

THE ROLE OF KORU ON PRESERVICE TEACHERS' STRESS, ANXIETY, AND
MINDFULNESS LEVELS

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ABSTRACT

This study examined whether the Koru mindfulness intervention led to improved wellness outcomes, as evidenced by decreases in anxiety and stress scores, and increases in mindfulness scores of preservice teachers. This study also investigated the extent to which participants implemented the Koru intervention with fidelity and were satisfied with the intervention. The research is guided by the following questions: (1) To what extent do preservice teachers who volunteered and were randomly selected for a mindfulness practice (MP) intervention implement the intervention with fidelity (i.e., come to the workshop and practice at home) throughout the period of the intervention? (2) How satisfied are participants with the intervention throughout and at the end of the intervention? (3) To what degree does intervention participation affect students' stress levels, as measured by the *Perceived Stress Scale* (PSS; Cohen, Kamarck, & Mermelstein, 1983)? (4) To what degree does intervention participation affect students' anxiety levels, as measured by the *State-Trait Anxiety Scale* (STAI-Y; STAI-Y; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983)? (5) To what degree does intervention participation affect students' mindfulness levels, as measured by the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003)? Major findings from this study demonstrate that Koru did significantly reduce preservice teachers' anxiety and stress levels; however, no significant effects on mindfulness were observed. Findings from this research show mindfulness training can potentially benefit preservice teachers' wellness outcomes.

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CHAPTER 1: INTRODUCTION

The high turnover rate found in the teaching profession is cause for alarm, with roughly 30% of beginning teachers leaving the teaching profession within five years. Even more concerning, teacher turnover rates are approximately 50% higher in schools serving high-poverty, under-resourced communities, when compared to their rural and suburban counterparts (Darling-Hammond & Sykes, 2003; Ingersoll, 2001; Ronfeldt, Loeb, & Wyckoff, 2013). Correlational evidence demonstrates that higher rates of school-level turnover are associated with lower student achievement scores (Boyd, Lankford, Loeb, & Wyckoff, 2005; Guin, 2004). Occupational stress and mental health-related difficulties such as anxiety and stress are thought to contribute to these distressing rates of teacher attrition (Merida-Lopez, Extremera, & Rey, 2017). Considering that the highest rates of teacher turnover occur during the first five years of service, it is crucial to equip preservice teachers with the skills which will enable them to navigate through the stress they are sure to encounter in the early years of their careers; this is particularly critical for preservice teachers that may potentially teach in high-poverty areas, which are known to have higher-than-average turnover rates. One such skill, meditation, is thought to enhance mental wellness by decreasing anxiety and stress, while increasing mindfulness; all of which could potentially assist in developing the grit necessary to enjoy a lifelong career in the teaching profession (Waters, Barsky, Ridd, & Allen, 2014).

Meditation is a contemplative practice involving the regulation of attention through keen observation of body states, emotions, and thoughts (Black, Milam, & Sussman, 2009). This study seeks to identify the ways in which Koru, a mindfulness practice (MP) designed for implementation with emerging adults, affects preservice

teachers' mental wellness. Koru is thought to decrease levels of stress and anxiety. While the underlying mechanisms leading to these changes are still being researched, preliminary findings suggest that MPs such as Koru enhance mental well-being through strengthening cognitive functioning and emotional regulation abilities. While existing research has identified some of the key processes through which MPs shape the aforementioned realms, it has been beyond the scope of this work to examine feasibility for and effects on preservice teachers. Indeed, in school contexts, most work has focused on practicing teachers or students. Consequently, the extant research fails to specifically address the effects that MPs (including Koru) may have on preservice teachers' well-being and mindfulness levels, a gap that the current study seeks to fill.

This dissertation will begin by providing the reader with an overview of the nature and extent of stress and anxiety among teachers, as well as the detrimental role that these factors play in teacher burnout. Second, a definition and overview of MPs which are commonly utilized in school settings will be described. In particular, I focus on the practice of Koru, a type of MP specifically designed for emerging adults. Third, I will analyze the effects that MPs demonstrate on the anxiety, stress, and mindfulness levels of emerging adults, preservice teachers, and practicing teachers. Fourth, I briefly explore the mechanisms thought to underlie these changes. Finally, I will conclude with a synthesis of the questions that remain about MPs. Thereafter, five research aims will guide the current study to answer the following questions:

1. To what extent do preservice teachers who volunteered and were randomly selected for a MP intervention implement the intervention with fidelity (i.e., come to the workshop & practice at home) throughout the period of the intervention?

2. How satisfied are participants with the intervention throughout and at the end of the intervention?

3. To what degree does intervention participation affect students' stress levels, as measured by the *Perceived Stress Scale (PSS)*?

4. To what degree does intervention participation affect students' anxiety levels, as measured by the *State-Trait Anxiety Scale (STAI-Y)*?

5. To what degree does intervention participation affect students' mindfulness levels, as measured by the *Mindful Attention Awareness Scale (MAAS)*?

This study involved 12 students enrolled in the Early Grades Preparation (PreK-4) program at West Chester University. During the early portion of the Fall 2018 semester, I sought permission from Early Grades Preparation (PreK-4) instructors to recruit students enrolled in their courses. Three instructors allowed the author to share with their classes a presentation outlining the specifics of the study. Students in each class were then asked to volunteer (with the caveat that half would receive the intervention and half would be placed in a waitlist control condition). A total of 12 students volunteered to take part in the study. After random assignment, but prior to beginning the intervention, both groups completed the demographic survey. After completion, both groups' mindfulness, anxiety, and stress levels were assessed. Mindfulness levels were assessed through the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003); anxiety was assessed through the State-Trait Anxiety Scale (STAI-Y; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983); and stress was assessed through the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983). The intervention group was exposed to the intervention for a duration of three weeks, while the control group did not receive the intervention. On

a daily basis during the study, the intervention group completed Home Practice Logs documenting their mindfulness practice. At the conclusion of the study, the control group was given access to a phone app that provided audio recordings of each session and video tutorials of each mindfulness technique. The control group was also given the opportunity to complete the training at a to-be-determined date in the future.

At the conclusion of the intervention, both groups' mindfulness, anxiety, and stress levels were assessed again using the MAAS (mindfulness), STAI-Y (anxiety), and PSS (stress) scales. The control group also completed a course satisfaction survey. Responses to all measures were analyzed using SPSS software.

Unique Contributions of the Current Study

Although numerous studies have documented benefits of mindfulness practices (MPs) related to stress and anxiety, to date, no study has examined the effect that Koru – a particularly promising technique – has on emerging adult-aged, preservice teachers. The promise of Koru for preservice teachers lies in three areas. First, there is evidence that Koru is effective at reducing stress and anxiety while promoting mindfulness outcomes with emerging adult populations. Second, Koru is a relatively brief intervention, designed to be implemented over the course of just four, weekly, 75-minute sessions. In order to minimize sample attrition, this study utilized a modified version of Koru consisting of three, weekly, 60-minute sessions. Previous research (Waters et al., 2014) has noted significant effects stemming from mindfulness interventions of shorter durations (i.e., < 6 weeks). Though promising, these effects were only noted in four studies-- as such, further research investigating brief mindfulness interventions needs to be conducted. The possibility exists that the shorter duration of this intervention may

appeal more broadly to college-aged participants, who typically have busy lives, and result in less attrition from the sample. Third, Koru is designed with emerging adult populations in mind; specific strategies for dealing with stressful situations typically encountered at this age are offered. For example, guided meditations and calming skills specifically tailored to curtail testing-related anxiety are presented. Thus, Koru has substantial potential to support college-aged preservice teachers.

Results from this study will inform the field in three ways. Most directly, results will reveal how feasible a three-session mindfulness meditation intervention is with preservice teachers. This research will also lend further insight into whether or not this population is satisfied with the intervention and whether or not there is an effect on their home mindfulness practice and general well-being. If it is determined that an intervention of this type can indeed produce significant effects on participants' anxiety, stress, and/or mindfulness levels, the implications may be far-reaching, in that Koru could be widely integrated into teacher education programs.

CHAPTER 2: LITERATURE REVIEW

Teacher Mental Health

Teacher mental health is a huge issue; this issue is especially pressing when teachers are new to the field. The World Health Organization (2004) defines mental health as a condition of wellness during which an individual realizes his or her potential, can manage normal stresses encountered in life, can work effectively, and possesses the ability to contribute to his or her community. Although mental health studies of teachers utilize widely varying indicators, their foci converge on domains involving stress, burnout, psychological distress, and psychiatric disorders such as depression and anxiety (VanDroogenbroeck & Spruyt, 2015). Numerous studies conducted throughout the country and around the world have all drawn a similar conclusion: teachers are exposed to excessive levels of these adverse experiences, which have been associated with absenteeism, teacher attrition, and general lack of motivation (Bridger, Day, & Morton, 2013). Indeed, the problem may be intensifying. Below, I explore the distinct constructs of stress, anxiety, and burnout, which a meta-analysis conducted by Montgomery and Rupp (2005) found have high-average correlations ($r = .40$). Notably, other key terms used in the literature include depression and psychological distress; however, I focus here on the outcomes most commonly examined in MP interventions.

Stress. Stress is the belief that an event or situation eclipses one's coping mechanisms (Bamber & Schneider, 2016). Chronic stressors are defined as events perceived to be stressful which occur over an extended period of time (Schonfeld, 1990). Researchers have identified numerous chronic stressors for teachers; one of the most frequent chronic stressors to emerge from the literature is lack of support from supervisors, coworkers, and parents. A demanding workload, disruptive students, less

autonomy, and increased accountability are also commonly cited stressors in the literature (Mahan, Mahan, Park, Shelton, Brown, & Weaver, 2010; VanDroogenbroeck & Spruyt, 2015) Exposure to these stressors is thought to be intensifying; in fact, numerous researchers (Johnson, Cartwright, Taylor, & Millet, 2005; Travers & Cooper, 1993) have proposed that policy shifts occurring within the teaching profession throughout the past few decades (frequently referred to as 'intensification') may be an underlying cause of increases in teacher stress.

The intensification thesis posits that, due to increased scrutiny on the economics of education, teachers are progressively subjected to pressures from policymakers, experts, supervisors, and parents. This intensification also leads to a constantly expanding teaching role, increasing accountability, exceptional increases in administrative workload, and diminished autonomy. The MetLife Survey of the American Teacher: Challenges for School Leadership (2012), a survey which has been conducted annually since 1984, noted that 51% of teachers surveyed in 2012 reported feeling under great stress several days a week; this is an increase of 15 percentage points of teachers reporting that level in 1985. In short, the teaching profession has changed drastically over the past few decades and the deleterious effects of stress on teacher well-being have been well-documented in the extant research (VanDroogenbroeck & Spruyt, 2015). Accordingly, findings from a large portion of the teacher mental health research demonstrates that anywhere between 16% to 53% of surveyed teachers find teaching to be very or extremely stressful (e.g., Bellingrath, Rohleder, & Kudielka, 2010; Cropley, Steptoe, & Joeke, 1999; Fernet, Guay, Senécal, & Austin, 2012; Friedman, 2011; Hakanen, Bakker, & Schaufeli, 2005; Skaalvik & Skaalvik, 2009; Van Der Doef & Maes,

2002; Van Droogenbroeck, Spruyt, & Vanroelen, 2014; Zimmermann et al., 2012). While a large portion of these studies relied on one-item measures asking teachers to rate how stressful they find being a teacher, information yielded from these studies demonstrates that teachers feel stressed.

Anxiety. Stress, when not effectively dealt with, can lead to anxiety (Bamber & Schneider, 2016). Anxiety can be defined as a transient state during which an individual may feel apprehensive, worried, or threatened (Mahan et al., 2010). In a survey study conducted with 168 teachers from urban and suburban school districts, Mahan et al. (2010) examined the relationship between stressors and anxiety and depression; they also investigated the extent to which anxiety and depression can be predicted by stressors and, conversely, by coworker and supervisor support. Their findings showed that exposure to chronic stress was significantly and positively associated with anxiety and depression, meaning that as chronic stress increased, anxiety and depression also increased. (The generalizability of their findings is questionable, however, due to convenience sampling and a 23.9% response rate for the questionnaires from which they drew their data.)

Similarly, Travers and Cooper (1993) investigated anxiety and depression levels among a sample of 1790 school and university teachers in the United Kingdom. They utilized t-tests to compare teacher scores to data from a similar study completed in 1979 which included tax officers ($n = 316$), general practitioners ($n = 1774$), and dentists ($n = 484$). Their results showed that teachers scored higher on anxiety measures.

Burnout. Burnout is often characterized as the end result of long-term exposure to chronic stress. Although numerous definitions of burnout exist, it is most frequently characterized as a psychological syndrome resulting from emotional exhaustion,

depersonalization (feeling detached from one's self, or as if one is an outside observer of their thought processes), and a diminished sense of personal accomplishment (Maslach, 1993). Teacher burnout often has roots in the early portion of a teacher's career, with many teachers reporting significant levels of stress during student teaching (Fives, Hamman, & Olivarez, 2007). Research suggests anxiety- and depression-fueled burnout is pervasive among teachers. For example, Schaufeli, Daamen, and Van Mierlo (1994) conducted pioneering studies which investigated teacher mental wellness by comparing burnout scores of 326 Dutch secondary school teachers with burnout data on 2,951 human services employees such as physicians, nurses, social workers, and correctional officers. Their findings revealed that secondary teachers showed the highest levels of burnout and work stress.

Similar results come from other large-scale studies of burnout comparing across fields. A study conducted by DeHeus and Diekstra in the Netherlands (1999) utilized a multidimensional survey to compare burnout scores for teachers ($n = 1018$) with those from five other human service professions: managers ($n = 944$), therapists and social workers ($n = 227$), physicians and dentists ($n = 196$), nursing professionals ($n = 825$), and household and caring professionals ($n = 343$). Results revealed that both male and female teachers had the highest levels of burnout in comparison to the other service professions.

Summary. Taken together, these findings, and a wealth of other work on related outcomes including emotional exhaustion and depression (Johnson, Cooper, Cartwright, Donald, Taylor, & Millet, 2005; Schaufeli & Enzmann, 1998), clearly indicate that teachers need more support in managing the stressors they encounter on a daily basis. Considering the true purpose of teaching is to facilitate the academic growth of students

while simultaneously supporting their social and emotional needs, it becomes clear that addressing the pervasive teacher stress and burnout is a crucial step in cultivating a truly healthy school environment for all learners (Gray, Wilcox, & Nordstokke, 2017; Kipps-Vaughan, 2013).

Consequences of Teacher Mental Health

A number of unfortunate consequences follow from challenges to teachers' mental health, including impaired teacher-student relationships and teacher turnover.

