INVESTIGATION OF THE RELATIONSHIP BETWEEN MINDFULNESS AND EMPATHY IN PRE-NURSING STUDENTS EXPOSED TO A FOUR-WEEK MINDFULNESS TRAINING.

by

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ABSTRACT

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University of Wisconsin – Milwaukee, 2019
Under the Supervision of Stephen R. Wester, Ph.D.

Objective: To investigate the effects of a four-week mindfulness program on levels of mindfulness, empathy, and anxiety in a group of pre-nursing students.

Methods: This study utilized a multiple-baseline across subjects design. Results from nine study participants were examined.

Results: Data demonstrates that a detectable decrease in anxiety levels can result from participation in self-directed mindfulness program as short as four weeks. Results regarding mindfulness and empathy levels were less conclusive. A specific relationship between empathy and mindfulness cannot be determined from this study.

Conclusions: Because previous studies have demonstrated a persistence of skills, practice, and benefits acquired through mindfulness training it can be concluded that individuals exposed to a four-week program will continue to develop benefits beyond those initially expressed. The incorporation of a mindfulness training into nursing curriculum is likely to yield beneficial outcomes for the students and those that they serve throughout their career. Moreover, mindfulness can be incorporated into curriculum in cost-effective and scalable ways. Despite the noted limitations of this study, the results add to the overwhelmingly positive evidence regarding the beneficial outcomes of mindfulness; no significant drawbacks or side-effects of mindfulness practice have been demonstrated. Therefore, healthcare providers and healthcare educators should give real consideration to the practice of mindfulness.

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TABLE OF CONTENTS

List of Figures	v
List of Tables	vi
Introduction	**1**
Literature Review	**4**
Origins and Meaning of Mindfulness	4
Beginning to Understand the Effects of Mindfulness	8
Mindfulness and the Body	8
Mindfulness and the Mind	21
Mindfulness and Pro-Social Behavior	28
Mindfulness and Empathy	33
Stress and Anxiety in Healthcare Professionals	52
Summary	62
Purpose of Current Research and Hypotheses	63
Methods	**64**
Design	64
Recruitment	66
Participants	67
Treatment	68
Measures	71
Incentive for participation	73
Anticipated Risks and Benefits of Participation	73
Analysis of Data	74
Results	**74**
Hypotheses	74
Completion of surveys	75
Individual results	76
Mindfulness	76
Anxiety	78
Empathy	80
Patterns across individuals	82
Discussion	**83**
Mindfulness	84
Anxiety	84
Empathy	85
Limitations	86
Implications	88
Summary	**91**
References	**101**
Appendices	**123**
Curriculum Vitae	**136**

LIST OF FIGURES

Figure 1: Graphed summary of results 94

LIST OF TABLES

Table 1: Summary of results **93**

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A Proposal for the Investigation of the Relationship Between Mindfulness and Empathy in Pre-Nursing Students Exposed to a four-week Mindfulness Training.

Introduction

Today's healthcare providers (HCPs) are arguably among the most highly pressured workers. Business Insider recently reported that eight out of the top 14 most stressful jobs in America are healthcare professionals; the report ranked positions according to the frequency of high-stress situations, consequences of mistakes, and time pressures ("The 14 Most Stressful Jobs In America," n.d.). Amid corporate demands, legislative confines, conflict with insurance agencies, and expectations of near perfect performance, today's doctors, nurses, allied health professionals, administrators, and support staff need to have higher than average levels of patience, awareness and compassion to help assist individuals and families in times of dire need (Glasberg, Eriksson, & Norberg, 2008). Furthermore, decisions made by healthcare providers are often a matter of life and death. With all of this pressure there is no doubt that symptoms of physical and psychological stress are prevalent in this population (Calnan, Wainwright, & Almond, 2000). Left unchecked, this stress can lead to not only devastating consequences for the individual healthcare provider, but also those that they serve. Studies have shown that healthcare providers feeling depressed, anxious, or burned out tend to be less empathetic, less present, and prone to make more mistakes (Halbesleben, Wakefield, Wakefield, & Cooper, 2008). Moreover, some research suggests that nurses may be at elevated risk of such consequences due to the working conditions that traditionally do not allow for much autonomy (Omdahl & O'Donnell, 1999).

Mindfulness meditation can offer a means of improving the well-being of healthcare providers and the service they provide (Fortney & Taylor, 2010; Ludwig DS & Kabat-Zinn J,

2008; Martín-Asuero, 2010; Shapiro, Astin, Bishop, & Cordova, 2005), as well as reduce costs associated with mistakes by healthcare providers (Hales, Kroes, Chen, & Kang, 2012). The ancient practice of mindfulness has been shown to promote a variety of health and interpersonal benefits (Conn, 2011; Davidson & McEwen, 2012; Kabat-Zinn & Hanh, 1990; Keng, Smoski, & Robins, 2011; Ludwig DS & Kabat-Zinn J, 2008; Salzberg, 2010). Numerous scientific studies have shown physical benefits of mindfulness ranging from improved cardiovascular health (Ditto, Eclache, & Goldman, 2006), to improved outcomes of psoriasis treatment ("Recognizing the mind-skin connection," 2006), to overall lowered levels of the stress hormone cortisol (Jacobs et al., 2013). Similarly, more recent studies have shown significant psychological benefits including: reduction of anger, reduction of anxiety, reduction of symptoms associated with depression, and increased compassion (Beddoe & Murphy, 2004; Kalish, 1971; Beddoe & Murphy, 2004; Carmody & Baer, 2008; Croskerry, 2013; Schutte & Malouff, 2011). Additionally, mindfulness practices have been shown to improve focus, decision-making ability, and interpersonal relationship development (Beddoe & Murphy, 2004). Increased levels of empathy as a result of participation in mindfulness meditation have been reported (Lamothe, Rondeau, Malboeuf-Hurtubise, Duval, & Sultan, 2016). Empathy is recognized as an important component of providing quality care across domains of healthcare; likewise, empathy has been acknowledged as a key ingredient to quality training for healthcare providers (Beddoe & Murphy, 2004; Kalish, 1971).

The amount of mindfulness training and practice needed to yield positive effects is unclear from the literature, and estimates vary considerably (Carmody & Baer, 2009). While most research on mindfulness utilizes pre-post intervention methodologies, multiple baseline design may offer further insights regarding the optimal amount of mindfulness training and

practice. This design provides several benefits over other potential research approaches. Most significantly it can demonstrate evidence of effect of treatment with few participants. Additionally, it allows for examination of temporal effects of the treatment during the treatment phase (Kazdin, 1982).

While it is clear that mindfulness practice offers numerous potential benefits, to date relatively little is understood in regard to the mechanisms by which these benefits are imparted. Some researchers are currently exploring physiological and neuro-psychological pathways that may help to explain what has been observed (Davidson & McEwen, 2012), while others suggest that social psychological constructs such as empathy are at the heart of understanding such phenomenon (Lamothe, Rondeau, Malboeuf-Hurtubise, Duval, & Sultan, 2016). Anecdotal evidence suggests an intuitively logical relationship between empathy and mindfulness, but strong and consistent empirical evidence to substantiate this is lacking (Kabat-Zinn & Hanh, 1990; Stew, 2011). The aim of the proposed study was to better understand the effectiveness of a four-week mindfulness program on the psychological benefits derived from mindfulness practice. In particular, it investigated the following questions: 1) Can exposure to a 4-week individual mindfulness training affect a change in nursing students' level of mindfulness, empathy, or anxiety? and, if so, 2) when do such changes take place? 3) Are the changes in mindfulness concurrent, precipitant of, or following changes in empathy? Reduction in participant anxiety scores as a result of treatment was anticipated. Additionally, it was hypothesized that rises in mindfulness and empathy scores would be observed as a result of participation in the treatment protocol. Furthermore, we predicted that the increased mindfulness scores would be precipitant of increased levels of empathy.

Literature Review

Origins and Meaning of Mindfulness

The term "mindfulness" has been used to describe both a practice and a state of being. Mindfulness meditation is the practice of cultivating moment- to- moment non-judgmental awareness (Kabat-Zinn & Hanh, 1990; Santorelli, 2000). It is included in the realm of insight meditation, and differs from other forms of meditation in its lack of trying to control any stimuli, behaviors, or outcomes (e.g. breathing or thoughts) (Freeman, 2009). Mindfulness allows individuals to openly monitor and observe stimuli without necessarily reacting to them.

The term "mindfulness" is an English derivation of the Pali word "sati." Pali was the language of Buddhist psychology approximately 2,500 years ago. "Sati" implies awareness, attention, and remembering (Germer, Siegel, & Fulton, 2013). Multiple forms of mindfulness practice exist; Western teachers commonly refer to the incorporation of three forms of mindful practice 1) open monitoring (awareness), 2) concentration (focused attention), and 3) loving-kindness (acceptance) (Germer et al., 2013; Salzberg, 2010). The Pali word "vipassana" refers to the non-judgmental open monitoring of observations. "Metta," another Pali word, is used interchangeably with the term "loving-kindness" to refer to the practice of compassionately accepting circumstances (or people) as they are.

The practice of mindful meditation is deeply rooted in Buddhist tradition, yet the practice itself is devoid of any dogma or religious beliefs. In short, mindfulness meditation is practiced by first choosing a point of focus (one's own breath is commonly used initially as this focal point). Then the individual's task is to observe the focal point in as much detail as possible using as many senses as they are able. When the individual begins to lose focus and become distracted,

they are to merely notice that they are distracted and then, return their attention to the focal point without judging the fact that they were distracted nor becoming involved with the distraction. Individuals will inevitably lose focus numerous times during each meditation session; this is expected and the practice of mindfulness relies on this happening as the practice is bringing the attention back (Salzberg, 2010). While this practice is simple in nature, it is a challenge to carryout for beginners and advanced practitioners alike.

Though mindfulness has been practiced through the ages, it has not been scientifically studied until more recently. Several scholars have described positive personal experiences with mindfulness meditation that inspired them to lead the mindfulness movement in the West – among them are three prominent figures in the mindfulness movement Sharon Salzberg, Richard Davidson, and Jon Kabat-Zinn (Davidson & McEwen, 2012; Kabat-Zinn & Hanh, 1990; Salzberg, 2010). As a student of the 14th Dalai Lama, His Holiness Tenzin Gyatso, Salzberg is a best-selling author and renowned teacher of Buddhist philosophy and mindfulness. She is also co-founder of Insight Meditation Society. She recently wrote the book *Real Happiness: The Power of Meditation, A 28-Day Program* (Salzberg, 2010) designed for individual, at-home training in mindfulness meditation. In efforts to systematically research mindfulness meditation, researchers at University of Wisconsin – Madison's Center for Investigating Healthy Minds, under the tutelage of Dr. Richard Davidson, are responsible for igniting a cascade of studies that explore the neurobiological underpinnings of how mindfulness practice can, and does, affect the brain. Much of the original enthusiasm for the investigation of mindfulness can be traced back to research begun at the University of Massachusetts Medical Center. Jon Kabat-Zinn is the primary researcher there attributed with bringing his passion for personal practice of mindfulness to the awareness of Western culture through both popular media and the scientific community.

Mindfulness meditation can be practiced in variety of ways, making systematic research difficult. Kabat-Zinn is credited with developing the Mindfulness Based Stress Reduction (MBSR) program in the late 1970s in response to this problem. MBSR is a highly structured eight-week mindfulness training program utilizing sitting meditation, body awareness, and mindful movement. It is a clinical program aimed at helping participants manage stress through the systematic practice of mindfulness meditation. MBSR is primarily a skills-based and psychoeducational program that typically consists of 8-10 sessions, including a one-day retreat. Participants of MBSR receive instruction on a variety of mindfulness meditation techniques such as sitting meditation, walking meditation, body scan meditation, and loving kindness (e.g. Metta) meditation, as well as basic yoga practice. MBSR is commonly delivered in small group settings with one or two facilitators. Each session lasts approximately two hours, and participants are expected to complete daily meditation exercises at home between sessions.

In a typical first session, participants can expect to be led through a basic breathing meditation while sitting upright in a chair or on a meditation cushion. After a brief introduction, the facilitator will generally begin the meditation by sounding a tingsha or other meditative bell tone. Participants are instructed to close their eyes, or soften their gaze, while they sit erect to allow for ease of breath. Verbal guidance aimed at helping participants become morefully aware of their present experience of breathing, and accepting it without judgment or needing to change anything, is offered. Basic breathing facilitation may include a very slowly spoken script with extended pauses like the following: “Simply notice your breath. Where do you find it? Can you feel it as it comes in through your nose? Can you feel it more distinctly in the rise and fall of your chest? Wherever you notice it that is fine. It may take you several breaths before you even begin to notice anything, and that is ok too. Once you find your breath you may want to explore

it. What does it feel like? Just breathe. Can you notice the temperature of the air you are breathing? Is there more air flowing through one nostril than the other or does it feel similar in both? You may have a thought enter your mind that distracts you from noticing your breath. That is fine, just notice it. There is no need to do anything about that thought right now. Right now you can just let it go and return to noticing your breath. Notice how each time a distraction occurs you can choose to return your focus to your breath…"

Meditations are then ended with the sound of the bell. Each meditation session is progressively longer and incorporates new stimuli as a point of focus (ie, movement, eating, thoughts, etc.). After each meditation, participants are encouraged to share and discuss their experiences and areas in which they felt challenged. Subsequent sessions generally begin with a discussion of how the home practice went since last session, and the facilitators address any questions or concerns prior to beginning a new meditation practice. Early sessions may begin with a series of short (e.g., 5 -minute) guided meditations, and later sessions generally progress to more extended (e.g., 45-min) meditations with less guidance.

