Teacher Mindfulness Competencies in the K-12 School Setting

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TEACHER MINDFULNESS COMPETENCIES IN THE K-12 SCHOOL SETTING

A Dissertation Presented by JESSICA FRANCES JANZE

Submitted to the Office of Graduate Studies for the degree of

DOCTOR OF PHILOSOPHY

August 2022

School Psychology Program
TEACHER MINDFULNESS COMPETENCIES IN THE K-12 SCHOOL SETTING

A Dissertation Presented by JESSICA F. JANZE

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ABSTRACT

TEACHER MINDFULNESS COMPETENCIES IN THE K-12 SCHOOL SETTING

August 2022

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Mental health symptomology in childhood and adolescence can lead to long-term negative health outcomes. Mindfulness has demonstrated lasting effects on increasing resiliency and preventing mental health relapse. Mindfulness programs for youth have begun the adaptation process into school settings. Little is known regarding best-practice for mindfulness-based programs (MBPs) in this novel environment. The current study examines the effect of mindfulness levels and teachers’ foundational competencies on K-12 teachers’ mindfulness competencies. Group level and individual teacher data are presented and provide a preliminary basis for further investigation. Suggestions for future research in this area are discussed.
DEDICATION

The entirety of this dissertation is dedicated to my grandmother, Elza Janze. For introducing me to my own meditation practice and for always reminding me of the sacredness within.

_It is our responsibility, as heirs of the Dhamma, to remind such experimenters that they have entered a sanctuary deemed sacred by Buddhists. Thus, respectful towards their sources, they should pursue their investigations with humility and gratitude. They should recognize that while the Dhamma bids everyone come and take what they need, they are drawing from an ancient well of sacred wisdom that has nourished countless spirits through the centuries and whose waters still retain their potency for those who drink from them today._

Bhikkhu Bodhi (2011, p. 36)
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CHAPTER I
INTRODUCTION AND LITERATURE REVIEW

Childhood and adolescence are prominent psychosocial developmental life stages that hold opportunities for establishing future patterns of adult health (Sawyer et al., 2012). In addition to being a time of opportunity for developing healthy life patterns, it is also a time that represents a vulnerability for the onset of mental health issues. According to the World Health Organization, the average age of onset for mental illness is between the ages of 12-14 years old worldwide (World Health Organization [WHO] n.d.). Kessler and colleagues (2005) provide a conservative estimate that around 50% of adults with psychiatric disorders experienced clinically significant symptomology before the age of 14. Due to our current understanding of mental health prevalence and onset, effective interventions must be developed and implemented during this critical window of development (Sawyer et al., 2012).

Clinically significant symptoms in childhood and adolescence can lead to academic underachievement, delinquent behavioral concerns, and relationship difficulties in the short term (Goodyer et al., 1997). Long term, these concerns can present as financial problems, impaired employment prospects, participating in high-risk behavior, higher rates of substance abuse, reduced quality of life, physical illness, and increased risk of suicide attempts or
completions (Goodyer et al., 1997; Sapthiang et al., 2019). According to Williams and Kuyken (2012), the earlier depression develops in an individual’s life the more recurrent it is likely to appear in adulthood. Conversely, mental wellbeing established during early years aids in the development of functioning and stable health in adulthood (Gillham et al., 2008; World Health Organization, 2012).

In response to the known effects of mental illness on impairment, there has been a growing interest in broad-based health promotion interventions that build resiliency and aim to prevent mental illness among young populations (Sapthiang et al., 2019; Windle 2011). Resilience has varied meanings but is generally understood as the competence of individuals in the context of significant challenges to adaptation or development (Masten & Coatsworth, 1998). Resiliency is thought to develop through three powerful adaptive systems: parent-child attachment relationships, cognition regulation, and self-regulation (Masten & Barnes, 2018). According to Geoffrey Rose (1992), blanket approaches that incorporate all individuals, including low-risk individuals, can develop resiliency more effectively than targeting only high-risk individuals. These interventions can be delivered in mental health clinics, hospitals, and community settings, but are most often delivered in school environments (Sapthiang et al., 2019).

Many universal, school-based programs have been developed to address broad-based resiliency development for school-aged children and youth (Dray et al., 2017). The majority of which are based on second wave cognitive-behavioral techniques that focus on adjusting faulty thinking and belief modification techniques (Dray et al., 2017). While these approaches are effective, they are limited by the necessity of cognitive change, which is not
universally effective for clients (Kahl et al., 2012). Unlike their second wave counterparts, third-wave cognitive approaches, such as interventions that contain a component of mindfulness, focus on accepting, rather than changing, current cognitive processes, and somatic stimuli (Brown et al., 2011). According to Dimidjian and colleagues (2016), these third-wave interventions seek to promote awareness of emotions and the valuable information they provide an individual rather than seeing them as faulty or needing to be changed. Third-wave therapies have been shown to offer “clear and significant clinical benefit” (p. 902, Dimidjian et al., 2016) which have received increased attention in the scientific community broadly.

Mindfulness

One such intervention that has shown promise for the prevention of mental health symptomology and the development of resiliency is mindfulness (Farb et al., 2018). Mindfulness is often defined as, “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally” (Kabat-Zinn, 2004, p. 4). Mindfulness is thought to develop resiliency through improving three powerful adaptive systems (Masten & Coatsworth, 1998): attachment (Snyder et al., 2012), cognition (Bakosh et al., 2016), and self-regulation (Shapiro & Schwartz, 2000), similar to the three adaptive symptoms resiliency is thought to develop through (Masten & Barnes, 2018). The goal of mindfulness is to maintain awareness while disengaging from a strong attachment to beliefs, thoughts, or emotions and finally to develop a greater sense of emotional regulation and balance (Ludwig & Kabat-Zinn, 2008). It appears that a key mechanism of mindfulness is to create a ‘mental breathing space’ in which adolescents can begin to observe their thoughts and feelings and
increase their awareness of them (Sapthiang et al., 2019). This awareness and perceptual distance foster a greater capacity to regulate emotions and promotes wellbeing (Sapthiang et al., 2019).

**History**

Mindfulness practices originate from ancient Buddhist and Eastern perspectives of comprehensive awareness and alertness to the present moment to alleviate human suffering (Maex, 2011; Renshaw & Cook, 2017). Until recent advances in technology, mindfulness practices were largely accessible by Westerners by way of India and Asian pilgrimage only (Maex, 2011). Practices were often preserved in monasteries by the dedicated lives of monks and nuns (Bodhi, 2011). Eastern pioneers such as Thich Nhat Hanh and S.N. Goenka were some of the few to introduce the practice of mindfulness through community organizing and peace activism in the 1960s and '70s, making them available for secular and non-monastic populations in the west.

Although mindfulness is a relatively new phenomenon in western science leading to promising outcomes, the practice dates back to India during the fifth century B.C. (Bodhi, 2011). Originally, the practice of mindfulness was not taught as a doctrine or a set program, but rather as, "a body of principles and practices that sustain human beings in their quest for happiness and spiritual freedom. At its heart lies a system of training that leads to insight and the overcoming of suffering." (Bodhi, 2011 p. 20). While mindfulness practices were historically based in a spiritual context, current-day western mindfulness programs are based in secular thought and commonly backed by rigorous scientific research (Dimidjian & Linehan, 2003).
The most notable entrance of mindfulness to scholarly research was in 1979 through the work of medical doctor Jon Kabat-Zinn with a program called Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990), an 8-week, secular training program designed for adult populations the United States (US). Kabat-Zinn's aim of reducing stress and targeting chronically ill patients in his lab resulted in unexpected outcomes for clinical and non-clinical adult populations including, but not limited to, reductions in chronic pain (Kabat-Zinn et al., 1986), fatigue (Surawy et al., 2005), stress (Chang et al., 2004), cancer (Smith et al., 2005), and insomnia (Yook et al., 2008). A recent meta-analysis examining effects of MBSR for healthy adult individuals found large and lasting effects on stress-reduction, moderate effects on anxiety, depression, and quality of life, and small effects on burnout (Khoury et al., 2015).

Since its demonstration of robust and lasting results (Grossman et al., 2004), MBSR has been established as an evidence-based program offered around the US in hospitals and community settings for adults (Chiesa & Serretti, 2009). During an 8-week MBSR program, participants learn to increase their awareness of the present, moment-to-moment experiences and are provided extensive practice of bringing awareness back to the present moment through activities such as breath awareness, mindful walking, sitting meditations, and psychoeducation. Whenever participants notice their attention has been diverted from the present moment, they are directed to return to the present moment in a non-judgmental manner using the breath as an anchor (Kabat-Zinn, 1990).

The MBSR program has since been adapted for use in a psychological context by Teasdale and colleagues (1995) and is referred to as Mindfulness Based Cognitive Therapy.
(MBCT). MBCT is an approach to psychotherapy that uses a CBT technique in combination with mindfulness meditation principles and practices. Similar to MBSR, MBCT has demonstrated robust outcomes in the prevention of depressive relapses (Kuyken et al., 2016) and reducing depressive and anxiety symptoms for adults with Bipolar and Anxiety disorders (Chiesa & Serretti, 2011). Other programs similar to MBSR and MBCT have been adapted for various populations, often broadly referred to as Mindfulness-Based Programs (MBPs). MBPs continue to be developed for novel populations and are currently in varying levels of research and development (Dimidjian & Segal, 2015). Mindfulness-Based programs can include a variety of mindfulness-based activities such as body scans (silently and systematically moving one’s awareness to sensations in each area of the body), sitting meditation (focusing one’s attention on their breath and allowing thoughts to come and go without attachment to or judgment of them), movement meditation (focused attention on sensation while moving slowly and with intention), mindful eating (focused awareness of sensations associated with each aspect of eating), and psychoeducation (understanding the way stress works in the nervous system and how intentional breathing influences this; Kabat-Zinn, 1990).

Although MBPs have gained substantial support, they are not the only way mindfulness is represented in clinical settings. Other third-wave cognitive therapies such as Dialectical Behavioral Therapy (DBT; Linehan, 1993) and Acceptance and Commitment Therapy (ACT; Hayes et al., 1999) incorporate elements of mindfulness. These programs are best referred to as Mindfulness-Informed Programs (MIPs; Crane et al., 2017). While these programs offer an important contribution to their given field, they do not exemplify
mindfulness as their primary therapeutic tool, instead, it is one among many. This is in contrast to MBPs which emphasize sustained and formal training focused on mindfulness practices alone.

**Characteristics of Mindfulness-Based Programs**

With rapid adaptations occurring to incorporate the benefits of mindfulness in the fields of medicine, psychology, and education, there is an increased risk of short-cuts or “watering down” of the practice (Walsh, 2016), as is natural with many formalized programs. Clarity of what characteristics make a program an MBP is important so that existing research can be interpreted meaningfully, future research can rely on established definitions, and community practice can be assured to contain essential elements that reassure accurate delivery to service receivers (Crane et al., 2017).

To meet this demand a group of mindfulness researchers gathered to provide a framework for that defines the essential characteristics of MBPs; the constant and fundamental elements that must remain present regardless of the population, age, or environment the program is being adapted for (Crane et al., 2017). Two essential elements of an MBP were identified: 1) The characteristics of the program; and 2) The qualities of the teacher leading the program. According to Crane et al. (2017), the following five characteristics must remain intact for a program to be considered Mindfulness-Based:

1) Theories and practices that draw from a confluence of contemplative traditions, science, and the major disciplines of medicine, psychology, and education; 2) Underpinned by a model of human experience which addresses the causes of human distress and the pathways to relieving it; 3) Develops a new relationship with
experience characterized by present moment focus, decentering and an approach orientation; 4) Supports the development of greater attentional, emotional and behavioral self-regulation, as well as positive qualities such as compassion, wisdom, equanimity; and 5) Engages the participant in a sustained intensive training in mindfulness meditation practice, in an experiential inquiry-based learning process and in exercises to develop insight and understanding (Crane et al., 2017, p. 993).

