups once a week, it was difficult to hold them accountable for diary entries.

In retrospect, I now see that at least three key changes would be necessary to insure student compliance with the use of homework entries. First, tangible incentives should be offered for a set minimum entry completion rate. As homework completion is often used as one element of quarterly grades, bonus points for completion could be a powerful incentive. Second, use of the SRLD needs to be promoted more frequently than once per week during the research session. This point might be done by enlisting the classroom teachers as daily monitors of SRLD completion. Third, parents could be enlisted in the project, asking them to encourage their children to use the SRLD and practice mindfulness regularly.

Limitations and Future Directions

Several limitations of this study should be taken into consideration when interpreting the findings. First, the sample size of 82 students was less than initially hoped for and the number of

students who completed all three pre- and post-intervention measures was smaller still (N = 56). This presented a lesson in maximizing potential sample size. Looking back, it may have been necessary to involve more than one grade level or more than one school. Second, two of the three dependent measures relied on self-reported data, which can be prone to social desirability biases (Rattray & Jones, 2007). In addition, the third measure, subtests of the TEA-Ch 2 are designed to be given to one student at a time but due to time constraints were administered in a lab setting to as many as 18 students at a time. It is noted that several measures of sustained attention were considered including the Cognitive Assessment System (Naglieri & Das, 1997), the Integrated Visual and Auditory Continuous Performance Task (BrainTrain, 2015), and the Neuropsychological Assessment II (Korkman, Kirk, & Kemp, 2007) but each presented the constraint of being administered to subjects one at a time. This points out the need for psychometric tests of attention that are designed to be given en masse. Although the most common use of such tests is as part of a more comprehensive battery to recommend or rule out additional services for students, I believe that computerized tests of sustained attention, such as the TEA-Ch 2 subtests used here, could be adopted to be used with large groups of students. Such an adaptation would benefit future research.

Another methodological limitation of the current study was its reliance on quantitative data alone. While there is clearly value to quantitative data, the importance of qualitative research methods is also acknowledged. The current study may have been improved with the addition of open ended interviews with individual students and/or focus groups of students to capture their experience of the interventions. The use of qualitative data could offer a more exploratory approach to understanding the value students found in either the Paws b or SRL

curricula. Future researchers are encouraged to adopt a mixed-methods approaches that incorporates both quantitative and qualitative data for studies on mindfulness and SRL.

Another limitation and major disappointment in this research was the low number of entries students made in the online SRLD. This specific lack of data prevented analysis of the first hypothesis, "Does the practice of mindfulness prior to homework impact students' SRL state during homework". I also believe that students inconsistent use this tool on a regular basis severely limited their development of SRL skills due to a lack of the desired reaction effect. (Shapiro & Cole, 1999). Since the group who had both interventions was also given a prompt to listen to a brief guided breathing meditation, it is likely that the failure to use the SRLD also lessened the impact of the Paws b curriculum. Several studies on mindfulness intervention highlight the importance of daily practice (Semple, Droutman, & Reid, 2017; Weare, 2012). Vettese et al. (2009), called for future research on mindfulness to document home practice. Past studies with adult participants have found a correlation between hours of home mindfulness practice and improvements in cognitive functioning and psychological well-being (Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007; Carmody & Baer, 2008). Additionally, Jha et al. (2010) have suggested that improvements in cognitive functions and affective well-being may be subject to a "dose response"; that is, cognitive improvement may depend upon the amount of mindfulness training. It was hoped that the SRLD entries would provide such a log. In retrospect, an incentive for regular completion of the online diary, regular reinforcement by classroom teachers, and parental involvement would have been wise additions to the design. Constraints on my own time due to other job responsibilities limited the frequency with which I could offer lessons in either SRL or MAP to once per week. Future research in this area might increase the number and frequency of both SRL and MAP lessons. It would also be beneficial to

employ a longitudinal design in future research to understand if any changes in behavior, affect, or attentional capabilities remain beyond formal lessons.

I believe that studies in the areas of SRL and mindfulness that have been cited throughout this dissertation justify further exploration of how mindfulness practice might support the development of student SRL skills. The rapid growth of curricula dedicated to encouraging mindfulness in K-12 classrooms (Semple et al., 2017) offers an opportunity for such research to occur. SRL provides researchers a tested theoretical framework shown to benefit student achievement (Wigfield, Klauda, & Cambria, 2011; Zimmerman, 1990). While growing interest in school mindfulness programs offers a vehicle for expanding SRL's reach.

Conclusion

There have been several studies on SRL interventions over the past 40 years. The majority of these have focused on students in Secondary School and College (Kitsantas & Zimmerman, 2009). There is a need for further SRL studies, like the current one, of students in elementary school. Studies on mindfulness have similarly focused on older populations including college-aged students and adults (Zoogman et al., 2014). With the increasing popularity of mindfulness programs for elementary and High School aged students there is a clear need for research on their effects (Davidson et al., 2012). The current study also sought to address weaknesses cited in prior research: the lack of theoretical frameworks tied to the research of mindfulness, the lack of experimental design, failure to use measures beyond self-reports. The current research tied the theoretical framework of SRL to an established mindfulness curriculum developed specifically for elementary school children. It used a quasi-experimental, multiple condition, pre/post intervention design, and attempted to gather data using established measures of sustained attention in addition to self-report measures of SRL and stress.

Interest in and implementations of mindfulness programs continue to grow in United States and elsewhere. If such implementations are to be sustained, further research on the effects of mindfulness training within schools is needed (Greenberg & Harris, 2012). Linking mindfulness to the well-established theoretical framework of SRL offers the possibility of synergistic benefits for both areas (Howell & Buro, 2010; Semple et al., 2017).

References

Abrami, P. C., Wade, A., Pillay, V., Aslan, O., Bures, E. M., & Bentley, C. (2008). Encouraging self-regulated learning through electronic portfolios. *Canadian Journal of Learning and Technology, 34*(3). doi:10.21432/t2630w

American Psychiatric Association. (2000). *DSM-IV-TR: Diagnostic and statistical manual of mental disorders, fourth edition, text revision*. Washington, DC: Author.

American Psychological Association. (2017). *Stress in America: Coping with Change* (Rep.). Stress in America Survey. Washington, DC: Author.

Arch, J. J., & Craske, M. G. (2006). Mechanisms of mindfulness: Emotion regulation following a focused breathing induction. *Behaviour Research and Therapy*, *44*(12), 1849–1858. doi:10.1016/j.brat.2005.12.007

Assor, A., & Connell, J. P. (1992). The validity of students' self-reports as measures of performance affecting self-appraisals. In D. H. Schunk & J. L. Meece (Eds.), *Student perceptions in the classroom* (pp. 25–47). Hillsdale, NJ: Lawrence Erlbaum Associates.

Azevedo, R., & Hadwin, A. F. (2005). Scaffolding self-regulated learning and metacognition: Implications for the design of computer-based scaffolds. *Instructional Science, 33*(5–6), 367–379. doi:10.1007/s11251-005-1272-9

Bach, P., Hayes, S. C., & Levin, M. (2015). Mindfulness as a key construct in modern psychotherapy. In *Handbook of mindfulness and self-regulation* (pp. 141–154). New York: Springer-Verlag.

Baddeley, A. (1992). Working memory. *Science, 255*(5044), 556–559. doi:10.1126/science.1736359

Baijal, S., Jha, A. P., Kiyonaga, A., Singh, R., & Srinivasan, N. (2011). The influence of concentrative meditation training on the development of attention networks during early adolescence. *Frontiers in Psychology, 2*, 1–19. doi:10.3389/fpsyg.2011.00153

Baird, B., Mrazek, M. D., Phillips, D. T., & Schooler, J. W. (2014). Domain-specific enhancement of metacognitive ability following meditation training. *Journal of Experimental Psychology: General, 143*(5), 1972–1979. doi:10.1037/a0036882

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*(2), 122–147. doi:10.1037//0003-066x.37.2.122

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44*(9), 1175–1184. doi:10.1037//0003-066x.44.9.1175

Bandura, A. (1997). Expectancy value theory. In *Self-efficacy: The exercise of control* (pp. 212–240). New York: W. H. Freeman and Company.

Bandura, A. (2006). Toward a psychology of human agency. *Perspectives on Psychological Science, 1*(2), 164–180. doi:10.1111/j.1745-6916.2006.00011.x

Bandura, A. (2012). Social cognitive theory. In *Handbook of theories of social psychology* (Vol. 1, pp. 349–373). Thousand Oaks, CA: Sage Publications.