Beginning to Understand the Effects of Mindfulness

As popularity of mindfulness practice in the West has grown so has research on the topic. Researchers from a variety of disciplines, including neuroscience, medicine, religious studies, counseling, neurobiology, and social psychology, to name a few, have sought to better understand how and why mindfulness works; what differentiates mindfulness from other practices; and what aspects of mindfulness impart such benefits. Early studies of MBSR were aimed at documenting the effects of mindfulness practice on practicing participants in comparison to non-practicing control groups. Biological (blood pressure, cortisol levels,

increased immunity, etc.) as well as self-reported psychological benefits (decreased stress, increased relaxation, better coping ability, etc.) were noted.

The following pages take a closer look at some of the key research findings that have resulted. In particular we will focus our review on those areas of study that can help to shed light on the potential role of mindfulness in preparing healthcare providers for better service. Specifically we examine the relationship between mindfulness and the body, the mind, and pro-social behaviors such as the expression of empathy.

Mindfulness and the Body

Mindfulness and immune function. Mindfulness can offer a means of improving the well-being of healthcare providers and the service they provide (Fortney & Taylor, 2010; Ludwig DS & Kabat-Zinn J, 2008; Martín-Asuero, 2010; Shapiro et al., 2005). In 2003, the seminal work led by Davidson and Kabat-Zinn demonstrated that mindfulness can have profound, and sometimes rather unexpected, effects on the body (Davidson et al., 2003). These researchers sought to better understand possible biological mechanisms associated with somatic, affective, and cognitive outcomes of meditation. In particular, their study showed for the first time that mindfulness mediation practice is associated with increased immune function and specific brain alterations.

For this randomized control study, researchers recruited a total of 48 participants who were employees of a biotechnology company in Madison, Wisconsin. Brain electrical activity, blood biochemistry, and self-report measures were utilized. Because brain activity was being measured, all participants were right-handed to control for distinct differences in the brain activity between right- and left-handed individuals. Participants were randomized into treatment

or wait-listed control groups. Participants in the treatment group completed an eight-week MBSR training that consisted of weekly 2.5-3 hours of class time as well as a 7-hour silent retreat. The instructor was Jon Kabat-Zinn, the originator of the MBSR program. Participants were instructed to complete one hour of home-based meditation practice 6 days per week and were asked to provide daily reports of their meditation practice. A flu vaccine was administered to all participants (both treatment and wait-list control) at the end of the eight-week meditation.

Brain electrical activity, EEG, measures of all participants were obtained before random assignment (Time 1), immediately after (Time 2), and four months after the training period ended (Time 3). EEG was recorded from 27 sites distributed across the scalp. Self-report inventories of affect and anxiety were also obtained at each time point. Blood draws were taken at 2-5 weeks and again at 8-9 weeks post-vaccination.

Results regarding the influenza vaccine showed a clear significant increase in antibody titers from the 4 to eight-week blood draws of the treatment group versus the controls. Additionally, results showed significant Group x Time interaction in regard to trait anxiety with a reduction of anxiety shown in meditators. There was no significant Group x Time interaction pertaining to the Positive and Negative Affect Scale; however, there was a significant reduction in trait negative affect within the treatment group. In terms of brain electrical activity, there were no group differences at the beginning of the study, but the treatment group showed significantly greater left-sided anterior brain activity at the end of the study as compared to the wait-list control group. Left-side anterior brain activation is associated with more positive affect. Furthermore, the increased left-side brain activity was predictive of the increase in antibody titers in meditators. In short, the mindfulness practice group exhibited improved mood and a stronger beneficial response to the flu vaccination.

While other studies have demonstrated that general mitigation of the stress response can lead to improved health outcomes it is remarkable that a non-medical intervention as succinct and prescriptive as MBSR can have such a profound effect (Padgett & Glaser, 2003). Additionally, though many studies rely only on subjective self-report measures and participant self-report, this study produced compelling objective data demonstrating concrete effects of mindfulness on the body. Since this study, other researchers have confirmed similar effects on immune function and brain activity (Brewer et al., 2011; Carlson, Speca, Faris, & Patel, 2007).

Brewer and colleagues conducted a small controlled study to determine how brain activity differed between experienced meditators and control individuals (Brewer et al., 2011). They recruited 12 individuals with ten or more years of meditation experience and pair-matched them according to basic demographics with non-meditators. All individuals were given instructions for three meditation tasks associated with mindfulness meditation 1) focused attention, 2) loving kindness, and 3) choice-less awareness and asked to perform each for 4.5 minutes as their brain activity was monitored. This study re-confirmed what other studies had shown – namely, that the two primary nodes of the default-mode network (DMN) associated with mind-wandering and self-referential processing had decreased activity in meditators as compared to non-meditators. This study also demonstrated that this decreased activation of the posterior cingulate cortex (PCC) and the medial prefrontal cortex (mPFC) occurred *during* the meditation tasks.

Carlson et al conducted an investigation of the ongoing effects of participation in an MBSR program with cancer patients (Carlson et al., 2007). They examined outcomes in terms of quality of life, stress, mood, and endocrine and immune functions. Their earlier studies demonstrated salutary effects in each of these areas (Carlson, Ursuliak, Goodey, Angen, &

Speca, 2001). In 2007, they sought to determine if such effects persisted over a 6-month and a year-long follow-up. Participants were eligible for the study if they were at least 18 years of age, had a diagnosis of early stage prostate cancer or Stage 0, I, or II breast cancer and were at least 3 months post-surgery. Participants with a mood disorder and those with previous MBSR experience were excluded. In total, 49 patients with breast cancer and 10 with prostate cancer were enrolled in the study. All participants took part in a full eight-week MBSR program, in groups of 15 individuals, and instructed to complete daily at-home practice. Assessments of blood pressure, cortisol level, quality of life, immune cell counts, mood, stress level, and intracellular cytokine production were completed at one-week prior to intervention, the morning of the first day of the program, immediately after the final session, one-week post completion, 6-month follow-up, and 12-month follow-up. Each of these measures, with exception of the mood disturbance scores, demonstrated positive effects of the MBSR program that persisted through the one-year follow-up. There were no significant change in mood scores over the study period; authors attribute this to the fact that the initial scores were low to begin with. Interestingly, the positive effects noted seemed to be irrelevant of the amount of home practice reported by participants; this suggests that once improvements were instigated by MBSR, they may be self-sustaining.

Mindfulness and the pain cycle. Research has shown positive effects of mindfulness on physical pain. Emotions and thoughts are known contributors to pain, and in turn, chronic pain has been shown to lead to depression, anxiety, and other mental health concerns (Fishbain, Cutler, Rosomoff, & Rosomoff, 1997). Research has shown that mindfulness can be instrumental in breaking this vicious cycle. In 2008, Morone, Greco, and Weinrer conducted a randomized controlled clinical trial to study the effects of an eight-week mindfulness course on chronic pain

(Morone, Greco, & Weiner, 2008). In this pilot study, researchers followed 37 older adults (mean age of 75 years) with chronic low back pain. After baseline measures of pain intensity (Paint Questionnaire Short Form), pain acceptance (Chronic Pain Acceptance Questionnaire), quality of life (SF-36 Health Status Inventory), and three measures of physical function (Roland and Morris Questionnaire, Short Physical Performance Battery, and SF-36 Physical Function scale) were obtained, participants were randomized to intervention or wait-list control groups. The intervention group met once a week (90 minutes) for eight weeks and learned three basic mindfulness techniques based on the MBSR model. Daily "homework" meditation of 45-50 minutes was recommended. The techniques taught by trained facilitators were: 1) the body scan, 2) sitting/breathing practice, and 3) walking meditation. The attitudes of patience, non-judging, beginner's mind, letting go, non-striving, and trust were emphasized during the training to support mindfulness meditation. After the eight-week intervention was complete, the wait-list controls were immediately crossed over into the meditation group.

In addition to baseline scores, measures were taken post-intervention and at three-month follow-up (note: both treatment and control group had taken the eight-week course by this point). In addition to the previously mentioned measures, level of continued meditation was also assessed at the three-month follow-up. Change scores were calculated between the pre- and post-intervention measures and two sample *t*-tests were used to determine significance level between intervention and control groups. None of the baseline measures differed significantly between groups. Results showed significant improvement in scores in the mindfulness group versus the wait-list controls in regard to pain acceptance (the control group actually worsened over the eight-week period). Physical function as measured by SF-36 Physical Function Scale, but not the other two scales, also showed significant improvement in the mindfulness versus the control

group. Mean pain scores and quality of life improved in the treatment group but did not reach statistical significance over the control group. In the intervention group there were no significant differences between the scores obtained at eight-weeks and 3-month follow-up for any of the measures – suggesting the persistence of the effects of the meditation.

This study represents the first published to demonstrate the feasibility of an eight-week mindfulness program for older adults with chronic lower back pain. Other studies have demonstrated positive effects of mindfulness on chronic pain but have done so with younger participants (mean age ranging from 38 to 51) (Baer, 2003). This study is important in showing that such effects may be obtained throughout one's lifetime.

The results of this study are particularly important in understanding the potential effects of mindfulness in healthcare providers when one considers the research of Smedley and colleagues (Smedley, Egger, Cooper, & Coggon, 1995). They conducted a cross-section survey of 2,405 nurses and found that 60% of participants suffered from low back pain; furthermore, a striking 10% of these individuals had been absent from work due to the severity of their pain.

A Swiss study demonstrated the potential long-term benefits of mindfulness in regard to pain management (Grossman, Tiefenthaler-Gilmer, Raysz, & Kesper, 2007). There researchers conducted a quasi-experimental study examining the effects of an eight-week MBSR course on 58 women with fibromyalgia. Fibromyalgia is a condition associated with severe physical pain and fatigue and is often linked to a history of emotional trauma (Keel, 1998).

During 1-1.5 hour interviews with researchers, participants completed a battery of inventories to measure parameters of pain and quality of life within two weeks prior to receiving an intervention and again at two weeks post-intervention. These measures included: The Quality

of Life Profile for the Chronically Ill (QoL), the German version of the Hospital Anxiety and Depression Scale (HADS), the Pain Perception Scale (PPS), and the Inventory of Pain Regulation (IPR). Additionally, the Somatic Symptom Inventory (SSI) was incorporated to measure the intensity of physical symptoms during the last two weeks. Individuals were assigned to treatment group (31 patients) or control group (15 patients) based on time of enrollment. Participants were also contacted three years post-study period for follow-up interviews.

The treatment group participated in a full eight-week MBSR program that included the all-day retreat and yoga (these components are commonly left out of research studies due to scheduling and resource constraints). Participants also committed to completing daily 45-minute homework assignments. An active eight-week control intervention was used; like the treatment group, it utilized a similar instructor, location, and curricular format; however, the concepts taught in the program focused on progressive relaxation and gentle stretching rather than components of mindfulness. The control group did not include the all-day retreat.

Statistical analysis utilized independent t-tests to compare treatment and control groups as well as ANOVAs to study differences among pre-, post-, and 3-year follow-up data. Significant differences between treatment and control groups were noted in nearly all of the individual inventory measures including: sensory pain, affective pain, somatic complaints, depression, anxiety, pain intensity, avoidance, resignation, functional status, enjoyment/relaxation, negative affect, social contact, and sense of belonging. There was no statistical difference between groups in regard to visual analog scale of pain, competence, or positive affect. Some of the positive changes were most distinct at post-intervention and attenuated over time to the 3-year follow-up point. However, some measures demonstrated significant changes that were maintained through 3-year follow-up these include: HADS

depression, HADS anxiety, VAS pain, SSI somatic complaints (specifically sleep problems, circulatory complaints, headaches, and skin complaints), sense of competence, and resignation. While affective and sensory pain perception did not significantly change from pre-intervention to follow-up, short-term positive changes were seen at post-intervention. Quality of life measures indicated positive change overall from pre-intervention through 3-year follow-up with the highest scores at post-intervention and decreases between post-intervention and 3-year follow-up. Results associated with clinically significant pain reduction were mixed. While patients showed reduction of symptoms on the VAS global ratings scale, the long-term benefits were not demonstrated for the other pain variable.

Overall, the findings of this study provide evidence of both short-term and long-term benefits of mindfulness in the mitigation of components of chronic pain. These results are particularly impressive due to the fact that control group was so similar to the treatment group and only differed in regard to the content focus of mindfulness versus another credible intervention.

Mindfulness and the endocrine system. The relationship of mindfulness to chronic disease, such as diabetes has been investigated. It is well-established that psychological distress is associated with reduced glycemic control in patients with diabetes; yet, the use of stress-reduction interventions to improve glycemic control is largely understudied (Surwit et al., 2002). In 2007, a small prospective study conducted at Thomas Jefferson University yielded the first published results showing that mindfulness can improve glycemic control in patients with Type 2 Diabetes (Rosenzweig, Reibel, Greeson, Edman, & others, 2007). In this pilot study, Rosenweig and colleagues observed 14 adult patients (mean age 59.2 +/- 2.57 years) with Type 2 Diabetes

as they participated in an eight-week MBSR program. Diet, exercise, and medication routines were not altered during the study.