The following four elements must be possessed by the teacher of the program for it to be considered Mindfulness-Based:

1) Has particular competencies which enable the effective delivery of the MBP; 2) Has the capacity to embody the qualities and attitudes of mindfulness within the process of the teaching; 3) Has engaged in appropriate training and commits to ongoing good practice; and 4) Is part of a participatory learning process with their students, clients, or patients (Crane et al., 2017, p. 993).

This framework serves to guide the adaptation process when introducing MBPs to novel environments. It is inevitable that the format of MBSR programs must be shifted to accommodate these novel environments, however, it is essential that they maintain the above characteristics. That is to say, these core elements must be present for a program to deliver the evidence-based training developed by a preexisting body of literature (Kabat-Zinn, 1990; Suelmann et al., 2018). Further, these guidelines provide reassurance to service users and researchers alike, which serves to create a reliable understanding of what MBPs encompass and what they may deliver (Crane et al., 2017).
Measuring Mindfulness

As mindfulness has been studied more scientifically, measuring one’s level of mindfulness has become an important factor in understanding how the skill is developed. According to results from existing research, higher mindfulness levels may be more inherent in certain personality styles such as those with higher rates of consciousness (Dreison et al., 2015) and may increase naturally with age (Lehto et al., 2015). Mindfulness has also been reported to increase through formal mindfulness training and interventions (Suelmann et al., 2018). These mindfulness levels are, theoretically, correlated with the outcomes that are experienced by individuals following formal mindfulness training (i.e., lower levels of stress, higher levels of wellbeing) and may be an important predictor of individual outcomes (Suelmann et al., 2018).

Carmody and Baer (2008) conducted a study of 174 adults participating in an MBSR program exploring the relationship between levels of mindfulness, amount of mindfulness practiced at home, and medical or psychological symptoms. Outcomes of the study suggest time spent engaged in home mindfulness practice and formal meditation exercises positively correlate with improvements in medical and psychological symptomology. These results support the claims that (a) mindfulness is a skill that can be developed through practice (Kabat-Zinn, 1990), (b) mindfulness practice is reflected positively on formal mindfulness questionnaires, and (c) higher mindfulness levels are correlated with positive psychological symptomology (Carmody & Baer, 2008). According to Carmody and Baer’s (2008) study, increased mindfulness levels can be considered a protective factor and have been found to
mediate the relationship between formal mindfulness training and improvements in psychological functioning overall.

Mindfulness levels are most commonly measured by self-report questionnaires (Bergomi et al., 2013; Goodman et al., 2017) such as the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006) used in Carmody and Baer’s (2008) study. The use of a self-report mindfulness questionnaire allows researchers to know if an individual engaging in a mindfulness practice, or formal training, are in fact becoming more mindful (Manuel et al., 2017). Many mindfulness questionnaires have been developed for use with adult populations (Park et al., 2013) and while most mindfulness questionnaires correlate strongly with one another and have promising psychometric outcomes (Baer et al., 2006), one area of broad disagreement among mindfulness measures is the number of factors that go together to comprise the concept of mindfulness. To address this issue, Baer and colleagues (2006) conducted a factor analysis on five of the most widely used mindfulness questionnaires:

The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), The Freiburg Mindfulness Inventory (FMI; Buchheld et al., 2001), The Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004), The Cognitive and Affective Mindfulness Scale (CAMS; Feldman et al., 2004; Hayes & Feldman, 2004), and The Mindfulness Questionnaire (MQ; Chadwick et al., 2005). Results of the analysis revealed five prominent factors of mindfulness which are the basis for their mindfulness questionnaire, the FFMQ: 1) Observing, 2) Describing, 3) Acting with Awareness, 4) Non-Judgment of Inner Experience, and 5) Non-Reactivity to Inner Experiences. The FFMQ is composed of 39 items that raters respond to according to how often each statement is true for them (1= never or very rarely
true, 6 = very often or always true). The FFMQ demonstrates good construct validity and has been validated with meditating and non-meditating adult populations (Baer et al., 2008).

**Adapting Mindfulness for Children and Adolescents**

Given the strong evidence for the effectiveness of MBPs in adult populations (Kabat-Zinn, 1990; Klingbeil et al., 2017; Kuyken et al., 2016; Suelmann et al., 2018), over the last decade researchers have focused on whether mindfulness interventions are appropriate for child and adolescent populations as well (Dunning et al., 2019; Kallapiran et al., 2015; Simkin & Black, 2014; Zoogman et al., 2015). This is in line with the second stage of the National Institute of Health stage model of intervention development, a guideline for understanding the development of interventions across settings and populations (Onken et al., 2014). Stage 2 in this model, the adaptation of an established intervention (in this case MBSR) to a new population (children and adolescents), involves testing efficacy of the intervention through extensive research studies. Stage 2 research is often conducted through randomized control trials (RCTs) and meta-analyses of the intervention taught to fidelity by highly trained interventionists. Once Stage 2 has established a given intervention's effectiveness for a specific population, Stage 3 can begin to address the complexities of translating the intervention from a lab-controlled environment (e.g., utilizing highly trained external facilitators) toward a community-based setting (e.g., K-12 schools where access to highly trained external facilitators is not always feasible).

A recent meta-analysis of controlled trials on the effects of MBPs on mental health and cognition in children and adolescents was conducted by Dunning et al. (2019). Thirty-three RCTs, which included over 3,600 children and adolescents, were reviewed. Participants
who received MBPs demonstrated significant improvements in the areas of mindfulness, executive functioning, attention, depression, anxiety, stress, and negative behaviors. The meta-analysis included a mixture of studies conducted in school, community, and hospital settings, further supporting the utility of MBPs for use with child and adolescent populations.

Research has now begun to swing from if the intervention is effective for child and adolescent populations (Stage 2) toward how it is most effective in a community (e.g., school) setting (Stage 3; Onken et al., 2014). That is to say, enough evidence has collected to establish that MBPs are in fact effective for the child and adolescent population. Now, the focus has been shifted to exploring the way implementation differences (tiers of delivery, dose, age implemented, facilitator training/characteristics, etc.) affect the benefits experienced by children and adolescents. This is done in the hope of finding a best practice for MBPs in a community setting (Felver et al., 2016). Factors such as developmental period, type of mindfulness intervention, and identity of the facilitator (i.e., schoolteacher vs. outside facilitator) are all novel conditions in a child and adolescent community settings that differ from first generation MBPs designed around hospital settings for adult populations (Felver et al., 2015).

**Mindfulness in the School Setting**

The prevalence of research related to mindfulness in school psychology journals has grown considerably over the past decade, reflecting a growing interest in the use of MBPs for the K-12 school setting (Bender et al., 2018). Because of their broad reach and prominent role in the lives of children and adolescents, schools are seen as a primary setting where preventative efforts should be made (Greenberg, 2010; Kuyken et al., 2017; Leland, 2015). In
line with stage two of the National Institute of Health stage model of intervention development, as discussed above, extensive research has confirmed that school-based mindfulness programs are considered a safe and generally beneficial intervention for young populations (Onken et al., 2014; Renshaw et al., 2017). These activities are similar to adult MBPs but limited by school hours, competing class schedules, and developmental language (Carsley et al., 2018; Kabat-Zinn, 1990; Zenner et al., 2014).

MBPs can be integrated into the classroom setting through a variety of approaches but are generally understood in three categories (Meiklejohn et al., 2012): indirect, direct and combination. An indirect approach involves the teacher receiving personal mindfulness training which is then communicated indirectly to students through actions, reactions, and behaviors. A direct approach involves the teacher receives implementation training and directly delivers the MBP to students. Finally, a combination of direct and indirect approaches involves the teachers receive mindfulness training and implementation training, through behavior and teaching the intervention is delivered to the student. MBP activities can be incorporated differently based on the duration of intervention, targeted population, and school day restrictions (Kuyken et al., 2017). For example, this can look like a mindfulness activity being utilized first thing in the morning for a set 20-min period or incorporating mindfulness activities throughout the day on an as-needed basis for 1-2 min at a time.

Results of an analysis exploring the way MBPs are currently being implemented in schools revealed that most school based MBPs are implemented in a large group format within a class setting targeting all students across all grade levels (Felver et al., 2015). However, a variety of mindfulness-based activities are used and delivered in varying dosages
when implemented in schools, anywhere from 5-120 min at a time. Further, MBPs are being implemented by both classroom teachers and outside facilitators (researchers, mindfulness experts, etc.), sometimes in conjunction with one another, and most studies exploring mindfulness utilize student self-report questionnaires as the primary mode of data collection (i.e., the FFMQ), but others utilized teacher observations or, in some cases, did not measure mindfulness at all (Felver et al., 2015). In summary, Felver and colleagues’ meta-analysis reveals a significant range of implementation styles occurring in school settings. Authors recommend more focus on outcomes of existing interventions in school settings to expand our understanding of which intervention techniques are most effective.

A more recent meta-analysis conducted by Carsley and colleagues (2018) examined MBP characteristics of implementation and the effects on mental health and wellbeing for students. The study assessed research involving close to 4,000 students across 24 studies and explored the effects of developmental age, gender, type of intervention, and facilitator on mental health outcomes in school settings. One notable result of the analysis suggests MBPs delivered during late adolescence (compared to middle childhood) result in higher effects immediately following the intervention and significant effects at follow up. Researchers contribute this difference to a developmental period during adolescence referred to as the window of opportunity (Roeser & Pinela, 2014) where brain plasticity and cognitive systems are malleable as they construct adolescents' identity.

Carsley and colleagues' (2018) meta-analysis also explored characteristics of interventions used to teach mindfulness. Studies that included a variety of mindfulness activities, including yoga-focused activities, had significantly higher outcomes on mental
health and wellbeing than prepackaged mindfulness programs which often rely on set scripts for the implementor and limited variety of intervention. Researchers hypothesize this may be due to the facilitator relying too heavily on prepackaged mindfulness programs without the understanding of mindfulness itself and without embodying the practice personally. Teachers that utilized a range of activities with a personal understanding of the practice would likely be able to adapt the intervention to the needs of their students with more flexibility (Carsely et al., 2018).

**Mindfulness Teachers**

In the mindfulness literature, the facilitator is central in the delivery and achievement of positive outcomes; that is, the integrity of the program rests on the identity of the facilitator (Crane et al., 2013; Kabat-Zinn, 1990; McCown et al., 2010). Recall above the following four elements that must be possessed by the teacher of the program for it to be considered Mindfulness-Based:

1) Has particular competencies which enable the effective delivery of the MBP;
2) Has the capacity to embody the qualities and attitudes of mindfulness within the process of the teaching;
3) Has engaged in appropriate training and commits to ongoing good practice; and
4) Is part of a participatory learning process with their students, clients, or patients (Crane et al., 2017, p. 993).

Emphasis is placed on the teacher’s *embodiment* of mindfulness, which requires adequate training as well as a regular personal practice (Crane et al., 2012; Kabat-Zinn, 2011). The embodiment of mindfulness is mentioned throughout almost all literature
regarding mindfulness, developing it is considered deeply personal and experiential (Crane et al., 2010; Maex, 2011; McCown et al., 2010). During formal mindfulness training, an individual learns to practice non-reactivity and non-judgment toward their own thoughts and experiences (Kabat-Zinne, 1990). A trainer can teach these ideas conceptually, but to model these skills they must be proficient in them on a personal level. A teacher who embodies mindfulness is able to teach mindfulness skills through explicit lessons and behavioral modeling (Maex, 2011). Instead of simply understanding an abstract technique, students are able to witness the technique from a teacher proficient in the skill. Maex (2011) explains,

[When teaching mindfulness] we will notice the tendency of the mind to defend, to console, to agree, to contradict, to react. The group will look at us and wonder: *What’s he going to say to this?* So, by responding without reacting to whatever comes, we become a role model in the process of teaching mindfulness. How we respond is guided by the intention to teach the trainee to attend mindfully to his or her own experience. We accept what students present as their perspective on the world and assist in clarifying that experience (p. 172).