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology, 71*(2), 230–244. doi:10.1037//0022-3514.71.2.230

Bembenutty, H., & Karabenick, S. A. (1998). Academic delay of gratification. *Learning and Individual Differences, 10*(4), 329–346. doi:10.1016/s1041-6080(99)80126-5

Bembenutty, H. (2011). Meaningful and maladaptive homework practices: The Role of Self-Efficacy and Self-Regulation. *Journal of Advanced Academics, 22*(3), 448–473. doi:10.1177/1932202x1102200304

Bembenutty, H., White, M. C., & DiBenedetto, M. K. (2016). Applying social cognitive theory in the development of self-regulated competencies throughout K–12 grades. In A. A. Lipnevich (Ed.), *Psychosocial skills and school systems in the 21st century: Theory, research, and practice* (pp. 215–239). New York: Springer.

Biegel, G. M., Brown, K. W., Shapiro, S. L., & Schubert, C. M. (2009). Mindfulness-based stress reduction for the treatment of adolescent psychiatric outpatients: A randomized clinical trial. *Journal of Consulting and Clinical Psychology*, *77*(5), 855–866. doi:10.1037/a0016241

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., … Devins, G. (2004). Mindfulness: A Proposed Operational Definition. *Clinical Psychology: Science and Practice, 11*(3), 230–241. doi:10.1093/clipsy.bph077

Boekaerts, M., Pintrich, P. R., & Zeider, M. (2000). *Handbook of self-regulation*. San Diego, CA: Academic Press.

BrainTrain. (2015). *IVA-2 Research Studies* (Rep.). Retrieved September 23, 2016, from BrainTrain, Inc. website: https://www.braintrain.com/wp-content/uploads/2015/09/IVA-Research-Studies-09-06-15.pdf

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822–848. doi:10.1037/0022-3514.84.4.822

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*(4), 211–237. doi:10.1080/10478400701598298

Brown, S. L., Nobiling, B. D., Teufel, J., & Birch, D. A. (2011). Are kids too busy? Early adolescents' perceptions of discretionary activities, over scheduling, and stress. *Journal of School Health, 81*(9), 574–580. doi:10.1111/j.1746-1561.2011.00629.x

Brydges, R., Manzone, J., Shanks, D., Hatala, R., Hamstra, S. J., Zendejas, B., & Cook, D. A. (2015). Self-regulated learning in simulation-based training: A systematic review and meta-analysis. *Medical Education, 49*(4), 368–378. doi:10.1111/medu.12649

Burke, C. A. (2009). Mindfulness-based approaches with children and adolescents: A preliminary review of current research in an emergent field. *Journal of Child and Family Studies, 19*(2), 133–144. doi:10.1007/s10826-009-9282-x

Butzler, K. B. (2016). The synergistic effects of self-regulation tools and the flipped classroom. *Computers in the Schools, 33*(1), 11–23. doi:10.1080/07380569.2016.1137179

Carifio, J., & Perla, R. J. (2007). Ten common misunderstandings, misconceptions, persistent myths and urban legends about Likert scales and Likert response formats and their antidotes. *Journal of Social Sciences, 3*(3), 106–116. doi:10.3844/jssp.2007.106.116

Carmody, J. (2014). Eastern and Western approaches to mindfulness. In A. Ie, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley Blackwell handbook of mindfulness* (Vol. 1, pp. 48–57). Chichester, West Sussex, UK: Wiley Blackwell.

Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine*, *31*(1), 23–33. doi:10.1007/s10865-007-9130-7

Carr, N. (2008, July/August). Is Google making us stupid? *The Atlantic*, 302(1), 56–63.

Carr, N. (2011). *The shallows: What the Internet is doing to our brains*. New York: W.W. Norton & Company.

Carter, S. P., Greenberg, K., & Walker, M. S. (2017). The impact of computer usage on academic performance: Evidence from a randomized trial at the United States Military Academy. *Economics of Education Review, 56*, 118–132. doi:10.1016/j.econedurev.2016.12.005

Chambers, R., Lo, B. C., & Allen, N. B. (2008). The impact of intensive mindfulness training on attentional control, cognitive style, and affect. *Cognitive Therapy and Research, 32*(3), 303–322. doi:10.1007/s10608-007-9119-0

Chanowitz, B., & Langer, E. J. (1981). Premature cognitive commitment. *Journal of Personality and Social Psychology, 41*(6), 1051–1063. doi:10.1037/0022-3514.41.6.1051

Chiesa, A., Calati, R., & Serretti, A. (2011). Does mindfulness training improve cognitive abilities? A systematic review of neuropsychological findings. *Clinical Psychology Review*, *31*(3), 449–464. doi:10.1016/j.cpr.2010.11.003

Chung, J., Pagnini, F., & Langer, E. (2016). Mindful navigation for pedestrians: Improving engagement with augmented reality. *Technology in Society, 45*, 29–33. doi:10.1016/j.techsoc.2016.02.006

Cirillo, F. (2013). *The Pomodoro Technique: Do more and have fun with time management*. Berlin: FC Garage.

Claessens, B. J., Eerde, W. V., Rutte, C. G., & Roe, R. A. (2007). A review of the time management literature. *Personnel Review*, *36*(2), 255–276. doi:10.1108/00483480710726136

Cleary, T. J., Callan, G. L., & Zimmerman, B. J. (2012). Assessing self-regulation as a cyclical, context-specific phenomenon: Overview and analysis of SRL microanalytic protocols. *Education Research International, 2012*, 1–19. doi:10.1155/2012/428639

Cleary, T. J. (2015). *Self-regulated learning interventions with at-risk youth: Enhancing adaptability, performance, and well-being*. Washington, DC: American Psychological Association.

Cooper, J. E., Horn, S., & Strahan, D. B. (2005). "If only they would do their homework:" Promoting self-regulation in high school English classes. *The High School Journal, 88*(3), 10–25. Retrieved April 22, 2017.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Los Angeles, CA: Sage.

Cullen, M. (2011). Mindfulness-based interventions: An emerging phenomenon. *Mindfulness, 2*(3), 186–193. doi:10.1007/s12671-011-0058-1

Davidson, R. J., & Kabat-Zinn, J. (2004). Alterations in brain and immune function produced by mindfulness meditation: Three caveats: Response. *Psychosomatic Medicine, 66*(1), 149–152. doi:10.1097/00006842-200401000-00023

Davidson, R. J., Dunne, J., Eccles, J. S., Engle, A., Greenberg, M., Jennings, P.,… Vago, D. (2012). Contemplative practices and mental training: Prospects for American education. *Child Development Perspectives, 6*(2), 146–153. doi:10.1111/j.1750-8606.2012.00240.x

De Bruyckere, P., Kirschner, P., & Hulshof, C. D. (2016). Technology in education: What teachers should know. *American Educator, 40*(1), 12–18. doi:10.1145/155049.155053

Delgado-Pastor, L. C., Perakakis, P., Subramanya, P., Telles, S., & Vila, J. (2013). Mindfulness (Vipassana) meditation: Effects on P3b event-related potential and heart rate variability. *International Journal of Psychophysiology*, *90*(2), 207–214. doi:10.1016/j.ijpsycho.2013.07.006

Desbordes, G., Gard, T., Hoge, E. A., Holzel, B. K., Kerr, C., Lazar, S. W., Olendzki, & Vago, D. R. (2015). Moving beyond mindfulness: Defining equanimity as an outcome measure in meditation and contemplative research. *Mindfulness, 6*(2), 356–372. doi:10.1007/s12671-013-0269-8

Dignath, C., & Büttner, G. (2008). Components of fostering self-regulated learning among students. A meta-analysis on intervention studies at primary and secondary school level. *Metacognition and Learning, 3*(3), 231–264. doi:10.1007/s11409-008-9029-x

Effeney, G., Carroll, A., & Bahr, N. (2013). Self-regulated learning and executive function: Exploring the relationships in a sample of adolescent males. *Educational Psychology*, *33*(7), 773–796. doi:10.1080/01443410.2013.785054

Ergas, O. (2014). Mindfulness in education at the intersection of science, religion, and healing. *Critical Studies in Education, 55*(1), 58–72. doi:10.1080/17508487.2014.858643

Ergas, O. (2015). Educating the wandering mind. *Journal of Transformative Education, 14*(2), 98–119. doi:10.1177/1541344615611258

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). London: Sage.