The curriculum of this program followed that established by Dr. Jon Kabat-Zinn (Kabat-Zinn & Hanh, 1990) and included 150-minute weekly sessions as well as an all -day weekend retreat, and daily home practice. Researchers measured levels of Glycosylated hemoglobin A1c (HA1c), blood pressure, body weight, and self-reported psychological symptoms including anxiety, depression, somatization, and general psychological distress. Scores were obtained at baseline (during the week prior to the start of the MBSR program), at program completion, and one-month follow-up. Eleven of the original participants completed the entire study. Paired t-tests were used to compare measures at the three time-points.

Results depicted a downward trend in HA1c (indicating greater glycemic control) from baseline to completion of the MBSR intervention; likewise, a large reduction in HA1c of 0.48% was seen at one-month follow-up ($P=0.3$, $d=0.88$). Similarly, a downward trend in blood pressure was seen at the completion of the program and maintained with statistical significance through the one-month follow-up ($P=0.009$, $d =0.48$). While there was significant reduction of symptoms associated with depression (43% decrease), anxiety (37% decrease), and general psychological distress (35% decrease) seen at completion of the study, this reduction was not maintained through the one-month follow-up period. There was no change measured in mean body weight during the study; this finding helped to corroborate self-reports that there were indeed no notable lifestyle changes in regard to medication, diet, or exercise.

The authors reasoned that the parallel reductions in psychological stress, blood pressure, and HA1c could be explained through an interruption in the body's stress response due to participation in the MBSR program. Specifically, they suggested a potential down-regulation of

stress-indicators (including cortisol, norepinephrine, beta endorphin, glucagon, and growth hormone) known to increase blood glucose and insulin resistance. The results of this study provide an appealing argument for the continued investigation of the bodily effects of mindfulness as they pertain to the endocrine system.

From the mitigation of pain, to profound effects on the cardiovascular system, to immunological and endocrinological improvements, to even changes in brain structure mindfulness has shown to provide a vast array of opportunities for improved body function. In 2004, Paul Grossman and his colleagues in Germany conducted a meta-analysis of the health benefits associated with mindfulness (Grossman, Niemann, Schmidt, & Walach, 2004). They argue that given the prevalence of chronic illness across populations and the taxing nature of treating chronic disease on modern conventional medical systems, the investigation of a relatively brief and cost-effective intervention that can potentially treat a range of symptoms is warranted.

Grossman et al initially uncovered 64 empirical studies but noted that many were excluded due to lack of experimental rigor. Their final analysis included 20 studies conducted prior to 2001 that specifically investigated the effects of mindfulness-based stress reduction programs. The programs studied consisted of 6-12 weeks of weekly sessions (typically 2.5 hours each) covering a variety of mindfulness techniques and yoga poses, home practice, and an all-day retreat. Note that not all of these studies strictly followed the MBSR curriculum established by Kabat-Zinn but were united in approach and conceptual focus. The research aimed to provide an empirical foundation for evaluating whether or not MBSR systematically improves health outcomes. The authors provide a comprehensive and easily understood explanation of the concept of mindfulness that bears repeating:

> Mindfulness is characterized by dispassionate, nonevaluative and sustained moment-to-moment awareness of perceptible mental states and processes. This includes continuous, immediate awareness of physical sensations, perceptions, affective states, thought and imagery. Mindfulness is nondeliberative: It merely implies sustained paying attention to ongoing mental content without thinking about, comparing or in other ways evaluating the ongoing mental phenomena that arise during periods of practice. Thus, mindfulness may be seen as a form of naturalistic observation, or participant-observation, in which the objects of observation are the perceptive mental phenomena that normally arise during waking consciousness (p.36).

The meta-analysis included both observational and controlled studies. Researchers considered the concept of health to be inclusive of both mental and physical measures. Only data from standardized and validated scales with established internal consistency were included. All inclusion decisions were derived via consensus of three researchers. The analysis was focused on immediate pre- to post-intervention changes rather than long term effects. Two separate analyses of effect sizes (Cohen's *d*) were conducted; the first included only data from controlled studies, and the second included data from both controlled and observational studies.

The 20 studies included represented a total of 1605 participants. Both clinical and non-clinical populations were included. Studies were comprised of individuals with diagnoses including: fibromyalgia, cancer, coronary artery disease, depression, chronic pain, anxiety, obesity, and binge- eating disorder. Results yielded moderately strong effect sizes, approximately 0.5 ($P < 0.0001$), for both controlled and observational data. Further analysis of sensitivity demonstrated significant heterogeneity of populations represented.

These results suggest that mindfulness-based stress reduction programs can be employed as useful interventions for a wide range of chronic disorders. Further, the authors suggest that the consistency of effect sizes across sample domains may indicate that the ability of mindfulness to enhance general coping assisted with distress and disability.

Mindfulness and regulatory control. Exploring physiological measures of stress and reactivity in relation to mindfulness can also be useful. Arch and Craske demonstrated that a short, 15-minute, mindful breathing activity led to lowered emotional volatility of participants (2006). While some physiological measures may be personally or physically invasive (e.g., collection of urine or blood samples to examine for levels of stress hormones), other non-invasive methods exist. One such measure, heart rate variability, has been shown to more accurately reflect flexibility of the autonomic nervous system response to emotional stimuli (Thayer, Friedman, Borkovec, Johnsen, & Molina, 2000).

Physiological response to emotional and physical stress is dependent on the interplay between the sympathetic and parasympathetic nervous system. When the sympathetic nervous system is activated an increased heart rate results; conversely, parasympathetic activation leads to decreased heart rate. During resting periods, the dominance of the inhibitory effect of the vagus nerve on the sinoatrial node reflects parasympathetic activity. High frequency heart rate variability (HF-HRV) refers to changes in heart rhythms as examined through changes in the interbeat interval, R-R interval. Decreased parasympathetic nervous system activity or increased sympathetic nervous symptom activity will result in reduced HRV. Moreover, high frequency (HF) activity has been linked to efferent vagal (parasympathetic) activity (Berntson et al., 1997). Individuals with greater emotional control tend to exhibit greater amounts of high frequency heart rate variability (HF-HRV) (Delgado-Pastor, Perakakis, Subramanya, Telles, & Vila, 2013).

A recent study investigated the levels of mindfulness and heart rate variability (Vest Rogers, 2009). In that study, participants were asked to complete two self-report measures: the Mindful Attention Awareness Scale (MAAS) and the Hassles and Uplifts Scale. Additionally, laboratory and at-home heart rate variability measures were obtained. In the laboratory, HRV was measured during periods of rest and while participants viewed an emotionally evocative film clip. Results showed that during periods of rest, individuals with high levels of mindfulness experienced greater HF-HRV than those with lower levels of mindfulness. While it was predicted that this difference would also be seen in during emotional provocation, the results did not support this. A limitation of this study is that it did not investigate participants' level of mindfulness training and relied completely on self-reports of levels of mindful awareness. It is unclear from this study if participation in mindfulness training would yield results more aligned with predictions.

In 2013, Delgado-Pastor and colleagues conducted a study to explore the physiological measures of attention and autonomic regulation in experienced meditators (Delgado-Pastor et al., 2013). Each of their 10 participants had a minimum of two years' experience in practicing Vipassana meditation prior to the study. As the researchers noted, Vipassana is a primary technique on which mindfulness is based. Each participant underwent two data collection sessions; during one session they were asked to meditate, in the other session they rested with no meditation (random thinking session). Each session lasted 30 minutes and was preceded and followed by a standardized auditory oddball task. Heart rate variability was monitored throughout the sessions and task completion. Results showed increased attentional engagement after meditation and increased autonomic control during meditation.

In summary, research has demonstrated that mindfulness practice is associated with a vast array of improvement in body function ranging from the mitigation of pain, to profound effects on the cardiovascular system, to immunological and endocrinological improvements, to greater regulatory control, to even changes in brain structure. Overall, no adverse bodily reactions to mindfulness have been noted. Such changes may provide opportunity for improved health of healthcare providers and the services they provide and improved outcomes for individuals to whom they provide services.

Mindfulness and the Mind

Mindfulness and severe mental illness. In 2012, Davis and Kurzban conducted a literature review examining the effects of mindfulness treatments for individuals with severe mental illnesses such as schizophrenia, schizoaffective disorder, and bipolar disorder (L. Davis & Kurzban, 2012). Their investigation focused on four major mindfulness-focused treatment approaches: mindfulness-based stress reduction (MBSR) (Kabat-Zinn & Hanh, 1990) mindfulness-based cognitive therapy (MBCT) (Teasdale et al., 2002), dialectical behavioral therapy (DBT) (Linehan et al., 1999), and acceptance and commitment therapy (ACT) (Hayes, Strosahl, & Wilson, 1999). These researchers conducted a comprehensive search of electronic databases for studies published 1985-2012 that included mindfulness or a manualized mindfulness intervention as the primary means of intervention.

The search yielded ten quantitative and three qualitative studies. All the studies investigated changes in participants from before to after a mindfulness treatment. Each of the studies fell into one of two categories 1) use of mindfulness as a stand-alone treatment or 2) the incorporation of mindfulness skills and techniques in combination with cognitive-behavioral components.

The studies consistently showed improvements in mental health as a result of utilizing the mindfulness-based interventions when compared to wait-list controls and treatment as usual (TAU) active controls. Specifically, reduction in anxiety, reduction of depressive symptoms, decrease in believability of hallucinations, decrease in distress associated with psychotic events, and improved social interaction were noted. Authors observed that the believability of hallucinations mediates the relationship between both the frequency of such hallucinations and the personal distress resulting from psychotic episodes. They argued that the strength in mindfulness interventions arises from its ability to help an individual change the relationship with their own thoughts rather than trying to change the content of the thoughts. For instance, one who experiences a hallucination while practicing mindfulness is instructed to just be aware and notice the hallucination rather than judging it as good or bad, labeling it as "real" or "fake", or reacting to it in any way.

One of the qualitative studies looked at this change in relationship more closely (Abba, Chadwick, & Stevenson, 2008). In-depth interviews revealed that prior to mindfulness training, individuals' sense of self-worth and identity was characterized as bad, abnormal, or wrong due to the presence of the psychotic symptoms. Mindfulness helped to change this sense of self through a process of three distinct stages identified by the researchers 1) being aware of the psychotic symptoms, 2) allowing the symptoms to arise and pass without responding or reacting to them, 3) reclamation of personal power through acceptance of the psychosis and self.

While the results of this study demonstrated promising evidence of the benefits of mindfulness for use with individuals who experience severe mental illness, the authors caution that not all of the studies reviewed shared the same level of rigor. They reiterate the need for

additional research and a clearly articulated operational definition of mindfulness for future studies.

Mindfulness, anxiety, and depression. In 1992, Kabat-Zinn and colleagues at the University of Massachusetts conducted a study to determine the effectiveness of a mindfulness-based program for patients with anxiety disorders (Kabat-Zinn et al., 1992). All of the participants were screened during a structured interview and found to meet the criteria for generalized anxiety disorder or panic disorder according to the DSM-III-R. This was the first study published that explored mindfulness for use with this clinical population that included diagnostic procedures. Each participant underwent a thorough Structured Clinical Interview for DSM-III-R (SCID) conducted by a psychologist or psychiatrist. The Symptom Checklist-90-Revised (SCL-90-R) and the Medical Symptom Checklist were used to as part of the structured interviews to assess symptoms of anxiety. Individuals were excluded if they had other primary psychiatric diagnoses, any psychotic disorder, or history of recurrent substance abuse. In total, 22 participants met the study criteria and completed the program.

Trained interviewers gathered weekly data from participants via phone interviews using the Beck Anxiety Inventory, the Beck Depression Inventory, and self-reports of frequency and severity of panic attacks from the time of recruitment through the end of treatment. After treatment, phone interviews were conducted at monthly interviews for a period of three months. Additionally, at four points during the study (recruitment, pretreatment, posttreatment, and 3-month follow-up) an extensive battery of measures was administered including the Hamilton Rating Scale for Anxiety, Hamilton Rating Scale for Depression, Fear Survey Schedule, Mobility Inventory for Agoraphobia, self-report scale for improvement expectation, and a compliance questionnaire.

The treatment consisted of the eight-week MBSR program which included weekly 2-hour class sessions led by a trained instructor, an all-day meditation retreat, and daily home-practice. The participants of this study were distributed among five classes that took place during the study period. The instructors did not know which students were participants, nor did they know their diagnoses. Statistical analyses for both individual and groups were conducted; formal single-subject analyses were not presented due to the strength and consistency of group effects.

Results demonstrated significant reduction of anxiety and reduction from pre-treatment to post-treatment on all measures; these improvements were maintained through follow-up as well. The frequency of panic attacks in individuals with panic disorder linearly declined throughout the study. Various predictors of the drop in anxiety were tested, but the patterns of reduction were so consistent that no predictors were found: there were no demographic or baseline factors that differentiated results; expectancy ratings were not predictive of any differences in decreases; nor were self-reported amount of practice predictive of change in scores. Furthermore, 91% of the participants reported that they were still practicing the mindful meditation techniques at the 3-month follow-up point, with 84% of these practicing formally three or more times per week. Continued informal use of mindful breathing techniques in daily live was reported by 21 of the 22 participants at the 3-month follow-up. This suggests that mindfulness provides simple and practical means for self-care.