This concept becomes especially central to school-based mindfulness teachers as they are modeling this technique for their students throughout the school day. Understanding how to support teachers in establishing this concept is essential to the delivery and achievement of positive outcomes.

**Mindfulness Teachers in the School Setting**

When Carsley and colleagues’ (2018) examined the difference between classroom teachers in comparison to outside facilitators (such as trained mindfulness instructors or
researchers) they found lower effects on mental health and wellbeing at post-test in studies facilitated by classroom-teachers as compared to those facilitated by outside facilitators. But the most significant outcomes were demonstrated when teachers trained in MBPs delivered the intervention directly. In their discussion, Carsely et al. (2018) contribute this finding to the teachers' ability to incorporate elements of the intervention with their students throughout the day, leading to increased practice and consistency, which are core elements of mastery (Kabat-Zinn, 1990).

Carsely and colleagues’ (2018) findings are imperative to our understanding of MBP delivery in school settings, as it further aligns school-based delivery of MBPs with Crane and colleagues’ findings that the instructor is an essential component of a successful MBPs (Crane et al., 2017). Segal and colleagues (2013) emphasize instructors, “teach mindfulness out of their experience of it” (p. 54) and that an instructor’s own experience of mindfulness, “colors the way each practice is presented, each interaction is handled” (p. 64). The quality of any given MBP is dependent on the teacher's personal experience of the practice and skills relevant to the specific context in which the intervention is implemented (Kabat-Zinn 2011; Teasdale et al., 2003), making training and personal practice imperative to quality implementation.

Trained teachers have "the capacity to embody the qualities and attitudes of mindfulness" which allows them to demonstrate and teach the practice in a fuller way than those unfamiliar with the practice (Crane et al., 2017, p. 993). Teachers who embody mindfulness are able to model techniques such as non-judgment and acceptance on demand during stressful or difficult situations students experience throughout their day (Crane et al.,
2017), which there is no script for. Teachers who understand the practice can likely help students utilize the practice in novel situations unique to school settings which may not be captured in pre-packaged or scripted programs. After all, mindfulness, like any other skill, is strengthened with practice (Leland, 2015).

As the field moves toward integrating MBPs in school settings it may be convenient to respond to this hurdle without having K-12 teachers engage in the personal preparation or ensuring the competencies required for implementation (Grossman, 2010; Kabat-Zinn, 2011). However, teachers’ mindfulness competency must be a central focus to ensure the integrity of intervention delivery and outcomes for students, regardless of the setting (Crane et al., 2012; 2017). Kabat-Zinn (2009) notes that without the embodiment of mindfulness, “it wouldn’t be mindfulness, it wouldn’t be dharma, and the effort itself wouldn’t be very mindful...For mindfulness is not just one more method or technique...It is a way of being, of seeing” (p. xi). Therefore, a better understanding of mindfulness competencies is needed to support educators in school settings in ensuring proper implementation techniques.

**Mindfulness Competencies**

Competence, in the light of a workplace environment, can be conceptualized as “foundational” or “specific” (Barber et al., 2007). “Foundational competencies” are broad and capture what is required of a specific profession. For example, foundational competencies for a K-12 teacher may understood as passing licensing exams, which assume minimal competencies and undergoing performance reviews to assure ongoing competencies (Kane, 1982). In contrast, a “specific competency” refers to the ability to carry out a specialty within the broader context of foundational competency (Barber et al., 2007). An example of
this is a licensed eight grade teacher (foundational competency) that instructs music lessons (specific competency). Unlike the foundational competency of a K-12 teacher, the specific competency requires additional and specific training on a subject matter. Mindfulness can be considered a specific competency that a teacher could have. One that would require additional and specific training in mindfulness.

According to Crane and colleagues (2012), there are six domains of mindfulness competencies that a teacher should possess: 1) *Coverage, pacing, and organization of session curriculum*: the teacher addresses the curriculum content of the session and is able to balance the needs of the individual, group, and requirement of the course; 2) *Relational skills*: the teacher brings qualities to the group which students are learning to bring to themselves, the teacher mirrors these qualities during the program; 3) *Embodiment of mindfulness*: the teacher expresses mindfulness through the teacher’s present moment focus on the moment to moment experience; 4) *Guiding mindfulness practices*: the teacher offers guidance that invites the student into the practice and enables them to participate; 5) *Conveying course themes through interactive inquiry and didactic teaching*: the teacher reviews experiences and teaches material in an interactive way; and 6) *Holding of group learning environment*: the teaching is able to effectively connect the participants with the material in a group format.

In order for an instructor to establish a specific competency in mindfulness, adequate training and personal practice are required to ensure mastery of skill and fidelity of intervention implementation (Crane et al., 2012; Kabat-Zinn, 1990; Villasanta & Ofreneo, 2020). As a note, Crane and colleagues (2012) encourage teachers not to view mindfulness as an ‘add on' training or a set of ‘techniques' to employ. Instead, it is recommended that
mindfulness competencies are understood as a way of being which emerges as the individual encounters the practice of mindfulness and embodies it as a part of themselves (Crane et al., 2017).

**Developing Specific Mindfulness Competencies**

Although it is recognized that adequate training and personal practice are required for teaching mindfulness in a classroom setting (as is the case with teaching any skill; Carsely et al., 2018; Crane et al., 2017; Felver et al., 2015), very little is known about the type, amount, or features of training required to develop competent mindfulness-based teachers unique to the K-12 school setting (Felver et al., 2015). This is the process that occurs during Stage 3 of the National Institute of Health stage model of intervention development discussed above (Onken et al., 2014). Studies examining mindfulness training for K-12 schoolteachers are limited and procedures within current studies vary greatly (Carsley et al., 2018). For example, a study conducted by Kuyken and colleagues (2013) investigating the effects of mindfulness in schools utilized teachers trained by the Mindfulness in Schools Program (MiSP). The MiSP teacher training curriculum is based on contemplative practices from programs such as MBSR and MBCT. MiSP teacher training is a four-day course with the prerequisite of attending an eight-week secular mindfulness training (such as MBSR) and having an ongoing personal mindfulness practice for at least six months. The training provides K-12 teachers with the resources and skills necessary to deliver the MiSP curriculum in their classroom.

Outcomes of the study utilizing MiSP trained K-12 teachers demonstrated fewer depression symptoms, lower stress, and greater wellbeing for students as compared to the
Another study examining the effect of mindfulness in schools utilized a current K-12 teacher who had previously received training in contemplative practices in their personal life (e.g., a yoga teacher certification) and had an existing established personal mindfulness practice (Bergen-Cico et al., 2015). No additional formal training was provided or required by the teacher in this study. The results of this study demonstrate significant improvements in students’ global and long-term self-regulation skills as compared to the control group. Although outcomes for both studies demonstrate positive results, teachers in both studies received varying degrees of training. Notably, neither of these studies examined implementation fidelity due to the assumption of the training competencies of the teacher in each situation.

Given requirements outlined by experts in the mindfulness field (Crane et al., 2017) and strong research linking mindfulness trained K-12 teachers with higher student outcomes (Carsley et al., 2018), more research is needed to explore mindfulness teacher requirements with K-12 teachers delivering MBPs. Further, more research is required to understand the unique demands a school setting introduces and the best way to prepare K-12 teachers to ensure core elements of the MBP are accounted for (Crane et al., 2017). This need is echoed by Felver et al.’s review of mindfulness in schools (2015): "We would recommend that future researchers consider exploring the amount of training and experience needed to implement MBP effectively using measurable and definable criteria, with the intention to scientifically determine what constitutes adequate preparation in order to ensure that MBPs are implemented with integrity and fidelity" (p. 42-43).
Given the variations in personal mindfulness practice, formal mindfulness training, and mindfulness implementation techniques among K-12 teachers, little is known about the influence of such practices on their mindfulness levels or embodiment of mindfulness. Further, little is known regarding the way foundational teacher competencies (such as teacher certification and experience) influence a teacher’s specific mindfulness competencies. A consideration of these unique factors could influence the field’s understanding of the way mindfulness can be effectively integrated into the novel environment of a school setting.

**Purpose of this Study**

Childhood and adolescence are important developmental periods where establishing healthy life patterns are of focus and providing broad-based resilience building programs in the school setting is essential (Goodyer et al., 1997; Kessler et al., 2005; Sawyer et al., 2012). Mindfulness has been shown to build resiliency (Grossman et al., 2004) among the school-aged population and increased mindfulness levels can be considered a protective factor for the prevention of certain mental health symptomologies (Carmody & Baer, 2008; Kuyken et al., 2016). MBPs have been demonstrated as an appropriate intervention for the child and adolescent populations (Dunning et al., 2019) and have recently begun the adaptation process into the K-12 school setting (Bender et al., 2018).

In order for MBPs to provide robust outcomes in school settings, a focus must be placed on teacher competencies, as indicated in previous literature (Crane et al., 2012; Grossman, 2010; Kabat-Zinn, 2011; Walsh 2016). The specific competencies and embodiment of mindfulness by the teacher of a K-12 mindfulness program are essential in the delivery process and connected to higher outcomes for students (Carsely et al., 2018;
Crane et al., 2012; Felver et al., 2015). Little is known about K-12 teachers’ mindfulness competencies, however preliminary research suggests that when teachers receive training and have personal experience with the practice students experience more positive outcomes of MBPs (Carsely et al., 2018; Crane et al., 2012; Maex, 2011).

Although mindfulness levels have been shown to mediate the relationship between formal mindfulness training and positive psychological symptomology (Suelmann et al., 2018), little is known about the way these levels are influenced by mindfulness teacher competencies (specific mindfulness training or foundational teacher skills). Mindfulness levels have been shown to increase with practice and formal training following a structured MBSR course (Carmody & Baer, 2008) but more research is required to understand the dose of personal practice or formal training required to increase mindfulness levels. Further, research is required to understand the role foundational training competencies (such as the training and experience required to become a K-12 teacher) play in a teacher’s mindfulness levels (if any at all). To better assist in the adaptation process of MBIs in school settings a better understanding of factors that contribute to mindfulness competencies is required. As such, the current paper poses the following research questions to further the field’s understanding of K-12 teachers’ mindfulness competencies:

1) What is the relationship between K-12 teachers’ levels of mindfulness (as measured by the FFMQ) and their amount of personal mindfulness practice and formal mindfulness training (which are considered specific competencies)?

a) What is the relationship between K-12 teachers’ levels of mindfulness (as measured by the FFMQ) and their amount of personal mindfulness practice?
b) What is the relationship between K-12 teacher’s levels of mindfulness (as measured by the FFMQ) and their amount of formal mindfulness training?

2) What is the relationship between the tenure of a teacher’s career (which is considered a foundational competency) and their levels of mindfulness (as measured by the FFMQ)?

Increased mindfulness levels have been shown to improve psychological functioning (Carmody & Baer, 2008), but it is unknown if they are influenced by one’s specific mindfulness competencies among K-12 teacher populations. In the current study, it is hypothesized that higher levels of specific mindfulness competencies (formal training and personal practice) are positively correlated with higher levels of mindfulness (as measured by the FFMQ). Further, it is hypothesized that personal mindfulness practice and formal mindfulness training will individually correlate positively to mindfulness levels. It is also hypothesized that a teacher’s foundational competencies (as measures by length of tenure) will be positively correlated to mindfulness levels (as measures by the FFMQ).

Social Justice Implications

All universal interventions available to students in a public-school setting that reduce suffering and improve wellbeing can be considered a social justice intervention (Hackman & Rauscher, 2004). Further, it is imperative to remember the long-term effects education can have on an individual’s lifespan:

There is no such thing as a neutral educational process. Education either functions as an instrument that is used to facilitate the integration of the younger generation into the logic of the present system and bring about conformity to it, or it becomes “the
practice of freedom,” the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world (Freire, 2018, p. 219).