Teacher-student relationships. Ample evidence is emerging that, when teachers report lower levels of mental health, the quality of their classroom instruction, and particularly their relationships with children, may be lower (Pianta, 1999). For example, Osher, Kidron, Brackett, Dymnicki, Jones, & Weissberg (2016) found that higher levels of teacher stress were linked to lower levels of student engagement. They also found increased teacher stress levels were related to increased reactive and punitive teacher responses, which ultimately contributed to negative classroom climates, less emotionally supportive adult-child classroom interactions, and less student learning of social and emotional outcomes; other studies have demonstrated similar findings (Osher, Kidron, Brackett, Dymnicki, Jones, & Weissberg, 2016; Yoon, 2002).

Turnover. Another consequence of impaired mental health among teachers, including stress, anxiety, burnout, and related issues, is teacher turnover (von der Embse, Kilgus, Solomon, Bowler, & Curtiss, 2015; Yoon, 2002). Teacher turnover refers to the attrition (teachers leaving the teaching profession altogether) or migration (teachers remain in the profession but switch schools) of teachers. Teacher attrition results in schools expending time and financial resources in recruiting, retraining, and retaining

new staff (Barnes, Crowe, & Schaefer, 2007). For example, the National Commission on Teaching and America's Future approximates the cost of a teacher leaving to be as much as \$17,862 per teacher. Furthermore, teacher turnover has been found to impair school climate by reducing the number of experienced teachers in schools and disrupting the consistency of classroom instruction (Ryan, von der Embse, Pendergast, Saeki, Segool, & Ryan et al., 2107). Moreover, teachers working in high-poverty, low-income areas experience particularly high levels of stress, burnout, and other negative outcomes, which are then manifested in disproportionate rates of urban teacher attrition and migration in comparison to their suburban counterparts.

According to a study conducted by the National Center for Education Statistics (1998), schools in which over 50% of the students are minorities experience turnover rates which are twice as high in comparison to schools with lower populations of minority students. A similar study conducted by Freeman, Scafidi, and Sjoquist (2002) found that teachers coming from schools serving minority, low-income, and under-resourced communities were more likely to switch schools. Ingersoll (2001) demonstrated that schools with poverty levels greater than 50% have significantly higher turnover rates when compared to low-poverty schools (schools with less than 15% poverty). A study which focused on schools in the School District of Philadelphia revealed similar findings, with the highest teacher turnover rates being found in the highest poverty schools, when compared to schools with the lower rates of poverty (Useem & Neild, 2002); specifically, between 1999-2000, 46% of middle school teachers working at schools with highest poverty rates had been employed by their respective school for two years or less. One of the driving factors behind these higher attrition rates

stems from teachers employed by high-poverty schools accepting offers to teach in schools with higher-performing students or students from higher socioeconomic backgrounds (Betts, Rueben & Danenberg, 2000; Bohrnstedt & Stecher, 1999; Hanushek, Kain & Rivkin, 1999, 2001). Unfortunately, Lankford, Loeb, and Wyckoff (2002) found that teachers leaving higher poverty urban schools typically possess higher quality teaching skills in comparison to the teachers who choose to stay in those schools.

In sum, high levels of work-related stress contribute to weaker teacher-child interactions and greater teacher turnover. These are serious challenges facing the field of education, particularly in high-need school districts, and especially at the outset of a teacher's career where the stress of teaching may be relatively higher. Therefore, it is reasonable to assume that preservice teachers about to embark on careers in high-need settings would benefit from training in practices which can help mitigate some of the harmful effects caused by chronic stress. While the body of research investigating the effects of stress on teachers is well-established, a scant amount of research has focused on identifying and testing methods which can be used to reduce stress and enhance teacher resiliency. A small but growing array of studies has begun to investigate practices which can potentially mitigate the well-demonstrated, harmful effects of stress. One possible solution involves MPs. This study aims to fill in these gaps by investigating the effects that Koru, an MP specifically designed for emerging adults, has on preservice teacher mental health.

Mindfulness Practices

MPs emerged from Buddhist Vipassana meditation; they were originally brought to western societies by a monk named Thich Nhat Hanh (Bamber & Schneider, 2016,

Kang, Choi, & Ryu, 2009). Jon Kabat-Zinn developed mindfulness-based stress reduction (MBSR), one of the most promising MP interventions, in 1979. Since the inception of MBSR 30 years ago, the popularity of MPs has exploded; the availability of MPs in over 200 hospitals, medical centers, and clinics around the world is a testimony to their effectiveness. MPs have even begun springing up in schools throughout the world; indeed, over the past 10 years, MPs have been developed in Canada (Mindful Education), England (Mindfulness in Schools Project, DotB), India (The Alice Project) and the United States (Mindful Schools, MindUp). Additionally, in 2012, the Collaborative for Academic, Social, and Emotional Learning (CASEL) allotted \$7 million to facilitate the development of social-emotional learning curricula which included features of mindfulness (Waters et al., 2014).

While MBSR is one of the more commonly researched MPs, other commonly researched interventions include mindfulness-based cognitive therapy (MBCT), acceptance-based behavioral therapy (ABBT), Acem, Cultivating Awareness and Reliance in Education (CARE), Centering Prayer, Koru, Loving Kindness Meditation, Mindfulness-Based Wellness Education (MBWE) Shamatha, Standardized Meditation, Transcendental Meditation, Vipassana meditation, Yoga Nidra, and Zen meditation. Considering all of these interventions are based upon the same components, the term “Mindfulness Practice” or “MP” is used throughout this paper to refer to any type of mindfulness practice intervention. While existing research has identified many benefits of MPs, this evidence base is unwieldy due to methodologically inconsistent approaches across projects. Certainly, many forms of MPs have been found to be beneficial to varying degrees with both clinical and non-clinical populations; the existing research

demonstrates promise. However, great strides need to be taken towards establishing a more coherent picture of which types of meditation are most effective and which intervention dosages and delivery methods are optimal. In addition, developmentally appropriate delivery methods need to be examined in-depth, in order to determine which mindfulness interventions are most effective for different demographics. This study aimed to determine the feasibility and identify the effectiveness of a three-session Koru mindfulness meditation intervention for emerging adult preservice teachers by investigating associated mental wellness outcomes.

Defining Mindfulness Practices

Mindfulness can be defined as any practice that may foster an awareness of the present moment, bodily sensations, the connection between mind and body, attention control, and non-judgmental thoughts (Bamber & Schneider, 2016). According to Kabat-Zinn (1990), mindfulness is a secular form of meditation based on training the mind to be aware of the present moment. Critically, that awareness is accepting, as thoughts and feelings are merely observed in the present moment without being labeled as “right” or “wrong”. Oftentimes, interventions involving mindfulness utilize techniques such as concentrating on the rhythm of one’s breath, which calls attention to the present moment; body scans, which involve undertaking a systematic mental sweep through the body while bringing an affectionate, open hearted awareness to each region; and diaphragmatic breathing, which is a deep-breathing technique accomplished by focusing one’s awareness on contracting the diaphragm muscle while inhaling. Broadly speaking, then, MPs focus on retraining the mind to be less emotionally reactive and aim to cultivate increased resiliency to stressful thoughts and events through a variety of behaviors.

Core components of mindfulness practices. While MP is an umbrella term under which numerous contemplative practices may be classified, two core components of MPs unify these practices: control of attention and cultivation of non-judgmental awareness.

Control of attention. MP training often begins with developing the ability to deliberately focus attention on passing thoughts, emotions, actions, and feelings; this skill is considered foundational to any mindfulness practice (Bamber & Schneider, 2016; Kabat-Zinn, 2003). This sustained focus requires meditators to constantly monitor the quality of attention. In the event their attention begins to wander, the typical mindfulness instruction is to acknowledge the wandering and then refocus attention on the chosen object. For example, while aiming to focus on breathing, one may notice that the focus has shifted to a pain in the ankle. This distraction is then released, and focus returns to the intended object. Thus, while acquiring the ability to sustain attention on a selected object, this practice develops three attentional regulation skills: the first is the ability to vigilantly monitor focus; the next skill is the ability to quickly disconnect from distracting objects; and the last is the capacity to promptly redirect your focus to the chosen object (Lutz, Slagter, Dunne, & Davidson, 2008).

Cultivation of non-judgmental awareness. Kabat-Zinn (2003) also points out that simply focusing on the present moment is not enough; a non-judgmental viewpoint must be developed as well. This involves avoiding unpleasant self-judgements and being aware of what we are experiencing without attempting to change it or push it away; instead our experience is accepted with equanimity. In the absence of mindfulness, one's thought process can sometimes become a vicious cycle through which negative feelings are

perpetuated and reinforced. Commonly, this cycle begins with any event which produces a negative mental reaction, or a “trigger event”. For example, a person may be driving to work, wind up in a traffic jam, and arrive late to work. This trigger event would then begin a cycle of negative self-judgments such as *I’m always late for work; I mess up like this all the time, and I’m going to lose my job*. Cultivating a nonjudgmental awareness involves halting this vicious cycle through an effort to rationally process emotions and the simple act of not judging one’s thoughts. This type of awareness is also thought to develop a sense of non-reactivity, meaning current-moment experiences are acknowledged, then let go. An example of this would be experienced mindfulness practitioners encountering some type of negative emotion or perhaps experience a trying encounter with a loved one; instead of embracing the emotion they feel and responding to the situation with that emotion, they would acknowledge this emotion, but put it aside so that their response could come from a place of emotional stability, tractability, and a sense of awareness (Bamber & Schneider, 2016).

MPs are believed to enhance emotional and cognitive flexibility; in other words, experiencing the core components of a MP is thought to result in heightened physical, mental, and emotional well-being. The neurological underpinnings which are thought to be the basis of these changes will be explored next.

Underlying Neurological Mechanisms

The evidence base indicates that several core regions of the brain are affected after engaging in MPs; while an in-depth review of these neurological effects is beyond the scope of this paper, several findings will be highlighted in order to provide the reader with an awareness of these changes. While neurological research investigating the effects

of mindfulness is still in its infancy, these findings do demonstrate that, generally speaking, MPs can affect the structure of the brain (Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007; Grant, Courtemanche, Duerden, Duncan, & Rainville 2010). While not exhaustive, this list indicates some of the more common neurological regions which undergo structural changes thought to result from various forms of mindfulness meditation: amygdala, anterior cingulate cortex (ACC), prefrontal cortex (PFC), and posterior cingulate cortex (PCC) regions have been associated with mindfulness meditation interventions.

Amygdala. The amygdala plays a critical role in the processing of emotions; typically, the amygdala is activated in response to fearful or stressful emotional events. An fMRI study conducted by Brefczynski-Lewis et al. (2007) found long-term meditators showed reduced amygdala activity when exposed to pictures designed to stimulate an emotional response. This finding suggests a generally higher level of emotional self-regulation and non-reactivity among meditators.

Anterior cingulate cortex (ACC). This region is thought to be responsible for the self-regulation of attention and emotion (Cahn & Polich, 2006). A study conducted by Grant et al. (2010) utilized functional magnetic resonance imaging (fMRI) to show increased cortical thickness in the ACC of 17 long-term meditators as compared to a control group. This could indicate an enhanced ability for self-regulation-related tasks (Tang, Holzel, & Posner, 2015). Other findings have further demonstrated that after only five days of meditation, cerebral blood flow in the ACC region has improved. Increased cerebral blood flow in this region has been correlated with increases in self-reported positive mood (Tang et al., 2015).

Prefrontal cortex (PFC). Meditation has also been linked to changes in the prefrontal cortex, which is the area responsible for overseeing higher level executive functioning skills such as attention, concentration, and the regulation of emotions. Neurological findings related to this area of the brain have demonstrated that it is activated during mindfulness meditation; correlational studies have associated this activation with anxiety relief (Zeidan, Martucci, Kraft, McHaffie, & Coghill, 2014).

Posterior cingulate cortex (PCC) The PCC is thought to be responsible for self-awareness. Long-term meditators have shown increased grey matter density in the PCC; typically, increased grey matter in this region of the brain correlates positively with higher levels of self-awareness (Hasenkamp & Barsalou, 2012; Waters et al., 2014).

Summary. Limitations associated with this research include: (a) the utilization of varying MPs across studies, (b) the use of disparate brain measurement techniques, and (c) the focus on various parts of the brain. Further, the brain is a complex organ and mental functions often rely on multiple, complex interactions between varying neural networks. Thus, a full understanding of the relationship between observed neurological changes associated with MPs and enhanced cognitive functioning is not, at this time, possible to isolate from the evidence base (Tang et al., 2015). However, taken together, these results suggest that MPs alter practitioners' brains in ways that increase self-awareness, emotional stability, and emotional regulation. Accordingly, it is plausible that these increases could potentially account for the enhanced sense of general well-being that is often associated with MPs (Waters et al., 2014). The studies below highlight the effects MPs have on (a) practicing teachers, (b) emerging adults outside of the teaching

field, and, for just a very few projects, (c) preservice teachers, who are generally emerging adults within the field of teaching.

Mindfulness Practice Effects on Teacher and Emerging Adults' Wellness

Below, I describe the full array of studies identified for practicing teachers, emerging adults, and preservice teachers. For each study, I explain the sample characteristics and sample size, the methods of the MP intervention, the measures used, and the results. Within each section, studies are organized in the order of their comprehensiveness and complexity, so that each builds (at least to some extent) on the methods and findings of the one before. Taken together, this review provides a rich explication of what is known about MPs with these participants and what MP techniques appear to be effective, as well as what remains to be discovered and which methods (e.g., randomized control trials) are relatively underused.

Practicing Teachers. Studies which utilized practicing teachers have shown MPs to be a promising approach to reducing anxiety, stress and enhancing well-being (see Table 1 for a summary). Beshai, McAlpine, Weare, and Kuyken (2015) conducted a feasibility trial ($N = 89$) with secondary school teachers and staff which investigated the efficacy, process, and acceptability of a modified pilot program titled “The b. Foundations Mindfulness Course.” This course was modified and condensed to fit the busy schedules of teachers and is based on MP principles. The course was comprised of 75- minute sessions held once a week for nine weeks (675 minutes total instruction); sessions focused on body scans, developing focus, and cultivating self-compassion. Participants were self-selected into the intervention ($n = 49$) or wait list control ($n = 40$) groups. Participants’ stress, well-being, mindfulness, and self-compassion levels were

assessed at baseline and at the conclusion of the intervention. The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) was utilized to assess stress levels; well-being was assessed with the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS; Stewart-Brown, Platt, Tennant, Maheswaran, Parkinson, & Weich, 2011); Mindfulness was measured by the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006); and self-compassion was measured from the Neff Self-Compassion Scale (SCS; Neff, 2003). Findings revealed significant reductions in PSS scores ($p < .001$; $\eta p^2 = .25$), significant increases in WEMWBS scores ($p < .001$ $\eta p^2 = .30$), and significant increases in FFMQ scores ($p < .01$; $\eta p^2 = .35$). A meaningful effect size ($\eta p^2 > .14$) was also found for the intervention group across all of the outcome variables.