Three years after the completion of the study above, researchers conducted a subsequent study to investigate the longitudinal effects of the mindfulness program on the same participants. (J. J. Miller, Fletcher, & Kabat-Zinn, 1995). Eighteen of the participants from the original study participated in the 3-year follow-up. Ten of the participants completed in-person interviews and eight completed the three-year follow-up via phone interview. The same battery of inventories

was used as in the original study. As in the original study, repeated measures ANOVA were used to analyze data. As a measure of comparison, data were obtained from 39 of the individuals who were previously screened and met the criteria for inclusion in the original study but who did not participate in the eight-week MBSR program. Scores obtained from the General Severity Index, the SCL-90-R and the Anxiety sub-scale of the SCL-90-R were obtained and compared for these two groups.

Results of the 3-year follow-up study clearly showed that both subjective and objective improvements in symptoms of anxiety and depression were maintained through the 3-year follow-up period. Of the 18 participants who completed the eight-week MBSR course during the original study, 10 continued formal mindfulness practice three years posttreatment. Furthermore, the original cohort of participants was asked to rate the degree of importance they attributed to the mindfulness program on a scale of 1-10 (1 signified "of no importance" and 10 meant "very important). Twelve of the 18 rated it as a 7 or greater with 5 giving it the highest rating of 10. Additionally, 16 of the 18 reported that they felt the mindfulness program had a "lasting value" for them.

Later studies corroborated the beneficial of effects of mindfulness in treating anxiety disorders (Kim et al., 2009; Koszycki, Benger, Shlik, & Bradwejn, 2007; Lee et al., 2007). A randomized controlled study conducted by Jon Vollestad and his colleagues demonstrated medium to large effect sizes on measures of anxiety (Cohen's d = 0.55-0.97) and large effect size for measures of depression (d = 0.97) (Vøllestad, Sivertsen, & Nielsen, 2011). Furthermore, results demonstrated that 44% of the participants reached clinical recovery of their anxiety and depression symptoms; the gains were maintained over a 6-month follow-up period.

The effects of mindfulness on anxiety and depressive symptoms have also been investigated in non-clinical populations. In 2010, Way and colleagues conducted a study with 27 participants of "normal" young adults who were undergraduate students at University of California, Los Angeles (UCLA) (Way, David, Eisenberger, & Lieberman, 2010). This study investigated the neural correlates of depressive symptoms and dispositional mindfulness. The authors note that increased resting amygdala activity is one marker of depressive symptomology and suggest that mindfulness may decrease depressive symptoms by quieting an overly active amygdala. Additionally, amygdala reactivity is associated with depression; hyper-reactivity of the amygdala towards emotional stimuli is seen during depressive states and quells upon resolution of depressive symptoms (Sheline et al., 2009).

In Way's study, the participants were screened via phone interview and excluded if they had a serious mental or physical health issue, were pregnant, were currently receiving mental health services or taking medications for mental health, were claustrophobic, had any metal (except dental fillings) in their bodies, or were left-handed. Qualified participants completed the Beck Depression Inventory to assess for depressive symptoms; the Mindful Attention Awareness Scale (MAAS) to assess for dispositional mindfulness; the Spielberger Trait Anxiety Inventory (STAI); a portion of the International Personality Item Pool selected to assess for neuroticism; and the Public Self-Consciousness subscale of the Self-Consciousness Scale to assess one's self-awareness as a social object. Participants viewed three different sets of stimuli in a matching task including a fixation cross, expressive faces (fear, anger, happiness, or surprise), and shapes. Functional brain imaging was acquired for each participant during rest and the matching tasks.

Correlational analyses were performed. Results demonstrated that dispositional mindfulness was negatively correlated with resting activity in self-referential processing portions

of the brain as well as with resting activity in the amygdala. Depressive symptomology was positively correlated with activity in the right amygdala. When viewing emotional faces, depressive symptomology was positively correlated with amygdala activity and dispositional mindfulness was negatively correlated with amygdala activity. Dispositional mindfulness was associated with bilateral amygdala activity whereas the correlation with depressive symptomology was limited to the right amygdala. These results suggest that mindfulness is associated with intrinsic neural activity and that changes in resting amygdala activity may be a possible mechanism by which mindfulness elicits improvements in depressive symptoms. The authors note that these results underscore the practice of mindfulness as observant contemplation ("being") as opposed to action ("doing").

Mankus and her colleagues recently conducted a study that investigated the relationship between anxiety, mindfulness, and heart rate variability (Mankus, Aldao, Kerns, Mayville, & Mennin, 2013). Their study of undergraduate students collected levels of anxiety and mindfulness via self- report measures (Generalized anxiety disorder questionnaire-IV and MAAS) and heart rate measures via the Polar RS400 Heart Rate Monitor. Results demonstrated that individuals with high generalized anxiety scores had significantly lower levels of mindfulness than those with less generalized anxiety. Furthermore, they determined that the generalized anxiety level interacted with MAAS in predicting heart rate variability (Mankus, Aldao, Kerns, Mayville, & Mennin, 2013).

Studies have consistently shown that mindfulness has been linked to improved mental health outcomes with moderate to large effect sizes. These improvements have been demonstrated in participants ranging from those with severe mental health concerns to normal

populations. Non-judgmental acceptance of one's experience has been suggested as an essential stimulus of these positive outcomes.

Mindfulness and Pro-Social Behavior

Mindfulness, attributions, and appraisals. In social psychology, the term 'attribution' refers the process individuals use to explain the causes of behavior (their own as well as others') and events. Dispositions toward certain types of attribution may help to strengthen ego and reduce psychological stress (e.g., self-serving bias promotes attribution of positive events to self and negative events to others). Attributional errors can also lead to psychological distress (e.g. overly attributing outcomes/events to external factors can leave an individual with a perceived lack of control). Recently, researchers looked at the effect of mindfulness on stress attribution, coping, and well-being (Weinstein, Brown, & Ryan, 2009). Weinstein and colleagues conducted four separate studies with college students including laboratory- based, longitudinal, and daily diary designs. The results of their investigations demonstrated that mindful individuals made more benign stress appraisals, reported less frequent use of avoidant coping strategies, and in two studies, reported higher use of approach coping.

In 2008, Greeson conducted a research review of the impacts of mindfulness practice on behavioral outcomes (Greeson, 2009). Using a total of 52 exemplars of theoretical work and empirical research published between the years 2003-2008, he found that mindfulness was associated with less emotional distress, more positive states of mind, and improved quality of life. Specifically, the research suggested that individuals with higher levels of mindfulness have more regulatory control of their own sense of well-being, due, in part, to greater emotional awareness, understanding, acceptance, and the ability to correct for unhelpful mood states. It also

demonstrated that interventions designed to train individuals to increase levels of mindfulness led to decreased psychological distress, reduced rumination, decreased levels of anger, and increased well-being. Furthermore, the study showed that a number of mindfulness-based training programs – including Acceptance and Commitment Therapy (ACT), Dialectical Behavior Therapy (DBT), Mindfulness-Based Cognitive Therapy (MCBT), Mindfulness-Based Eating Awareness training (MB-EAT), and Mindfulness-Based Stress Reduction (MBSR) – can effectively treat serious mental health conditions including anxiety disorders, major depressive disorder, eating disorders, chronic pain, and borderline personality disorder.

It has been postulated that mindfulness may help to mitigate stress-related illness through a number of psychological, biological, and behavioral pathways, including a) increasing accuracy of primary stress appraisals, b) assisting with secondary appraisal of stressor demands and proper coping resources, c) decreasing dysfunctional coping styles such as catastrophizing and ruminating, d) increasing positive reappraisal and other adaptive coping strategies, and e) reducing psychophysiological activation (Garland, 2007).

The role of mindfulness in social cognitions has also been explored. One recent study investigated mindfulness as means of regaining attention lost due to stereotype threat (Weger, Hooper, Meier, & Hopthrow, 2012). Stereotype threat refers to the real or perceived risk of confirming negative stereotypes about one's social group. Stereotype threat often creates significant anxiety in individuals and robs them of necessary cognitive resources to complete tasks. Weger and his colleagues compared an experimental group of college women who received a five-minute mindfulness state induction with a control group that received no mindfulness instruction. Results showed that individuals exposed to stereotype threats experienced more mind-wandering and off-topic thoughts leading to lower scores on a math test.

Furthermore, this study demonstrated that the impact of stereotype threat was significantly reduced when participants participated in a mindfulness task.

Mindfulness and spirituality. While mindfulness itself is devoid of any dogma or religious beliefs, mindfulness meditation may be included as part of one's spiritual practice; as such it is useful to explore the potential outcomes of mindfulness due to its spiritual nature. Additionally, because spirituality is a more broadly studied concept, it is helpful to look at the spirituality research literature for potential avenues that need further research in mindfulness. For instance, the reader may note that the research in mindfulness has shown overwhelming positive effects of the practice; broader investigations of spiritual practices have yielded potential drawbacks. Exploring both the positive and negative outcomes of spirituality can help to inform useful directions for new mindfulness research. The spiritual potential of mindfulness meditation is especially salient when one considers interpersonal and relational mindfulness exercises such as Metta, or Loving Kindness meditation (Parameshwaran, 2015). Interestingly, research suggests that outcomes of spiritual practices in general are similar to the outcomes seen specifically with mindfulness. Spirituality may encompass a breadth of practices including, but not limited tocontemplative practices, prayer, ceremonies, ritualized self-care activities, participation in faith communities, connectedness with nature, expression through the creative arts, community service, and social activism (Cummings, Ivan, Carson, Stanley, & Pargament, 2014; Vogel, McMinn, Peterson, & Gathercoal, 2013; Wulff, 1997). There is ample evidence that religion and spiritual practices can, and do, contribute to increased mental health, physical health, and overall well-being (Elkonin, Brown, & Naicker, 2014; Koenig, King, & Carson, 2012; Walsh, 2010). For the sake of brevity, we will explore research that highlights some of the more prominent findings.

Shared rituals and religious beliefs can contribute to a sense of connectedness with others; this has particularly important implications for marriage and family therapies (Walsh, 2010). The centrality of one's meaning system is shown to be an important factor in promoting life satisfaction and contributing to the reduction of distress associated with chronic pain (Dezutter, Robertson, Luyckx, & Hutsebaut, 2010). Spiritual practices have been shown to contribute to resiliency in trauma survivors through the promotion of forgiveness of self and others, hope, meaning, peace, and comfort) (Brewer-Smyth & Koenig, 2014). Futhermore, spirituality appears to provide mitigation of depression, anxiety, and suicidal ideation (Vitale, 2015).

Themes of change and spiritual growth were noted in research findings of Tarrasch in his study involving a population of graduate students (Tarrasch, 2014). In this study, Ricardo Tarrasch investigated the impacts of a two-semester mindfulness meditation training curriculum geared towards graduate students. While the target population of this proposed study is pre-service healthcare providers, both populations have in common an uncommonly elevated exposure to stress. Tarrasch points out several core themes that warrant more attention, including how most students lacked previous meditation experience and how their process of change during practice often involved a heightened turning-point. The current proposed study will further explore the nature of this turning-point.

Despite the protective and healing factors associated with religion and spiritual practices it should be noted that they can also contribute to negative outcomes. For some, inability to maintain the ideals of the religious doctrine or spiritual practices they inherited through family connections may contribute to feelings of guilt, inadequacy, or depression (Koenig et al., 2012). Likewise, when interacting with a therapist of differing religious and spiritual background there

is the potential for the client to feel disconnected, judged, or over-pathologized (Cummings et al., 2014).

Approximately, three fourths of surveyed members of the American Psychological Association reported that their religiosity and spirituality influenced their professional practice at least moderately (Bilgrave & Deluty, 1998). As demonstrated above, spiritual practices have the potential to increase the physical health, mental health, and overall well-being of individuals. This is important in considering how a healthcare provider's personal use of spiritual practices may contribute to client outcomes. It stands to reason that healthier healthcare providers are better able to perform their duties, create strong therapeutic relationships, and more effectively influence well-being in their clients. Research regarding this logic is mixed. Personal characteristics such as empathy, emotional intelligence, and compassion afforded to therapists through spiritual practices has been shown to increase clients' positive perception of the therapist and thereby strengthen the therapeutic relationship necessary for positive client outcomes (Beddoe & Murphy, 2004; Cummings et al., 2014; Watson, Steckley, & McMullen, 2014). However, a mismatch between levels of client and healthcare provider religiosity and spirituality can lead to detrimental outcomes. Specifically, in their comprehensive review of existing studies, Cummings and his colleagues noted that there is some evidence that therapists high in religiosity and spirituality tend to hold conservative values and may over-inflate the diagnoses of clients who deviate from these values (e.g., engage in unconventional sexual behavior) (2014). Due to the lack of religious dogma associated with mindfulness, practitioners may not be at such a risk; however, it is important that health care providers always be self-aware and reflective of personal practices and biases that may negatively impact clients.