Given our current understanding of the known effects of mental illness on impairment, mindfulness-based practices are proposed as a broad-based health promotion to build resiliency and prevent mental illness among young populations. Understanding the influence of teachers’ individual mindfulness competencies on the delivery of mindfulness-based interventions in the school setting holds the potential to improve the quality of intervention delivery to students at a universal level. This understanding and improved quality may extend to all students, including students from marginalized backgrounds.
CHAPTER II

METHOD

Research Design

The current correlational study utilized primary data collected from Grade K-12 schoolteachers that practice mindfulness meditation techniques with their students. Mindfulness levels, as indicated by the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006), and demographics were collected through online surveys. As described in Chapter I, it was hypothesized that higher scores on the FFMQ overall would correlate positively with formal mindfulness training and that a higher frequency of engaging in a personal mindfulness practice would positively correlate to mindfulness levels.

Participants

The target population for this study is K-12 teachers from public, private, and nontraditional school settings (e.g., therapeutic programs, remote learning, and clinical setting with academic programs). Teachers were included in the study based on the following inclusion criteria: 1) the individual identified currently as a teacher, and; 2) the individual identified as implementing a mindfulness routine or curriculum with their students in the prior academic year. Teachers of any race, ethnicity, and gender were invited to participate.
The principal investigator of this study is a fifth-year doctoral student in a school psychology program that identifies as a cisgender female. The principal investigator was the sole recruiter for the study and distributed questionnaires to all individuals who consented to partake in the study and met the inclusion criteria. All data collected from participants, whether the questionnaire was completed in full or not, were de-identified and stored on an encrypted USB key and locked filing cabinet. This physical USB key and passwords was accessible only to the principal investigator and supervising researcher.

A total of 328 surveys were collected from current K-12 teachers. Of these, 21 (6%) open ended questions in the surveys were responded to in a language other than English and 148 (45%) respondents had not completed the open-ended question part of the survey. While respondents completed surveys, they had the option of submitting the survey before all answers were completed. Thus, the 148 participants that began the survey but did not complete it. When examined closer, no clear pattern of respondents that did and did not complete the survey was evident. Due to the inability to analyze independent variables with the missing information, these surveys were not included in the final data set ($N = 159, 52\%$).

A total of 159 survey responses were used in the current study.

Table 1

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>37.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years Teaching</td>
<td>10.65</td>
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</table>
Procedure

Current K-12 teachers who identified as using a mindfulness-type activity with their classroom were recruited for the current project. For this study, “mindfulness-type activities” were defined as any activity used in mindfulness-based programs including body scans, breathing exercises, movement meditation, mindfulness visualization, mindful eating, and psychoeducation about mindfulness (Kabat-Zinn, 1990). Recruitment occurred primarily via
snowball sampling due to the exploratory nature of this study and because participants were more difficult to locate than a survey intended for all K-12 teachers. Surveys were sent to the administration of mindfulness organizations and programs that support teachers with mindfulness activities as well as posted on the pages of mindfulness-related social media groups. Participants receiving the survey were asked to send the survey to additional participants who may qualify. In hopes of recruiting a large sample, participants who completed the survey had the option to opt into a raffle for the chance to win one of five gift cards valued at $20 USD each.

Potential participants were informed that the study was part of a research project aimed at understanding the ways teachers’ experiences influence their mindfulness characteristics. Informed consent was obtained from all participants prior to taking part in the study. The recruitment process began following the successful proposal of the current research study as well as complete Institutional Review Board (IRB) approval from the University of Massachusetts Boston.

**Statistical Power**

An ideal study should be able to determine if differences between groups exist. The statistical power of a study is positively correlated with the sample size; therefore, a power analysis was conducted to determine the smallest sample required to meet a statistical confidence interval. According to Suresh and Chandrashekara (2012), three primary factors are required to conduct a power analysis: 1) Alpha (α), the probability of a type I error. An alpha of 0.05 is used to ensure a confidence interval of at least 95%; 2) Beta (β), the probability of a type II error. The ideal power for a study to be reasonably confident in
outcomes is considered to be 80%, therefore setting beta at 0.2 (Suresh & Chandrashekara, 2012); and 3) Effect size, the measure of strength of the relationship between variables. Cohen’s $f$ statistic is a measure of a standardized average effect in the population, 0.25 is considered medium effect sizes for use with ANOVA (Salkind, 2010). An a priori power analysis was conducted using G*Power3 (Faul et al., 2007) to test the difference between three independent group means. Results determined that a minimum sample of 120 participants was required to achieve a power of 80%.

**Data Collection**

Individuals recruited for this study were asked to complete an online questionnaire through Qualtrics consisting of four screening questions, 17 demographic questions, and 40 questions that make up the FFMQ. The demographic questionnaire included questions about personal characteristics as well as questions about the respondent’s personal mindfulness practice (PM), formal mindfulness training (MT), and teacher tenure (TT). Completion of all required questionnaires was expected to take respondents less than 15 min.

**Instruments**

The survey used in the current study included a demographic questionnaire and the 39 items of the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2008). The demographic questionnaire included embedded questions to assess for personal mindfulness practice, formal mindfulness training, and teacher tenure.

**Demographic Questionnaire**

Participants completed a demographic questionnaire consisting of 17 questions that asked about age, racial/ethnic identification, level of education, teaching certification status,
school environment, and characteristics of students taught (see Appendix B). The demographic form included the following embedded questionnaires:

**Personal Mindfulness Practice (MP).** Data characterizing Personal Mindfulness Practice (MP) was collected in two ways: 1) the number of sessions per week an individual practices mindfulness, and 2) the average length of each session.

*Number of Days Practiced Per Week.* To understand the number of days per week, on average, an individual engages in a personal mindfulness practice the following question was asked: “Do you have any previous experience with mindfulness-related meditation practice, personally?” Respondents were asked to choose one of the following answers: “1) Yes, I usually practice mindfulness meditation exercises at least once per week. Please specify how many days per week you practice: __; 2) Yes, I practice mindfulness meditation exercises, but only occasionally and not on a weekly basis. Please specify how often you practice mindfulness meditation, on average: __; or 3) No, I have never practiced mindfulness meditation exercises.” Responses were understood as a continuous variable from 0-7 days per week.

*Duration of Personal Mindfulness Practice per Session.* The average duration of personal mindfulness sessions was explored as a continuous variable. Respondents were asked: “When you practice mindfulness, on average, how long do you practice for (in minutes)?”

**Formal Mindfulness Training (MT).** For the purpose of the current study, *formal mindfulness training* was defined as any mindfulness-related training received by participants conducted by a third-party mindfulness related entity (including, but not limited to,
Mindfulness-Based Stress Reduction (MBSR) courses, yoga teacher training, mindfulness retreats, and participation in other formalized mindfulness courses). To assess the amount of formal training a participant has received, a single item measure adapted from the PM question was used (Yela et al., 2020): “Have you participated in formal mindfulness meditation related training?” Respondents chose one of the following choices: “Yes, I have formal mindfulness-related training” or “No, I do not have formal mindfulness-related training”. If a respondent replied with, “Yes, I have formal mindfulness-related training,” they were asked open ended questions regarding the characteristic of this training (i.e., the type of mindfulness training received, length of training received, and frequency of training).

Respondents were then put into one of three categories according to their MT: 1) no mindfulness training, 2) low amount of training, or 3) moderate training. Individuals who indicated they had never received formal mindfulness training were placed in category 1. The remaining 44 individuals that indicated they have formal mindfulness training were divided into “low” and “moderate” categories based on the amount of training they received. Researchers explored the option of placing participants in “no/low/moderate/high” categories, but on further investigation and due to the study’s sample size, the “no/low/moderate” option was chosen.

Individuals who indicated they had received formal curriculum-based mindfulness training, or multiple mindfulness trainings were placed by the principal investigator in category 3 (i.e., “an 8-week MBSR course”, a “mindful schools training”, “RYT 200, yoga movement coach, several children’s yoga certifications”. All other individuals were placed in category 2 (i.e., “A PD at my school”, “four training sessions in yoga”, etc.). For example,
one respondent provided the following information regarding formal mindfulness training and was placed in the moderate category: “4 10 week mindfulness meditation classes at the Earth and Spirit Center in Louisville KY., Trained and taught The Compassionate Schools Project out of UVA and implemented in Jefferson County Public Schools, Mindfulness for Teachers class from MindfulSchools, Participated in a 4 day silent retreat in Massachusetts, Was a Fellow with The Collaborative for Spirituality in Education lead by Dr. Lisa Miller at Columbia Teachers College.”

Another example of a moderate category answer is: “I took a two year facilitator training at Against The Stream Buddhist Meditation Society. I have also taken 3 Mindful school course.” The following are examples of participants’ responses placed in the low category group: “PD at my school”, “workshops at conferences”, and “yoga classes and some mindfulness classes through my yoga studio”.

**Teacher Tenure (TT).** To assess foundational teacher competencies, the following questions were asked: “Are you currently licensed as a K-12 teacher in your place of residence?” (Y/N) and “How many years of teaching experience do you have?” (open numerical answer).

**The Five Facet Mindfulness Questionnaire (FFMQ)**

The FFMQ (Baer et al., 2008) measures how often individuals report engaging in mindfulness actions on a scale from 1, *never or very rarely true*, to 5, *very often or always true* (see Appendix A). The FFMQ is comprised of five factors (or facets): 1) **Observing**, defined as, “attending to or noticing internal and external stimuli, such as sensations, emotions, cognitions, sights, sounds, and smells” (e.g., *When I’m walking, I deliberately notice the sensations of my body moving*); 2) **Describing**, defined as “noting or mentally labeling these stimuli with words” (e.g., *I can easily put my beliefs, opinions, and
expectations into words); 3) Acting with awareness, defined as, “attending to one’s current actions, as opposed to behaving automatically or absent-mindedly” (e.g., I am easily distracted); 4) Non-judging of inner experience, defined as, “refraining from evaluation of one’s sensations, cognitions, and emotions” (e.g., I tell myself that I shouldn’t be thinking the way I’m thinking); and 5) Non-reactivity to inner experience, defined as, “allowing thoughts and feelings to come and go, without attention getting caught up in them” (e.g., When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it).

The FFMQ has demonstrated internal consistency and has been shown to be a reliable measurement of mindfulness (α = .90; Baer et al., 2008). It has been validated with clinical, meditating, and non-meditating adult populations (Baer et al., 2008; Curtiss & Klemanski, 2014). A short form is available (Bohlmeijer et al., 2011) as well as versions in Chinese (Deng et al., 2011); Dutch (Veehof et al., 2011); Brazilian (Barros et al, 2014); Spanish (Cebolla et al., 2012); and Japanese (Sugiura et al., 2012).

**Statistical Analysis**

**General**

The data in this study was analyzed in R Studio (R Core Team, 2021) with functions sourced from the Rallfun-v40.txt file (Mair & Wilcox, 2020; Wilcox, 2022). Preliminary analysis explored the shape and nature of variables’ distributions for methodological and theoretical considerations. The main analysis characterized all the independent-dependent variable (IV-DV) and independent-independent variable (IV-IV) associations separately, then proceeded to examine interaction effects. The page notations below reference the
Introduction to Robust Estimation and Hypothesis Testing textbook (Wilcox, 2022) for more detailed descriptions of the methods used in this analysis.

**Exploratory Procedures**

Analysis first characterized variable distributions with conventional boxplots; however, outlier detection was based on the MAD-Median rule, using the R function ‘out’. Unlike other methods, the MAD-Median rule directly applies probability to outlier definition (p. 102), with a p<0.05 detection criterion. Analysis further studied the shape of distributions using a kernel density estimator, with the R function ‘akerd’. This function plots the probability of each value in the distribution in a continuous format (p. 52). Although Kernel (probability) density estimators tend to perform better than histograms, the current study did employ the latter in certain cases. It also examined data with stem-and-leaf presentations to evaluate distribution continuity.