These findings demonstrate that a condensed and modified version of an MP intervention can yield meaningful effect sizes on critical outcomes such as stress, mindfulness, and well-being. However, this study did not employ a randomized control trial design, and therefore there may be group differences, particularly around selection biases, which at least partly account for these findings. Furthermore, the participants were predominantly female and Caucasian, and no demographic material beyond this information was collected by the researchers, meaning that participants may appear homogeneous but actually differ systematically in ways that were not captured, which could also at least partly account for these results. A final limitation found with this study and many MP studies involved the usage of self-reported measures. While these types of measures are valid, reliable, and commonly used, the addition of physiological, neuroscientific, or objectively measured data would strengthen these findings. Additionally,

considering that MP training is designed to bring long-term benefits, the addition of follow-up data to any mindfulness study would lend credence to the intervention's effectiveness.

A study conducted by Flook, Goldberg, Pinger, Bonus, and Davidson (2013) addressed several of the limitations found in the previous study. These authors researched the effects of a MP on 18 elementary school teachers. Participants were randomized into either the intervention group ($n = 10$), or the waitlist control ($n = 8$) group. The intervention group participated in a two-and-a-half-hour course that met on a weekly basis for the duration of eight weeks. An additional component of the course involved a one day, six-hour immersion lesson (1,560 minutes total instruction). Variables assessed included psychological distress as measured by the Symptom Checklist 90-R (SCL; Derogatis, 1994); mindfulness and self-compassion as assessed with FFMQ and SCS scales; burnout as measured by the Maslach Burnout Inventory-Educators Survey (MBI-ES; Maslach, Jackson, & Leiter, 1996); and three dimensions of teacher classroom behavior: emotional support, classroom behavior, and instructional support, as measured by an observational coding system called the Classroom Assessment Scoring System (CLASS; LaParo, Pianta, & Stuhlman, 2004). Cortisol levels were also measured along with other neuropsychological and attentional tasks. The Cambridge Neuropsychological Test Automated Battery (CANTAB, 2000) was used to measure sustained attention and affective attentional bias; the Rapid Visual Information Processing Task (RVP; CANTAB, 2000) was used to measure sustained visual attention, and the Affective Go/No-Go Task (AGN; Kaplan, Erickson, Luckenbaugh, Weiland-Fiedler, Geraci M, et al., 2006) was used to measure emotional processing. Participants were randomized into

either the intervention group ($n = 10$), or the waitlist control ($n = 8$) group.

Participants were assessed pre- and post-intervention; results showed the intervention group's psychological distress scores significantly decreased ($p = .005$; $d = .53$), while their mindfulness scores significantly increased ($p = .032$; $d = .24$). Their burnout scores significantly decreased on two subscales (emotional exhaustion, $p = .038$; $d = .25$, personal accomplishment, $p = .014$; $d = .99$). Additionally, CLASS scores for the intervention group increased significantly ($p = .046$; $d = .28$), along with significantly decreased affective attentional bias scores ($p = .012$; $d = .33$), which indicated a greater ability to focus.

These findings are useful in demonstrating that an eight-week MP-focused training protocol may be effective in enhancing teacher well-being by decreasing burnout and increasing mindfulness. These results also demonstrate that MP training may provide benefits to students, as suggested by the increases in CLASS scores.

These findings converge with the results obtained from Anderson and colleagues (1999), who demonstrated similar effects from a MP intervention on stress, anxiety, and burnout levels of 91 elementary, middle and high school teachers. Each session lasted one-and-a-half hours; sessions were held on a weekly basis for five-weeks; a one-and-a-half hours follow-up session was held one month after the initial five-week session ended (540 minutes total instruction). Participants were also instructed to meditate twice a day for 20 minutes for the duration of the intervention. The intervention was based upon a program taught by the American Meditation Society and involved instruction in the practice of basic mantra meditation (which involves the repeated repetition of a word or phrase to help focus while meditating), as well as pranayama or breathing techniques, and

group practice of these techniques. Stress levels were measured through administration of the Teacher Stress Inventory (TSI; Fimian, 1988); burnout levels were measured with the Maslach Burnout Inventory Second Edition-Educators Survey Version (MBI; Maslach & Jackson, 1993); and anxiety levels were measured through the State-Trait Anxiety Inventory for Adults (STAIA; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). These measures were administered to the intervention group and waitlist control group at baseline and posttest; a follow-up test was also administered four weeks after the study concluded to test for lasting intervention effects.

Results demonstrated significant reductions on stress-level scores for the intervention group at posttest ($p = .006$) and follow-up ($p < .001$). MBI scores were significantly lower for the intervention group at posttest ($p < .001$) and follow-up ($p < .001$), and anxiety scores also were significantly lower for the intervention group at posttest ($p < .001$) and follow-up ($p < .001$). It is also noteworthy that significant effects were observed across the intervention group, regardless of whether or not the participant complied with the suggested twice daily 20-minute meditations. These findings demonstrate that significant effects on stress, anxiety, and burnout can be obtained through exposure to as little as five weeks (540 minutes) of a MP intervention. While this study did not report effect sizes, did not utilize a placebo control group and focused on a predominantly female, Caucasian sample, these findings are more generalizable than the previous two studies due to the usage of a randomized control design and a larger sample size.

Table 1
Practicing Teacher MP Findings

Citation	Purpose	Amount of Instructional Time	Outcomes
Beshai, McAlpine, Weare, and Kuyken (2015)	To investigate the efficacy, process, and acceptability of a MP on secondary teachers ($N = 89$) stress, well-being, mindfulness, and self-compassion levels.	675 minutes	Observed effect ($\eta p^2 = .14$) for intervention on all outcome measures. Effect maintained after controlling for baseline differences between intervention and comparison groups. Significant decreases in stress score ($\eta p^2 = .25$); significant increases in wellness ($\eta p^2 = .30$).
Flook, Goldberg, Pinger, Bonus, and Davidson (2013)	Researched the effects of a MP on elementary school teachers' psychological distress, mindfulness, self-compassion, burnout, classroom behavior, and attention ($N = 18$).	1,560 minutes	Significant increases in mindfulness ($d = .24$); self-compassion ($d = .97$); classroom behavior score ($d = .28$). Significant decreases in burnout ($d = .25$); affective attentional bias scores ($d = .33$).
Anderson, Levinson, Barker & Kiewra, (1999).	MP intervention on stress, anxiety, and burnout levels elementary, middle and high school teachers ($N = 91$).	540 minutes	significant reductions on stress-level scores for the intervention group at posttest ($F [1,88]=7.8; p = .006$) and follow-up ($F [1,88] = 39.3; p < .001$). MBI scores were significantly lower for the intervention group at posttest ($F [6,78] = 8.3; p < .001$) and follow-up ($F [6,77] = 11.4; p < .001$), and anxiety scores also were significantly lower for the intervention group at posttest ($F [1,88] = 37.5; p < .001$) and follow-up ($F [1,88] = 41.6; p < .001$).

Summary. The findings described above demonstrate the efficacy of non-Koru MP interventions, even when brief in duration, with practicing teachers, on a variety of outcomes likely to reduce stress, anxiety, and turnover while increasing student learning. Effective durations for stress and anxiety were as low as five weeks, one time per week, for a total of 540 total instructional minutes. Effective durations for mindfulness were as low as 675 total instructional minutes. Among the effective techniques beneath the umbrella of MPs that emerged were breathing technique instruction, body scans, and guided meditations, all of which are core components of Koru. While the minimal time commitment necessary for significant effects in the above studies was 540 minutes, Koru has demonstrated significant effects after only 300 minutes of instruction (Greeson et al., 2014).

Emerging Adults. The studies above were all conducted with teachers ranging in age from 24-61. Considering this age range, it is difficult to generalize these findings to preservice teachers, who are typically younger and very different developmentally. The developmental stage spanning from the late teens through the early twenties is typically known as emerging adulthood (Arnett, 2015). This period is distinct from adolescence and young adulthood; it is distinguished by both a departure from the dependency associated with childhood and adolescence, and a freedom from the social roles and responsibilities typically associated with adulthood. This stage in life is often characterized by the exploration of identity; as such, emerging adults often experience instability and uncertainty in many domains of life.

The age during which the typical student enrolls in college classifies them as an emerging adult. Not surprisingly then, studies dating back more than 50 years have demonstrated the far-reaching academic, personal, and social consequences stemming from the stress and anxiety many college-aged students experience (Bamber & Schneider, 2016). In particular, many college students struggle with finding a balance between their academic and social lives, and managing their various course requirements (Brown, 2017). Furthermore, preservice teachers are not only confronted with preparing for certification requirements, which are unique to the teaching profession (Brown, 2017), but they also will be entering a profession which is (as above) rife with stressors (Bellingrath et al., 2010; Cropley et al., 1999; Daamen, & Van Mierlo 1994; Fernet et al., 2012; Friedman, 2003; Hakanen et al., 2005; Skaalvik & Skaalvik, 2009; Van Der Doef & Maes, 2002; Van Droogenbroeck et al., 2014; Zimmermann et al., 2012). Taken together, all of this makes preservice teachers ideal candidates for mindfulness interventions.

MP is an encouraging tool to assist emerging adults in navigating the unique challenges faced during this period of their development, and it has been studied in relation to stress and anxiety reduction in college students. While an in-depth review of the literature regarding college students and mindfulness – which, to my knowledge, includes 15 empirical studies – is beyond the scope of this teacher-focused paper, many of the findings stemming from this research have been promising. Overall, 73% of the 15 studies investigating the effects of MPs noted significant reductions in stress scores (Demarzo, Andreoni, Sanches, Peres, Fortes, & Garcia-Campayo, 2010; Newsome, 2010; Newsome, Waldo, & Gruszka, 2012; Oman, Shapiro, Thoresen, Plante, & Flinders, 2008;

Shapiro, Brown, & Biegel, 2007; Shapiro, Jazaieri, & Goldin, 2012; Song & Lindquist, 2015). All nine of the studies examining the effects of MPs on anxiety demonstrated significant reductions in anxiety scores (Astin, 1997; Barbosa, Raymond, Zlotnick, Wilk, & Toomey, 2013; Beddoe & Murphy, 2004; Blevins, 2009; Barbosa, Raymond, Slotnick, Wilk, & Toomey-Mitchell, 2013; Rosenzweig, Reibel, Greeson, Brainard, & Hojat, 2003; Shapiro, Schwartz, & Bonner, 1998; Shapiro et al., 2012; Shapiro et al., 2007; Song & Lindquist, 2015). Finally, of six studies examining mindfulness as a mediator between MPs and stress and anxiety, five of the studies observing increases in mindfulness also noted significant decreases in stress and/or anxiety (Newsome, 2010; Newsome et al., 2012; Shapiro et al., 2007; Shapiro et al., 2012; Song & Lindquist, 2015).

Specific MPs emerging from these studies as effective were varied, including instruction in mindfulness meditation, body scanning, breathing techniques, and simple yoga postures. However, all of the studies utilized an eight-week MP workshop that entailed weekly group meetings (two-hour classes), and a one-day retreat (six-hours of mindfulness instruction) between sessions six and seven, as well as 45 minutes of daily homework (966 total minutes of instruction time). This suggests that at least some group workshops and homework may be important. But, while very thorough, a combination of the lengthy eight-week time commitment and the rigorous 45 minutes of daily homework may well preclude many emerging adults from committing to this type of very intensive MP design. A more streamlined design, such as the Koru method, might be more feasible.

Common limitations shared among the majority of these studies are a disproportionate number of female participants, self-reported measures, self-selected participants, small sample sizes, and no physiological stress markers to corroborate and

strengthen self-reported data. Overall, studies using MPs show potential, but should be interpreted with caution.

In consideration of emerging adults' time constraints, Koru is condensed to four, weekly, 75-minute sessions and only requires ten minutes of daily meditation. Moreover, after only 300 minutes of instructional time, Koru has empirically demonstrated significant effects on stress, anxiety, and mindfulness levels (Greeson et al., 2014). In consideration of the empirical evidence and the characteristics of the intervention group for this study, the Koru intervention makes the most sense for preservice teachers.

Preservice Teachers. While a small but growing body of research has investigated mindfulness with emerging adults, preservice teachers more specifically have not been extensively researched; in fact, very few studies exist (see Table 2 for a summary). Two pilot studies (Jennings, 2011) focused on two groups of participants: practicing teachers in high-poverty urban schools ($n = 31$) and preservice teachers and their mentors from suburban schools ($n = 43$). Both groups completed a program titled Cultivating Awareness and Reliance in Education (CARE; Jennings, 2011); the program consisted of four, eight-hour sessions spread out over four weeks (1,920 minutes total instruction time). The goals of this program were to enhance teacher's well-being, thereby improving students' cognitive, emotional, and social development. Pre- and posttests surveyed participants' well-being (Positive and Negative Affect Schedule [PANAS]; Watson, Clark, & Tellegen, 1988), depression (The Center for Epidemiologic Studies Depression Scale [CES-D]; Radloff, 1977), time pressure (The Time Urgency Scale [TUS]; Landy, Rastegary, Thayer, & Colvin, 1991), physical symptoms (The Daily Physical Symptoms [DPS]; Larsen & Kasimatis, 1997); motivation/efficacy (Problems in

Schools Questionnaire [PIS]; Deci, Schwartz, Sheinman, & Ryan, 1981), Teachers' Sense of Efficacy Questionnaire ([TSES]; Tschannen-Moran & Woolfolk Hoy, 2001), and mindfulness data (The Five Facet Mindfulness Questionnaire [FFMQ]; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), The Interpersonal Mindfulness in Teaching Questionnaire (IMT; Greenberg, Jennings & Goodman, 2010).

Results indicated that, although both groups underwent the same program, the teachers in the high-poverty, urban schools were the only group which demonstrated significant improvements ($p < .05$) at posttest for the five facets of the Five Facet Mindfulness Questionnaire; effect sizes ranged from $d = .21$ to $.94$; Interpersonal Mindfulness in Teaching (IMT) for the high-poverty urban teachers' group increased at posttest ($p < .05$; $d = .48$). Time urgency scores also increased for the urban group ($p < .05$; $d = .24$). No significant effects were noted with the preservice teacher group.

These results suggest the importance of tailoring the mindfulness instruction to meet the unique and varying needs of educators in suburban and urban settings. Further research is needed to determine the underlying reasons accounting for significant effects only being noted with the high-poverty urban practicing teacher group. The CARE program was designed to address the needs of teachers exposed to high levels of emotional stress. With this in mind, it is possible that this accounts for the lack of significant effects observed with the suburban group of teachers. A limitation to this study involves the small sample size lacking racial diversity. An additional limitation to these studies involved the pairing of student teachers with their supervisors. As noted by the authors, it is possible the student teachers may have experienced added stress by

working with their supervisors and it is possible that the supervisors focused more on supporting the needs of their mentees and less on learning the program content.