Friese, M., Messner, C., & Schaffner, Y. (2012). Mindfulness meditation counteracts self-control depletion. *Consciousness and Cognition, 21*(2), 1016–1022. doi:10.1016/j.concog.2012.01.008

Fuller, T., & Ramsay, A. (1819). *Gnomologia: Adages and proverbs, wise sentences, and witty sayings, ancient and modern, foreign and British*. London: T. and J. Allman.

Galloway, M., Conner, J., & Pope, D. (2013). Nonacademic effects of homework in privileged, high-performing high schools. *The Journal of Experimental Education, 81*(4), 490–510. doi:10.1080/00220973.2012.745469

Garner, J. K. (2009). Conceptualizing the relations between executive functions and self-regulated learning. *The Journal of Psychology, 143*(4), 405–426. doi:10.3200/jrlp.143.4.405-426

Gonzalez-Dehass, A. R., & Willems, P. P. (2016). Nurturing self-regulated learners: Teacher, peer, and parental support of strategy instruction. *The Educational Forum, 80*(3), 294–309. doi:10.1080/00131725.2016.1173751

Greenberg, M. T., & Harris, A. R. (2012). Nurturing mindfulness in children and youth: Current state of research. *Child Development Perspectives, 6*(2), 161–166. doi:10.1111/j.1750-8606.2011.00215.x

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits. *Journal of Psychosomatic Research, 57*(1), 35–43. doi:10.1016/s0022-3999(03)00573-7

Hart, R., Ivtzan, I., & Hart, D. (2013). Mind the gap in mindfulness research: A comparative account of the leading schools of thought. *Review of General Psychology, 17*(4), 453–466. doi:10.1037/a0035212

Hennelly, S. (2011). *The immediate and sustained effects of the .b mindfulness programme on adolescents' social and emotional well-being and academic functioning* (Unpublished master's thesis). Oxford Brookes University.

Howell, A. J., & Buro, K. (2010). Relations among mindfulness, achievement-related self-regulation, and achievement emotions. *Journal of Happiness Studies, 12*(6), 1007–1022. doi:10.1007/s10902-010-9241-7

Huppert, F. A., & Johnson, D. M. (2010). A controlled trial of mindfulness training in schools: The importance of practice for an impact on well-being. *The Journal of Positive Psychology, 5*(4), 264–274. doi:10.1080/17439761003794148

Ie, A., Ngnoumen, C. T., & Langer, E. J. (2014). [Foreword]. In A. Ie (Author) & A. Ie, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley Blackwell handbook of mindfulness*(Vol. I, pp. 1–5). Chichester, West Sussex, UK: Wiley Blackwell.

International Baccalaureate Organization. (2017). *What is an IB education?* [Brochure]. Author. Retrieved from www.ibo.org

James, W. (1900). *Talks to teachers and students*. Boston, MA: George H. Ellis.

James, W. (1920). *Psychology: The briefer course*. New York: Henry Holt & Co. Retrieved from https://archive.org/details/psychologybriefe00willuoft

Jha, A. P., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. *Cognitive, Affective, & Behavioral Neuroscience, 7*(2), 109–119. doi:10.3758/cabn.7.2.109

Jha, A. P., Stanley, E. A., Kiyonaga, A., Wong, L., & Gelfand, L. (2010). Examining the protective effects of mindfulness training on working memory capacity and affective experience. *Emotion*, *10*(1), 54–64. doi:10.1037/a0018438

Jones, S. (2014). Mind how you learn. *Schoolhouse Magazine,* (Autumn/Winter), 66–69.

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York: Delta Trade Paperbacks.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice, 10*(2), 144–156. doi:10.1093/clipsy/bpg016

Kabat-Zinn, J. (2005). *Wherever you go, there you are: Mindfulness meditation in everyday life / Jon Kabat-Zinn*. New York: MJF Books.

Kabat-Zinn, J. (2011). Some reflections on the origins of MBSR, skillful means, and the trouble with maps. *Contemporary Buddhism, 12*(1), 281–306. doi:10.1080/14639947.2011.564844

Kang, Y., Gruber, J., & Gray, J. R. (2014). Mindfulness: Deautomatization of cognitive and emotional life. In A. Ie, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley Blackwell handbook of mindfulness* (Vol. 1, pp. 168–185). Chichester: Wiley-Blackwell.

Kaplan, D. S., Liu, R. X., & Kaplan, H. B. (2005). School related stress in early adolescence and academic performance three years later: The conditional influence of self-expectations. *Social Psychology of Education, 8*(1), 3–17. doi:10.1007/s11218-004-3129-5

Karabenick, S. A., Woolley, M. E., Friedel, J. M., Ammon, B. V., Blazevski, J., Bonney, C. R., … Kelly, K. L. (2007). Cognitive processing of self-report items in educational research: Do they think what we mean? *Educational Psychologist, 42*(3), 139–151. doi:10.1080/00461520701416231

Katz, I., Buzukashvili, T., & Feingold, L. (2012). Homework stress: Construct validation of a measure. *The Journal of Experimental Education, 80*(4), 405–421. doi:10.1080/00220973.2011.610389

Katz, I., Eilot, K., & Nevo, N. (2014). "I'll do it later": Type of motivation, self-efficacy and homework procrastination. *Motivation and Emotion, 38*(1), 111–119. doi:10.1007/s11031-013-9366-1

Kaunhoven, R. J., & Dorjee, D. (2017). How does mindfulness modulate self-regulation in pre-adolescent children? An integrative neurocognitive review. *Neuroscience & Biobehavioral Reviews*, *74*, 163–184. doi:10.1016/j.neubiorev.2017.01.007

Keng, S., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review, 31*(6), 1041–1056. doi:10.1016/j.cpr.2011.04.006

Killingsworth, M. A., & Gilbert, D. T. (2010). A wandering mind is an unhappy mind. *Science, 330*(6006), 932–932. doi:10.1126/science.1192439

Kitsantas, A., Dabbagh, N., Hiller, S. E., & Mandell, B. (2015). Learning technologies as supportive contexts for promoting college student self-regulated learning. In *Self-regulated learning interventions with at-risk youth: Enhancing adaptability, performance, and well-being.* (pp. 277–294). Washington, DC: American Psychological Association.

Kitsantas, A., & Zimmerman, B. J. (2009). College students' homework and academic achievement: The mediating role of self-regulatory beliefs. *Metacognition and Learning*, *4*(2), 97–110. doi:10.1007/s11409-008-9028-y

Korkman, M., Kirk, U., & Kemp, S. (2007). *NEPSY-II.* Pearson Assessment.

Kristeller, J. L., & Epel, E. (2014). Mindful eating and mindless eating: The science and the practice (A. Ie, Ed.). In C. T. Ngnoumen & E. Langer (Eds.), *The Wiley Blackwell Handbook of Mindfulness* (Vol. 1, pp. 913–933). New York: Wiley.

Kuyken, W., Byford, S., Taylor, R. S., Watkins, E., Holden, E., White, K., … Teasdale, J. D. (2008). Mindfulness-based cognitive therapy to prevent relapse in recurrent depression. *Journal of Consulting and Clinical Psychology, 76*, 966–978. doi: 10.1037/a0013786

Kuyken, W., Weare, K., Ukoumunne, O. C., Vicary, R., Motton, N., Burnett, R., … Huppert, F. (2013). Effectiveness of the Mindfulness in Schools Programme: Non-randomised controlled feasibility study. *The British Journal of Psychiatry, 203*(2), 126–131. doi:10.1192/bjp.bp.113.126649

Laerd Statistics. (2015). One-way MANOVA using SPSS Statistics. *Statistical tutorials and software guides.* Retrieved from https://statistics.laerd.com

Langer, E. J., & Moldoveanu, M. (2000). The construct of mindfulness. *Journal of Social Issues, 56*(1), 1–9. doi:10.1111/0022-4537.00148

Langer, E. J., & Piper, A. I. (1987). The prevention of mindlessness. *Journal of Personality and Social Psychology, 53*(2), 280–287. doi:10.1037//0022-3514.53.2.280

Langer, E. J., & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. *Journal of Personality and Social Psychology, 34*(2), 191–198. doi:10.1037//0022-3514.34.2.191

Langer, E. J. (2000). Mindful learning. *Current Directions in Psychological Science, 9*(6), 220–223. doi:10.1111/1467-8721.00099

Langer, E. J. (2014). Mindfulness forward and back. In A. Ie, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley Blackwell handbook of mindfulness* (Vol. 1, pp. 7–20). Chichester, UK: John Wiley and Sons.