To explore the nature of associations, analysis applied an interval running smoother with the R function ‘rplot’. This function provides a trimmed means extension to Cleveland’s (1979) method, which is based on a *locally weighted running-line*. Briefly, for each X value, the function plots the trimmed mean of Y values, which are weighted according to proximity. Stated differently, to produce localized prediction, the Yi values associated with Xi values that are closer to X receive heavier weights (p. 621). This method is particularly useful for detecting curvature. It is also sensitive to shifts in the nature of the association as a function X value. The current study also employed a 3D extension of this function to explore the associations among multiple predictors and examine interactions (p. 700).
Group Comparisons

The study applied the Yuen’s test (Yuen, 1974) of trimmed mean to compare groups (e.g., mindfulness scores across the different levels of formal training). The trimmed mean generally performs better than methods based on means across a wide range of situations, except normally. Specifically, it maintains high power and adequate control over type I error in the face of considerable departure from normality, heavy tailed distributions and outliers (Wilcox, 1998). The trimmed mean symmetrically removes a specified percentage of observations from each tail of the distribution and adjusts the standard error, accordingly, with the winsorized variance (p. 34). In skewed or heavy tailed distributions, the trimmed mean provides an adequate measure for central tendency and a more faithful measure of location relative to the mean.

To examine all pairwise comparison, analysis applied the R function ‘lincon’, which provides a trimmed mean extension of Dunnett’s T3 method (p. 383). Effect sizes for trimmed means were computed with the R function yuenv2. Trimming in the current study was set to 10%, based on outlier examination and power considerations. Controlling for Type I error across multiple comparison adhered to Rom’s (1990) procedure, which constitutes a stepwise rejection method based on a modified Bonferroni inequality (p. 398).

Finally, categorical analysis of the intersection between a teacher tenure split and training levels applied Pearson test of independence. Subsequent comparisons of binomials across groups employed the R function ‘twobinom’, which is based on Storer and Kim’s method (1990).
**Regression**

Analysis used the Theil Sen regression estimator to protect against outliers, using the R function ‘tsreg’. The slope of the Theil-Sen line corresponds to the median of the slopes computed across any pair of observations in the dataset, i.e., $X_i,y_i$ and $X_j,y_j$, for which $X_i > X_j$ (p. 594). To test for curvature, analysis compared the Theil Sen slopes between different sections of the predictor’s distribution with the R function ‘reg2ci’, which is based on a percentile t bootstrap method (nbs=599). Least Square regression was also used for comparison in one case. Measures of associations were based on extensions of these methods in addition to Skipped correlation, using the R function ‘scor’. The Skipped correlation offers the advantage of removing outliers, or leverage points, while considering the overall structure of the data (p. 567).

**Interactions**

To test for interaction effects between the continuous predictors (i.e., Teacher Tenure and Frequency of Practice), analysis explored different spaces in their distributions with the R function ‘smgridAB’. The spaces were differentiated by high and low levels of the predicting variable, operationalized by median splits. The ‘smgridAB’ function provides trimmed means comparisons of the DV (i.e., mindfulness levels) across the 4 groups that emerge from the median splits. Analysis used the R function ‘smgridLC’ to test for an interaction with the null hypothesis of $TT(\text{low})/MP-F(\text{low}) – TT(\text{low})/MP-F(\text{high}) = TT(\text{high})/MP-F(\text{low}) – TT(\text{high})/MP-F(\text{high})$. Differences in explanatory power were illustrated with M estimator regression, using the R function ‘MMreg’. This function is also
based on percentile t bootstrap and predicts means computed after removing outliers with the MAD-Median rule (p. 102).

Interaction analysis involving the categorical predictor of formal training conducted an all pairwise comparison of the Theil Sen slopes (i.e., of TT/ML and MP-F/ML associations) across the formal training levels. This analysis used the R function `reg1mpc`, which is based on a percentile t bootstrap method (nbs=2000).
CHAPTER III
RESULTS

Variable Distributions

Analysis first explored the shape of distributions visually with Kernel probability estimators (see Figure 1) and boxplots presentation (see Figure 2). In addition, preliminary analysis examined outliers and the distributions' measures of location and spread, summarized in Table 2.

The Mindfulness Level (ML) distribution emerged as symmetric for the bulk of the observations, for scores ranging between 110 and 130; yet, it is characterized by a right heavy tail that contained 22 outliers, consisting of 14% of the sample. These data suggest that there is a disproportional increase in levels of mindfulness above the median, or toward the higher level of the ML distribution. Participants above ML=130 achieve a substantially higher level of mindfulness than expected under normality. Scores on the FFMQ range from 39-195 with 117 being the average score (Baer et al., 2008). This finding is similar to that of other studies examining teacher mindfulness training where scores were around 139 post mindfulness training and 117 prior to training (Beshai et al., 2016).

Mindfulness Practice (MP) emerged as heavily skewed to the right for both frequency (MP-F) and duration (MP-D). Approximately 45% of participants reported mindfulness

39
practice once a week (26%) or less (18%), and an additional 34% indicated practicing between 2 and 3 times a week (see histogram in Figure 3). Only about 20% of participants reported a more regular practice. Analysis indicated 15 outliers on the higher end. The MP-D distribution centered on 25-min session-duration, based on the median; however, the excessive skewness, with few outliers, suggested significant and continuous disproportional increases in practice time at the higher end of the distribution.

Formal Mindfulness Training (MT) was conceptualized categorically across three levels: 1) no mindfulness training, 2) low amount of training, and 3) moderate training. Of the 159 respondents, 114 indicated they have no formal mindfulness training (72%). Twenty-four individuals indicated they have a low level of formal training (15%) and the remaining 20 individuals indicated a moderate level of formal mindfulness training (13%). The range of Teacher Tenure (TT) in the current sample is 41 years, with an average TT of 11 years. The TT variable emerged as heavily skewed to the right, with a median of 9 years and 15 outliers present. While the sample was composed of teachers across school settings, public school data suggests similar trends in teacher tenure. The range in MA public schools is 0-30+ with an average TT of 6-10 years.

In an integrated view, the right skew appears to be consistent across all the IV and DV variables. Most participants report no formal training, infrequent practice of brief duration, and a teaching tenure of less than 10 years; whereas, there rest of the sample shifted toward higher engagement and seniority at a significant rate. ML followed a somewhat similar pattern, although the departure from the bulk of the observation occurred at a higher
quantile. To the extent that this sample is representative, analysis suggests widening discrepancies among teachers with increased engagement.

**Figure 1**

*Kernel Probability Estimators for all Variables – Invariably Skewed to the Right*
Figure 2

Boxplots of all Variables Reflecting Skewness
Table 2

*Measures of Locations, Dispersions, and Outliers*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Max</th>
<th>Min</th>
<th>Range</th>
<th>Mean</th>
<th>Median</th>
<th>Trimmed</th>
<th>Variance</th>
<th>Win. Variance</th>
<th>– High</th>
<th>– Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML</td>
<td>170</td>
<td>100</td>
<td>70</td>
<td>126.75</td>
<td>121.50</td>
<td>123.49</td>
<td>224.55</td>
<td>90.76</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>MP-F</td>
<td>0</td>
<td>7</td>
<td>7</td>
<td>2.30</td>
<td>2</td>
<td>1.93</td>
<td>4.12</td>
<td>1.46</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>MP-D</td>
<td>0</td>
<td>120</td>
<td>120</td>
<td>32.11</td>
<td>25</td>
<td>28.08</td>
<td>772.89</td>
<td>373.03</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>TT</td>
<td>43</td>
<td>2</td>
<td>41</td>
<td>10.65</td>
<td>9</td>
<td>9.15</td>
<td>53.67</td>
<td>14.96</td>
<td>15</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 3

*Practice Frequency Distribution – Sharp Skew*
Independent-Dependent Variable Associations

Association Between Mindfulness Levels (ML) and Mindfulness Practice Frequency (MP-F)

The running interval smoother, employing R function ‘rplot’, suggested that the association between ML and MP-F is positive and linear, as indicated by Figure 4. In the same figure, Theil-Sein regression analysis, removing 15 leverage points with the ‘xout’ argument, confirmed this observation with explanatory power of 0.45 and association strength of 0.67. For the full data, explanatory power was 0.64. The estimated slope, calculated by R function ‘regciMC’ had a 95% CI of 3.56 (se=0.78, P<0.00). Least Square Regression yielded a highly significant result with a slope of 4.63 (df = 1,142, se =0.70, t=6.61, p<7.19e-10), an intercept of 116.7, explanatory power of 0.23 (Full data r = 0.31) and a strength of association of 0.48 (Full data r = 0.55).

Figure 4

Evidence for Linear Association Between ML - MP-F
Note. Running interval smoother (left). Theil Sen Regression line (right)

**Association Between Mindfulness Level (ML) and Mindfulness Practice Duration (MP-D)**

The running interval smoother in Figure 5 suggested a complex, curved relationship between ML and MP-D. As the figure indicates, the positive association turns negative around MP-D=20. To test for curvature, analysis compared the Theil Sen slopes between MP-D≤20 (n = 77) and MP-D=20>20 (n = 87) with R function ‘reg2ci’ (see Figure 5 on the right side). The difference between the estimated slopes (0.7 versus -0.2) observed in Figure 5 was highly significant (P<000, 95% CI: 0.74-1.425), based on percentile t bootstrap with 599 subsamples. This result suggests that the duration of session positively correlates with ML for sessions 0 to 20 min long. Then, increased reported session duration may be negatively associated with ML.
**Figure 5**

*The ML - MP-D Association Curves Around 20 minutes from Positive to Negative*

![Graph showing association between mindfulness level and mindfulness training duration](image)

*Note.* Running interval smoother (left). Theil Sen Regression lines, based in a MP-D=20 split (right)

**Association Between Mindfulness Level (ML) and Formal Mindfulness Training (MT)**

A boxplot (see Figure 6) examination of ML scores across MT levels suggested marked increase in ML as a function of formal training (no training med=120, tmean=119.83; low training med=132, tmean=132.13; moderate training med=145, tmean=142.92). The boxplot further suggested that the group without training had lower variance and more outliers than the other two groups. However, a bootstrap comparison of the biweight midvariances only detected a significant difference between the no training and moderate training groups (no training group bivar = 72.92351, moderate training group bivar=227.37, 95% CI: -
272.28923, -22.84526, ratio=0.32, nbs=2000, p<0.02). In addition, the R function ‘out’
detected 21 outliers for the group without formal training, based on the MAD-Median Rule.
No outliers were detected in the other two groups.

Next, an all pairwise comparison of trimmed means (trimming set to 10%), using R
function ‘lincon’, revealed significant difference across all groups, after adjusting for
multiple comparisons based on Rom’s (1990) procedure. Table 3 summarizes these results.
Thus, increased level of formal training is positively correlated with higher levels of
mindfulness.

**Figure 6**

*Mindfulness Level Increases Significantly Across the Levels of Formal Training*
Table 3

*Formal Mindfulness Training Group Trimmed Means Comparisons*

<table>
<thead>
<tr>
<th>Groups compared</th>
<th>Test statistic</th>
<th>Critical value</th>
<th>se</th>
<th>df</th>
<th>CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT=0 – MT=1</td>
<td>3.31</td>
<td>2.56</td>
<td>3.71</td>
<td>23.40</td>
<td>-21.8, -2.78</td>
<td>2.99e-03</td>
</tr>
<tr>
<td>MT=0 – MT=2</td>
<td>6.08</td>
<td>2.62</td>
<td>3.85</td>
<td>18.23</td>
<td>-33.4, -13.3</td>
<td>9.13e-06</td>
</tr>
<tr>
<td>MT=1 – MT=2</td>
<td>2.17</td>
<td>2.50</td>
<td>5.10</td>
<td>33.20</td>
<td>-23.8, 1.7</td>
<td>3.70e-02</td>
</tr>
</tbody>
</table>

*Association Between Mindfulness Level (ML) and Teacher Tenure (TT)*

The running interval smoother indicated a complex association between ML and TT with a notable change in slope around 12 years of tenure. As Figure 7 suggests, there is no association between TT and ML for TT≤12 and a positive association emerges for TT>12. Subsequent analysis compared the Thei Sen slopes, which appears to the right of the figure, with R function ‘reg2ci’, based on 599 bootstrap samples. This procedure confirmed that the slopes are different (Slope TT≤12=0, nTT≤12=114; Slope TT> 12=1.42, nTT>12=45; p= <0.04).
Figure 7

ML-TT Relationship Shifts From no Association to Positive Association Around TT=12

Note. Running interval smoother (left). Theil Sen Regression lines, based in a TT=20 split (right)

A skipped correlation analysis estimated the strength of the association for TT≤12 and TT> 12 at 0.08 (Test statistic=0.88, critical value for rejection at 0.05 level = 2.38) and 0.47 (Test statistic=3.53, critical value for rejection at 0.05 level = 2.47), respectively. A Yuen test of trimmed means further determined that the groups differed in level of mindfulness (Tmean TT≤12= 123.18, Tmean TT>12= 131.72, 95%CI: -15.52, -1.56, se=3.47, test statistic=2.46, critical value for rejection=2.01 p<0.01). As the boxplot in Figure 8 shows, the difference between the groups is largely attributed to the higher end of the distribution (i.e., above the medians, Med TT≤12=121, Med TT>12=122.5, whole sample=121.5). Thus, the more experienced teachers were as likely as their younger...
counterparts to report scores below the median, but much more likely to score at the higher quantiles of the ML distribution.