Similarly, an additional study found associations between significant increases in mindfulness and a mindfulness-based intervention. Specifically, researchers at the Ontario Institute for Studies in Education in Canada conducted research solely focusing on preservice teachers ($N = 28$); their study yielded positive findings on several outcomes not demonstrated by the previous study findings. Poulin, Mackenzie, Soloway, and Karayolas (2008) examined the effects of a nine-week, elective MP course which met weekly for four hours (2,160 minutes total instruction time). The MP course was incorporated into the teacher education program. Students who chose not to enroll in the elective course volunteered to participate as a control group. Outcome measures used for this study included the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2003) to measure four components of mindfulness: Observing, Describing, Acting With Awareness, and Accepting Without Judgments. The Kessler 10 Psychological Distress Scale was used to measure levels of distress (K10; Kessler et al., 2002), and the Satisfaction with Life Scale (SWLS; Diener et al., 1985) was used as a broad measure of well-being. The short form of the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Hoy 2001) was used to investigate three outcomes related to teaching: Student Engagement, Instructional Strategies, and Classroom Management. Data comparing the control group to the intervention group found the mindfulness intervention group showed significant increases in mindfulness ($p < .001$; $\eta p^2 = .23$) and self-efficacy ($p < .05$; $\eta p^2 = .03$). These findings shared the same limitations found in many mindfulness studies: a small, predominantly female sample size, no racial diversity, and no control group. While

these limitations diminish the generalizability of the study, they nonetheless add to the body of research demonstrating the effectiveness of mindfulness.

A quasi-experimental, classroom-based comparative feasibility study (Miyahara, Harada, Tanaka, Fukuhara, Kano, Ono, & Sadato, 2017) ($N = 43$) was conducted using a pre-recorded MP-inspired guided sitting meditation and a pre-recorded Loving Kindness Meditation. The participants were not exposed to any direct mindfulness instruction, rather they listened to two 35-minute audio recordings of guided meditations (70 minutes total exposure to intervention). This study sample was drawn from female early childhood education university students in Japan. Participants were enrolled in two separate classes; over the course of two classes, participants sat for pre-recorded meditations. Both classes were assessed pre- and post-study using the Compassionate Love Scale (CLS; Sprecher & Fehr, 2005) and the Stress Response Scale (SRS; Chandler, Shermis, & Marsh, 1985). A non-significant, but reduced stress response score was noted in both groups; no other significant differences were noted. The authors did note that qualitative data drawn from the study indicated that participants were satisfied with the intervention and found that it was highly feasible to integrate mindfulness meditation into the curriculum, albeit with minor modifications.

This study did not utilize a control group, so it is not known if observed stress reductions were a placebo effect; additionally, this study utilized a small, all female, Japanese sample; as such, these findings are very limited in their generalizability.

While the previous study did not note any significant effects, a similar study did note significant effects and also addressed a primary limitation found in the previous study, namely the inclusion of a control group. Hue and Lau (2015) utilized a six-week

adapted version of MBSR with preservice teachers ($N = 70$) in Hong Kong. Participants in this study attended a six-week, 15-hour mindfulness program, and a seven-hour, one-day mindfulness retreat (1,320 minutes total instruction time). The mindfulness program consisted of body awareness activities, daily mindfulness instruction, body scans, and loving-kindness practice. The control group participated in the study only by completing the questionnaires.

Measures included the Mindfulness Attention Awareness Scale (MAAS; Brown & Ryan, 2003), the Well-being Scale (WHO-5; Bech, 2001), the Depression Anxiety Stress Scale (DASS; Lovibond & Lovibond, 1995) and Perceived Stress Scale (PSS; Cohen, Kamark, & Mermelsteen, 1983). These measures were completed prior to the beginning of the study and at the conclusion of the study. MANOVA results showed a significant multivariate effect for Time on the mindfulness scale (Pillai's $F(2, 132) = 3.66; p = .028; \eta^2 = .05$). Results from the Well-being scale scores showed a significant effect for Time (Pillai's $F(1, 136) = 4.36; p = .039; \eta^2 = .03$). No significant effects were observed on the DASS scale. Thus, it appears that six weeks is a sufficient duration of time to significantly increase mindfulness levels, as evidenced by the MANOVA results. It should be noted that the participants in this study were not randomized and motivational differences between groups were not assessed; varying levels of motivation between groups could confound these results. The sample size was also small and demographic information such as age and gender were not provided by the author, which limits the generalizability. Regardless, these results suggest a six-week intervention can benefit mindfulness and wellbeing outcomes.

In contrast, a study conducted by Brown (2017) which investigated the self-reported effects of mindfulness instruction on preservice elementary teachers' mindfulness and stress levels ($N = 20$) noted no significant effects for mindfulness. This study did not utilize a control group or an established mindfulness program. Participants were exposed to 15-20 minutes of mindfulness instruction during each three-and-a-half-hour class over two class periods (30-40 minutes total instruction time). Mindfulness topics and techniques were not part of any specific mindfulness intervention, but focused on breathing mindfully, listening, tasting and observing mindfully, reducing stress, avoiding negative self-talk, staying in the present, pausing before reacting, cultivating kindness to oneself and others, practicing self-caring. A pre/posttest design was used to compare Mindfulness Attention Awareness Scale (MAAS; Brown & Ryan, 2003) and Perceived Stress Scale (PSS; Cohen & Williamson, 1988) data derived from surveys administered at the beginning and end of the semester. Findings from this study indicated that the median posttest mindfulness scores were significantly lower and posttest perceived stress scores were significantly higher, which signifies the students were significantly less mindful and more stressed at the conclusion of the study. A possible explanation for these findings is an insufficient amount of time (roughly 30-40 minutes) was devoted to the intervention; it is also possible the researcher's choice to not follow an established MP both may have influenced these outcomes.

Table 2
Preservice Teacher MP Findings

Citation	Purpose	Amount of Instructional Time	Outcomes
Jennings, (2011)	Focused on practicing teachers in high-poverty urban schools ($n = 31$) and preservice teachers and their mentors from suburban schools ($n = 43$). Examined well-being, depression, mindfulness, motivation, physical symptoms, and time pressure.	1,920 minutes	Urban educators significantly increased in mindfulness (as measured by Five Facet Mindfulness Questionnaire [effect sizes ranged from $d = .21$ to $.94$] and Interpersonal Mindfulness in Teaching [IMT] mindfulness [$d = .48$] and time urgency [$d = .24$]).
Poulin, Mackenzie, Soloway, and Karayolas (2008)	Examined preservice teachers ($N = 28$) enrolled in MP course which was incorporated into the teacher education program. Measured four components of mindfulness: Observing, Describing, Acting With Awareness, and Accepting Without Judgments; distress, well-being, student engagement, instructional strategies, and classroom management.	2,160 minutes	Significant increases in mindfulness ($\eta p^2 = .23$) and self-efficacy ($\eta p^2 = .03$)
Miyahara, Harada, Tanaka, Fukuhara, Kano, Ono, & Sadato (2017)	Examined effects of pre-recorded meditations on female early childhood education university students in Japan ($N = 43$) stress and compassionate love levels.	70 minutes	No significant effects were noted.
Hue and Lau (2015)	Studied effect of MP on preservice teachers ($N = 70$) in Hong Kong. Examined mindfulness, well-being, depression, anxiety, and stress.	1,320 minutes	Results showed intervention group significantly improved on mindfulness ($\eta p^2 = .05$) and well-being ($\eta p^2 = .03$).
Brown (2017)	Investigated the effects of mindfulness instruction on preservice elementary teachers' mindfulness and stress levels ($N = 20$).	30-40 minutes	No significant effects were noted.

Summary. In sum, these findings demonstrate promise; established MP techniques appear to be effective in increasing mindfulness and reducing preservice teacher stress levels, at least if training offers a minimum of 1,320 minutes of instructional time. Definitive conclusions regarding the efficacy of mindfulness interventions are difficult to draw due to contrasting findings coupled with the utilization of varying measures and interventions. Additionally, many of the studies predominantly focus on female students, meaning these effects may not be generalizable to male students. Finally, none of these studies were supported with physiological, neuropsychological, or otherwise objective data. The addition of non-self-reported types of data would galvanize these findings and lend them more credibility.

Mindfulness Meditation: Koru

The mindfulness meditation program which was utilized in this study has shown positive, significant effects on emerging adults' mindfulness levels in four weeks. Koru was designed by two psychiatrists (Rogers & Maytan, 2012) over the course of a decade at Duke University's student counseling center. Koru is specifically designed for emerging adulthood, which is the typical age of the preservice teacher.

The term "Koru" derives from the New Zealand Maori word which describes the shape of an unfurling fern frond. Translated literally, the word means "looped" or "spiraled". From a figurative perspective, this looped or spiraled shape is intended to represent layers of balanced growth around an anchored center, which embodies the type of growth experienced by emerging adults as they develop a Koru practice. Koru offers participants stress-management techniques in addition to mindfulness training; these techniques can be specifically applied to stressful situations typically encountered by

emerging adults, such as test anxiety. Koru also offers breathing techniques which are designed to promote immediate relief from stress, which may appeal to emerging adults (Greeson et al., 2014). Specifically, Koru trains emerging adults in four mind-body awareness skills: belly breathing, dynamic breathing, walking meditation, and guided imagery. This combination of skills has demonstrated positive effects on stress and anxiety; it also has been shown to quickly reduce stress, which in turn builds emerging adults' motivation to continually practice Koru (Greeson et al., 2014). Secondly, Koru is a brief program which consists of only four, 75-minute sessions and 10 minutes of essential daily meditation practice. As stated earlier, this study utilized a modified version of Koru consisting of three, 60-minute sessions and 10 minutes of essential daily meditation practice. A more detailed breakdown of each session is offered in a subsequent section below. The essential daily meditation practice provides the students with flexibility by allowing them to vary their 10-minute daily practice among the choices of belly breathing, dynamic breathing, or body scan. The program is designed to address the time constraints typically associated with emerging adults' busy schedules. Finally, the program generally utilizes a small group format which provides plentiful opportunities for peer interaction, which this demographic often values (Greeson, Juberg, Maytan, James, & Rogers, 2014; Rogers & Maytan, 2012).

To date, only one randomized controlled trial (RCT) has investigated the efficacy of Koru in enhancing wellness. Greeson et al. (2014) evaluated Koru's effectiveness in reducing stress, improving sleep, and increasing mindfulness, self-compassion and gratitude with college students ($N = 90$). Greeson and associates employed an active intervention group/wait list control study design as they examined whether levels of

stress, sleep sleeping issues, and self-concept changed throughout the course of a semester if participants practiced Koru. Prior to the intervention, participants were administered a battery of self-report questionnaires designed to assess stress levels (Perceived Stress Scale [PSS]; Cohen & Williamson, 1988), sleep levels (Medical Outcome Study Sleep Scale [MOS SLP9]; Yang, Dubois, Kusinski, Sun, & Gajria, 2007), mindfulness (Cognitive and Affective Mindfulness Scale-Revised [CAMS-R]; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007), self-compassion (Neff Self-Compassion Scale [SCS]; Neff, 2003), and gratitude (The Gratitude Questionnaire-Six Item Form [GQ-6]; Valero, Garcia-Alandete, Gallego-Perez, Bernabe, Valero, & Gallego-Perez, 2013); demographic characteristics were also collected.

Greeson et al. (2014) hypothesized that the active intervention group would demonstrate reductions in stress, improvements in sleep quality, and increased levels of mindfulness, self-compassion, and gratitude, when compared to the waitlist control group. This hypothesis was tested through the use of a Group x Time interaction effect model; *t*-tests were also run to test for between-group differences at baseline and posttest. Significant Group X Time interactions were found for improvements in perceived stress levels ($F = 4.50$; $df [1, 76.40]$; $p = .037$; $d = .45$) sleep problems ($F = 4.71$; $df [1, 79.49]$; $p = .033$; $d = .52$), mindfulness ($F = 26.80$; $df [1, 79.09]$; $p < .001$; $d = .95$), and self-compassion ($F = 18.08$; $df [1, 74.77]$; $p < .001$; $d = .75$). All of these significant effects were subsequently replicated with the waitlist group. Significant correlations were observed between changes in perceived stress, sleep problems, mindfulness, and self-compassion. These findings demonstrate the interrelation of stress, sleep, mindfulness,

and compassion improvements and the potential effectiveness of Koru with undergraduate-aged students.

While these results are encouraging, it should be noted that these findings have yet to be replicated by other researchers; future studies replicating these findings would lend them credibility. Additionally, two of the researchers who have been studying Koru are the creators of the Koru program itself; it is unknown how their extensive experience in facilitating mindfulness interventions could have potentially impacted these results. Furthermore, the study relied on participants' self-reported surveys of well-being outcomes, which could be prone to recall bias. Finally, broader generalizability of these findings is limited due to a lack of diversity in the sample, which was 66% female and 62% white.

Conclusions

Although the existing research demonstrates promise, great strides need to be taken towards establishing a more coherent picture of which types of MPs are most effective and which intervention dosages and delivery methods are optimal. While the existing literature demonstrates MP interventions can be effective, it is difficult to ascertain the active ingredients which lead to the most beneficial outcomes. Additionally, the extended duration of many mindfulness interventions limits their accessibility to those with time constraints and those who may be skeptical of the efficacy of mindfulness. This study examined the efficacy of a condensed MP intervention, Koru, lasting only three weeks. It was hypothesized that the shorter duration of this study would result in less sample attrition, increased accessibility, greater wellness outcomes, and the development of a more stable home mindfulness practice. In turn, all of these

developments could potentially help engender the grit and coping mechanisms necessary to sustain a lifelong teaching career. This study also sought to determine the feasibility of offering a mindfulness intervention as a component of teacher education coursework.

Specifically, this study sought to answer the following questions:

Current Study Research Questions

1. To what extent do preservice teachers who volunteered and were randomly selected for a MP intervention implement the intervention with fidelity (i.e., come to the workshop & practice at home) throughout the period of the intervention?
2. How satisfied are participants with the intervention throughout and at the end of the intervention?
3. To what degree does intervention participation affect students' stress levels, as measured by the Perceived Stress Scale (PSS)?
4. To what degree does intervention participation affect students' anxiety levels, as measured by the *State-Trait Anxiety Scale (STAI-Y)*?
5. To what degree does intervention participation affect students' mindfulness levels, as measured by the Mindful Attention Awareness Scale (MAAS)?

CHAPTER 3: METHODS

Participants

This study involved 12 students enrolled in the Early Grades Preparation (PreK-4) program at West Chester University; all students were Caucasian and female. Their ages ranged from 20-28 years old.