Langer, E. J. (2016). *The power of mindful learning*. Boston, MA: Da Capo Lifelong Books.

Lani, J. (2017). Conduct and interpret a repeated measures ANOVA. Retrieved from http://www.statisticssolutions.com/conduct-interpret-repeated-measures-anova/

Lutz, A., Slagter, H. A., Dunne, J. D., & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences, 12*(4), 163–169. doi:10.1016/j.tics.2008.01.005

Lutz, A., Slagter, H. A., Rawlings, N. B., Francis, A. D., Greischar, L. L., & Davidson, R. J. (2009). Mental training enhances attentional stability: Neural and behavioral evidence. *Journal of Neuroscience, 29*(42), 13418–13427. doi:10.1523/jneurosci.1614-09.2009

Maclean, K. A., Ferrer, E., Aichele, S. R., Bridwell, D. A., Zanesco, A. P., Jacobs, T. L… Saron, C. D. (2010). Intensive meditation training improves perceptual discrimination and sustained attention. *Psychological Science, 21*(6), 829–839. doi:10.1177/0956797610371339

Manly, T., Anderson, V., Crawford, J., George, M., Underbjerg, M., & Robertson, I. (2016). *Test of everyday attention for children: Administration, scoring and technical manual* (2nd ed.). London: Pearson.

Markowska, A. (2013). Attention processes in mindfulness: The influence of mindfulness intervention on performing stroop based tasks. *Acta Neuropsychologica*, *11*(4), 333–344.

Mason, M. F., Norton, M. I., Horn, J. D., Wegner, D. M., Grafton, S. T., & Macrae, C. N. (2007). Wandering minds: The default network and stimulus-independent thought. *Science, 315*(5810), 393–395. doi:10.1126/science.1131295

Mathew, K. L., Whitford, H. S., Kenny, M. A., & Denson, L. A. (2010). The long-term effects of mindfulness-based cognitive therapy as a relapse prevention treatment for major depressive disorder. *Behavioural and Cognitive Psychotherapy, 38*(5), 561–576. doi:10.1017/s135246581000010x

McCloskey, L. E. (2015). Mindfulness as an intervention for improving academic success among students with executive functioning disorders. *Procedia - Social and Behavioral Sciences, 174*, 221–226. doi:10.1016/j.sbspro.2015.01.650

McCown, D. (2014). East meets West in the pedagogy of the mindfulness-based interventions. In A. Ie, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley Blackwell Handbook of Mindfulness* (Vol. 2, pp. 1085–1104). New York: Wiley.

The MetLife Survey of the American Teacher: The Homework Experience (Rep.). (2007, November 19). Retrieved August 18, 2016, from https://www.metlife.com/assets/cao/contributions/foundation/american-teacher/metlife-survey-american-teacher-2007-homework-experience.pdf

Miller, J. J., Fletcher, K., & Kabat-Zinn, J. (1995). Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *General Hospital Psychiatry, 17*(3), 192–200. doi:10.1016/0163-8343(95)00025-m

Mindfulness All-Party Parliamentary Group. (2015). (United Kingdom, The Mindfulness Initiative). Retrieved August 15, 2016, from http://www.themindfulnessinitiative.org.uk

Moos, D. C., & Bonde, C. (2015). Flipping the classroom: Embedding self-regulated learning prompts in videos. *Technology, Knowledge and Learning, 21*(2), 225–242. doi:10.1007/s10758-015-9269-1

Mrazek, M. D., Broadway, J. M., Phillips, D. T., Franklin, M. S., Mooneyham, B. W., & Schooler, J. W. (2014). Mindfulness: An antidote for wandering minds. In A. Ie, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley Blackwell handbook of mindfulness* (Vol. I, pp. 153–167). Hoboken: Wiley.

Mrazek, M. D., Franklin, M. S., Phillips, D. T., Baird, B., & Schooler, J. W. (2013). Mindfulness training improves working memory capacity and GRE performance while reducing mind wandering. *Psychological Science, 24*(5), 776–781. doi:10.1177/0956797612459659

Mrazek, M. D., Smallwood, J., & Schooler, J. W. (2012). Mindfulness and mind-wandering: Finding convergence through opposing constructs. *Emotion*, *12*(3), 442–448. doi:10.1037/a0026678

Mueller, P. A., & Oppenheimer, D. M. (2014). The pen is mightier than the keyboard: Advantages of longhand over laptop note taking. *Psychological Science, 25*(6), 1159–1168. doi:10.1177/0956797614524581

Naglieri, J. A., & Das, J. P. (1997). *Cognitive Assessment System* [Pamphlet]. Itasca, IL: Riverside Publishing Company.

Napoli, M., Krech, P. R., & Holley, L. C. (2005). Mindfulness training for elementary school students. *Journal of Applied School Psychology, 21*(1), 99–125. doi:10.1300/j370v21n01_05

Nhat Hanh, T., & Weare, K. (2017). *Happy teachers change the world: A guide for cultivating mindfulness in education*. Berkeley, CA: Parallax Press.

Panadero, E., & Alonso-Tapia, J. (2014). How do students self-regulate?: Review of Zimmerman's cyclical model of self-regulated learning. *Anales De Psicología, 30*(2), 450–462. doi:10.6018/analesps.30.2.167221

Perlmuter, L. C., & Langer, E. J. (1983). The effects of behavioral monitoring on the perception of control. *Clinical Gerontologist, 1*(2), 37–43. doi:10.1300/j018v01n02_04

Pintrich, P. R., Smith, D. A., Garcia, T., & Mckeachie, W. J. (1993). Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educational and Psychological Measurement*, *53*(3), 801–813. doi:10.1177/0013164493053003024

Pintrich, P. R., & Zusho, A. (2002). The development of academic self-regulation: The role of cognitive and motivational factors. In A. Wigfield & J. S. Eccles (Eds.), *Development of Achievement Motivation: A Volume in the Educational Psychology Series* (pp. 249–284). San Diego: Academic Press.

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451–502). San Diego, CA: Academic Press.

Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, *16*(4), 385–407. doi:10.1007/s10648-004-0006-x

Preston, A. S., Heaton, S. C., McCann, S. J., Watson, W. D., & Selke, G. (2009). The role of multidimensional attentional abilities in academic skills of children with ADHD. *Journal of Learning Disabilities, 42*(3), 240–249. doi:10.1177/0022219408331042

Puddicombe, A. (2016). *The headspace guide to meditation and mindfulness: How mindfulness can change your life in ten minutes a day*. New York: St. Martins Griffin.

Ramdass, D., & Zimmerman, B. J. (2011). Developing self-regulation skills: The important role of homework. *Journal of Advanced Academics, 22*(2), 194–218. doi:10.1177/1932202x1102200202

Rattray, J., & Jones, M. C. (2007). Essential elements of questionnaire design and development. *Journal of Clinical Nursing, 16*(2), 234–243. doi:10.1111/j.1365-2702.2006.01573.x

Reber, R. (2014). Mindfulness in education. In A. Ie, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley Blackwell Handbook of Mindfulness* (Vol. 2, pp. 1054–1070). New York: Wiley.

Rechtschaffen, D. J. (2014). *The way of mindful education: Cultivating well-being in teachers and students*. New York: W.W. Norton & Company.

Renshaw, T. L., & Cook, C. R. (2017). Introduction to the special issue: Mindfulness in the schools—historical roots, current status, and future directions. *Psychology in the Schools, 54*(1), 5–12. doi:10.1002/pits.21978

Rice, V. J., & Liu, B. (2016). The relationship between sustained attention and mindfulness among U.S. active duty service members and veterans. *Advances in Intelligent Systems and Computing Advances in Social & Occupational Ergonomics*, 397-407. doi:10.1007/978-3-319-41688-5_37

Rich, A. (2005). Claiming an Education. In C. Anderson & L. Runciman (Eds.), *Open questions: Readings for critical thinking and writing* (pp. 608-611). New York: Bedford/St. Martin's.

Ritchhart, R., & Perkins, D. N. (2000). Life in the mindful classroom: Nurturing the disposition of mindfulness. *Journal of Social Issues, 56*(1), 27–47. doi:10.1111/0022-4537.00150

Roeser, R. W., & Peck, S. C. (2009). An education in awareness: Self, motivation, and self-regulated learning in contemplative perspective. *Educational Psychologist, 44*(2), 119–136. doi:10.1080/00461520902832376

Ryan, T. (2012). *A mindful nation: How a simple practice can help us reduce stress, improve performance, and recapture the American spirit*. Carlsbad, CA: Hay House.