**Figure 8**

*Higher Tenure is Represented More Significantly than Lower Tenure at the Higher End of the Mindfulness Level Distribution*

![Boxplot showing Mindfulness Level Distribution by Teacher Tenure](image)

**Associations Between the Independent Variables**

*Association between Mindfulness Practice (MP) and Mindfulness Training (MT)*

A boxplot (see Figure 9) inspection of MP across MT levels suggests that the frequency of practice increased as a function of training level, as indicated by medians of the
groups (no training med=1, low training med=2, mod training med=5). An all pairwise comparisons of trimmed means (trimming set to 10%), employing R function ‘lincon’, confirmed a significant difference between the groups. Table 4 summarizes the results of this analysis. These results indicate that people who receive more formal training tend to practice mindfulness more often.

**Figure 9**

*Frequency Practice Increased with Level of Formal Training*
Table 4

All Pairwise Comparisons Practice Frequency across Training Levels

<table>
<thead>
<tr>
<th>Groups compared</th>
<th>Test statistic</th>
<th>Critical value</th>
<th>se</th>
<th>df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT=0 – MT=1</td>
<td>2.16</td>
<td>2.53</td>
<td>0.37</td>
<td>27.87</td>
<td>3.91e-02</td>
</tr>
<tr>
<td>MT=0 – MT=2</td>
<td>6.28</td>
<td>2.62</td>
<td>0.53</td>
<td>18.04</td>
<td>6.35e-06</td>
</tr>
<tr>
<td>MT=1 – MT=2</td>
<td>4.13</td>
<td>2.54</td>
<td>0.61</td>
<td>27.17</td>
<td>3.08e-04</td>
</tr>
</tbody>
</table>

Association Between Formal Mindfulness Training (MT) and Teacher Tenure (TT)

A boxplot (see Figure 10) inspection of TT across MT levels suggests that the higher levels of training were received by those with more tenure, as indicated by medians of the groups (no training med=9, low training med=9.5, mod training med=20). An all pairwise comparisons of trimmed means (trimming set to 10%), employing R function lincon, confirmed a significant difference between the groups. Table 5 summarizes the results of this analysis.
Teachers with Higher Tenure are More Likely to have Received Formal Training

Table 5

All Pairwise Comparisons of MT and TT

<table>
<thead>
<tr>
<th>Groups compared</th>
<th>Test statistic</th>
<th>Critical value</th>
<th>se</th>
<th>df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT=0 – MT=1</td>
<td>2.23</td>
<td>2.64</td>
<td>0.87</td>
<td>16.42</td>
<td>0.04</td>
</tr>
<tr>
<td>MT=0 – MT=2</td>
<td>4.59</td>
<td>2.77</td>
<td>1.48</td>
<td>11.35</td>
<td>7.2e-04</td>
</tr>
<tr>
<td>MT=1 – MT=2</td>
<td>2.85</td>
<td>2.62</td>
<td>1.70</td>
<td>18.21</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Given the shift in the association between TT and ML around TT=12, described earlier, analysis further applied categorical methods to estimate the extent to which teachers with tenure exceeding 12 years were more likely to receive formal training than teacher with
less than 12 years of experience. Table 6 displays a contingency table across the TT and MT categories.

**Table 6**

*MT and TT Contingency Table at the TT=12 Intersection*

<table>
<thead>
<tr>
<th>MT</th>
<th>N &lt;=12 years of TT</th>
<th>N &gt;12 years of TT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 No</td>
<td>90</td>
<td>25</td>
</tr>
<tr>
<td>2 Low</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>3 Moderate</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

A Pearson Chi Square test indicates that these variables are dependent (Chi square = 12.6, p<0.001). Next, analysis compared the binomial probabilities associated with each level of training across the TT groups using the R function ‘twobinom’ test. Table 7 summarizes the results of this analysis. As the table indicates, the probability for receiving no training is significantly higher for teacher with less than 12 years of experience; whereas the likelihood to receive moderate to high level of formal training is significantly higher in for teachers with more than 12 years of experience. Hence, per previous results, tenure is associated with training as well as mindfulness level.
Table 7

Probabilities Associated with MT Across TT Groups

<table>
<thead>
<tr>
<th>MT Level</th>
<th>Probability for TT≤12</th>
<th>Probability for TT&gt;12</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>0.79</td>
<td>0.55</td>
<td>0.003</td>
</tr>
<tr>
<td>Low</td>
<td>0.14</td>
<td>0.18</td>
<td>0.56</td>
</tr>
<tr>
<td>Moderate</td>
<td>0.07</td>
<td>0.27</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Association Between Mindfulness Practice Frequency (MP-F) and Teacher Tenure (TT)

The running interval smoother indicated a remarkable similarity between the MP-F - TT and ML – TT association (see Figure 11); although, it suggested a shift from no association to a positive association around a slightly higher turning point, i.e., TT=15.

Figure 11

TT is Associated with ML and MP-F with Similar Curvature
Figure 12 depicts the respective Theil Sein slopes for TT≤15 (n=128) and TT>15 (n=31) in this association (groups were split based on the smoother), which were estimated at 0 and 0.22, respectively. The percentile bootstrap comparison of the slopes was highly significant (p<0.008, 95%CI for the difference: -0.46, -0.09). The skipped correlation estimate for TT>15 subgroup was 0.35 (test statistic= 2.49, p<0.05).

**Figure 12**

*TT–MP-F Association Turns From no Association to a Positive Association*

*Note.* Theil Sen Regression lines, based in a TT=15 split
Interactions

Interactions between Mindfulness Practice Frequency (MP-F) and Teacher Tenure (TT)

The respective boxplots and smoothers that characterize the association between MP-F and TT for the split (TT≤12/T>12 ) samples are presented in Figure 13. They suggest that for the same number of sessions per week, teachers with higher tenure achieved higher mindfulness levels. A yuen test indicated that the difference in ML is significant (Difference: 11.93, 95%CI: 2.58, 21.28, p<0.01, se=4.48, test statistic=2.66, Critical value = 2.08, df=19.8, effect size = 0.45).

Figure 13

Higher level of ML Observed for the Same MP-F in More Senior Teachers

Figure 14 further displays boxplots of ML across higher/lower MP-F and TT, based on TT=15 split, and Table 8 summarizes the yuen comparisons between higher and lower MP-F levels within each TT group. Although no significance difference emerged between
the lower practice frequency groups, the higher frequency groups differed significantly, despite the small sample size, with a moderate to large effect size of 0.71. Thus, higher frequency is associated with higher mindfulness levels in older relative to younger TT.

**Figure 14**

*ML Boxplots Across MP-F and TT*

---

**Table 8**

*Trimmed Means Comparisons of Higher and Lower MP-F Levels and TT Groups*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Difference in trimmed means</th>
<th>CI for difference</th>
<th>Test statistic</th>
<th>Standard error</th>
<th>P value</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP-F&gt;3</td>
<td>24, 10</td>
<td>-20.43</td>
<td>-31.45, -9.40</td>
<td>3.90</td>
<td>5.23</td>
<td>0.001</td>
<td>0.71</td>
</tr>
<tr>
<td>MP-F≤3</td>
<td>104, 21</td>
<td>-5.55</td>
<td>-13.26, 2.16</td>
<td>1.50</td>
<td>3.69</td>
<td>0.15</td>
<td>0.24</td>
</tr>
</tbody>
</table>
The shift thus described in ML as a function of both MP-F and TT can be further observed in Figure 15 with a 3D running interval smoother. As the figure indicates, the highest mindfulness scores emerge with higher practice frequency as well as higher tenure.

**Figure 15**

*ML Rises as a Function of MP-F and TT*

To observe the interactive effect, analysis compared the 3D smoother within the TT≤12/TT>12 split samples. As figure 16 indicates, at lower TT, mindfulness increases only as a function of practice frequency, whereas, with higher TT both variables predict ML, implying a possible interaction.
Figure 16

*Observing the Interaction Between TT and MP-F in a 3D plot*

![3D plots showing interaction between TT and MP-F](image)

*Note.* Running interval smoothers across the TT=12 split

To test for interaction, analysis explored the intersection of the high and low spaces of the TT and MP-F distributions with a median split, using R function `smgridAB` (see Table 9).

**Table 9**

*MP-F & TT Contingency Table*

<table>
<thead>
<tr>
<th></th>
<th>MP-F below median</th>
<th>MP-F above median</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT below median</td>
<td>119.44 (n=63)</td>
<td>125.50 (n=46)</td>
</tr>
<tr>
<td>TT above median</td>
<td>118.72 (n=58)</td>
<td>133.68 (n=46)</td>
</tr>
</tbody>
</table>
Table 10 presents separate comparisons of trimmed means between the subgroups of high and low TT, as well as between the subgroups of high and low MP-F. The groups in Table 10 are organized according to the following arrangement, consistent with Table 9:

<table>
<thead>
<tr>
<th>M1</th>
<th>M2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3</td>
<td>M4</td>
</tr>
</tbody>
</table>

Table 10

**Trimmed Means Between Subgroups of TT**

<table>
<thead>
<tr>
<th>Groups compared</th>
<th>Difference</th>
<th>95% CI</th>
<th>P value</th>
<th>QS Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>m1 – m2</td>
<td>-6.06</td>
<td>-9.94,-2.18</td>
<td>0.003</td>
<td>0.34</td>
</tr>
<tr>
<td>m3 – m4</td>
<td>-14.96</td>
<td>-22.16,-7.75</td>
<td>0.00017</td>
<td>0.32</td>
</tr>
<tr>
<td>m1 – m3</td>
<td>0.71</td>
<td>-2.24,3.37</td>
<td>0.63</td>
<td>0.50</td>
</tr>
<tr>
<td>m2 – m4</td>
<td>-8.18</td>
<td>-15.76,-0.60</td>
<td>0.04</td>
<td>0.43</td>
</tr>
</tbody>
</table>

As the Table 10 indicates, this analysis failed to detect a significant difference between the high and low TT groups under the MP-F median, consistent with Figure 14 and Table 8. All other comparisons indicated significant group differences in hypothesized directions. Next, analysis confirmed an interaction effect by testing the null hypothesis, m1-
m3 = m2-m4, with R function ‘smgridLC’ (Difference = 8.89, Test statistic = 2.2, critical value= 2.00, se=4.03, df=53.72 95%CI: 0.80,16.9, p<0.03, SQ effect size=0.54).

Finally, a multiple regression model, based on M estimators (using R function MMreg), indicated that the variance accounted for in ML by the three IVs changes dramatically as a function of TT Level, as determined by TT≤12/TT>12 split (11% versus 58%, respectively). Table 11 summarizes these results.