Procedures

Recruitment. Three rounds of recruiting were conducted for this study. The first and second rounds of recruiting occurred during the Spring and Summer 2018 semesters. Recruiting emails were sent to all students enrolled in the College of Education at a large, public, urban university located in northeastern United States. Recruiting emails listed the specifics of the study, the potential benefits of mindfulness, and provided information about a raffle that would be held at the end of each training session. Only one participant was recruited from these first two recruiting attempts, which necessitated a third round of recruiting at a different university. The third round of recruiting occurred at a large, suburban university in northeastern United States. During the early portion of the Fall 2018 semester, I sought permission from Early Grades Preparation (PreK-4) instructors to recruit students enrolled in their courses. Three instructors allowed me to share with their classes a presentation outlining the specifics of the study, potential benefits of mindfulness, and information about a raffle that would be held at the conclusion of each training session. During each raffle three names would be randomly drawn from the control and intervention groups; those three participants would be receive a \$10, \$15, or \$20 Wawa gift card. Students in each class were then asked to volunteer (with the caveat

that half would receive the intervention and half would be placed in a waitlist control condition). A total of 12 students volunteered to take part in the study.

Random assignment. Next, I randomly assigned participating students to one of the two conditions using the RAND function in Microsoft Excel. Both the intervention and control groups were composed of six participants. This function has been shown by Rotz, Falk, Wood, and Mulrow (2001) to pass the DIEHARD tests (a battery of statistical tests for measuring the quality of a random number generator). The intervention group was exposed to the intervention for a duration of three weeks, while the control group did not receive the intervention. On a daily basis during the study, the intervention group completed Home Practice Logs documenting their mindfulness practice. At the conclusion of the study, the control group was given access to a phone app that provided audio recordings of each session and video tutorials of each mindfulness technique. The control group was also given the opportunity to complete the training at to be determined date in the future.

Data collection. After random assignment, but prior to beginning the intervention, both groups completed the demographic survey. After completion, both groups' mindfulness, anxiety, and stress levels were assessed. Mindfulness levels were assessed through the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003); anxiety was assessed through the State-Trait Anxiety Scale (STAI-Y; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983); and stress was assessed through the Perceived Stress Scale (PSS; Cohen et al., 1995). At the conclusion of the intervention, both groups' mindfulness, anxiety, and stress levels were assessed again using the MAAS, STAI-Y,

and PSS scales, respectively. The control group also completed a course satisfaction survey. Responses to all measures were analyzed using SPSS software.

Intervention. The content of each session is prescribed by the Koru guide (Rodgers & Maytan, 2012). I was the instructor for each Koru training session. I am a certified yoga instructor with 11 years of experience teaching yoga and meditation classes. This study utilized a condensed version of Koru which consisted of three, 60-minute training sessions. Typically, Koru consists of four, 75-minute training sessions. The duration of each session was condensed by shortening the group check-in component and by reducing the duration of each guided meditation by approximately 8 minutes. The fourth Koru session was also omitted; this session focused on mindful eating and a labeling feelings meditation. This session was omitted after reviewing several mindfulness studies and identifying the most common components of MPs which found significant stress, anxiety, and mindfulness effects (Brown, 2017; Hue and Lau, 2017; Jennings, 2011; Miyahara, Harada, Tanaka, Fukuhara, Kano, Ono, & Sadato, 2017; Poulin, Mackenzie, Soloway, & Karayolas, 2008). Each session is briefly detailed below.

Session 1. Session one of the intervention consisted of the students completing the IRB consent form and the MAAS, STAI-Y, and PSS measures. Following that, a brief opening meditation was facilitated to set the tone of the class. The opening meditation is a breath awareness activity which gives the students a chance to relax and focus on the present moment. During the opening meditation the students are asked to simply focus on their breath and the place in their body where their breath can be felt. Next, an initial check-in was conducted. During the first check-in, introductions were made and students shared their goals for the class; all of the subsequent check-ins focused on the students

sharing their experiences with their daily mindful practices from the previous week. Following that, mindfulness was introduced and described to the participants; participants were told that developing mindfulness requires practice and an open mind. We then proceeded to learn an easily used relaxation skill: belly breathing. Next, we learned the skill of dynamic breathing, which works well to reduce high levels of stress/anxiety. Dynamic breathing is a three-part process during which the participants breathed quickly but deeply through their nose, while pressing their upper arms into the sides of their chest and exhaling forcefully; participants were also asked to bend at the knees with each exhalation, if possible. Following this, we completed our first guided meditation, which was a body scan. During the body scan participants followed a script that I read aloud which asked them to focus their awareness on different parts of the body. To conclude, we reviewed the guidelines for the 10-minute daily meditation practice and mindfulness log, which is an important tool for developing a mindfulness practice. This session was slightly longer than 60 minutes due to the participants filling out the demographic and pretest surveys.

Session 2. Session two began with a collection of the mindfulness logs in order to emphasize that the students are expected to do their mindfulness homework. Next, we completed a brief opening meditation. Then, we completed a check-in during which each student was asked to share her thoughts, experiences, and feelings regarding their daily mindful practices from the previous week; this provided me with the first opportunity to hear about the students' practice experiences. The first skill we reviewed in session two was a walking meditation, which is a good way for restless or sleepy students to practice meditation. During the walking meditation participants walked in a circle in the

classroom; the goal of the walking meditation was to continuously focus the attention on the sensations that were felt in the feet. The second skill we reviewed was a Gatha Guided Meditation. This type of meditation uses gathas, or meditation poems, to help focus the breath during sitting meditation. The gatha used in class was the following: “Breathing in, I know I am breathing in. Breathing out, I know I am breathing out. Breathing in, I notice my in-breath has become deeper. Breathing out, I notice that my out-breath has become slower. Breathing in, I calm myself. Breathing out, I feel at ease.” Students were instructed to align their breath with the words of the gatha. To conclude, I passed out the next week’s meditation logs.

Session 3. Session three began by collecting the meditation logs, which was followed by a brief opening meditation. Then, we completed a check-in during which each student was asked to share her experiences with the daily mindful practices from the previous week. Next, we completed a guided imagery activity to help students develop deeper levels of calm relaxation. During the guided imagery each participant was asked to utilize all of her senses to visualize a calm, peaceful place. This was followed by a labeling thoughts meditation, which was designed to help students observe the mind and train them to work with any thoughts that arise during meditation. The labeling thoughts meditation guided participants through the process of identifying and labeling their thoughts, then letting them go. Following this, the students completed the satisfaction survey and were reassessed on the MAAS, STAI-Y, and PSS measures they took prior to the start of the three-week session. This session was slightly longer than 60 minutes due to participants completing the posttest measures and satisfaction survey.

Waitlist control. As described above, the waitlist control group was given access to a phone app that provided audio recordings of each session and video tutorials of each mindfulness technique. The control group was also given the opportunity to complete the training at to be determined date in the future.

Measures

Demographic Variables and background. A short demographics survey consisting of questions about age, gender, education, certification band, and current or previous mindfulness participation was administered (see APPENDIX A).

Stress. Stress was measured with the Perceived Stress Scale—10 Item (PSS; Cohen et al. 1983), which contains 10 questions. The PSS is the most widely used psychological instrument for measuring the perception of stress; accordingly, it is commonly used in mindfulness research (Beshai, McAlpine, Weare, & Kuyken, 2015; Brown 2017; Hue & Lau 2015; Greeson et al. 2014). It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also includes a number of direct queries about current levels of experienced stress. The PSS was designed for use in community samples with at least a junior high school education. The items are easy to understand, and the response alternatives are simple to grasp. Moreover, the questions are of a general nature and hence are relatively free of content specific to any subpopulation group. The questions in the PSS ask about feelings and thoughts during the last month. In each case, respondents are asked how often they felt a certain way. Items are summed together to create one total score. Research has demonstrated this measure to have Cronbach's alpha values of 0.84, 0.85 and 0.86 in

samples of, respectively, 64, 114 and 332 healthy college students (see APPENDIX B; Cohen et al. 1983).

Mindfulness. Mindfulness was measured with the Mindfulness Measure-Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). The MAAS is a 15-item measure targeting “open or receptive awareness of and attention to what is taking place in the present” (Brown & Ryan, 2003). The MAAS was chosen due to time constraints and because it is commonly used in mindfulness research (Brown, 2017; Hue & Lau, 2015). Numerous studies conducted since 2003 have demonstrated the MAAS’s excellent psychometric properties. Factor analyses with undergraduate, community and nationally sampled adult, and adult cancer populations have confirmed the MAAS contains a single factor scale structure (Brown & Ryan, 2003; Carlson & Brown, 2005). Internal consistency levels (Cronbach’s alphas) generally range from .80 to .90. The MAAS has demonstrated high test-retest reliability, discriminant and convergent validity, known-groups validity, and criterion validity (see APPENDIX C). Due to an error on the MAAS Google Form, data was only collected for 11 of the 15 items on this measure. MAAS score was calculated by computing a mean for the 11 items included on the measure. APPENDIX C highlights the items that were omitted from the scale.

Anxiety. The State-Trait Anxiety Inventory was used to measure anxiety (STAI-Y). The STAI-Y is a commonly used measure of trait and state anxiety (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The STAI-Y has been used in previous mindfulness research (Anderson, Vidya, Levinson, Edward, Barker, & Kiewra, 1999). It can be used in clinical settings to diagnose anxiety and to differentiate it from depressive syndromes. Form Y2, its most popular version, has 20 items for assessing trait anxiety

and 20 for state anxiety. State anxiety items include: “I am tense; I am worried” and “I feel calm; I feel secure.” Trait anxiety items include: “I worry too much over something that really doesn’t matter” and “I am content; I am a steady person.” All items are rated on a 4-point scale (e.g., from “Almost Never” to “Almost Always”). Higher scores indicate greater anxiety. Items were summed together to obtain subtest scores, which were then combined to for a total anxiety score. The STAI-Y is appropriate for those who have at least a sixth-grade reading level. Internal consistency coefficients for the scale have ranged from .86 to .95; test-retest reliability coefficients have ranged from .65 to .75 over a 2-month interval (Spielberger et al., 1983). In a study conducted by Spielberger (1989), test-retest coefficients for this measure ranged from .69 to .89 (see APPENDIX D).

Satisfaction. The Satisfaction Survey measured course satisfaction and contains 12 questions which were evaluated on a 5-point Likert scale. The questions assess aim fulfilment (“To what extent have your aims/intentions/wishes for the 8-week course been fulfilled?”), course impact on daily life (“How helpful has the course been for how you handle stress/difficulties/pain; your relationship with others; your daily activities”), amount of practice on completion of the course (“How much do you practice mindfulness now?”) and support and inspiration from group and teacher (“How helpful did you find big/small group discussions; teaching sessions; teacher support; learning in the group” and “How much do you feel your teacher has helped you to understand what Mindfulness is about”, “How much do you feel the group has helped you to understand what Mindfulness is about”, “How much do you feel the teacher has inspired you to do the Home Practice”, and “How much do you feel the group has inspired you to do the Home

Practice”). The Likert scale consisted of five points ranging from 1 (“*not at all*”) to 5 (“*very much so*”). The total score was calculated by summing across all 12 survey items for each participant. This survey was borrowed from a study conducted by Ruijgrok-Lupton, Crane, and Dorjee (2017). In this study the authors used this survey to assess participant satisfaction level for a MBSR training. These authors found the reliability for this measure was $\alpha = .912$ (see APPENDIX E). Reliability for the current study was $\alpha = .458$.

Home Practice Logs. Home practice logs were designed to monitor the students’ participation in the 10-minute, daily mindfulness homework. The Home Practice Log asks the students to record (on a daily basis) the date, mindfulness exercise, minutes of practice, and two things for which they are grateful. The total minutes practiced were utilized for three purposes: (a) determining the fidelity with which the participants implemented the intervention, (b) the extent to which participants’ home practice of Koru outpaced that of peers who also volunteered but were not randomly selected for the training, and (c) the extent to which changes in MAAS/STAI-Y/PSS levels between the pre- and posttests were moderated by students’ fidelity of implementation (see APPENDIX F).

CHAPTER 4: RESULTS

The current chapter is organized as follows. The first section will begin by presenting the plan of analysis, including descriptive statistics and a correlation analysis. Second, there will be a presentation of the five analyses that were conducted to answer the five research questions. One member of the control group did not complete any posttest surveys, which will be discussed in the limitations section.

Descriptive Statistics

Descriptive statistics for the entire sample on all observed variables are presented in Table 4.1. One-way ANOVAS were conducted to compare differences by group on pretest score for stress, mindfulness, and anxiety. There were no differences by group on stress, $F(1, 10) = .46, p = .513$; mindfulness, $F(1, 10) = .04, p = .843$; and anxiety, $F(1, 10) = .02, p = .885$.

Individual pretest and posttest scores for each measure are presented in Table 4.2.

Table 4.1
Descriptive Statistics: Mindfulness, Stress, and Anxiety

	Control					Intervention				
	<i>M</i>	<i>SD</i>	Min	Max	<i>N</i>	<i>M</i>	<i>SD</i>	Min	Max	<i>n</i>
pretest MAAS	3.65	.67	3.00	4.80	6	3.48	.67	2.54	4.27	6
posttest MAAS	3.89	.88	3.09	5.36	6	3.45	.92	1.72	4.36	6
pretest PSS	29.33	4.93	22	34	6	27.16	6.08	17	33	6
posttest PSS	27.00	5.15	22	35	5	20.50	3.15	15	24	6
pretest STAI	100.33	27.62	72	138	5	98.33	17.91	71	123	6
posttest STAI	97.40	28.92	79	148	5	78.50	10.88	61	89	6

Table 4.2
Individual Descriptive Statistics: Mindfulness, Stress, and Anxiety

	Pre PSS	Post PSS	Pre STAI-Y	Post STAI-Y	Pre MAAS	Post MAAS
Control 1	29.00	29.00	85.00	79.00	17.00	22.00
Control 2	33.00	25.00	91.00	93.00	15.00	14.00
Control 3	25.00	24.00	84.00	88.00	16.00	15.00
Control 4	34.00		132.00		17.00	
Control 5	33.00	35.00	138.00	148.00	21.00	19.00
Control 6	22.00	22.00	72.00	79.00	20.00	18.00
Intervention 1	32.00	23.00	123.00	88.00	15.00	23.00
Intervention 2	29.00	21.00	106.00	89.00	15.00	15.00
Intervention 3	17.00	15.00	71.00	61.00	14.00	10.00
Intervention 4	23.00	20.00	87.00	75.00	20.00	19.00
Intervention 5	33.00	24.00	106.00	85.00	24.00	23.00
Intervention 6	29.00	20.00	97.00	73.00	24.00	23.00

Correlations

Pearson correlations were computed among variables in the study. As seen in Table 4.3, at pretest, a strong correlation between pretest PSS score and pretest STAI-Y score ($r = .80$; $p = .002$) was observed, signifying participants reporting higher stress scores also reported higher anxiety scores. As a follow-up, Spearman correlations were also conducted (see table 4.4).