Sahdra, B. K., MacLean, K. A., Ferrer, E., Shaver, P. R., Rosenberg, E. L., Jacobs, T. L., … Saron, C. D. (2011). Enhanced response inhibition during intensive meditation training predicts improvements in self-reported adaptive socioemotional functioning. *Emotion, 11*(2), 299–312. doi:10.1037/a0022764

Sanger, K. L., & Dorjee, D. (2016). Mindfulness training with adolescents enhances metacognition and the inhibition of irrelevant stimuli: Evidence from event-related brain potentials. *Trends in Neuroscience and Education, 5*(1), 1–11. doi:10.1016/j.tine.2016.01.001

Schmitz, B., Klug, J., & Hertel, S. (2013). Collecting and analyzing longitudinal diary data. In B. P. Laursen, T. D. Little, & N. A. Card (Eds.), *Handbook of developmental research methods* (pp. 181–195). New York: Guilford Press.

Schmitz, B., & Perels, F. (2011). Self-monitoring of self-regulation during math homework behaviour using standardized diaries. *Metacognition and Learning, 6*(3), 255–273. doi:10.1007/s11409-011-9076-6

Schober, B., Finsterwald, M., Wagner, P., Lüftenegger, M., Aysner, M., & Spiel, C. (2007). TALK - A training program to encourage lifelong learning in school. *Zeitschrift für Psychologie, 215*(3), 183–193. doi:10.1027/0044-3409.215.3.183

Schunk, D. H., & Pajares, F. (2009). Self-efficacy theory. In K. R. Wentzel & D. B. Miele (Eds.), *Handbook of motivation at school* (pp. 35–53). New York: Routledge.

Schunk, D. H., & Usher, W. L. (2013). Barry J. Zimmerman's theory of self-regulated learning. In H. Bembenutty, T. Cleary, & J. Kitsantas (Eds.), *Applications of self-regulated learning across diverse disciplines: A tribute to Barry J. Zimmerman* (pp. 1–28). Charlotte, NC: Information Age Publishing.

Schunk, D. H. (1997). Self-monitoring as a motivator during instruction with elementary school students. Retrieved January 21, 2018, from ERIC database. (ED 404035)

Schunk, D. H. (1998). Teaching elementary students to self-regulate practice of mathematical skills with modeling. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulated learning: From teaching to self-reflective practice* (pp. 137–159). New York: Guilford Press.

Schunk, D. H. (2001). Social cognitive theory and self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement* (2nd ed., pp. 118–152). Mahwah, NJ: Lawrence Erlbaum Associates.

Schunk, D. H. (2013, April). *Self-regulated learning: Where we are and where we might go*. Paper presented at the 2013 Annual Meeting of the American Educational Research Association, San Francisco, CA.

Schunk, D. H. & Usher E. L. (2013). Barry J. Zimmerman's theory of self-regulated learning. Bembenutty, H., Cleary, T. J., & Kitsantas, A. (Eds.). (2013). *Applications of self-regulated learning across diverse disciplines: A tribute to Barry J. Zimmerman*. (pp. 1–28). Charlotte, NC: Information Age Publishing.

Segal, Z. V., Williams, J. M., & Teasdale, J. D. (2013). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse* (2nd ed.). New York: Guilford Press.

Semple, R. J. (2010). Does mindfulness meditation enhance attention? A randomized controlled trial. *Mindfulness*, *1*(2), 121–130. doi:10.1007/s12671-010-0017-2

Semple, R. J., Droutman, V., & Reid, B. A. (2017). Mindfulness goes to school: Things learned (so far) from research and real-world experiences. *Psychology in the Schools*, *54*(1), 29–52. doi:10.1002/pits.21981

Semple, R. J., Lee, J., Rosa, D., & Miller, L. F. (2010). A randomized trial of mindfulness-based cognitive therapy for children: Promoting mindful attention to enhance social-emotional resiliency in children. *Journal of Child and Family Studies, 19*(2), 218–229. doi:10.1007/s10826-009-9301-y

Shapiro, E. S., & Cole, C. L. (1999). Self-monitoring in assessing children's problems. *Psychological Assessment, 11*(4), 448–457. doi:10.1037//1040-3590.11.4.448

Shapiro, E. S. (1984). Child behavioral assessment. In T. H. Ollendick (Ed.), *Child behavioral assessment principles and procedures* (pp. 148–165). New York: Pergamon Press.

Shapiro, S. L., & Carlson, L. E. (2017). *The art and science of mindfulness: Integrating mindfulness into psychology and the helping professions*. Washington, DC: American Psychological Association.

Sitzmann, T., & Ely, K. (2011). A meta-analysis of self-regulated learning in work-related training and educational attainment: What we know and where we need to go. *Psychological Bulletin, 137*(3), 421–442. doi:10.1037/a0022777

Smallwood, J. (2013). Distinguishing how from why the mind wanders: A process-occurrence framework for self-generated mental activity. *Psychological Bulletin, 139*(3), 519–535. doi:10.1037/a0030010

Stoeger, H., & Ziegler, A. (2005). Evaluation of an elementary classroom self-regulated learning program for gifted mathematics underachievers. *International Education Journal*, *6*(2) 261–271.

Teasdale, J. D. (1999). Metacognition, mindfulness and the modification of mood disorders. *Clinical Psychology & Psychotherapy*, *6*(2), 146–155. doi:10.1002/(sici)1099-0879(199905)6:23.0.co;2-e

Thomas, G., & Atkinson, C. (2016). Measuring the effectiveness of a mindfulness-based intervention for children's attentional functioning. *Educational and Child Psychology, 33*(1), 51–64.

Thomson, D. R., Besner, D., & Smilek, D. (2015). A resource-control account of sustained attention. *Perspectives on Psychological Science*, *10*(1), 82–96. doi:10.1177/1745691614556681

Toffler, A. (1970). *Future Shock*. New York: Bantam Books.

Turkle, S. (2013). *Alone together: Why we expect more from technology and less from each other*. Cambridge, MA: Perseus Books.

Turkle, S. (2016). *Reclaiming conversation: The power of talk in a digital age*. New York: Penguin Books.

United Nations' Secretary General. (2015). *A life of dignity for all: Accelerating progress towards the Millennium Development Goals and advancing the United Nations development agenda beyond 2015* (pp. 1–19, United Nations Secretary General's Report). New York: United Nations.

U.S. Department of Health and Human Services. (2012). *National survey of child and adolescent well-being: Inhibitory control abilities among young children in the child welfare system* (pp. 1–9, Rep. No. 1). Washington, DC: U.S. Department of Health and Human Services. Retrieved March 9, 2018, from https://www.acf.hhs.gov/sites/default/files/opre/inhibitory_control.pdf

Van Dam, N. T., Vugt, M. K., Vago, D. R., Schmalzl, L., Saron, C. D., Olendzki, A., … Meyer, D. E. (2017). Mind the hype: A critical evaluation and prescriptive agenda for research on mindfulness and meditation. *Perspectives on Psychological Science,* 174569161770958. doi:10.1177/1745691617709589

Vandevelde, S., & Van Keer, H. (2011, August). *Studying primary school children's self-regulated learning*. Presented at the 14th Biennial Conference for Research on Learning and Instruction (EARLI 2011), Exeter, UK (pp. [607]-[609]). Retrieved from https://earli.org/sites/default/files/2017-03/BookofAbstractsandSummaries.pdf

Vandevelde, S., Keer, H. V., & Rosseel, Y. (2013). Measuring the complexity of upper primary school children's self-regulated learning: A multi-component approach. *Contemporary Educational Psychology, 38*(4), 407–425. doi:10.1016/j.cedpsych.2013.09.002

Vettese, L. C., Toneatto, T., Stea, J. N., Nguyen, L., & Wang, J. J. (2009). Do mindfulness meditation participants do their homework? And does it make a difference? A review of the empirical evidence. *Journal of Cognitive Psychotherapy, 23*(3), 198–225. doi:10.1891/0889-8391.23.3.198

Vickery, C. E., & Dorjee, D. (2016). Mindfulness training in primary schools decreases negative affect and increases meta-cognition in children. *Frontiers in Psychology, 6*, 1–13. doi:10.3389/fpsyg.2015.02025

Vohs, K. D., Baumeister, R. F., Schmeichel, B. J., Twenge, J. M., Nelson, N. M., & Tice, D. M. (2014). Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *Motivation Science*, *1*(S), 19–42. doi:10.1037/2333-8113.1.s.19

Wang, Z., & Tchernev, J. M. (2012). The "myth" of multitasking: Reciprocal dynamics of media multitasking, personal needs, and gratifications. *Journal of Communication, 62*(3), 493–513. doi:10.1111/j.1460-2466.2012.01641.x

Weare, K. (2012, April). *Evidence for the impact of mindfulness on children and young people*. Retrieved from .b Mindfulness in Schools Project website: https://mindfulnessinschools.org/wp-content/uploads/2013/02/MiSP-Research-Summary-2012.pdf

Weare, K. (2013). Developing mindfulness with children and young people: A review of the evidence and policy context. *Journal of Children's Services,8*(2), 141–153.