Table 11

<table>
<thead>
<tr>
<th>Sample</th>
<th>TT slope</th>
<th>MP-F slope</th>
<th>MT Slope</th>
<th>Intercept</th>
<th>Association strength</th>
<th>Explanatory power</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT≤12</td>
<td>0.004</td>
<td>0.08</td>
<td>2.24</td>
<td>0.01</td>
<td>0.342</td>
<td>0.116</td>
</tr>
<tr>
<td>Full sample</td>
<td>-0.03</td>
<td>0.36</td>
<td>3.77</td>
<td>115.47</td>
<td>0.519</td>
<td>0.269</td>
</tr>
<tr>
<td>TT&gt;12</td>
<td>-0.11</td>
<td>-0.51</td>
<td>6.41</td>
<td>127.59</td>
<td>0.762</td>
<td>0.580</td>
</tr>
</tbody>
</table>

Interactions between Formal Mindfulness Training (MT) and Teacher Tenure (TT)

To examine interactions between MT and TT, analysis conducted an all pairwise comparisons of the Theil Sen slope that emerged in the TT/ML associations across the three MT levels, using R function ‘reg1mcp’. Table 12 displays the results of this procedure. As the Table indicates, these comparisons did not detect an interaction effect.
Table 12

*Theil Sen TT/ML Slope Comparisons Across MT Levels*

<table>
<thead>
<tr>
<th>Groups Compared</th>
<th>P value</th>
<th>Critical value</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT=0 – MT=1</td>
<td>0.65</td>
<td>0.05</td>
<td>-1.67, 0.80</td>
</tr>
<tr>
<td>MT=0 – MT=2</td>
<td>0.07</td>
<td>0.02</td>
<td>-1.19, 0.06</td>
</tr>
<tr>
<td>MT=1 – MT=2</td>
<td>0.64</td>
<td>0.03</td>
<td>-1.40, 1.30</td>
</tr>
</tbody>
</table>

Interactions between Formal Mindfulness Training (MT) and Mindfulness Practice Frequency (MP-F)

A similar null result for interaction emerged from the respective slope comparisons in the MP-F/ML association (See Table 13).

Table 13

*Theil Sen MP-F/ML Slope Comparisons Across MT Levels*

<table>
<thead>
<tr>
<th>Groups Compared</th>
<th>P value</th>
<th>Critical value</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT=0 – MT=1</td>
<td>0.81</td>
<td>0.03</td>
<td>-6.67, 4.00</td>
</tr>
<tr>
<td>MT=0 – MT=2</td>
<td>0.61</td>
<td>0.02</td>
<td>-4.33, 3.33</td>
</tr>
<tr>
<td>MT=1 – MT=2</td>
<td>0.94</td>
<td>0.05</td>
<td>-5.85, 6.75</td>
</tr>
</tbody>
</table>
CHAPTER IV
DISCUSSION

The growing interest in the use of MBPs in school settings, as evident by the increasing prevalence of research in scholarly journals, offers to extend the use of broad-based preventative programs for mental health care (Bender et al., 2018). Schools are seen as a primary setting where these broad-based interventions should occur due to their easy access and low cost to families (Greenberg, 2010; Kuyken et al., 2017; Leland, 2015). However, as MBPs are implemented in school settings at a higher rate, more information about implementors (e.g., teachers) is essential to understand.

Findings from this study extend the current understanding of training implications for teachers implementing Mindfulness-Based Programs (MBPs) in the school setting. Specifically, results extend the current understanding of the relationship between mindfulness levels and the tenure of a teacher’s career, formal mindfulness training, and personal mindfulness practice. Further, this study seeks to understand the way teacher tenure, formal mindfulness training, and personal mindfulness practice interact with one another to influence an individual’s mindfulness level.

Results from prior research indicate clinically significant mental health symptoms present in childhood and adolescence may lead to short and long-term consequences
including academic underachievement, impaired employment prospects, and participating in high-risk behavior (Goodyer et al., 1997; Sapthiang et al., 2019). Broad-based health promotion interventions that aim to prevent mental illnesses among young populations have been cited as one way to address this problem (Sapthiang et al., 2019; Windle 2011). K-12 school settings serve as an ideal venue for implementing these universal, broad-based interventions due to accessibility for students and ease of implementation (Sapthiang et al., 2019).

Previous literature on universal, broad-based preventative programs suggests mindfulness as a promising intervention to increase resiliency and prevent mental health concerns among children and adolescent populations (Dimidjian et al., 2015; Farb et al., 2018; Masten & Coatsworth, 1998). MBPs have demonstrated robust and long-lasting results in controlled settings implemented by highly trained mindfulness professionals (Grossman et al., 2004), however, with rapid adaptations occurring to incorporate these interventions in various community settings there is an increased risk of “watering down” the practice by diverging from controlled variables, which could result in poorer outcomes (Walsh, 2016). As such, researchers have outlined specific aspects of MBPs that must be preserved to maintain high quality outcomes (Crane et al., 2017).

The current study seeks to support the process of implementing MBPs in community-based settings, namely school-based settings. Specifically, the study examines factors that may influence K-12 teachers’ mindfulness levels in hopes of learning more about the way these factors support the qualities essential of teachers to implement MBPs in classroom settings with a high degree of fidelity. While the qualities required of mindfulness teachers
are outlined by experts in the field (Crane et al., 2017), little is known about K-12 teachers’ mindfulness qualities specifically. Preliminary research suggests that when teachers receive training in mindfulness and have a personal experience with the practice, they may demonstrate higher mindfulness levels, which extend to increased positive outcomes for students (Carsely et al., 2018; Crane et al., 2012; Maex, 2011).

**Exploratory Findings**

The current study analyzed data from 159 K-12 teachers who report implementing mindfulness-based activities in their classroom settings. As outlined in Chapter 3, results of the sample indicate the highest number of teachers personally engage in a mindfulness practice on average of 1 day per week (26%) for an average of 32 min. Notably, most respondents did not indicate receiving any formal mindfulness training (72%). Research suggests formal training may be more beneficial to teachers than self-taught or informal ‘ (Montero-Marin et al., 2021), however similar research suggests a high attrition rate in formalized training options for teachers (Crane et al., 2020), potentially contributing to the trend observed in this study.

**Research Questions**

*What is the relationship between K-12 teachers’ levels of mindfulness and their amount of personal mindfulness practice?*

The first question posed in this study was intended to better understand the influence of a personal mindfulness practice on teachers’ mindfulness levels. It was hypothesized that personal mindfulness practice and mindfulness levels would demonstrate a strong positive correlation as suggested in previous studies (Carsely et al., 2018; Crane et al., 2017; Felver et
al., 2015). For the current study, the frequency and duration of personal mindfulness practice were considered. In regard to frequency of practice, the current study supports previous findings indicating more frequent mindfulness practice results in higher mindfulness levels. However, the results of the current study suggest a complicated relationship between the amount of time engaged in mindfulness practice and mindfulness levels overall. Results suggest time spent in mindfulness practice is positively correlated to mindfulness levels between 0-20 min. Following 20 min the association between duration of practice and mindfulness levels is less clear. More research should be done to understand this finding. It is possible that more information regarding the type of mindfulness practice and what specifically an individual is doing during his time may provide clarity to this relationship. For example, an individual may be practicing formal seated mindfulness for 20 min and another may be “acting mindful” for 20 min during their workday.

Previous studies have found that the practice of mindfulness leads to increased mindfulness levels (Carmody & Baer, 2008; Soler et al., 2014). However, these studies have generally utilized pre- and post-measures to detect this change in mindfulness levels when implementing a specific intervention. The current study relies on self-report data for time spent in mindfulness practice. Therefore, the current study offers a more specific understanding of how much time is associated with increased mindfulness levels.

While the association between frequency of mindfulness practice and mindfulness appear to be linear and positive, it is heavily moderated by teacher tenure. Teachers with more than 12 years of experience in the field benefit from higher levels of mindfulness.
practice much more than those with 12 or less years of experience. Practice promotes mindfulness but much more so for senior teacher, especially with more frequent practice.

**What is the relationship between K-12 teachers’ levels of mindfulness and their amount of formal mindfulness training?**

The second question posed by the current study sought to explore the relationship between a teacher’s mindfulness levels and the amount of formal mindfulness training they had received. It was hypothesized that formal mindfulness training would demonstrate a strong positive correlation to mindfulness level. As expected, the results of this study support this hypothesis. A strong positive relationship between formal mindfulness training and mindfulness levels was demonstrated, supporting findings from previous literature outlining the impact of mindfulness training on teachers’ mindfulness level (Meiklejohn et al., 2012; Nadler et al., 2020). This finding is likely due to the role formal mindfulness training serves in engaging an individual in the practice experientially and through increased understanding of the practice. Unexpectedly, findings indicate this relationship is moderated by Teacher Tenure. Teachers with higher level training with more than 12 years of teaching experienced have a much higher mindfulness score than those with 12 or less years of teaching experience and the same level of formal mindfulness training. Said differently, more senior teachers benefit much more than younger teacher not only from personal practice but also from training (almost 18 points in trimmed means).
What is the relationship between the tenure of a teacher’s career and their levels of mindfulness?

The third question explored in this study was the relationship between the tenure of a teacher’s career and their mindfulness levels. It was hypothesized that teacher tenure would demonstrate a positive correlation to mindfulness levels. Teaching competencies are considered essential components to implementing mindfulness (Crane et al., 2018), which were assumed to be achieved through increased tenure. While results support this hypothesis to some degree, the relationship between teacher tenure and mindfulness levels may be more complicated. No correlation between these variables is apparent between 0-12 years of teaching experience, however, after roughly 12 years of teaching, mindfulness levels are seen to increase. A positive correlation is demonstrated for teaching 12 or more years with mindfulness levels. According to the principal investigator’s understanding, this is the first-time teacher tenure was explored in relation to mindfulness levels. Similarly, previous research suggests K-12 teachers continue to improve in competencies and student outcomes for at least the first 12 years of their career (Sorensen & Ladd, 2020).

Further findings from this study indicate teachers with more than 12 years of experience are more likely to have higher levels of formal mindfulness training. These teachers are less likely to have low or no mindfulness training. Perhaps this is due to more tenured teachers having a mastery of their trade allowing them to pursue additional trainings, such as mindfulness. Further, these teachers are more likely to practice mindfulness more frequently than teachers with less than 12 years of experience and benefit more from the practice.
According to results of this study, it appears that teacher tenure matters a great deal in understanding the relationship between practice/training and mindfulness level. In fact, most of the variance in these associations is explained by the upper quartile of teacher tenure distractions, not by the bulk of observations. Notable, the explanatory power of this association of close to 60%, suggesting a very strong influence of teacher tenure on other variables.

While teachers with less than 12 years of tenure engage in formal mindfulness practice, results suggest that mindfulness practice is more correlated with higher levels of mindfulness in teachers with more than 12 years of experience. Put differently, mindfulness practice has a higher impact on more experienced teachers than on less experienced teachers. Factors contributing to this result should be further studied to understand the implications of this finding. However, this finding may be related to previous research suggesting mindfulness is absorbed more effectively with increased age (Carsley et al., 2018).