Mindfulness and Empathy

To understand the relationship between mindfulness and empathy it is important to understand what is meant by the term "empathy." At first glance the reader may note one's own general sense of the meaning of the word "empathy.".It may conjure images of warm interactions, sincere conversations, or meetings of the mind. While a general sense of the word may come naturally, a working definition is more difficult to pinpoint as one recognizes the potential complexity of the concept. Empathy has been subject of ongoing scholarly discourse for decades. One can trace the discussion of empathy as therapeutic tool to the work of Carl Rogers. Indeed, empathy is described as the core of Rogers's person-centered approach to counseling (Cain, 2010). Rogers (1965) describes empathy as:

> The state of empathy, or being empathic, is to perceive the internal frame of reference of another with accuracy, and with the emotional components and meanings which pertain thereto, as if one were the other person, but without ever losing the "as if" condition. Thus it means to sense the hurt or the pleasure of another as he senses it, and to perceive the causes thereof as he perceives them … (p.210)

More recently, Stein-Parbury suggests that empathy is the ability to perceive the meaning and feelings of another and communicate those feelings to the other person (Stein-Parbury, 2009). Barrett-Lennard adds to this definition by including the idea that once the feelings have been communicated, the person exhibiting empathy then recognizes that their communication of feelings has been understood, and in doing, so, completes the cycle of empathy (Barrett-Lennard, 1981). Hojat and colleagues note that empathy is multi-dimensional and comprised of both cognitive and affective components (Hojat et al., 2002). They further clarify that while sympathy and empathy are sometimes confused, "[B]oth concepts involve sharing, but empathetic

physicians share their understanding, while sympathetic physicians share their emotions with their patients" (Hojat et al., 2002, p. 2). They note that while excessive sympathy of healthcare providers can impede objectivity needed for appropriate diagnosis and treatment, no such constraints exist for levels of empathy. They point out "because understanding is always beneficial to patient care…an abundance of empathy should never impede patient care" (Hojat et al., 2002, p. 2).

Schultz noted that empathy for all humanity is one of the 11 basic needs that must be met for self-actualization (Schultz, 2003). Self-actualization, the highest level of human need identified by Maslow, refers to the realization of one's own potential and fulfillment of one's abilities. Other's perception of one's level of empathy can impact interpersonal relationships as well. Watson and her colleagues demonstrated that clients' perception of therapists' level of empathy was associated with improvements in attachment insecurities and self-treatment (Watson et al., 2014). Some research suggests that mindfulness practice may be associated with increased levels of empathy (Beddoe & Murphyrogers, 2004).

Empathy in Healthcare

An often-cited description of empathy as it pertains to healthcare professionals comes from the work of Mercer and Reynolds who define empathy in terms more of a learnable (teachable) skill rather than a purely emotional experience or a personality trait (Mercer & Reynolds, 2002). Specifically, they state:

> Clinical empathy involves an ability to: (a) understand the patient's situation, perspective, and feelings (and their attached meanings); (b) to communicate that understanding and

check its accuracy; and (c) to act on that understanding with the patient in a helpful (therapeutic) way. (p. S9)

Mercer and Reynolds attribute much of their conceptualization of empathy to the extensive review of the literature conducted by Morse and colleagues in 1992. Morse et al (1992) proposed four distinct components of a multidimensional conception of empathy as summarized by:

> [1] Emotive – the ability to subjectively experience and share in another psychological state or intrinsic feelings,
>
> [2] Moral – an internal altruistic force that motivates the practice of empathy
>
> [3] Cognitive – The helper's intellectual ability to identify and understand another persona's feelings and perspective from an objective stance
>
> [4] Behavioral [sic] – Communicative response to convey understanding of another's perspective (Mercer & Reynolds, 2002, p.S10).

Aligning with this model, researchers can intentionally distance themselves from the purely emotional connotations of commonly associated with empathy and operationalize this seemingly nebulous concept; this allows room for more objectively observable and empirically measurable definitions. It is interesting to note that greater significance has been afforded to the cognitive and behavioral aspects of empathy in clinical contexts through this model as well (Neumann et al., 2012).

Empathy and Pre-service Healthcare Provider Training

Empathy is recognized as an important component of providing quality care across domains of healthcare; likewise, empathy has been acknowledged as a key ingredient to quality

training for healthcare providers. Research on the effect of empathy on health outcomes in primary care may be lacking; however, in the fields of behavioral health and nursing, research suggests that empathy plays a key role in improving outcomes (Mercer & Reynolds, 2002). As such, it is widely accepted that caring and empathy is an important part of the nurse-patient relationship (Beddoe & Murphy, 2004; Brunero, Lamont, & Coates, 2010; Stein-Parbury, 2009). While some researchers note that it is integral to the relationship (McCabe, 2004), others suggest that it is the "most critical ingredient of the helping-relationship" (Kalish, 1971, p. 202).

Empathy is recognized as key skill in promoting successful relationships between psychotherapists and those they serve. Indeed, empathy is included as a base-level benchmark for relational competency among psychologists (Fouad et al., 2009). Similarly, the Association of Colleges and Nursing (AACN), the national body that establishes quality standards for nursing education in the United States, makes it clear that empathy is a critical component in nursing education. In *The Essentials of Baccalaureate Education for Professional Nursing Practice* the AACN states, "Caring is a concept central to professional nursing practice. Caring as related to this essential encompasses the nurse's empathy for, connection to, and being with the patient, as well as the ability to translate these affective characteristics into compassionate, sensitive, and patient-centered care" (A. H. Davis & Kimble, 2011).

Likewise, the need for empathy is recognized as a vital component of physician training. In 1998, the Association of Medical Colleges (AAMC) released a series of reports on the Medical School Objectives Project, an initiative aimed at articulating general consensus among the medical education community in regard to the skills, attitudes, and knowledge that graduating medical students should possess. Among their recommendations is the directive that medical schools are expected to educate physicians who "must be compassionate and empathetic

in caring for patients ("Learning Objectives for Medical Student Education Guidelines for Medical Schools," 1998, p.13).

Despite time constraints in already packed nursing curricula, educators and researchers recognize the need to include time-efficient and effective means of teaching nursing students relational skills such as empathy and caring (Brunero et al., 2010). Some argue that the need for such training is now increased due to the emergence of research demonstrating that today's undergraduate-age students have a tendency toward characteristics of entitlement and narcissism (Low & LaScala, 2015).

Researchers, educators, and governing bodies in health-related fields alike recognize the importance of empathy. Research-informed curricular trends in healthcare provider training help to ensure that students become caring and compassionate providers.

Mindfulness, Empathy and Emotional Intelligence

In a 2016 study, Lamothe and fellow researchers remind us of the importance of emotional competencies for healthcare providers exposed to patient suffering and investigate the role of mindfulness as it pertains to empathy (Lamothe et al., 2016). In this systematic review, the researchers identified 39 studies published up to January 2015 that evaluate the effects of mindfulness-based stress reduction (MBSR) on healthcare workers; 14 of these studies investigated empathy or some form of emotional intelligence. These studies included complete MBSR programs as well as adaptations of the program ranging in length from 1 to 12 weeks. The majority of the 2379 total participants included in the studies identified were women (81%). Eleven different mental health outcomes were measured throughout these studies including burnout, perceived stress, anxiety, and depression. Seven studies specifically measured empathy;

all measures were self-descriptions of empathy with four of the studies employing the Jefferson Scale of Physician Empathy (JSPE). These seven studies are explored in-depth below. Five of the seven studies found that MBSR and related programs improves healthcare providers' empathy. Additionally, other studies in this review noted that mindfulness is also associated with increased emotional intelligence, observation and identification of one's own emotional states, and observation and identification of the emotional states of others. Authors note that when caring for others, an essential skill to avoid emotional contagion (and undue emotional burden) is to be able to determine if emotional states are coming from one's self or from others. Another construct investigated in this review was the idea of emotional acceptance; due to bias in the individual studies, no clear conclusions could be drawn in regard to mindfulness increasing emotional acceptance – however, it was clear that mindfulness did not decrease emotional acceptance. This finding is intuitive as a primary pillar of mindfulness teachings is the non-judgmental acceptance of experiences as they arise. The review revealed strong evidence suggesting that mindfulness should increase empathy. However, it is important to note that the findings of this study represent conclusions drawn according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines, but formal statistical meta-analyses were not performed due to the paucity of data available on empathy and emotional competencies. The authors recommend that future studies investigate shortened versions of MBSR interventions and incorporate patient feedback in regard to healthcare provider empathy.

Beddoe and Murphy conducted a pilot study that explored the effects of an eight-week MBSR course on stress and empathy of nursing students (2004). This study utilized a pretest-posttest design with no control group. A convenience sample of 23 baccalaureate nursing students volunteered for the study, and 16 participants completed the program as well as all pre-

and post-tests. All of the participants were women with no previous mindfulness experience. The program followed MBSR guidelines (Kabat-Zinn & Hanh, 1990) and consisted of 8 weekly 2-hour sessions and 30-minute daily home practice (5 days/week) with the use of audiotapes (Kabat-Zinn & Hanh, 1990). The all-day MBSR retreat session was not used in this study.

In addition to their attendance and home practice, participants were asked to maintain journals throughout the study and complete several questionnaires to assess their levels of stress and empathy before and after program participation. The assessments included a demographic questionnaire, the Interpersonal Reactivity Index (IRI), the Derogatis Stress Profile (DSP), and a homework questionnaire. The IRI is a 28-item, self-report inventory that measures four dimensions of empathy: perspective taking, fantasy, empathic concern, and personal distress (M. H. Davis & American Psychological Association., 1980). The Derogatis Sress profile is a 77-item, self-report inventory derived from interactional stress theory; it measures environmental events, personality characteristics, and emotional responses (Derogatis, 1987).

Results demonstrated that the mean pre-test scores for all four dimensions of the IRI of these nursing students were 40-50% higher than the means of female college students measured in earlier studies (M. H. Davis & American Psychological Association., 1980). Authors suggest that the higher than average initial scores may be due to nursing students choosing a profession that requires elevated levels of empathy. Participation in the mindfulness intervention significantly reduced nursing students' anxiety ($p > .05$). Participants reported that they found breath awareness beneficial in coping with stressful situations. Empathy scores remained strong and two dimensions of empathy – personal distress and fantasy – also demonstrated favorable downward trends. Chi square analysis demonstrated moderate positive relationships between regular home meditation practice and self-reported improvements in attitudes and behaviors.

Authors suggest that practices aimed at fostering awareness and acceptance of one's own personal experience lead to an increase of similar awareness of others' experiences. As such, they note that a meditation intervention designed to address personal distress and increase awareness can be suitable for increasing empathy. They propose that future courses for nursing students would benefit from explicitly linking the concepts of self-care and care for others.

Another study demonstrated no change in empathy scores of healthcare workers as a result of participation in a mindfulness meditation intervention. Galantino and colleagues conducted a study to investigate the relation between physiological markers of stress, namely salivary cortisol levels, and psychological stress indices (Galantino, Baime, Maguire, Szapary, & Farrar, 2005). A secondary goal of their study was to determine whether these indices could be reduced via an eight-week mindfulness meditation program. The authors note that relatively recent changes to the healthcare system have increased the demands on healthcare workers and consequently led to increased stress, potentially decreased immune function, and a decrease in the expression and feeling of empathy they are trained to have for their patients.

Participants of the study included 84 employees of one institute within a university hospital. Participants were employed in a variety of administrative and direct patient care capacities. Once enrolled, all participants were asked to measure salivary cortisol and complete questionnaires before and after an eight-week mindfulness meditation program. The program utilized materials from MBSR and cognitive therapy adapted for a health care setting (Kabat-Zinn & Hanh, 1990). It was comprised of eight weekly 2-hour classes; each session included a didactic presentation, guided meditation practice, an interactive exercise to facilitate application of the techniques, and a group discussion. Audio recordings and readings were provided for home use, and participants were asked to practice the techniques daily for 30 minutes.

Salivary cortisol measures were obtained from individuals in the evening (between 5 and 7pm) to control for fluctuations due to circadian rhythm. Psychological measures were selected to assess mood, level of burnout, and empathy; they included the Profile of Moods States-Short from (POMS-SF), Maslach Burnout Inventory (MBI), and Interpersonal Reactivity Index (IRI). All measures were obtained at baseline and upon completion of the eight-week program (M. H. Davis & American Psychological Association., 1980; Maslach & Jackson, 1981; McNair, Lorr, & Droppleman, 1971).

Of the 84 enrolled participants, 82% (69) completed the questionnaires and 61% (42) completed the pre/post-salivary cortisol measurements. Paired *t*-tests showed no significant differences between baseline and post-intervention salivary cortisol levels. Further analysis showed that correlations between change in salivary cortisol and change in psychological measures were not significant. Comparisons of the POMS-SF scores taken before and after the intervention did demonstrate improvement in all six subscales ($p=0.001$). There was a decrease in the emotional exhaustion ($p=0.001$) and a borderline reduction in depersonalization ($p=0.08$) scales of the MBI. No significant pre to post changes were demonstrated in empathy scores.

A limitation of this study is that it did not include a control group, so it is unclear what other factors outside the intervention may have played a role in participant stress and coping levels. Additionally, it is unclear from this study the level of actual participation of individuals. Authors note that while individuals were encouraged to maximize their participation, "other factors and life events prevented full participation" (Galantino et al., 2005, p.260) but provide no detail in regard to these factors. Individual practice logs may have helped to clarify this. Finally, authors call for increased sensitivity of measures in future studies.