In general, variables measured at pre-test and post-test (e.g., stress, anxiety, and mindfulness) were correlated across these two time points, indicating stability over time. A strong correlation between pretest MAAS and posttest MAAS was observed ($r = .82$; $p = .002$); these values indicate that participants reporting higher mindfulness scores at the beginning of the study also reported higher mindfulness scores at the conclusion of the study. Pretest STAI-Y scores strongly correlated with posttest STAI-Y scores ($r = .78$; $p = .005$), indicating participants that reported higher anxiety at the outset of the

intervention also reported higher anxiety scores at the conclusion of the intervention. Moderate correlations between pretest and posttest PSS score ($r = .66$; $p = .027$) and pretest STAI-Y and posttest PSS score ($r = .61$; $p = .048$) score were also detected.

For the intervention only, regarding attendance at classes, a strong, negative correlation was observed for attendance and fidelity ($r = -.91$; $p = .030$), suggesting participants that attended fewer classes completed their daily mindfulness practice with greater fidelity. No relationship between fidelity and any other variables was observed. Strong negative correlations between attendance and pretest PSS ($r = -.91$; $p = .011$), and pretest STAI-Y ($r = -.84$; $p = .038$) were also noted, indicating participants with lower intervention attendance had higher stress and anxiety scores at the outset of the intervention. A moderate negative correlation between group and posttest PSS score ($r = -.65$; $p = .030$) was observed, signifying participants in the control group had higher PSS scores at the conclusion of the study.

Among the outcome variables, posttest PSS score strongly correlated with posttest STAI-Y score ($r = .85$; $p = .001$) indicating participants with higher stress scores also had higher anxiety scores at the conclusion of the study. A strong correlation between posttest MAAS and posttest PSS ($r = .74$; $p = .009$) was detected, suggesting that participants with higher posttest stress levels also had higher posttest mindfulness levels; posttest MAAS also moderately correlated with pretest STAI-Y ($r = .68$; $p = .022$) and posttest STAI-Y ($r = .70$; $p = .019$). These findings suggest that participants with higher posttest mindfulness levels also had higher anxiety levels at the outset and conclusion of the study, which contradicts previous findings noting an inverse relationship between

mindfulness and stress/anxiety levels (Greeson et al., 2014). Experience, age, and satisfaction did not significantly correlate with any other variables.

Table 4.3
Pearson Correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. fidelity	1											
2. attendance	-.91*	1										
3. satisfaction	-.30	-.15	1									
4. age	.30	-.66	.40	1								
5. group	.b	.b	.b	.50	1							
6. experience	.44	-.25	-.30	-.27	-.45	1						
7. pretest MAAS	.00	-.46	-.08	.05	-.06	.22	1					
8. posttest MAAS	.30	-.58	.02	.10	-.26	-.12	.82**	1				
9. pretest PSS	.72	-.91*	.24	.46	-.21	.07	.37	.60	1			
10. posttest PSS	.23	-.74	.36	.07	-.65*	.19	.60	.74**	.66*	1		
11. pretest STAI	.65	-.84*	.42	.45	-.05	-.12	.35	.68*	.80**	.61*	1	
12. posttest STAI	.28	-.75	.70	.20	-.45	.13	.60	.69*	.59	.85**	.78**	1

** . Correlation is significant at the .01 level (2-tailed).

*. Correlation is significant at the .05 level (2-tailed).

Table 4.4
Spearman Correlations

	1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. fidelity	1											
2. attendance	-.71	1										
3. satisfaction	-.36	-.11	1									
4. age	.10	-.66	.37	1								
5. group	.b	.b	.b	.39	1							
6. experience	.29	-.25	-.42	-.17	-.45	1						
7. pretest MAAS	.00	-.43	-.31	.01	-.02	.10	1					
8. posttest MAAS	.45	-.66	.22	.23	.29	-.34	.67**	1				
9. pretest PSS	.21	-.84*	.15	.48	-.25	.13	.21	.40	1			
10. posttest PSS	.10	-.74	.40	.17	-.73*	.26	.18	.15	.70*	1		
11. pretest STAI	.36	-.84*	.47	.60	-.05	-.13	.27	.54	.85**	.37	1	
12. posttest STAI	.10	.62	.84*	.58	-.44	.11	-.11	-.12	.71*	.72*	.61*	1

** . Correlation is significant at the .01 level (2-tailed).

*. Correlation is significant at the .05 level (2-tailed).

Research Question 1

To what extent do participants in an early childhood elementary program who volunteered and were randomly selected for a MP intervention implement the intervention with fidelity (i.e., come to the workshop & practice at home) throughout the period of the intervention?

To address the first research question, fidelity survey results and class attendance records were entered into SPSS. Recall that the Home Practice Log asked the students to record (on a daily basis) the date, mindfulness exercise, minutes of practice, and one thing for which they are grateful. Fidelity scores consist of the total amount of minutes participants spent practicing mindfulness (minutes of practice) for the duration of the two-week intervention. Although prior research does not specify particular fidelity targets, it was estimated that 85% fidelity would be sufficient to engender changes in mindfulness, stress, and anxiety levels. The Koru program recommends participants engage in a mindfulness technique for 10 minutes per day for the duration of the 14 day study. Therefore, 100% fidelity would be indicated by participants amassing a total of at least 140 minutes of practice. As shown in Table 4.5, participants practiced for an average of 111.2 minutes, or 7.9 minutes/day, resulting in a 79% fidelity rate. The minimum time practiced was 41 minutes, and the maximum time practiced was 150 minutes. A total of two people reached 100% fidelity, and one person reached at least 85% fidelity. Three participants did not reach the 85% fidelity target. Descriptive statistics also revealed that 67% participants missed one training session; all participants attended at least two classes.

Table 4.5
Descriptive Statistics: Minutes of Practice and Class Attendance

	<i>N</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>
Minutes of practice	6	41.00	150.00	112.20	42.95
Class attendance	6	2.00	3.00	2.33	.52

Research Question 2

How satisfied are participants at the end of the intervention?

To address the second research question, a posttest satisfaction survey was administered to all participants in the intervention group. Recall that the satisfaction survey measured various aspects of course satisfaction and contained 12 questions, each of which were evaluated on a 5-point Likert scale. The total satisfaction score was calculated by summing across all 12 survey items. This posttest reliability for this measure was $\alpha = .458$ (see Limitations for more discussion on this point).

As seen in Table 4.6, participants were satisfied with the intervention ($M = 53.50$, $SD = 1.64$); satisfaction scores ranged from 51-56, out of a total possible 60 points.

Table 4.6
Descriptive Statistics: Satisfaction Score

Questions	<i>N</i>	Min	Max	<i>M</i>	<i>SD</i>
Item 1: To what extent have your	6	4.00	5.00	4.50	.55
Item 2: How helpful has the course been for how you handle stress/difficulties/pain?	6	3.00	5.00	4.50	.84
Item 3: How helpful has the course been for how you handle your relationships with others?	6	3.00	5.00	4.00	.89
Item 4: How helpful has the course been for how you handle your daily activities?	6	3.00	5.00	4.17	.75
Item 5: How much do you practice mindfulness now?	6	3.00	5.00	3.83	.75
Item 6: How helpful did you find big/small group discussions?	6	3.00	5.00	4.17	.75
Item 7: How helpful did you find the teaching sessions?	6	4.00	5.00	4.67	.52
Item 8: How helpful did you find the teacher?	6	5.00	5.00	5.00	.00
Item 9: How much do you feel your teacher has helped you to understand what mindfulness is about?	6	4.00	5.00	4.83	.41
Item 10: How much do you feel the group has helped you to understand what Mindfulness is about?	6	4.00	5.00	4.67	.52
Item 11: How much do you feel the teacher has inspired you to do the Home Practice?	6	4.00	5.00	4.83	.41
Item 12: How much do you feel the group has inspired you to do the Home Practice?	6	3.00	5.00	4.33	.82
Total satisfaction score	6	51.00	56.00	53.50	1.64

Research Question 3

To what degree does intervention participation affect students' stress levels, as

Measured by the PSS?

To address the third research question, a 2 (Group: Control, Intervention) x 2 (Time: Pretest, Posttest) repeated measures ANOVA (RMANOVA) was conducted to determine group differences and changes in PSS scores from pretest to posttest.

Descriptively, intervention group PSS score changed from pretest ($M = 27.16$, $SD = 6.08$) to posttest ($M = 20.50$, $SD = 3.15$). Control group PSS score changed from pretest ($M = 29.33$, $SD = 4.93$) to posttest ($M = 27.00$, $SD = 5.15$). The reliability for this measure at pretest was $\alpha = .78$; the reliability at posttest was $\alpha = .77$.

Prior to conducting the RMANOVA, Levene's test was run to determine whether the assumption of equal variances was violated. Levene's test was found to be non-significant, $F(1, 9) = .27$; $p = .614$. Thus, the RMANOVA was an appropriate test to use as an analysis for this research question. The RMANOVA showed that there was a significant main effect of time, suggesting a significant increase in PSS scores at the second time point $F(1, 9) = 14.19$; $p = .004$; $\eta p^2 = .61$. No main effect of group was found $F(1, 9) = 1.94$; $p = .198$; $\eta p^2 = .18$. A significant group x time interaction emerged, $F(1, 9) = 6.05$; $p = .036$; $\eta p^2 = .40$, with the intervention group ($M = 20.50$) exhibiting a lower posttest stress score than the control group ($M = 27$), as shown in Table 4.7. As a follow-up, a non-parametric Friedman test of differences among repeated measures was conducted for both the intervention and control groups. The intervention group rendered a Chi square of 6.00 which was significant ($p = .01$); the control group rendered a Chi square of .33 which was non-significant ($p = .56$).

Table 4.7
RMANOVA on PSS Pretest and Posttest by Group

Source	<i>df</i>	<i>F</i>	<i>p</i>	<i>MS</i>	ηp^2
Group	1, 9	1.94	.198	81.552	.18
Time	1, 9	14.19	.004	88.733	.61
Group x Time	1, 9	6.05	.036	37.824	.40

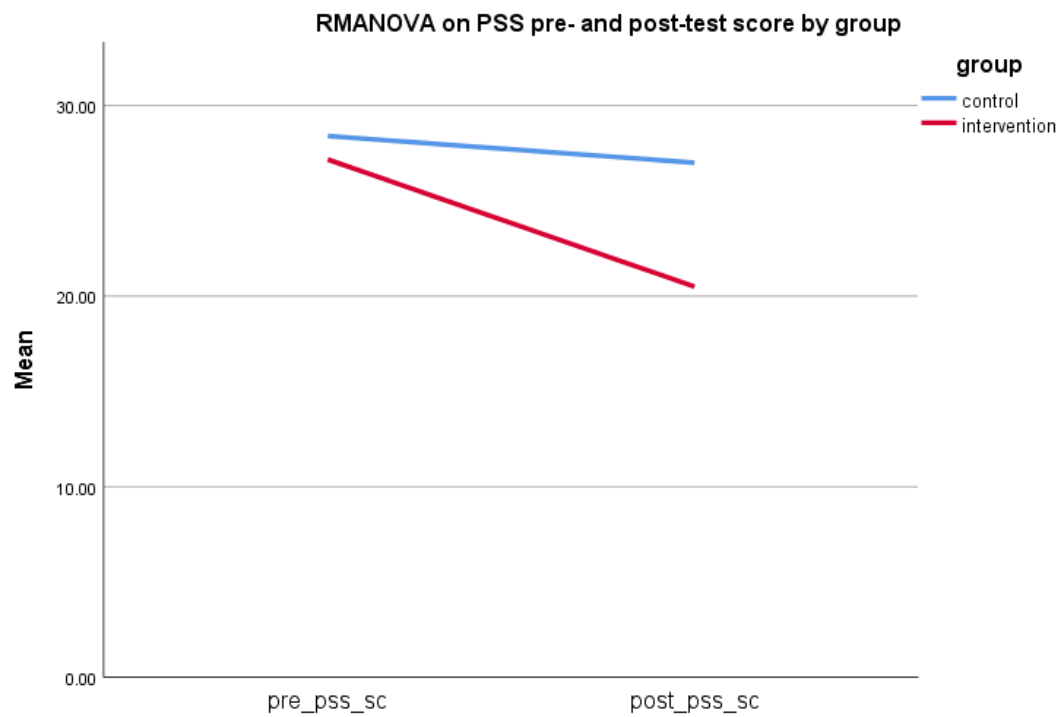


Figure 1. RMANOVA on PSS pre and posttest score by group.

Research Question 4

To what degree does intervention participation affect students' anxiety levels, as measured by the *State-Trait Anxiety Scale (STAI-Y)*?

To address the fourth research question, a 2 (Group: Control, Intervention) x 2 (Time: Pretest, Posttest) RMANOVA was conducted to determine group differences and changes in STAI-Y scores from pretest to posttest. Descriptively, intervention group STAI-Y score changed from pretest ($M = 98.33$, $SD = 17.91$) to posttest ($M = 78.50$, $SD = 10.88$). Control group STAI-Y score changed from pretest ($M = 100.33$, $SD = 27.62$) to posttest ($M = 97.40$, $SD = 28.92$). The reliability for this measure at pretest was $\alpha = .97$; the reliability at posttest was $\alpha = .96$.

Prior to conducting the RMANOVA, Levene's test was run to determine whether the assumption of equal variances was violated. Levene's test was found to be non-significant, $F(1, 9) = .28$; $p = .610$. Thus, the RMANOVA was an appropriate test to use as an analysis for this research question. The RMANOVA showed that there was a significant main effect of time, suggesting a significant increase in STAI-Y scores after exposure to the Koru intervention $F(1, 9) = 11.79$; $p = .007$; $\eta p^2 = .58$. No main effect of group was found $F(1, 9) = .33$; $p = .579$; $\eta p^2 = .04$. A significant group x time interaction was also found $F(1, 9) = 23.57$; $p = .001$; $\eta p^2 = .72$, with the intervention group ($M = 78.50$) exhibiting a lower posttest anxiety score than the control group ($M = 97.40$), as shown in Table 4.8. As a follow-up, a non-parametric Friedman test of differences among repeated measures was conducted for both the intervention and control groups. The intervention group rendered a Chi square of 6.00 which was significant ($p = .01$); the control group rendered a Chi square of 1.80 which was non-significant ($p = .18$).