Although more research is needed to understand the significance of increased tenure on one’s ability to benefit from similar amount of training and practice, one hypothesis is that more teaching experience allows a teacher to understand and absorb new concepts due to an overall increased efficiency in their daily tasks (Martin & Shoho, 2000; Rice, 2010). Naturally, it can be assumed that the more time an individual spends in the field of teaching, the more tools they have to integrate into effective classroom management. Further research to understand the factors continuing to this finding is needed.
Limitations

Several limitations should be considered when interpreting results of the current study. Most notably, it should be known that the current study occurred during the COVID-19 pandemic, which undoubtedly impacted the study in several ways. Firstly, during the time of this study, many K-12 schools had shifted to remote learning with very short notice. Therefore, it should be assumed that teachers responding to the current survey were experiencing novel and potentially severe levels of psychological stress from the pandemic and unusual demands placed on their teaching role. This stress and other unmeasured factors may have impacted the way teachers responded to items on the survey and they were not considered in data collection. Secondly, recruitment to schools was limited at this time and therefore the study relied on a snowball method through community forums and social media platforms. While the principal investigator originally intended to limit respondents to the United States, removing geographical boundaries was necessary to increase the number of respondents. This may have added variables to the sample not controlled for such as cultural differences in understanding teaching and mindfulness concepts. Additionally, while the survey was sent to organizations in the US and Canada, and it is assumed that respondents were primarily from these countries, more information about the survey sample (e.g., country of residency) would be helpful to understand results more completely. More direct methods of data collection would have allowed for a better understanding of a teacher’s implementation of mindfulness in their classroom. The online survey and snowball method, while assumed to be valid, introduces variables that are impossible to interpret such as clarity and engagement (of both teach and student) while teaching mindfulness skills.
Another limitation of the current study is that it relied on respondents to self-report the amount of time they engaged in a personal mindfulness practice each day. This was provided as an open-ended question which elicited a range of answers. A definition of personal mindfulness practice was not provided with the hope of gaining a better understanding of the state of the field. However, when reporting personal mindfulness practice, it is unclear what respondents specifically engage in during this time. In future research more information should be gathered regarding the type of personal practice and the specific activities that occur during this practice (i.e., formal sitting meditation vs. acting mindfully throughout the day).

Further, the current study relied on respondents to self-report the amount of formal mindfulness training received. On the survey, this question elicited an open-ended response resulting in a large range of answers. This response style made it difficult to categorize formal mindfulness training and relied on the primary investigator, with the support of the dissertation committee, to categorize. Additionally, when reporting on formal mindfulness training many respondents did not provide enough details to understand the breadth or depth of training received. Future studies should seek to elicit more specific details about formal mindfulness training.

Finally, the current study examines certain characteristics and how they relate to mindfulness levels. As this is a correlational study, causation cannot be determined. Further, no information regarding students’ experiences or outcomes was considered in the current study. Future studies should consider the ways mindfulness levels relate to implementation, competencies, and student outcomes.
Implications

Implications for Future Research

The sample in the current study was recruited by means of a snowball sample and was solely focused on teacher characteristics without regard to student outcomes or experiences. Therefore, findings are limited to teachers’ experiences and how they relate to individual mindfulness levels. Because of this, findings cannot be linked to how teachers implement mindfulness in their classrooms, students’ experiences, or student outcomes of this practice. Future research in this area should consider exploring the predictive relationship of teachers’ mindfulness levels on implementation, student experience, and student outcomes. Additionally, the current study utilized a survey that did not require respondents to answer certain questions before moving on to others. Future studies should consider forced-choice responding to ensure a more complete data set.

Furthermore, given the impact that the COVID-19 pandemic has had on students’ learning experiences, teachers’ ability to implement interventions such as mindfulness, and overall stress, similar data should be collected during a period of normative teaching experiences. Additionally, the function of virtual and in-person learning was not explored in the current study. However, at the time of data collection, many schools had shifted to remote learning due to the pandemic. Future studies should explore the functions virtual and in-person learning may have implementing mindfulness interventions for students and how specific characteristics of teachers may support this process. Further, given the additional stress added to teacher’s experiences by the COVID-19 pandemic, mindfulness should be further explored as an intervention to benefit their own mental health. While results of this
study suggests a relationship between mindfulness and personal practice on mindfulness levels, it failed to explore the relationship on mindfulness levels of teacher’s emotional health. This area is important to explore in order to fully understand the benefits that mindfulness may offer teachers as a number of stress management studies have found specific benefit to teachers when they are involved in training and delivery of school based MBPs (Frydenberg et al. 2004; Garcia et al. 2010; Hampel et al. 2008).

Finally, the current study noted a strong correlation between teachers with more than 12 years of teaching experiencing and higher mindfulness levels. Additionally, results suggest these teachers may benefit more from practice. Characteristics of these teachers, such as motivation and identify toward teaching, should be further explored. Further, the potential for mindfulness implementation in schools by these teachers is an area that may be beneficial to understand.

Implications for Practice

While the current study has several limitations, as discussed above, outcomes of the current study may be used to inform practice. When considering the best ways to train and support teachers implementing MBPs in their school setting personal practice, formal training, and teaching experience are variables to consider. When considering personal practice, teachers leading mindfulness exercises should consider engaging in their own practice. While the largest number of individuals in the current study reported engaging in mindfulness exercises one day per week, more frequent practice is positively correlated with higher mindfulness levels. Formal mindfulness training, of varying degrees, is also associated positively to mindfulness levels. Finally, as MBPs continue to adapt to the school setting,
teaching experience should be considered as a strong factor for competency. As teachers with greater than 12 years of experience had more formal training, practiced more regularly, and had higher mindfulness levels overall.

While it was expected that increased practice and training would impact mindfulness levels positivity, the impact of teacher tenure was notable. Teachers with higher tenure, especially those with greater than 12 years, benefit more from the same amount of practice and training.

**Implications for Policy**

The current study offers considerations for school administrators when implementing mindfulness-based programs or interventions in their schools. Primarily, it is important for administrators to understand the guidance put forth by experts in the field on the characteristics of mindfulness programs and qualities of mindfulness teachers, such as what is required of teachers before being allowed to teach mindfulness in school settings as outlined by Crane and colleagues (2017). Further, great consideration should be taken to ensure teachers leading mindfulness have the adequate competencies to ensure positive student outcomes and maximize benefits of investment. For example, a school administrator would likely not allow an individual to teach music classes with no understanding or training in music. Similarly, administrators should use results of the current study to understand the importance of formal training, personal practice, and tenure on mindfulness levels.

**Conclusion**

The current study explored the relationship of personal and formal practices on K-12 teachers’ mindfulness levels. Given our current understanding of the known effects of mental
illness on impairment, and the task of understanding best practice of MBPs in school settings, information about how various factors related to mindfulness in necessary. Understanding the influence of teachers’ individual mindfulness characteristics on their mindfulness levels holds the potential to improve the quality of intervention delivery to students at a universal level. This understanding and improved quality may extend to all students, including students from marginalized backgrounds. As hoped, implications for research and practice were realized.

Findings reveal that the more often one engages in a personal mindfulness practice the more likely they are to have a higher level of mindfulness. Formal mindfulness training is positively associated with increased mindfulness levels. And teachers with more than 12 years of teaching experience demonstrate higher mindfulness levels, more frequent practice, higher impact of practice, and more formal training than teachers with 12 years or less of experience. These findings provide a stronger basis for considering multiple aspects of a teacher’s mindfulness-based competencies when considering the implementation of MBPs in classroom settings.
APPENDIX A

FIVE FACET MINDFULNESS QUESTIONNAIRE

Description: This instrument is based on a factor analytic study of five independently developed mindfulness questionnaires. The analysis yielded five factors that appear to represent elements of mindfulness as it is currently conceptualized. The five facets are observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience.

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

<table>
<thead>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>never or very rarely true</td>
<td>rarely true</td>
<td>sometimes true</td>
<td>often true</td>
<td>very often or always true</td>
</tr>
</tbody>
</table>

_____ 1. When I’m walking, I deliberately notice the sensations of my body moving.
_____ 2. I’m good at finding words to describe my feelings.
_____ 3. I criticize myself for having irrational or inappropriate emotions.
_____ 4. I perceive my feelings and emotions without having to react to them.
_____ 5. When I do things, my mind wanders off and I’m easily distracted.
_____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.
_____ 7. I can easily put my beliefs, opinions, and expectations into words.
8. I don’t pay attention to what I’m doing because I’m daydreaming, worrying, or otherwise distracted.

9. I watch my feelings without getting lost in them.

10. I tell myself I shouldn’t be feeling the way I’m feeling.

11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

12. It’s hard for me to find the words to describe what I’m thinking.

13. I am easily distracted.

14. I believe some of my thoughts are abnormal or bad and I shouldn’t think that way.

15. I pay attention to sensations, such as the wind in my hair or sun on my face.

16. I have trouble thinking of the right words to express how I feel about things.

17. I make judgments about whether my thoughts are good or bad.

18. I find it difficult to stay focused on what’s happening in the present.

19. When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it.

20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

21. In difficult situations, I can pause without immediately reacting.

22. When I have a sensation in my body, it’s difficult for me to describe it because I can’t find the right words.

23. It seems I am “running on automatic” without much awareness of what I’m doing.

24. When I have distressing thoughts or images, I feel calm soon after.

25. I tell myself that I shouldn’t be thinking the way I’m thinking.

26. I notice the smells and aromas of things.
27. Even when I’m feeling terribly upset, I can find a way to put it into words.

28. I rush through activities without being really attentive to them.

29. When I have distressing thoughts or images I am able just to notice them without reacting.

30. I think some of my emotions are bad or inappropriate and I shouldn’t feel them.

31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.

32. My natural tendency is to put my experiences into words.

33. When I have distressing thoughts or images, I just notice them and let them go.

34. I do jobs or tasks automatically without being aware of what I’m doing.

35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

36. I pay attention to how my emotions affect my thoughts and behavior.

37. I can usually describe how I feel at the moment in considerable detail.

38. I find myself doing things without paying attention.

39. I disapprove of myself when I have irrational ideas.
APPENDIX B

DEMOGRAPHIC QUESTIONNAIRE

1. Age:
   a. 18-24
   b. 25-29
   c. 30-35
   d. 36-40
   e. 41-50
   f. 51-60
   g. 61-70
   h. 71+

2. Ethnicity:
   a. White
   b. Black/African American
   c. Asian
   d. Native Hawaiian/ Pacific Islander
   e. Latinx/Hispanic
   f. Native America/ American Indian
   g. Other (please specify): ____________________
   h. Multiracial (please specify): ____________________

3. Years of teaching total:
   a. 1-3 years
   b. 4-6 years
   c. 7-10 years
   d. 11-15 years
   e. 16+ years

4. Years of teaching at current school:
   a. 1-3 years
   b. 4-6 years
   c. 7-10 years
   d. 11-15 years
   e. 16+ years
5. Current grade(s) taught: ____

6. Grade(s) taught in the past: ______

7. Highest degree earned:
   a. High School Diploma
   b. Associate degree
   c. Bachelor’s Degree
   d. Master’s Degree
   e. Doctorate Degree

8. Please mark all that apply:
   a. I am certified to teach general education
   b. I am certified to teach special education
   c. I am not current certified
   d. I am a paraprofessional

9. Do you have previous experience with mindfulness relation meditation practice?
   a. Yes, I usually practice mindfulness meditation exercises at least once per week.
   b. Yes, I practice mindfulness meditation exercises, but only occasionally and not on a weekly basis.
   c. No, I have never practiced mindfulness meditation exercises.

10. On average, how many days per week do you practice mindfulness meditation exercises?
    a. I do not practice mindfulness meditation exercises
    b. Less than one day per week (please specify): ______
    c. 1 day per week
    d. 2 days per week
    e. 3 days per week
    f. 4 days per week
    g. 5 days per week
    h. 6 days per week
    i. 7 days per week

11. When you practice mindfulness, on average, how long do you practice for?
    a. I do not practice mindfulness meditation exercises
    b. Less than 1 minute at a time
    c. 1-5 minutes at a time
    d. 6-10 minutes at a time
    e. 11-15 minutes at a time
    f. 16-25 minutes at a time
g. 26 or more minutes at a time

12. How long have you been practicing mindfulness meditation exercises?
   a. I do not practice mindfulness meditation exercises
   b. 0-6 months
   c. 7-11 months
   d. 1-2 years
   e. 3-5 years
   f. 6 or more years

13. Have you participated informal mindfulness meditation related training?
   a. Yes, I have formal mindfulness meditation related training.
      Check all that apply:
      i. I have attended an 8 week mindfulness-based program (such as MBSR or MBCT). Please specify:_________
      ii. I have received training through a school-based mindfulness program (such as MindUP or Mindful Schools). Please specify:_________
      iii. I have attended a silent meditation retreat. Please specify:_________
      iv. Other, please specify:___________________
   b. No, I do not have formal mindfulness meditation related training.
      Please specify any self-instructional techniques (books, apps, YouTube videos, etc.):_______________________________
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