Weiner, B. (2014). The attribution approach to emotion and motivation: History, hypotheses, home runs, headaches/heartaches. *Emotion Review, 6*(4), 353–361. doi:10.1177/1754073914534502

White, B. P. (2014). The Perceived stress scale for children: A pilot study in a Sample of 153 Children. *International Journal of Pediatrics and Child Health, 2*(2), 45–52. doi:10.12974/2311-8687.2014.02.02.4

Wigfield, A., Klauda, S. A., & Cambria, J. (2011). Influences on the development of academic self-regulatory processes. In D. H. Schunk & B. J. Zimmerman (Eds.), *Handbook of self-regulation of learning and performance* (pp. 33–48). New York, NY: Routledge.

Winne, P. H., & Perry, N. E. (2000). Measuring self-regulated learning. *Handbook of Self-Regulation,* 531–566. doi:10.1016/b978-012109890-2/50045-7

Winne, P. H. (2010). Improving measurements of self-regulated learning. *Educational Psychologist*, *45*(4), 267–276. doi:10.1080/00461520.2010.517150

Woolley, M. E. (2006). The development and evaluation of procedures to assess child self-report item validity educational and psychological measurement. *Educational and Psychological Measurement, 66*(4), 687–700. doi:10.1177/0013164405282467

Yamamoto, K. (2007). Banning laptops in the classroom: Is it worth the hassles? *Journal of Legal Education, 57*(4), 477–520.

Zahariades, D. (2017). *The procrastination cure: 21 proven tactics for conquering your inner procrastinator, mastering your time, and boosting your productivity!* [Kindle e-book] Retrieved from http://www.amazon.com

Zelazo, P. D., & Lyons, K. E. (2012). The potential benefits of mindfulness training in early childhood: A developmental social cognitive neuroscience perspective. *Child Development Perspectives, 6*(2), 154–160. doi:10.1111/j.1750-8606.2012.00241.x

Zenner, C., Herrnleben-Kurz, S., & Walach, H. (2014). Mindfulness-based interventions in schools—a systematic review and meta-analysis. *Frontiers in Psychology*, *5*, 1–20. doi:10.3389/fpsyg.2014.00603

Zhang, L. & Maruno, S., (2010). Causal relationships among academic delay of gratification, motivation, and self-regulated learning in elementary school children. *Perceptual and Motor Skills, 111*(2), 631–642. doi:10.2466/10.11.20.pms.111.5.631-642

Zimmerman, B. J., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment. *American Educational Research Journal, 31*(4), 845. doi:10.2307/1163397

Zimmerman, B. J., & Kitsantas, A. (1997). Developmental phases in self-regulation: Shifting from process goals to outcome goals. *Journal of Educational Psychology, 89*(1), 29–36. doi:10.1037/0022-0663.89.1.29

Zimmerman, B. J., & Kitsantas, A. (1999). Acquiring writing revision skill: Shifting from process to outcome self-regulatory goals. *Journal of Educational Psychology, 91*(2), 241–250. doi:10.1037//0022-0663.91.2.241

Zimmerman, B. J., & Kitsantas, A. (2005). Homework practices and academic achievement: The mediating role of self-efficacy and perceived responsibility beliefs. *Contemporary Educational Psychology*, *30*(4), 397–417. doi:10.1016/j.cedpsych.2005.05.003

Zimmerman, B. J., & Labuhn, A. S. (2012). Self-regulation of learning: Process approaches to personal development. *APA Educational Psychology Handbook, Vol 1: Theories, Constructs, and Critical Issues.,* 399–425. doi:10.1037/13273-014

Zimmerman, B. J., & Schunk, D. H. (2001). Reflections on theories of self-regulated learning and academic achievement. In *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed., pp. 273–292). New York: Taylor & Francis.

Zimmerman, B. J., & Schunk, D. H. (1989). Reflections on theories of self-regulated learning and academic achievement. In *Self-regulated learning and academic achievement: Theory, research, and practice* (pp. 289–307). New York: Springer-Verlag.

Zimmerman, B. J. (1986). Becoming a self-regulated learner: Which are the key subprocesses? *Contemporary Educational Psychology, 11*(4), 307–313. doi:10.1016/0361-476x(86)90027-5

Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology, 81*(3), 329–339. doi:10.1037//0022-0663.81.3.329

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist, 25*(1), 3-17. doi:10.1207/s15326985ep2501_2

Zimmerman, B. J. (1998). Academic studying and the development of personal skill: A self-regulatory perspective. *Educational Psychologist, 33*(2), 73-86. doi:10.1207/s15326985ep3302&3_3

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation.* (pp. 13-39). San Diego, CA: Academic Press.

Zimmerman, B. J. (2002a). Achieving academic excellence: A self-regulatory perspective. *The Pursuit of Excellence through Education,* 85-115.

Zimmerman, B. J. (2002b). Becoming a self-regulated learner: An overview. *Theory into Practice, 41*(2), 64-70. doi:10.1207/s15430421tip4102_2

Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal, 45*(1), 166-183. doi:10.3102/0002831207312909

Zimmerman, B. J. (2011). Motivational sources and outcomes of self-regulated learning and performance. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulated learning and performance* (pp. 49-64). New York: Routledge/Taylor & Francis Group.

Zimmerman, B. J. (2012). Goal setting: A key proactive source of academic self-regulation. In D. H. Schunk & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (pp. 267-295). New York: Routledge.

Zimmerman, B. J. (2013). From cognitive modeling to self-regulation: A social cognitive career path. *Educational Psychologist*, *48*(3), 135-147. doi:10.1080/00461520.2013.794676

Zimmerman, B. J., Bonner, S., & Kovach, R. (1996). *Developing self-regulated learners: Beyond achievement to self-efficacy*. Washington, DC: American Psychological Association.

Zimmerman, B. J., Schunk, D. H., & DiBenedetto, M. K. (2017). The role of self-efficacy and related beliefs in self-regulation and performance. In *Handbook of competence and motivation: Theory and application* (2nd ed., pp. 313-333). New York: Guilford Press.

Zoogman, S., Goldberg, S. B., Hoyt, W. T., & Miller, L. (2014). Mindfulness interventions with youth: A meta-analysis. *Mindfulness, 6*(2), 290-302. doi:10.1007/s12671-013-0260-4

Zusho, A., & Edwards, K. (2011). Self-regulation and achievement goals in the college classroom. *New Directions for Teaching and Learning, 2011*(126), 21–31. doi:10.1002/tl.441

APPENDIX A

PERMISSION TO USE ZIMMERMAN'S "PHASES AND SUBPROCESSES OF SELF-REGULATED LEARNING" DIAGRAM

FORDHAM

Sean Adcroft <sadcroft@fordham.edu>

Permission Request to Use Figure of SRL Cycle

Barry Zimmerman <bzimmerman@gc.cuny.edu> Tue, Apr 26, 2016 at 10:44 AM
To: Sean Adcroft <sadcroft@fordham.edu>

Hi Sean:

Thank you for your kind remarks. You have my permission to reprint the Figure on page 67 of the three phase cyclical model of SRL in your dissertation. I ask only that its original source be acknowledged.

I wish you well in your research.