Table 4.8
RMANOVA on STAI Pretest and Posttest by Group

Source	<i>df</i>	<i>F</i>	<i>p</i>	<i>MS</i>	ηp^2
Group	1, 9	.33	.579	289.347	.04
Time	1, 9	11.79	.007	368.256	.57
Group x Time	1, 9	23.57	.001	736.074	.72

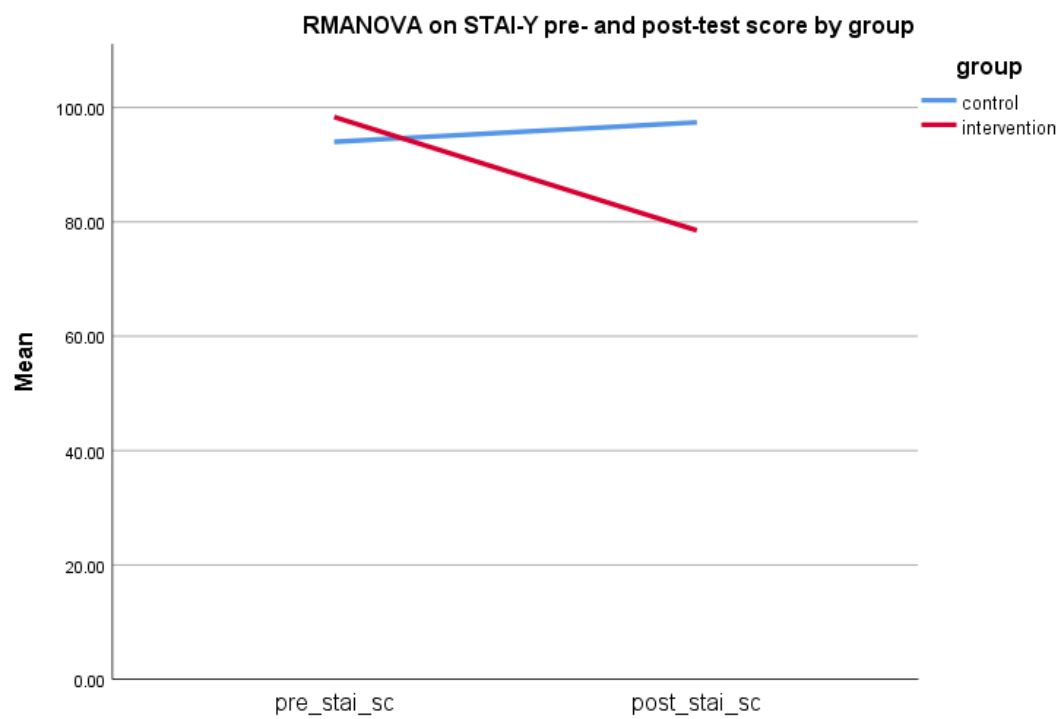


Figure 2. RMANOVA on STAI-Y pre and posttest score by group.

Research Question 5

To what degree does intervention participation affect students' mindfulness levels, as measured by the *Mindful Attention Awareness Scale (MAAS)*?

To address the fifth research question, a 2 (Group: Control, Intervention) x 2 (Time: Pretest, Posttest) RMANOVA was conducted to determine group differences and changes in MAAS scores from pre to posttest. Descriptively, intervention group MAAS score changed from pretest ($M = 3.48, SD = .67$) to posttest ($M = 3.45, SD = .92$). Control group STAI-Y score changed from pretest ($M = 3.65, SD = .67$) to posttest ($M = 3.89, SD = .88$). The reliability for this measure at pretest was $\alpha = .70$; the reliability at posttest was $\alpha = .88$.

Prior to conducting the RMANOVA, Levene's test was run to determine whether the assumption of equal variances was violated. Levene's test was found to be non-significant, $F(1, 9) = .04; p = .840$. Thus, the RMANOVA was an appropriate test to use as an analysis for this research question. The RMANOVA showed that there was no main effect of time $F(1, 9) = .46; p = .514; \eta p^2 = .05$, or group $F(1, 9) = .44; p = .523; \eta p^2 = .05$; the group x time interaction was also non-significant $F(1,9) = .72; p = .42; \eta p^2 = .07$, suggesting the Koru intervention had no effect on participants' mindfulness levels, as shown in Table 4.9. As a follow-up, a non-parametric Friedman test of differences among repeated measures was conducted for both the intervention and control groups. The intervention group rendered a Chi square of 1.80 which was non-significant ($p = .18$); the control group rendered a Chi square of 1.80 which was non-significant ($p = .18$).

Table 4.9
RMANOVA on MAAS Pretest and Posttest by Group

Source	<i>df</i>	<i>F</i>	<i>P</i>	<i>MS</i>	ηp^2
Group	1, 9	.44	.523	.507	.05
Time	1, 9	.46	.514	.062	.05
Group x Time	1, 9	.72	.418	.097	.07

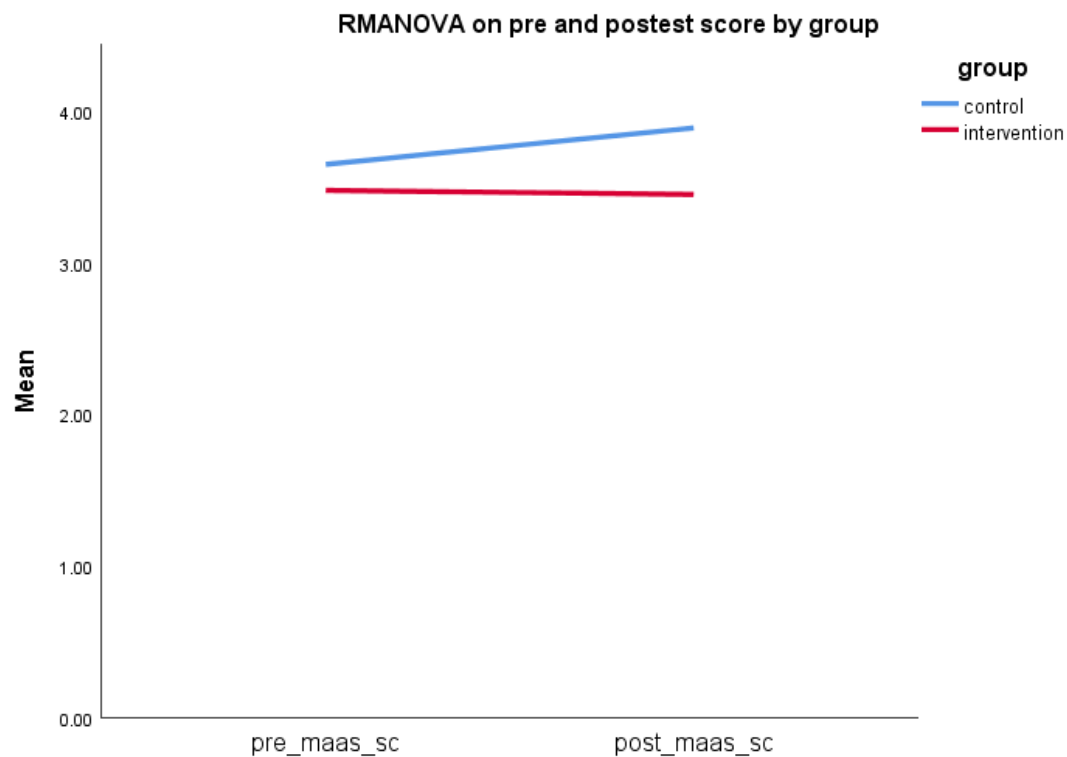


Figure 3. RMANOVA on MAAS pre and posttest score by group.

CHAPTER 5: DISCUSSION

The current study examined whether the Koru mindfulness intervention led to improved wellness outcomes, as evidenced by decreases in anxiety and stress scores and increases in mindfulness scores of preservice teachers. This study also investigated the extent to which participants implemented the Koru intervention with fidelity and were satisfied with the intervention. Recall that the lone study specifically investigating Koru's effect on emerging adults reported significant reductions in participants' stress levels, along with significant increases in participants' mindfulness levels. Similar studies which investigated the effects of non-Koru mindfulness interventions on practicing teachers yielded more mixed results: interventions offering a minimum of 540 minutes of instructional time reported significant effects on mindfulness and stress levels, whereas interventions of shorter durations did not. None of the reviewed studies specifically investigated the effects of mindfulness interventions on preservice teachers' anxiety levels.

This study, then, sought to determine if a condensed (180 minutes total instruction time) mindfulness intervention would significantly impact preservice teachers' stress, anxiety, and mindfulness levels. Minimizing the time commitment could potentially appeal more broadly to college students who typically experience time constraints. This chapter highlights the findings of the present study as they relate to prior literature, offers limitations that emerged as a result of the study design and during the data collection process, discusses the implications for researchers and educators, and suggests directions for future research.

Findings Related to Fidelity and Satisfaction

The present study sought to determine the extent to which participants would implement the intervention with fidelity (i.e., come to the workshop and practice at home); the study also sought to determine participants' satisfaction levels at the conclusion of the study. Recall that this study utilized a condensed, 3-session Koru intervention (180 minutes total instruction time), whereas prior literature researching Koru utilized the full 4-session intervention. The results from this study indicate that participants were satisfied with the condensed Koru mindfulness intervention. Moreover, fidelity results indicate that, despite the time constraints typically experienced by college students, the average participant was approaching the 140-minute mindfulness practice threshold set forth by the Koru manual. Additionally, although 4/6 of the participants did miss one training session, there was no sample attrition from the intervention group, although one member of the control group did not complete any of the posttest surveys.

Taken together, these findings are significant for several reasons. First, practicing mindfulness with greater frequency and duration may lead to greater wellness outcomes among pre-service teachers. As previous mindfulness studies have pointed out, the extent to which practitioners experience the benefits of mindfulness hinges upon the frequency and duration with which they practice mindfulness techniques (Cullen, 2011). It is possible that participants' satisfaction with the Koru intervention mindfulness techniques and training led to less sample attrition and greater fidelity, which in turn could account for the significant reductions in stress and anxiety scores; this possibility will be discussed in greater detail in a subsequent section.

Second, college students identify time constraints as the chief reason for not seeking assistance with mental health concerns (Downs & Eisenberg, 2012). Thus, it is possible the condensed nature of Koru may give the intervention broader appeal among college students and result in more students seeking to address stress and anxiety issues through participation in the Koru training. Third, despite the condensed nature of this intervention (180 minutes of instructional time) and participants' average fidelity rates being below the 140 mindfulness practice minute threshold recommended by Koru, participants did experience significant reductions in stress and anxiety levels. Prior mindfulness literature suggests a threshold of 540 instructional minutes is necessary for practicing teachers to experience significant wellness effects (Anderson et al., 1999); this study suggests that preservice teachers can experience significant stress and anxiety reductions with a greatly reduced time commitment.

To my knowledge, no prior literature has directly investigated participants' mindfulness intervention satisfaction levels. While no direct correlation was noted between participants' satisfaction levels and any of the wellness outcomes, a yet-to-be-determined relationship between participant satisfaction and fidelity and attrition could potentially exist, as suggested by Gresson et al. (2015). This points to the need for a satisfaction measure which is specifically developed for the Koru intervention; the role satisfaction plays in wellness outcomes could be teased out and further explored through future research.

Findings Related to Stress and Anxiety

The current study attempted to determine what effect the Koru intervention would have on the stress and anxiety levels of preservice teachers. Findings from this study

indicate that Koru significantly reduced the stress and anxiety levels of participants exposed to the intervention, whereas no significant changes were detected with the control group. The Home Practice Log component of this intervention could possibly account for these effects. During the study, the intervention group completed Home Practice Logs which asked the participant to document their mindfulness practice and to list one thing for which they are grateful. It is possible that intervention members developed their sense of gratitude through their daily recollections of things for which they are grateful. Previous research—though not conducted using preservice teachers—has demonstrated that higher levels of gratitude significantly predict lower levels of anxiety (Petrocchi & Couyoumdjian, 2015).

Prior research on Koru has demonstrated its potential to reduce emerging adults' stress levels (Greeson et al., 2014), and this study replicated and extended these findings by demonstrating the effectiveness of Koru at reducing stress and anxiety levels within a specific subset of the emergent adult demographic: preservice teachers.

Findings related to the effects of non-Koru mindfulness-based interventions on preservice teachers are more mixed. None of the literature reviewed for this study specifically investigated the effects of mindfulness-based interventions on preservice teachers' anxiety levels. These findings demonstrate that Koru, even when condensed, can significantly reduce preservice teachers' anxiety; however, more research is needed to determine whether or not non-Koru mindfulness-based interventions would be equally as effective. In regards to preservice teacher stress levels, prior research utilizing non-Koru based mindfulness interventions have not noted any significant effects on preservice teachers' stress levels (Brown, 2017; Hue & Lau, 2015; Miyahara et al., 2017).

However, prior research has demonstrated the effects of mindfulness on practicing teachers' stress and anxiety levels (Anderson et al., 1999; Beshai et al., 2015). Furthermore, Anderson et al. (1999) noted significant stress score reductions in practicing teachers' stress levels after utilizing only 540 minutes of mindfulness instructional time.

The findings from this study lend additional support to the notion that condensed mindfulness-based interventions may be equally effective as interventions of a longer duration. However, these findings should be interpreted cautiously until they are replicated by further studies.

Findings Related to Mindfulness

The present study sought to determine the effect that Koru mindfulness training would have on participants' mindfulness levels. It was hypothesized that undergoing the Koru training and completing the recommended daily mindfulness practice with 85% fidelity would engender changes in mindfulness levels. Interestingly, the Koru intervention did not significantly affect participants' mindfulness levels. The majority of prior mindfulness literature reviewed for this study has demonstrated the positive effects that mindfulness-based interventions have on both preservice and practicing teachers' mindfulness levels (Beshai et al., 2015; Flook et al., 2013; Hue & Lau, 2015; Jennings, 2011; Poulin et al., 2008). It should be noted that four items from the MAAS scale were omitted due to errors in the Google Forms settings. These four items were not marked as "required" questions and the majority of the participants did not respond to these items ("I drive places on 'automatic pilot' and then wonder why I went," "I find myself preoccupied with the future or the past," "I find myself doing things without paying

attention,” “I snack without being aware that I am eating”). It is possible that the inclusion of these questions could have altered the participants’ MAAS scores.

A second interesting finding to emerge from this study involves participants’ post-study mindfulness practice—findings from the satisfaction survey suggest that participants may not sustain their mindfulness practice after the training concludes. Item 5 from the Satisfaction Scale (“How much do you practice mindfulness now?”) was the lowest rated item on the scale. This finding points to the need for research investigating the long-term impacts of Koru practice. This research could examine whether or not the benefits of Koru are sustained over time, regardless of participants’ post-study mindfulness practice habits. This research could also seek to determine which aspects of the mindfulness training are unsustainable and why.

Of the non-Koru MP studies that demonstrated significant mindfulness effects, one commonality was noted: each study involved a minimum of 675 total mindfulness instructional minutes. The lone Koru study which utilized a sample of emerging adults from all majors also found significant effects from 300 minutes of instructional time. While the current study employed a research design which was mostly similar, it departs from prior literature by employing a condensed study design that totaled 180 minutes of mindfulness instructional time. Although this design was effective in significantly reducing stress and anxiety, it is possible that changes in mindfulness levels require a more sustained effort involving more instructional and home practice time.

This possibility is supported by prior research. Mihara et al. (2017) did not detect significant mindfulness effects after utilizing a condensed mindfulness-based meditation training (70 minutes total instruction time); Brown (2017) also utilized a condensed study

design (30-40 minutes total instructional time) and noted no significant mindfulness effects. The results from these researchers, coupled with the findings from this study, suggest that in order to engender changes in mindfulness, training programs may need to involve direct mindfulness training consisting of at least 300 minutes. Greeson et al. (2014) specifically researched Koru and found significant mindfulness effects after 240 minutes of instructional time. Although this study utilized university students of all majors, it is plausible that these findings could be replicated with preservice teachers. This possibility could be explored through future research.