A group of researchers led by Krasner conducted a thorough study to investigate the effects of an intensive program in mindfulness, communication, and self-awareness on levels of primary care physicians' well-being, psychological distress, burnout, and capacity for relating to patients (Krasner et al., 2009). The team created a continuing medical education (CME) course based on three techniques: mindfulness meditation, narrative medicine, and appreciative inquiry. Similar to mindfulness, both narrative medicine and appreciative inquiry involve focusing attention and awareness. A series of invitations to participate in the CME were sent out via mail and electronic communications to all 871 primary care physicians in the Greater Rochester, New York community. Participants were offered the course and CME credits at no cost in addition to a stipend of $250 for the completion of five surveys.

The program consisted of an intensive phase and a maintenance phase. The intensive phase was comprised of 8 weekly 2.5-hour sessions and an all-day silent retreat between the sixth and seventh weekly sessions. The maintenance phase consisted of 10 monthly 2.5-hour sessions following the eighth weekly session. Each weekly session included four training components: didactic material, formal mindfulness training, and narrative and appreciative inquiry exercises. Weekly didactic themes included "awareness of thoughts and feelings, perceptual biases and filters, dealing with pleasant and unpleasant events, managing conflict, preventing burnout, reflecting on meaningful experiences in practice, setting boundaries, examining attraction to patients, exploring self-care, being with suffering, and examining end-of-life care" (Krasner et al., 2009, p.1285). The mindfulness techniques taught were body scan, sitting meditation, walking meditation, and mindful movement. Narrative and appreciative inquiry exercises consisted of writing personal experiences and sharing them with a partner.

Participants completed five sets of surveys (at registration, first session, end of eighth session, end of 10th monthly session, three months after the end of the program). The surveys included: the 2-Factor Mindfulness Scale, the Maslach Burnout Inventory, the Jefferson Scale of Physician Empathy, the Physician Belief Scale, the Mini-markers of the Big Five Factor Structure personality scale, the Profile of Mood States (POMS) (Ashworth, Williamson, & Montano, 1984; R. A. Baer, 2006; Hojat et al., 2001; Maslach & Jackson, 1981; McNair et al., 1971; Saucier, 1994) . Linear mixed-effects models were used to analyze change in outcomes. Of the 70 persons enrolled, 73% completed all five survey sets. Mindfulness scores showed the largest effect sizes (total effect of 1.12, $P<0.001$) at the 15-month point. All three of the subscales of the Maslach Burnout Inventory showed improvements with medium effects sizes. Total empathy improved (effect size, 0.45, $P<0.001$). The Physician Belief scale improved significantly (effect size, 0.37, $P<0.001$). The POMS total score showed moderate effect sizes (effect size, 0.69). Personality traits of conscientiousness and emotional stability had showed small to moderate improvements. Improvements in mindfulness were moderately correlated with decreases in mood disturbance and emotional exhaustion. Improvements in mindfulness were correlated with increases in the perspective-taking scale of physician empathy. The authors note that for most measures similar degrees of improvements were seen after the eight-week intensive intervention and later time points. However, in this study, the short-term improvements in a few of the measures, including physician empathy, did not persist. The results of this study demonstrate that mindfulness programs can improve aspects of healthcare providers' personal well-being as well as interpersonal effectiveness in areas relevant to clinical practice. The authors suggest that self-awareness helps to improve awareness of others.

In response to the limitations of the Krasner study – namely lack of control group, non-randomization, and participants from a single location – Asuero and colleagues conducted a similar study (Asuero et al., 2014). They utilized an adaptation of the intensive program created by Krasner and offered it to a group of primary health care professionals in Spain. Invitations to participate in the study were posted on Web sites frequently visited by the target audience (which included physicians, nurses, social workers, and clinical psychologists). Inclusion criteria included an agreement of participants to attend at least 80% of the educational program, completion of home practice, and response to questionnaires. A total of 68 participants were recruited and were assigned to treatment or control groups according to a stratified randomization scheme based on occupation and place of work. There were two identical treatment groups (43 participants) and one control group (25 participants). The control participants were offered the intervention after completion of the study.

Like the Krasner study, the Asuero intervention was structured as a continuing education program with group psychoeducational activities. Each of the eight weekly sessions included four types of activities: educational presentation focused on mindful awareness of thoughts, feelings, biases, pleasant and unpleasant events, and concepts related to patient care; formal mindfulness meditation; narrative and appreciative inquiry exercised; and group discussion. Participants received an audio recording of home practice exercises and a book. They were offered the course free of charge but had to pay for the course materials.

Outcome measures consisted of validated Spanish versions of five self-administered questionnaires. The questionnaires were the Maslach Burnout Inventory, a short version of the Profile of Moods States-Short from (POMS-SF, Jefferson Scale of Physician, the Five Facets Mindfulness Questionnaire (FFMQ), and an participant evaluation of the intervention (R. A.

Baer, 2006; Hojat et al., 2001; Maslach & Jackson, 1981; McNair et al., 1971). Scores were obtained at baseline and post-intervention. Statistical analyses of the data revealed significant results. Specifically, a large improvement in total mood disturbance (between group difference of -7.1) was noted with an effect size of 1.15. Changes in mindfulness scores were also large as a result of participation in the intervention (between group difference of 11) with a standardized effect size of 0.9. Moderate levels of change were seen in regard to empathy (difference between groups 5.2, standard effect size 0.71) and burnout (difference between groups -7, standardized effect size 0.74). No significant changes from baseline were seen in the control group at the second time point.

These results coupled with those of the Krasner study suggest that mindfulness training can play an important role improving well-being of healthcare professionals in varying populations. As such, they can function as an instrumental element of the general education of healthcare students.

Bazarko and her colleagues conducted a study to explore the effects of a mindfulness program with a novel delivery approach (Bazarko, Cate, Azocar, & Kreitzer, 2013). The study consisted of a non-randomized pre-post intervention. The authors note that the traditional classroom-based MBSR program may limit participation because of time and location constraints; they therefore created an adaptation of the program that replaces six of the traditional sessions with telephonic sessions (tMBSR). Participants were recruited from nursing staff at a large healthcare corporation via email. All participants were employed as nurses and had no previous MBSR training. A total of 41 candidates were enrolled on a first-come, first-served basis.

Participants were asked to complete a one-hour informational phone call in addition to eight weeks of MBSR sessions and home practice. The intervention was delivered by an experienced MBSR instructor and consisted of a two full-day in-person retreats (first session and last session), and six weekly 1.5 hour group teleconference calls. Each participant received guided audio CDs, a customized workbook, a yoga instruction video, and a copy of the book *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness* by Jon Kabat-Zinn (Kabat-Zinn & Hanh, 1990). Self-reported measures of participant well-being were collected at 2-weeks prior to the start of the intervention, immediately after the eight-week intervention period, and 4-months post intervention. Of the initial 41 nurses, 36 completed the measures at all three time points.

The researchers created a consolidated online survey instrument comprised of six existing measures: the Perceived Stress Scale, the Copenhagen Burnout Inventory (CBI), the SF-12v2 Health Survey, Brief Serenity Scale, the Jefferson Scale of Physician Empathy, and the Self-Compassion Scale (Cohen, Kamarck, & Mermelstein, 1983; Hojat et al., 2001; Kreitzer, Gross, Waleekhachonloet, Reilly-Spong, & Byrd, 2009; Kristensen, Borritz, Villadsen, & Christensen, 2005; Neff, 2003; Ware, Kosinski, & Keller, 1996). It is unclear whether components of these scales or the scales in their entirety were used for the online instrument. Additionally, participants maintained a log of the type and length of practice they participated in and, at the final time point, were asked to report the average number of hours of MBSR practice they maintained per week.

Results demonstrate a high engagement in the program with an average total amount of time spent (including retreats, teleconferences, and self-practice) of 50.3 hours. An average of 28.5 total of hours of self-practice was noted. It should be mentioned that participants were

compensated with continuing education credits based on the number of reported self-practice hours. Statistically significant improvements were observed from baseline to post-intervention on nearly all measures; participants showed decreased perceived stress and burnout and increased general health, empathy, social functioning, serenity, and self-compassion. These changes were sustained 4-months post-intervention. In regard to empathy, participants demonstrated baseline scores consistent with those of nurses in previous studies (Fields et al., 2004). These scores showed significant improvement from baseline to post-intervention and no further change at 4-month post-intervention.

Two important limitations of this study are that it did not contain a control group and all of the participants were female (not representative of the total population). This pilot study demonstrates that a novel hybrid delivery method of teaching MBSR can yield benefits to healthcare workers similar to that of traditional in-person instruction. Added benefits of this hybrid telephonic delivery method is that it is easily scalable and provides flexibility for participants.

In 2013 Barbosa and colleagues studied the effects of a MBSR training on levels of anxiety and empathy in graduate healthcare students (Barbosa et al., 2013). While other studies have focused on a particular health profession (i.e., doctors, nurses, etc.), their quasi-experimental study was unique in that it utilized students from five different healthcare programs including podiatric medicine, occupational therapy, physical therapy, physician's assistant, and graduate nursing within a single university. The researchers sent an email to the general student population of a Western health science institution inviting them to attend an informational session about the study. Of the about 1300 students, 33 attended the session and completed screening surveys. Any students who were prescribed psychiatric medications in the previous

two months or with plans to discontinue use of medications during the study were excluded from the study. Sixteen students comprised the experimental group (13 completed the study) and 15 students were included in a matched control group. The experimental group participated in a complete MBSR program as outlined by Jon Kabat-Zinn including 8 weekly 2.5 hour sessions of practice and discussion, an all-day silent retreat, and daily 35 minute homework assignments (Kabat-Zinn & Hanh, 1990). Formal meditation practice included body scan, mindful movement (qi gong), mindful hatha yoga, and sitting meditation. Informal practices included mindful awareness of daily routines, pleasant and unpleasant events, and communication. The control group did not participate in the MBSR program.

Outcome measures were obtained from all participants at baseline, immediately upon completion of the MBSR program, and 3 weeks post-course completion. Instruments included the Burns Anxiety Inventory (BAI), Jefferson Scale of Physician Empathy (JSPE) and Maslach Burnout Inventory (MBI) (Burns, 1999; Hojat et al., 2001; Maslach & Jackson, 1981). Chi-square analyses were used to investigate differences in score between experimental and control groups. Results demonstrated a significant decrease in anxiety in weeks 8 ($p<0.001$) and 11 ($p<0.01$) as compared to baseline as a result of participation in the MBSR program. A significant increase in empathy was noted at week 8 ($p<0.0096$). A decrease in empathy which was not significant was noted between baseline and week 11 across all participants. There were no significant differences between burnout scores of experimental and control groups demonstrated. When asked to evaluate the MBSR program, experimental participants reported a positive response to the program; the overall rating in recommending the program to students was 4.75 out of a possible 5.

While this was a small pilot study it demonstrated significant effects of a MBSR program in students across a breadth of health science programs. Authors suggest that because "empathy is critical in developing well-rounded medical professionals" (p. 12) exposing students to MBSR as a curriculum requirement could provide a lasting impression.

In 1998, Shapiro et al. conducted a study to determine the short-term effects of a mindfulness program on medical and pre-medical students (Shapiro, Schwartz, & Bonner, 1998). The authors note that while empathy is an important skill for effective physicians, medical schools have played a role in decreasing levels of empathy in students rather than helping them to increase it. Therefore, the time during medical school appears to be an important point in which to introduce empathy training measures. They hypothesized that a mindfulness-based intervention would decrease overall symptomology associated with depression and anxiety, reduce both state and trait anxiety, and cultivate empathy and mindful listening skills.

They created a seven-week one-credit elective course for pre-medical and first and second year medical students. Students were actively recruited to the course through academic advisors, emails, and flyers. The study designed incorporated a matched randomization of participants into treatment and wait-list control groups. A total of 78 students were willing to risk potentially waiting for the course and were enrolled into the study. The intervention group was split into two separate but equal classes to maintain a small class size (18 and 19 participants each). Outcome measures of both treatment and control groups were taken at two points a) before the intervention and b) shortly following the intervention. The second time period was scheduled to coincide with exam time so as to maximize the scrutiny of the intervention during a high stress period. Furthermore, to avoid bias due to a meditative state, there was a 15-20 minute wait time between theend of the class and the administration of the questionnaires.

Though the course was shorter than MBSR program outlined by Jon Kabat-Zinn, it was modeled after this traditional program in terms of content and format. The seven-week course consisted of weekly 2.5 hour sessions and daily home practice assignments including journaling. Mindfulness techniques taught in the course included body scan meditation, sitting meditation, hatha yoga, loving kindness meditation, and forgiveness meditation. While the other techniques are part of the traditional MBSR program, the forgiveness meditation was unique to this intervention.

In this study, empathy was measured using the Empathy Construct Rating Scale (ECRS) (La Monica, 1981). Psychological distress was measured according to the Hopkins Symptom Checklist 90- Revised (SCL-90-R); this instrument consists of several subscales including: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism (Derogatis, 1987). Anxiety was measured using the State-Trait Anxiety Inventory (Form Y) STAI Form 1 (Spielberger, Gorsuch, & Lushene, 1970). Finally, the Index of Core Spiritual Experiences (INSPIRIT) was used to assess characteristics of personal spiritual experience (Kass, Friedman, Leserman, Zuttermeister, & Benson, 1991).