Barry Zimmerman

From: Sean Adcroft [mailto:sadcroft@fordham.edu]
Sent: Tuesday, April 26, 2016 8:49 AM
To: Zimmerman, Barry
Subject: Permission Request to Use Figure of SRL Cycle

[Quoted text hidden]

APPENDIX B

CIRILLO'S RULES FOR EFFECTIVE USE

OF POMODORO TECHNIQUE

Cirillo's Nine Rules to Maximize the Effectiveness of the Pomodoro Technique

Rule	Description
One	A pomodoro consists of 25-minutes plus a five-minute break.
Two	After every four pomodori comes a 15 - 30-minute break.
Three	The pomodoro is indivisible. There are no half or quarter Pomodori.
Four	Once a pomodoro begins, it should be completed with only minimal interruption. If a pomodoro is totally interrupted, it cannot be picked up at the point of interruption. One cannot count any piece of that pomodoro. If an activity is completed before the bell rings, continue to review that same activity until the bell rings.
Five	Protect the pomodoro. Handle interruptions quickly and efficiently so you can return to work and still count that pomodoro.
Six	If it takes more than 5-7 pomodori, break it down into separate activities. Complex activities should be simplified into smaller activities.
Seven	If an activity lasts less than one full pomodoro, combine it with other simple tasks that will take at least one pomodoro.
Eight	Results are achieved one pomodoro at a time.
Nine	The next pomodoro will go better.

APPENDIX C

CIRILLO'S *ACTIVITY INVENTORY* WORKSHEET

ACTIVITY INVENTORY

Name _____

APPENDIX D

CIRILLO'S *TO DO TODAY* WORKSHEET

To Do Today

the Pomodoro TECHNIQUE

NAME ..... DATE .....

UNPLANNED & URGENT (*write bottom-up*)

APPENDIX E

SELF-REGULATED LEARNING DIARY

Homework Diary

Use this form to guide you during homework.

Your email address ([redacted]) will be recorded when you submit this form. Not [redacted]?
Sign out
* Required

1. **Have you completed at least one pomo today?**
   Mark only one oval.

   ◯ Yes *Skip to "Doing Your Homework."*
   ◯ No *Skip to question 2.*

Planning

Before you begin your homework, please complete the items below by clicking the button that best describes your experience.

2. **The place that I've chosen to do my homework is quiet, well lit, and free from distraction.**
   Mark only one oval.

	1	2	3	4	5	
Not at all the case.	◯	◯	◯	◯	◯	Very much the case.

3. **I have set a specific goal for today's homework.** *
   Mark only one oval.

	1	2	3	4	5	
Not at all like me.	◯	◯	◯	◯	◯	Very much like me.

4. **I have looked over examples of math problems like those I have for homework tonight.** *
   Mark only one oval.

	1	2	3	4	5	
Not at all like me.	◯	◯	◯	◯	◯	Very much like me.

5. **I am confident that I can complete my math homework tonight.** *
   Mark only one oval.

	1	2	3	4	5	
Not at all like me.	◯	◯	◯	◯	◯	Very much like me.

Doing Your Homework

Homework Diary

OK, you are ready to begin your math homework. Use the pomodoro timer to set a timer for a 12-minute pomo and a 3-minute break!

Monitoring Your Work

Use this section after completing your pomo break. Please complete the items below by clicking the button that best describes your experience.

6. **I'm making good progress on my math homework and feel confident that I will finish it.** *
   Mark only one oval.

	1	2	3	4	5	
Not at all like me.	◯	◯	◯	◯	◯	Very much like me.

7. **I have thought about whether my answers make sense.**
   Mark only one oval.

	1	2	3	4	5	
Not at all like me.	◯	◯	◯	◯	◯	Very much like me.

8. **If I could ask my teacher one question about my math homework, what would it be?**

9. **Have you finished this assignment?** *
   Mark only one oval.

   ◯ Yes *Skip to question 10.*
   ◯ No *Skip to "Doing Your Homework."*

Thinking About How it Went

Complete this section after you finish your math homework for the day.

10. **How many pomos did you need to complete your math homework?** *
    Mark only one oval.

    ◯ 1
    ◯ 2
    ◯ 3
    ◯ 4
    ◯ 5

11. **How many internal disruptions did you have while doing your math homework?**
Mark only one oval.

- 1-3
- 4-5
- 6-9
- 10 or more

12. **How many external disruptions did you have while doing your math homework today?**
Mark only one oval.

- 1-3
- 4-5
- 6-9
- 10 or more

13. **What, if any, strategies did I use to complete my work?**

_____

14. **Please indicate how much you agree with the following statements** *

Mark only one oval per row.

	Not at all like me.	A little bit like me.	Somewhat like me.	Quite a lot like me.	Very much like me.
I kept my focus during each pomo.					
I met my goal for today					
I am happy with my work					

15. **Planning for Next Time. What will you do the same - or different - with your homework next time?** *

_____

_____

_____

_____

_____

Send me a copy of my responses.

APPENDIX F

ZIMMERMAN'S STUDY TIME SELF-MONITORING FORM

EXHIBIT 1 Study Time Self-Monitoring Form

Date	Assignment	Time Started	Time Spent	Study Context			Self-Efficacy
				Where?	With Whom?	Distractions?	

APPENDIX G

CIRILLO'S *RECORDS* WORKSHEET

RECORDS

Name _____

Date	*Time*	*Type*	*Activity*	*Estimate*	*Real*	*Diff*

APPENDIX H

ABBREVIATED CP-SRLI SURVEY

The Children's Perceived Self-Regulated Learning Inventory (CP-SRLI)

Students will answer questions using a five-point Likert scale:

1- not at all like me
2- a little bit like me
3 - somewhat like me
4 - quite a lot like me
5 - very much like me

	Subset of Questions Used in Study
TO1	Before I start my math homework, I ask myself: 'What is it about? What do I already know about it?'
TO2	Before I start my math homework, I read the instructions carefully.
TO3	If I get a similar math problem to one I have already done, I ask myself, "How did I approach it last time? Was that a good approach?"
PL1	If I find my math work difficult, I allow more time for it.
PL2	Before I start my math homework, I decide what to do first and what to do later.
PL3	Before I start my math homework, I think how much time I will need.
MT1	During my math homework, I ask myself, "Is the way that I am solving the problems working well?"
MT2	If I notice something isn't working out with my math homework, I try a different approach.
MT3	During my math homework, I check what I already have done from time to time and how much I still have to do.
MT4	During my math homework, I ask myself, "What part is difficult? What do I have to practice some more?"
P1	Even if I would rather do other things, I make myself start my math homework.
P2	Even if my math homework is difficult or boring, I do my best.
P3	Even if I would rather do other things, I finish my math homework.
P4	If I get distracted while doing my math homework, I immediately try to continue working.
	After finishing my math homework, ...
SPROD1	I go over my answers again.
SPROD2	I check that I haven't forgotten anything.
SPROD3	I check if I have done everything that was asked for.
SPROC1	I ask myself, "Have I done it the right way?"
SPROC2	I ask myself, "Did that way of doing my math homework work well?"
SPROC3	I ask myself, "How did I feel about it? (fun, difficult, boring, interesting, ...)?"
	TO = task orientation, PL = planning, MT = monitoring, P = persistence, SPROD = product evaluation, SPROC = process evaluation

APPENDIX I

PERMISSION TO USE CP-SRLI SURVEY

FORDHAM

Sean Adcroft <sadcroft@fordham.edu>

Request Permission to Use CPSRLI

Sabrina Vandevelde <Sabrina.Vandevelde@ugent.be> Wed, Feb 24, 2016 at 7:42 AM
To: Sean Adcroft <sadcroft@fordham.edu>

Dear Sean,

thank you for your interest in our work! We are pleased to hear that the CP-SRLI can help other researchers in assessing SRL. It would be nice to stay informed.
I formally give the permission to use the CP-SRLI.

Good luck with your research project,
Regards,
Sabrina

Op 19/02/2016 om 18:20 schreef Sean Adcroft:
[Quoted text hidden]

--
Sabrina Vandevelde (Sabrina.Vandevelde@Ugent.be)

Co-coördinator Master Gender & Diversiteit (http://www.mastergenderendiversiteit.be/)

Centre for Research on Culture and Gender
Department of Languages and Cultures
Faculty of Arts and Philosophy - Ghent University

Office: C0.10
Rozier 44
9000 Gent
Belgium

Onderzoeksgroep Taal, leren, innoveren (http://www.taallereninnoveren.ugent.be)

APPENDIX J

IRB REPORT OF ACTION FORM

FORDHAM UNIVERSITY
THE JESUIT UNIVERSITY OF NEW YORK

Fordham University IRB *Expedited Approval Notification*

To: Sean Adcroft
From: Michele Kuchera, IRB Office
Subject: Protocol #608
Date: 01/20/2017

The protocol **Developing Self-Regulated Learning with Time Management and Mindfulness Practice** has been approved under the rules for expedited review categories 6 & 7 on **01/20/2017**.

The approval of your study is valid through 01/19/2018, by which time you must submit an annual report either closing the protocol or requesting permission to continue the protocol for another year. Please submit your report by **12/22/2017** so that the IRB has time to review and approve your report if you wish to continue it for another year.