Limitations and Suggestions for Future Research

A limitation of the current study is the small sample size; additionally, one member of the control group did not complete any of the posttest surveys, despite being contacted several times. Considering the already small sample size, the inclusion of these data could have changed the findings. It is important to note that more than 100 students received information about this study and were eligible to participate. However, enrollment in the study was much smaller. This low enrollment may have been at least partly because of a lack of time among students. In a sense, this is an important finding, because it indicates that pre-service teachers in undergraduate programs may find interventions of this nature difficult to fit into their schedules. Future research could also integrate Koru into pre-service teachers' coursework, potentially allowing for a larger trial. This approach has been utilized by other researchers (Brown, 2017).

Low enrollment may also reflect a lack of interest among students in Koru or other mindfulness practices. It may be the case that pre-service teachers are not knowledgeable about the nature and potential value of mindfulness, particularly in the

classroom. Future mindfulness research recruitment presentations could more explicitly detail the research-proven benefits of mindfulness to preservice and practicing teachers; if potential participants are made aware of the ways in which mindfulness can be beneficial to both teachers and students, they may be more likely to enroll. The presentation utilized for this study did briefly highlight the benefits of mindfulness; however, time constraints did not allow for more thorough elaboration. Future presentations could also provide a breakdown of the content of each class and share more information about the mindfulness techniques that will be learned.

A second limitation is the lack of a novel control group; other research findings have raised the possibility that the exposure to any novel activity may account for some of the effects associated with mindfulness (Britton, Lepp, Niles, Rocha, Fisher, & Gold, 2014). Future research could assign the control group to complete a novel activity such as a history or art course. This would enable researchers to more definitively conclude that the benefits of mindfulness training actually stem from practicing mindfulness, and not from exposure to a novel activity.

Third, considering the typical demographic enrolled in teacher training programs, the sample contained a limited amount of diversity, thereby precluding the findings from being more broadly generalizable. All participants in this study were Caucasian and female; while this sample is typical for an early childhood education program, middle and secondary education programs typically enroll more male students. Future research could recruit participants from early childhood, middle, and secondary education programs in order to obtain a more gender-diverse sample.

Fourth, the satisfaction scale utilized in this study was found to have a negative Cronbach's alpha value due to a negative average covariance among the scale items. No coding errors were found in the data, and all scale items were worded in the same direction, thus reverse coding was unnecessary. The small sample size and small number of sample items could possibly account for the negative average covariance. An additional issue might be the relative lack of variability in the items, with participants rating the intervention from 3-5 on a scale from 1-5.

Fifth, the omission of four items from the MAAS scale changed the participants' scores, and could have altered the findings related to mindfulness in unknown ways.

Sixth, this study shares some of the limitations found in similar mindfulness studies due to time and financial constraints, chiefly the omission of objective physiological or neuroscientific data. Future work might explore obtaining salivary cortisol levels or heart rate monitoring in conjunction with self-reported stress levels. However, while this study relied on self-reported measures, significant effects have been noted throughout the body of mindfulness literature, and as such, these methods do have validity.

Seventh, no fidelity measures were taken to ensure I adhered to the protocol presented in the Koru manual. Future research could involve audio recording each session and having the recordings examined to verify that the intervention adhered to protocols sets forth in the Koru manual. Additionally, as an experienced yoga and meditation instructor, it is possible that my previous experience could partially account for these effects. Future research could utilize multiple instructors to ensure that any noted effects were the result of the Koru intervention.

Eighth, the lack of a follow-up survey limits the ability to gain any understanding of the longstanding effects associated with this intervention. Unfortunately, however, that approach was not feasible given the time constraints of the study (pre-service teachers were about to graduate and leave the university). Future work could include a six-week follow-up survey asking participants about their post-study mindfulness habits and present stress, anxiety, and mindfulness levels. Considering the satisfaction survey suggests mindfulness practice may decline post-study, this data would be valuable in identifying how and why mindfulness practice changes and the wellness effects associated with these changes.

Finally, it is possible that participants' above average levels of stress and anxiety influenced their decision to volunteer for this study, which could potentially result in a sample which is not representative of the typical population of preservice teachers. Future research could deliver the intervention as a component to multiple sections of the same course to minimize selection bias.

Implications

This study found some benefits for pre-service teachers of Koru mindfulness, particularly around stress and anxiety. An implication of this finding is that it is important for educators to remember the importance of developing effective self-care practices, and that even brief, focused experiences can support well-being. As this study demonstrates, mindfulness can play a critical role in enhancing teacher wellness, which may, in turn, help educators develop the grit necessary to enjoy a lifelong career in the teaching profession. Teachers planning on working in schools serving high-poverty, under-resourced communities could especially benefit from mindfulness training, as research

demonstrates this population of teachers is particularly susceptible to leaving the teaching profession early (Darling-Hammond & Sykes, 2003). Future research could seek to determine the unique benefits mindfulness practices may offer to teachers serving these communities.

Teachers are not the sole beneficiaries of their self-care practices, as studies have documented the connection between teacher well-being and student learning, student stress levels, and enhanced student-teacher relationships (Gray, Wilcox, & Nordstokke, 2017; Ronfeldt et al., 2013). Therefore, it is critical for preservice teachers to develop the ability to navigate the stress they are sure to encounter as practicing teachers. As this study has demonstrated, Koru mindfulness practices represent one such skill. A potential study could investigate the effect that Koru has on newly practicing teachers; considering the average age of first-year teachers is 26, it is possible that Koru would benefit newly minted teachers as well (National Center for Education Statistics, 2010).

These research findings contribute to the growing body of evidence acknowledging the benefits of mindfulness. Taken together, these findings speak to the need for including mindfulness training as a component of teacher preparation programs. Additionally, school leaders should consider including ongoing mindfulness training as a component of teacher professional development. A comprehensive approach to supporting teachers involves creating a system of behavioral and socio-emotional supports which complement and support effective teaching. Teacher well-being fosters positive impacts on student achievement and general well-being, ultimately contributing to a more positive school culture, which provides long-term benefits to both students and teachers. Mindfulness could be part of this solution.

Conclusions

The current study examined whether the Koru mindfulness intervention led to improved wellness outcomes, as evidenced by decreases in anxiety and stress scores, and increases in mindfulness scores of preservice teachers. This study also investigated the extent to which participants implemented the Koru intervention with fidelity and were satisfied with the intervention. This study found that Koru did significantly reduce preservice teachers' anxiety and stress levels after being exposed to the intervention; however, no significant effects on mindfulness were observed.

While the findings from this study regarding Koru's effect on mindfulness are not in line with previous research, the current study can serve as a foundation for future research to understand the optimal amount of mindfulness instructional time necessary to engender changes in mindfulness levels. This study also demonstrates that mindfulness trainings of shorter duration can significantly reduce stress and anxiety levels. Continuing this line of research is necessary to determine the optimal amount of mindfulness training time necessary to engender changes, while still appealing to time-constrained college students. Findings from this research can potentially influence educators, school leaders, and teacher preparation programs to include ongoing mindfulness training as a component of their preparation and professional development.

Epilogue

Designing and running this study gave me a full appreciation for the amount of thought, preparation, and effort that goes into conducting research. After my first two failed attempts at recruiting, I wondered if the study would ever even happen. Once I secured enough participants, I was met with the challenge of finding a space for the

intervention. Even after finally securing a space to conduct the intervention, I realized that the room would need to be totally reorganized in order to make it a usable space. As the study progressed, the disconnect between how I envisioned things would proceed and how things actually proceeded continuously grew. And I hadn't even begun analyzing the data yet.

I was plagued with doubts about whether or not I would find significant effects, and what I would even write about in the event that none were found. But in the end everything worked out, albeit not as I imagined. My biggest takeaway from this experience is that although mindfulness is a trendy research topic, preservice teachers are either too busy or haven't caught on to the trend. My first two rounds of recruiting emails were sent to hundreds of people, and I had one person volunteer for the study. Perhaps the format (email) was too impersonal, perhaps the interest wasn't there, perhaps there was not enough awareness of the benefits; regardless, people did not want to sign up. Although mindfulness is trendy, when given the opportunity to actually learn how to be more mindful, people just didn't seem very eager.

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APPENDIX A: DEMOGRAPHIC SURVEY

1. Age: What is your age?
2. What is your gender?
 - female
 - male
 - other
3. What is your grade level?
 - freshman
 - sophomore
 - junior
 - senior
4. Rate your experience level with the practice of meditation techniques.
 0. No experience whatsoever
 1. Some experience
 2. Experienced

APPENDIX B: PERCEIVED STRESS SCALE

PERCEIVED STRESS SCALE- The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

Name _____ Date _____ Age _____ Gender (Circle): M F

Other

1. In the last month, how often have you been upset because of something that happened unexpectedly?

0 = Never

1 = Almost Never

2 = Sometimes

3 = Fairly Often

4 = Very Often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

0 = Never

1 = Almost Never

2 = Sometimes

3 = Fairly Often

4 = Very Often

3. In the last month, how often have you felt nervous and “stressed”?

0 = Never

1 = Almost Never

2 = Sometimes

3 = Fairly Often

4 = Very Often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

0 = Never

1 = Almost Never

2 = Sometimes

3 = Fairly Often

4 = Very Often

5. In the last month, how often have you felt that things were going your way?

0 = Never

1 = Almost Never

2 = Sometimes

3 = Fairly Often

4 = Very Often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

0 = Never

1 = Almost Never

2 = Sometimes

3 = Fairly Often

4 = Very Often

7. In the last month, how often have you been able to control irritations in your life?

0 = Never

1 = Almost Never

2 = Sometimes

3 = Fairly Often

4 = Very Often

8. In the last month, how often have you felt that you were on top of things?

0 = Never

1 = Almost Never

2 = Sometimes

3 = Fairly Often

4 = Very Often

9. In the last month, how often have you been angered because of things that were outside of your control?

0 = Never

1 = Almost Never

2 = Sometimes

3 = Fairly Often

4 = Very Often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

0 = Never

1 = Almost Never

2 = Sometimes

3 = Fairly Often

4 = Very Often

References: The PSS Scale is reprinted with permission of the American Sociological Association, from Cohen, S., Kamarck, T., and Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 386-396. Cohen, S. and Williamson, G. Perceived Stress in a Probability Sample of the United States. Spacapan, S. and Oskamp, S. (Eds.) *The Social Psychology of Health*. Newbury Park, CA: Sage, 1988.

APPENDIX C: MINDFUL ATTENTION AWARENESS SCALE

Day-to-Day Experiences Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

I could be experiencing some emotion and not be conscious of it until some time later. 1 2 3 4 5 6

I break or spill things because of carelessness, not paying attention, or thinking of something else. 1 2 3 4 5 6

I find it difficult to stay focused on what's happening in the present. 1 2 3 4 5 6

I tend to walk quickly to get where I'm going without paying attention to what I experience along the way. 1 2 3 4 5 6

I tend not to notice feelings of physical tension or discomfort until they really grab my attention. 1 2 3 4 5 6

I forget a person's name almost as soon as I've been told it for the first time. 1 2 3 4 5 6

It seems I am "running on automatic," without much awareness of what I'm doing. 1 2 3 4 5 6

I rush through activities without being really attentive to them. 1 2 3 4 5 6

I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5	6
I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6
* I drive places on 'automatic pilot' and then wonder why I went there.	1	2	3	4	5	6
* I find myself preoccupied with the future or the past.	1	2	3	4	5	6
* I find myself doing things without paying attention.	1	2	3	4	5	6
* I snack without being aware that I'm eating	1	2	3	4	5	6

* = omitted item

References: 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, 822-848.

APPENDIX D: STAIT TRAIT ANXIETY FORM-Y

Your responses will be treated completely **confidentially**, and results will only be referred to in statistical form or anonymously.

Please read the following statements about how people feel **in general**. Circle the number that best describes how you generally feel. There are no right or wrong answers.

Self-evaluation questionnaire	STAI Form Y-1			
	1	2	3	4
1. I feel calm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I feel secure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I am tense	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I feel strained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I feel at ease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I feel upset	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I am presently worrying over possible misfortunes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I feel satisfied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I feel frightened	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I feel comfortable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I feel self-confident	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I feel nervous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I am jittery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I feel indecisive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I am relaxed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I feel content	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. I am worried	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. I feel confused	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. I feel steady	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. I feel pleasant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1: Not at all, 2: Somewhat, 3: Moderately so, 4: Very much so

Self-evaluation questionnaire	STAI Form Y-2			
	1	2	3	4
21. I feel pleasant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. I feel nervous and restless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. I feel satisfied with myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. I wish I could be as happy as others seem to be	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. I feel like a failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. I feel rested	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. I am "calm, cool, and collected"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. I feel that difficulties are piling up so that I cannot overcome them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. I worry too much over something that really doesn't matter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. I am happy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. I have disturbing thoughts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. I lack self-confidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. I feel secure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. I make decisions easily	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. I feel inadequate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. I am content	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Some unimportant thought runs through my mind and bothers me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. I take disappointments so keenly that I can't put them out of my mind	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. I am a steady person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1: Almost never, 2: Sometimes, 3: Often, 4: Almost always

References: Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.

APPENDIX E: COURSE SATISFACTION SURVEY

Reflect on your experiences during the past four weeks when answering the following questions.

1. To what extent have your aims/intentions/wishes for the 3-week course been fulfilled?

Not at all 1 2 3 4 5 Very Much So

2. How helpful has the course been for how you handle stress/difficulties/pain?

Not at all 1 2 3 4 5 Very Much So

3. How helpful has the course been for how you handle your relationships with others?

Not at all 1 2 3 4 5 Very Much So

4. How helpful has the course been for how you handle your daily activities?

Not at all 1 2 3 4 5 Very Much So

5. How much do you practice mindfulness now?

Not at all 1 2 3 4 5 Very Much So

6. How helpful did you find big/small group discussions?

Not at all 1 2 3 4 5 Very Much So

7. How helpful did you find the teaching sessions?

Not at all 1 2 3 4 5 Very Much So

8. How helpful did you find the teacher support?

Not at all 1 2 3 4 5 Very Much So

9. How much do you feel your teacher has helped you to understand what mindfulness is about?

Not at all 1 2 3 4 5 Very Much So

10. How much do you feel the group has helped you to understand what Mindfulness is about?

Not at all 1 2 3 4 5 Very Much So

11. How much do you feel the teacher has inspired you to do the Home Practice?

Not at all 1 2 3 4 5 Very Much So

12. How much do you feel the group has inspired you to do the Home Practice?

Not at all 1 2 3 4 5 Very Much So

Reference: Ruijgrok-Lupton, Crane, and Dorjee (2017)