Results yielded a high rate of completion, 97%, consistent with other studies (Kabat-Zinn et al., 1992). A total of 73 participants completed the study. A repeated measures Multivariate Analysis of Variance (MANOVA) was used to compare the intervention and control groups along the six outcome variables (depression, state anxiety, trait anxiety, spirituality, empathy, and overall psychological distress (General Severity Index of the SCL-90-R). The treatment and control groups were found to differ significantly at post-intervention, $K(6,64)=0.8005$, $p<0.03$. Multivariate Analysis of Covariance (MANCOVA) was then performed to protect against Type

1 error. A significant multivariate main effect was reported, $K(6,58) = 0.767$, $p<0.02$. The intervention group demonstrated significant change in the predicted direction along all outcome variables. Further analysis demonstrated that compliance with treatment played a role in outcome.

Statistical modeling was used to determine a hierarchical structure in which the change in trait anxiety was found to be the mechanism through which subsequent changes occur. This is consistent with an earlier study that demonstrated that reducing stress and anxiety through meditation yielded greater compassion and empathy in counselors Lesh, 1970). The authors note that the intervention was multimodal in nature and it would be useful for future studies to tease out the mechanisms through which the intervention worked. Perhaps a shorter or more simplified intervention could help to elicit such information.

Some evidence suggests relationship between empathy and mindfulness (Kabat-Zinn & Hanh, 1990; Stew, 2011). Shapiro and colleagues proposed that the promotion of a non-judgmental attitude may be at the core of this relationship, "participants who fail to develop a non-judgmental attitude might show little change in self-compassion and empathy, while larger changes may be associated with consistent application of an open, nonjudgmental attitude" (Shapiro, Carlson, Astin, & Freedman, 2006, p.383). While interpersonal benefits of mindfulness in and of themselves can lead to more effective healthcare outcomes due to more streamlined and effective communication among staff and between staff and clients, a recent review noted that there are mixed results demonstrating a direct link between mindful meditation practice of counseling trainees and reduction of symptoms in those they serve (D. M. Davis & Hayes, 2011). Researchers note that while psychological flexibility through self-awareness regarding one's own

feelings, thoughts, and behaviors is a key principle of relationship-centered care this notion has been largely understudied (Palladino et al., 2013).

Stress and Anxiety in Healthcare Professionals

Stress and anxiety are two concepts frequently encountered in discussions of mindfulness. Both stress and anxiety have been the topic of scientific investigation for decades. The term "anxiety" arose from psychoanalytic theory in the early 1920s and is descriptive of a particular emotion; it is the initial feelings of arousal associated with stress (Robinson, 1990). The term "stress" can be used to refer to both the stimulus and response. Early researchers, Lazarus and Folkman, provide a helpful definition: stress "is a particular relationship between the person and the environment that is appraised by the persona as taxing or exceeding his or her resources and endangering his or her well-being. This appraisal is succeeded by a series of physiological responses…" (as cited in Robinson, 1990, p.935). State anxiety refers to anxiety experienced in response to a situation; trait anxiety refers to a prolonged experience of anxiety in an individual as a result of a combination of individual factors and ongoing exposure to anxiety provoking situations. Both state and trait anxiety can lead to negative consequences. State anxiety has been linked to poor task performance (Tanaka, Takehara, & Yamauchi, 2006). Outcomes associated with prolonged stress and anxiety have been well-documented and include detrimental effects to psychobiologic systems, social functioning, and cognitive performance (Derogatis, 1987; Robinson, 1990).

Bunevicius et al. conducted a study to evaluate the prevalence of anxiety and depression in medical students. They randomly selected 360 medical students from a Lithuanian medical school to receive an invitation for participation in the study. There were no exclusion criteria, so all interested students were eligible to participate; a total of 338 (94%) completed a battery of

questionnaires. Participants completed the Hospital Anxiety and Depression Scale (HADS), the Ten-Item Personality Inventory (TIPI), and the Stress Vulnerability Scale (SVS) (Gosling, Rentfrow, & Swann, 2003; L. Miller & Smith, 1985; Zigmond & Snaith, 1983). Statistical analyses were performed on the responses.

Results showed that symptoms of anxiety and depression were prevalent in medical students. Anxiety was noted in 43% of the participants while symptoms of depression were reported in 14%. The scores on the anxiety and depression subscales of the HADS negatively correlated with scores on the TIPI emotional stability scale ($r=-0.39$, $p<0.01$ and $r=-0.2$, $p<0.01$, respectively). The anxiety and depression scores positively correlated with scores on the Stress Vulnerability Scale ($r=0.38$, $p<0.01$ and $r=0.44$, $p<0.01$, respectively). The results of this study demonstrate that personality traits and individual vulnerability are linked to increased severity of anxiety and depression in medical students. This is consistent with a previous study that demonstrated that depressive and anxiety disorders were more prevalent in a population of medical students compared to aged-matched peers of the general population (Dyrbe, Thomas, & Shanafelt, 2006).

Numerous research studies have shown high amounts of stress and anxiety in doctors, nurses, and other healthcare professionals (Weinberg & Creed, 2000). Weinberg and Creed conducted a study to determine whether job-specific stressors were associated with higher prevalence of anxiety and depression in healthcare professionals (Weinberg & Creed, 2000). Their study included doctors, nurses, administrative staff, and axillary staff. The authors criticized earlier research for its sole reliance on self-report data and failure to differentiate between work and outside sources of stress. Therefore, this study incorporated both self-report questionnaires and detailed clinical interviews for data collection. Participants were screened

using the general health questionnaire (GHQ) and a follow-up clinical interview to ascertain levels of anxiety and depressive disorders. Individuals who scored high on the GHQ were socio-demographically matched with low scorers. A total of 64 cases (high scorers) and 64 controls (low scorers) were included in the study. Data collection included a semi-structured clinical interview, the life events and difficulties schedule, and an objective measure of work problems. Specific accounts of stress were analyzed according to their level of threat to well-being and chronic nature. Case and control groups were compared using Mann-Whitney and Chi-square tests where appropriate.

Results showed that there were no significant differences between cases and controls in relation to management responsibilities at work or the amount of shift work. Cases did demonstrate significantly higher levels of certain areas of both work and outside of work stressors. Specifically, cases had substantially higher levels of chronic difficulty with severe health difficulty of a close relative, severe marital and other relationship difficulties. Cases had significantly more objective work problems than controls ($z=-3.81$, $p<0.001$). The most striking difference were in variables that suggest lack of support from management in cases versus controls; these included conflict of work role, lack of participation in decisions, interpersonal difficulty with supervisor, lack of support from manager, problems with physical environment, poor promotion prospects, job not secure, skills under-utilized, and a very heavy workload. Regression analyses showed that even when ongoing stress outside of work was controlled for, stressful situations associated with work contributed to higher levels of anxiety and depression. Overall, authors concluded that increases in both work-related and non-work-related stressors were associated with increased levels of anxiety and depression in healthcare providers. They

recommend the inclusion of both individual treatment and organizational attempts to reduce work stress as a means to mitigate the effect of stress on employee anxiety and depression.

A second study in 2000, also demonstrated that specific work factors were associated with increased levels of stress in healthcare professionals (Bryant C, Fairbrother G, & Fenton P, 2000). These authors created a unique survey that yielded both qualitative and quantitative data. The questionnaire was sent to all members of the Australasian Urological Nurses Association (n=350) with a 49% return rate (170). Respondents were asked to rate their current workplace stress level on a scale from 0 (low)-10 (high), to respond to a variety of closed-ended questions about their personal demographics, workplace demographics, substance use, lifestyle behaviors, injury or health problems, and future work plans; to respond to a series of open-ended questions with descriptions of stressful work situations, feelings generated by workplace stress and coping strategies. Stepwise multiple regression procedures were used to examine the relative influence of personal and professional factors on stress level ratings. Content analysis was performed on qualitative data from the open-ended questions.

Results revealed that over two-thirds of respondents identified feelings of frustration in response to workplace stress. Other responses included experiencing anger, mood changes, anxiety and depression. Both positive (e.g., debriefing with friends, exercise, passive time to unwind) and negative (e.g., self-medicating with drugs or alcohol, ruminating, screaming at family members) coping methods were identified. Positive mechanisms were reported twice as frequently as negative behaviors. Workload excess was the most prominently identified cause of workplace stress (identified four times more frequently than any other response category) and was determined to be the best predictor of stress levels.

It should be noted that while the survey was based on previous questionnaires in the literature, there was no validation of the instrument mentioned aside from a small pilot use. Other limitations of this study include in a narrow pool of participants (all nurses from within one specialty area) and reliance on one self-reported source of data. Despite the limitations of the instrument and study design, the researchers were able to uncover some interesting findings that suggest healthcare professionals are at risk of elevated stress levels based on their chosen profession.

One well-documented consequence of stress and anxiety in healthcare professionals is burnout (Anderson, 1991). In 1999, Omdahl and O'Donnell conducted a study to examine stressors contributing to nursing burnout in particular (Omdahl & O'Donnell, 1999). Rather than focusing on task- oriented factors as previous researchers has done, they opted to investigate empathy variables. Although empathy can have a strong positive influence on relationships between healthcare providers and patients, these researchers note that certain aspects of empathy may contribute to stress in the nurses. Their study was designed to specifically investigate emotional contagion, empathic concern, and communicative responsiveness. Emotional contagion refers to taking-on the emotion of another. Empathic concern is concern for the well-being of another without the requirement of shared emotion. Communicative responsiveness refers to one's ability to communicative effectively with others in regard to sensitive and emotional subjects.

Researchers created a 72-item Likert-response survey adapted from a compilation of existing questionnaires including Individual Reactivity Index (IRI) and Maslach Burnout Inventory. The subscale components of the survey included empathic concern, emotional contagion, communicative responsiveness, depersonalization, reduced personal accomplishment,

emotional exhaustion, and occupational commitment. Participants in this study were nurses from two large metropolitan hospitals. Questionnaires were distributed through nursing management and returned with a response rate of 27% (164). One-way analyses of variance and statistical contrasts were used to explore difference in scores along the seven subscale variables.

Results demonstrated a very clear pattern in which empathic concern and communicative responsiveness are negatively associated with variables associated with burnout, while emotional contagion is positively associated with burnout. This supports the authors' hypothesis that emotional contagion would contribute to burnout in nurses, while empathic concern and communicative responsiveness would yield a level of protection against burnout.

Work-related stress in healthcare professionals is consistently associated with impaired efficiency, poorer job performance, burnout, high rates of staff turnover, sickness, absenteeism, occupational accidents, increased health care costs, and reduced job satisfaction (Holt, 1993; Omdahl & O'Donnell, 1999; Tully, 2004). Research has demonstrated that individuals with lower autonomy are at elevated risk associated with job stress, and nurses are traditionally answerable to other professionals in regard to work-related decisions making them particularly susceptible (Sutherland & Cooper, 1990; Tully, 2004).

Overall, the research suggests that healthcare professionals are at a uniquely elevated risk of experiencing negative consequences of stress and anxiety. Furthermore there is a complex interplay of factors associated with stress and anxiety. Both personal characteristics and work-related factors unique to the healthcare setting contribute to levels of stress and anxiety.

Mitigation of stress and anxiety in healthcare professionals. Mindfulness presents a potential antidote to the negative outcomes associated with stress and anxiety. Several studies

have shown that mindfulness-based stress reduction programs can be an effective in helping to mitigate the deleterious consequences of stress and anxiety in healthcare professionals and healthcare students (Kang, Choi, & Ryu, 2009; Moscaritolo, 2009; Shapiro et al., 1998).

Shapiro and colleagues suggest that it is essential to address the issues associated with burnout and decreased effectiveness of healthcare professionals while the future providers are still students. In 1998 they conducted a study (detailed earlier in this paper) to investigate the effects of a mindfulness-based stress reduction program on medical and pre-medical students (Shapiro et al., 1998). They found that the students' participation in an eight-week mindfulness course can effectively reduce self-reported state and trait anxiety as well as reports of overall psychological distress. Furthermore, statistical modeling was used to determine a hierarchical structure in which the change in trait anxiety was found to be the mechanism through which subsequent changes occur. This is consistent with an earlier study that demonstrated that reducing stress and anxiety through meditation yielded greater compassion and empathy in counselors (Lesh, 1970).

A study of nursing students in Korea conducted by Kang et al. showed that a mindfulness meditation intervention was effective at reducing levels of stress and anxiety (Kang et al., 2009). This study used a nonequivalent control group pretest-posttest design. Study participants included 32 juniors and senior in the Department of Nursing at a single university. All study participants were female. Participants were randomly assigned to control or treatment groups. The eight-week intervention consisted of mindful meditation instruction and practice in addition to self-reflection and physical stretching exercises. Formal meditation instruction included body scan, breathing meditation, and walking meditation. The control group received no intervention beyond a preliminary study meeting.

Measurements of anxiety, depression, and stress level for control and experimental groups were obtained at a pre-intervention meeting and one-week after completion of the intervention. Research instruments included: the Psychosocial Wellbeing Index-short form (PWI-SF) indicating levels of stress, the State Trait Anxiety Inventory (STAI), and the Beck Depression Inventory (BDI) (Beck, Epstein, Brown, & Steer, 1988; Chang, 2000; Spielberger et al., 1970). In addition to the questionnaires, blood pressure and pulse rates were obtained from all participants before and after the intervention period and descriptive statistics about demographics and lifestyle were gathered. Analysis of covariance was used to compare the post-experimental effect between the control and experimental groups.