If you have any questions, feel free to contact irb@fordham.edu

Michele Kuchera,
IRB Office

Institutional Review Board
Fordham University
Collins Hall, B-31/B-34
Phone: (718)-817-0876
(718)817-0055
Email: irb@fordham.edu

Attachments:
- Adcroft Assent.pdf
- Adcroft Parent Consent Spanish.pdf
- Adcroft Parent Consent.pdf

APPENDIX K

IRB CONSENT FORM (ENGLISH)

FORDHAM
UNIVERSITY

New York City's Jesuit University

Parental Consent Form

Please read this consent document carefully before you decide to allow your child to participate in this study.

Parental Letter of Informed Consent

_____
(Date)

Dear Parent/Guardian,

My name is Sean Adcroft and I am a doctoral candidate in Fordham University's School of Education. I will be conducting a research study about mindfulness, time management, and self-regulated learning (SRL). SRL is a model of the steps successful learners use to accomplish a goal. I will be working under the supervision of Dr. Akane Zusho for my doctoral dissertation. In the process I will also be helping those students selected for one of the intervention groups to either learn more about mindfulness awareness practices or time management, homework, and self-regulated learning strategies. One group will receive both interventions and one will act as a control and receive neither.

Those students learning about mindfulness will receive lessons from the *Paws b* mindfulness curriculum which teaches students specific breathing and body awareness practices. Those students learning about time management, homework and self-regulated learning strategies will use an online homework diary that incorporates a timer to focus attention and questions to spur focus and reflection. If you would like to read more about these resources, you can do so at http://pomodorotechnique.com/ and https://mindfulnessinschools.org/what-is-b/paws-b-curriculum .

I am requesting your permission to include your daughter/son as a participant in one of the four groups in this research study. This project will take place between January 15, 2017 and May 15, 2017. This study will require students to complete brief questionnaires on self-regulated learning and test anxiety as well as an assessment that measures attention. Each assessment and survey will take no more than 20 minutes to complete.

All information gathered will be kept secure and your child's answers and identity will remain confidential. No student or parent names will appear in any reports produced as a result of this survey.

Possible risks of participating in this evaluation are minimal. The questions asked of your daughter/son are similar to those they may encounter in daily school life. Once again, the risks for this evaluation are minimal and your child's name and all other personally identifiable information will be kept confidential. Possible benefits may include reduced anxiety around homework, increased attention, and improved homework and study habits.

Your daughter/son's_participation in this project is voluntary. Neither you nor your child will be penalized or lose any benefits to which you are otherwise entitled if you decide that she/he will not participate in this evaluation. If you and your child decide(s) to participate in this project, they may stop participating at any time without penalty or loss of benefits. You have the right to see the assessment and survey questions and, if you wish, copies will be made available to you. Your request will be honored within a reasonable period after the request is received.

Right to withdraw from the study: Your child may choose to stop participation in the study at any time.

Who to contact if you have questions about the study: If you have questions about the study, please contact Sean Adcroft at (516) 477-8727.

Who to contact about your rights as a research participant in this study: You may contact Michele Kuchera, Manager of Fordham University Institutional Review Board, Phone: 718-817-0876. E-mail: MKuchera@fordham.edu.

YOU WILL BE GIVEN A COPY OF THIS CONSENT FORM WHETHER OR NOT YOU AGREE TO PARTICIPATE.

If you agree to participate in this study, please initial and sign below. Thank you.

Agreement:
I have read the information described above. I voluntarily agree to allow my child to participate in the research study on homework, mindfulness and self-regulated learning.

Name (Printed) _____

Signature _____

Date _____

If you agree to allow your child to participate in this research, please complete the information below:

_____	_____	_____
Participant's Name (please print)	Participant's Signature	Date
_____	_____	_____
Parent/Guardian's Name (please print) (For student participant)	Parent/Guardian's Signature (For student participant)	Date

Please return to Sean Adcroft, Manhasset High School, 200 Memorial Place, Manhasset, NY 11030.

Principal Investigator(s): Sean Adcroft

Date: _____

APPENDIX L

IRB CONSENT FORM (SPANISH)

FORDHAM
UNIVERSITY

New York City's Jesuit University

Parental Consent Form (Spanish)

Haga el favor de leer este consentimiento cuidadosamente antes de permitir que su hijo/hija participle en este estudio.

Carta Para el Consentimiento de Padres y/o Tutores

_____ (Fecha)

Estimado Padre y/o tutor:

Me llamo Sean Adcroft y actualmente estoy inscrito como un estudiante post-graduado en la Facultad de Maestría de la Universidad de Fordham. Estaré llevando a cabo una investigación sobre atención plena, organización de tiempo, y aprendizaje regulado por si mismo (SRL). SRL es un modelo de los pasos que los estudiantes exitosos usan para lograr un objetivo. Estaré trabajando bajo la supervisión del Dr. Akane Zusho para mi disertación. En el proceso, también estaré ayudando a los estudiantes que aprendan más sobre prácticas de atención plena, organización de tiempo, tarea y estrategias sobre aprendizaje regulado por si mismos. Un grupo recibirá las dos intervenciones y un grupo servirá como el control y no recibirá ninguna intervención.

Los estudiantes aprendiendo sobre atención plena recibirán lecciones del currículo de Paws b atención plena que les enseña prácticas específicas de respiración y reconocimiento propio de sus cuerpos. Los estudiantes aprendiendo sobre organización de tiempo, tarea y estrategias sobre aprendizaje regulado por si mismos usarán un diario de tarea online que incorporá un cronómetro para enfocar atención y preguntas para estimular enfoque y reflexión. Si quisiera leer más de estos medios, puede investigar http://pomodorotechnique.com/ and https://mindfulnessinschools.org/what-is-b/paws-b-curriculum.

Estoy solicitando su permiso para incluir su hija/hijo como participante en uno de los cuatro grupos de esta investigación escolar. Este proyecto tendrá lugar entre el 15 de enero, 2017 y el 15 de mayo, 2017. Este estudio requerirá que los estudiantes completen un breve asesoramiento y encuesta al empiece de cada estudio y en la conclusión. Cada asesoramiento y encuesta no llevará mas de 20 minutos para completar.

Toda la información recogida se guardará segura y las contestaciones de sus hijos y su identidad permanecerán confidencial. NINGUN nombre de estudiantes ni de sus padres aparecerá en ningún informe producido como resultado de esta encuesta.

Posibles riesgos de participación en esta evaluación serán mínimos. Las preguntas hechas a sus hijos serán similares a los que se topan en su vida cotidiana y escolar. Una vez mas, los riesgos para esta evaluación son mínimos y los nombres de sus hijos y otra información personal
e identificable será totalmente confidencial.

DERECHO A RETIRARSE DE ESTE ESTUDIO: Su hijo podrá escoger parar esta participación en este estudio a cualquier hora.

A QUIEN CONTACTAR SI TIENEN ALGUNA PREGUNTA SOBRE EL ESTUDIO: Si tiene alguna pregunta sobre el estudio, por favor póngase en contacto con Sean Adcroft al (516) 477-8727.

A QUIEN DIRIGIRSE SOBRE SUS DERECHOS COMO PARTICIPANTE DE INVESTIGACION EN ESTE ESTUDIO: Puede dirigirse a Michelle Puchera, Gerente del Institutional Review Board de la Universidad de Fordham. Teléfono: 718-817-0876. E.-mail: MKuchera"fordham.edu.

SE LE ENTREGARÁ UNA COPIA DE ESTE FORMULARIO DE CONSENTIMIENTO YA SEA QUE ACEPTE O NO PARTICIPAR.

Si acepta participar en este estudio, coloque sus iniciales y firme a continuación. Gracias.

Acuerdo:
He leído la información descrita arriba. Yo voluntariamente acepto permitir que mi hijo participe en el estudio de investigación sobre la tarea, la atención plena y el aprendizaje autorregulado.

Nombre (impreso) _____

Firma _____

Fecha _____

Si acepta permitir que su hijo participe en esta investigación, complete la información a continuación.

_____	_____	_____
Nombre del participante (imprimir)	Firma del participante	Fecha

_____	_____	_____
Nombre del padre / tutor (por favor imprima)	Firma del padre / tutor	Fecha

Regrese a Sean Adcroft, Manhasset High School, 200 Memorial Place, Manhasset, NY 11030

Investigador (es) principal (es): Sean Adcroft

_____
Fecha