Homogeneity tests of dependent variables in pretest scores showed that the experimental group had significantly higher levels of stress and anxiety than the control group; this was accounted for in covariate analysis of post-intervention scores. Results demonstrated that participants in the experimental group experienced significantly lower levels of stress and less anxiety after the intervention compared to the control participants ($F= 6.145$, $p=0.020$ and $F=6.985$, $p= 0.013$, respectively). There were no significant differences in the mean post-intervention depression scores between the control and experimental groups. The outcomes of this study confirm that a mindfulness-based program is effective in reducing stress and anxiety in nursing students.

Similar results were demonstrated in a study of nurses and midwives. In 2013, Foureur et al. published results of a pilot study that investigated the effects of a mindfulness-based program aimed at enhancing personal resilience (Foureur, Besley, Burton, Yu, & Crisp, 2013). This study incorporated a pre- and post-intervention design. Convenience sampling was used to recruit 40 midwives and nurses from two metropolitan teaching hospitals. The intervention was unique

from others reported in the literature in that it consisted only of a one-day mindfulness-based stress reduction workshop led by an experienced psychologist and a CD designed for daily 20-minute mindfulness practice sessions for eight weeks. The workshop was presented four times to accommodate work schedules of participants.

All participants completed three questionnaires prior to workshop attendance and 4-8 weeks post-intervention. The short form of the GHQ-12 was used to assess physical symptoms of anxiety, sleep disturbance, and depression (Goldberg et al., 1997). The SOC- Orientation to Life was used to measure participants' ability to cope with stress (Eriksson & Lindström, 2006). The DASS was used to measure the negative emotional states of depression, anxiety and stress (Lovibond & Lovibond, 1995). Additionally, all participants were asked to complete a log of daily practice habits and post-intervention focus groups were used to collect qualitative data. Twenty-eight (70%) participants returned the post-intervention surveys, 50% of this group completed the practice logs, and 10 individuals participated in the focus group.

Quantitative results demonstrated significant changes from pre- to post-intervention on all three of the measures. Differences were in the positive direction indicating better general health, a more positive orientation to life, and lower stress levels. Qualitative analyses demonstrated an overall all positive view of the intervention experience. Participants noted that a challenge to incorporating mindfulness practice into day-to-day work and home life is that "you need it most at times when it is hardest to make it a priority" (p.121). This suggests that ongoing practice and instruction during less stressful times may be instrumental in promoting a more automated mindful response.

While the specific measurement instruments vary between studies and there appears to be no preferred tool consistent among researchers, the literature clearly shows that healthcare

providers experience greater than normal levels of stress and anxiety. The potential deleterious consequences of heightened stress and anxiety are numerous (Foureur et al., 2013). Mindfulness based programs for healthcare students and professionals can offer a means to mitigate these consequences.

How Much Mindfulness is Needed?

One will note that throughout the research reviewed in the preceding pages, various durations of mindfulness trainings and practice were utilized. This begs the question, "how much mindfulness is needed to produce beneficial outcomes?" The mindfulness-based stress reduction (MBSR) program is a well-studied specific intervention utilizing mindful meditation. This program, which was developed at the University of Massachusetts, traditionally consists of at-least 26 hours of instruction including an all-day retreat, and the incorporation of yoga practice (Kabat-Zinn & Hanh, 1990). Some research suggests that similar benefits can be derived from shorter interventions. In 2013, researchers conducted an uncontrolled pilot study that utilized an abbreviated MBSR training adapted for primary care clinicians that consisted of 18 hours of training versus the traditional longer formats. Their results showed that the modified MBSR was associated with reduction in indicators of job burnout, depression, and anxiety (Fortney, Luchterhand, Zakletskaia, Zgierska, & Rakel, 2013). Similarly, Carmody and Baer (2009) conducted a meta-analysis that examined the effects of mindfulness instruction of varying length ranging from six to 28 total in-class hours and found no evidence that shortened versions are less effective in reducing psychological distress (Carmody & Baer, 2009).

Ruth Baer has published extensively on the topic of mindfulness. In particular she is well-known for her comprehensive research reviews and her work in developing and researching measures of mindfulness. She and James Carmody examined the relationship between the

amount of mindful practice and improvements in psychological functioning (Carmody & Baer, 2008). They incorporated a variety of measures of participant self-report measures related to stress, anxiety, and chronic pain. Overall, they concluded that more practice led to increased improvements.

A research methodology that could help to better answer the question of "how much mindfulness is needed?" is multiple-baseline across subjects design. Whereas the commonly used pre-post designs allow investigators to examine the effects of interventions of varying lengths, single-subject design allows for observation of treatment effects *during* the intervention. Such methodology appears to be novel in the study of mindfulness; a search of the literature yielded only two studies (both led by the same researcher) that incorporated a multiple-baseline design. Nirbahay Singh and colleagues published two studies utilizing multiple-baseline design that explored the effects of mindfulness treatments (Singh et al., 2004, 2007). Neither of the studies investigated length of mindfulness training and practice in regard to effects. This points to a gap in the current research that necessitates further investigation.

Summary

Healthcare professionals experience higher levels of stress and anxiety than the general population. The effects of this can lead to an array of negative personal and interpersonal consequences and decrease the quality of care they provide. Some studies suggest that nurses may be more vulnerable to these consequences than other healthcare professionals. Mindfulness can offer a means for mitigating such consequences. Furthermore, studies have suggested that training students in mindfulness is prudent so as to maximize the benefits throughout their careers. However, nursing programs are already pressed in terms of the amount of curriculum they need to accommodate in relation to the amount of time available. Therefore, efficiently

shortened versions of mindfulness training programs may be preferable. Research suggests that even shortened versions are effective - especially when coupled with ongoing individual practice.

Though it is clear that mindfulness can provide a number of benefits, it is less clear how such benefits are imparted. Researchers have recognized the role of empathy in promoting quality healthcare. While empathy and mindfulness have been linked in the literature, it is unclear what the nature of this relationship is. The current study investigated whether a four-week mindfulness training can lead to increases in mindfulness and empathy and decreases in anxiety of nursing students. In addition, the designed allowed an examination of when these potential changes occur across subjects.

Purpose of Current Research and Hypotheses

There are no known studies to date that explore such temporal effects of a mindfulness training on nursing students, therefore, the current study seeks to fill this gap. Specifically, it investigated the following questions: 1) Can exposure to a four-week individual mindfulness training affect a change in nursing students' level of mindfulness, empathy, or anxiety? and, if so, 2) when do such changes take place? 3) Are the changes in mindfulness concurrent, precipitant of or following changes in empathy?

Primary Hypotheses:

1. Reduction in participant anxiety scores as as a result of treatment was anticipated. Specifically, a downward trend in state anxiety scores as measured by the STAI was expected over the course of the study.

2. Additionally, it was hypothesized that rises in mindfulness and empathy scores would be observed as a result of participation in the treatment protocol. Increased levels of mindfulness (as measured by the MAAS) and empathy (as measured by the IRI) were expected to occur from midpoint through the end of the treatment.
3. Furthermore, we predicted that the increased mindfulness scores would be precipitant of increased levels of empathy.

Methods

Design

This investigation utilized a multiple-baseline across subjects design. The design incorporated two distinct phases and a one-week follow-up. Phase A corresponded to pre-treatment baseline measures and Phase B consisted of four weeks of the treatment intervention. Treatment start-times were staggered by one week for each treatment group. Additionally, a control group who received no intervention was included. This design provides several benefits over other potential research approaches. Most significantly it can demonstrate evidence of effect of treatment with few participants. Additionally, it allows for examination of temporal effects of the treatment during the treatment phase (Kazdin, 1982). Other designs were considered and abandoned based on limitations. Specifically, pre-post only designs would fail to detect when during treatment potential effects occur; and based on an anticipated low to moderate effect size, an experimental group design would require a large (approximately 75 individuals based on a crude power analysis) sample of participants to yield statistically

significant results. Such a large sample would not be feasible due to 1) funding constraints and 2) lack of a sufficiently large participant pool.

Though such single-case experimental designs are relatively uncommon in the field of psychology, they provide for a rigorous and methodologically robust analysis (Horner, Swaminathan, Sugai, & Smolkowski, 2012; Kazdin, 1982; Kratochwill et al., 2013; Smith, 2012). A popular criticism of single-case experimental designs is that they are inferior to group designs in terms of the ability to control for validity threats. In response to this criticism researchers have developed design and analysis standards (Kratochwill et al., 2013). Hence, this study was planned in accordance with the following recommended criteria for excellence in design. First of all, the independent variable (i.e. treatment intervention) was manipulated by the experimenter, and not a naturally occurring event, in order to minimize threat to internal validity. Secondly, each outcome variable was temporally measured and examined by two assessors. Furthermore, a minimum of three baseline points of data were collected for each participant in order to demonstrate control of confounding variables (Kratochwill et al., 2013). Beyond these recommendations, this study also included the use of a control group; though in multiple baseline design individuals serve as their own control for within and between phase comparisons, the added control group allows for discussion of general trends across individuals and helps to guard against threats to validity such as maturation, repeated measurement, or historical events (Kazdin, 2011).

Recruitment

Participants were recruited from an undergraduate pool of students enrolled at University of Wisconsin - Milwaukee (UWM), a Midwestern urban university. After approval of the Institutional Review Board of UWM, the researchers to sought enlist eight to ten individuals

during the Fall semester of 2017. Participants were recruited from a total pool of 176 pre-nursing students enrolled in the freshman nursing seminar course. While no direct recruiting occurred during class time, the researchers were invited to both sessions of the course to introduce the study to potential participants during class during the second week of the semester (see Appendix A: Introductory Script). This in-person introduction of both the researcher and research project was augmented with a flyer containing general study information, enrollment details, and researcher contact information (see Appendix B: Recruitment Flyer). Students were invited to express their interest in participating through a sign-up sheet or by emailing the researcher. The flyer noted that all participants must be 18 years of age or older, younger students were excluded from this study. Additionally, students who were currently, or had previously, received formal training in mindful meditation were excluded from the study; it is assumed that effects of outside training would alter the true effects of the current treatment.

From a class of 176 freshman pre-nursing students at a public urban university, 98 students (56%) indicated interest in participating in this study by providing their contact information in response to a short introduction of the study presented by a researcher. Participants were randomly selected from those that expressed an interest in the study and assigned to treatment condition. All participation was voluntary, and participants were made aware that they could withdraw from the study at any time without penalty.

A total of 15 names were drawn at random from the 98; some of these individuals indicated that they could not participate after realizing that they had competing other obligations, others did not respond to initial contact by researcher. A total of 10 contacted individuals participated in the study; one individual withdrew after initial interview leaving data collected

from nine participants. Pseudonyms ("Alex", "Arin", "Bailey", "Blake", "Casey", "Chris", "Dakota", "Dana", and "Drew") were assigned to the nine participants to protect their identity.

All participants completed a one-time brief individual intake interview with a researcher to review study guidelines, discuss potential benefits and risks of participation, obtain basic demographic information, confirm eligibility for study, address any question or concerns related to the study, determine if participant was currently employed in a setting where they have direct patient interaction, and obtain written consent. A standardized Consent to Participate form was used to guide this discussion (see Appendix C: Participant Consent). Additionally, after consent was given, baseline scores on the psychometric surveys were obtained at this time. The psychometric surveys included: a brief demographic questionnaire, Interpersonal Reactivity Index (IRI), Mindful Attention Awareness Scale (MAAS), and State-Trait Anxiety Inventory (STAI) (see Appendix D: Data Collection Instruments). Each initial meeting lasted approximately 30 minutes. Each participant received a sealed envelope that contained a book, an audio CD, and written instructions and agreed to wait to open the envelope until instructed to do so via email from the researcher.

Participants

All the participants were in their first semester as freshman pre-nursing students and aged 18 years or older. Although the 15 contacted individuals included both men and women, all the individuals who actually participated in the study self-identified as female. Seven of the nine (78%) participants identified as White while two (22%) identified themselves as Hispanic; no other ethnic groups were represented in this study. Regarding religious background, five of the nine participants said that they were Catholic (56%), two (22%) said that they were Christian

(non-Catholic), and two (22%) indicated that they had no religious background; no other religious groups were represented in this study.

Alex, Arin, Bailey, Chris, and Dakota self-identified as a White Catholic females. Blake self-identified as a White Christian female. Casey self-identified as a Hispanic Christian female. Dana self-identified as a Hispanic female with no religious background. Drew self-identified as a White female with no religious background.

Treatment

The treatment consisted of a four-week at-home mindfulness meditation program - *Real Happiness: The Power of Meditation: A 28-Day Program* book and audio CD (Salzberg, 2010). Researchers reached out to the program's publisher to obtain permission for delivery via electronic means but received no response. To avoid potential conflicts with copyright law, legal counsel advised not to deliver the materials via electronic means; rather, individual copies of the book and accompanying CD were purchased and given to each study participant. The author, Sharon Salzberg, provides written and verbal meditation instruction within a weekly format. The four weeks are outlined as follows:

Week 1: Concentration – Breathing Meditation

Week 2: Mindfulness of Body – Walking Meditation

Week 3: Mindfulness of Emotion – Meditation on Emotions

Week 4: Cultivating Compassion – Loving Kindness Meditation

During Week 1, participants were prompted by the readings to consider their experience with the concept of concentration, and those things that typically distract their concentration. The book

provided basic guidance in best-practices of meditation (e.g., selecting a time and location, posture, etc.). Then readers were instructed to use the rhythmic sensations of their own breath as an initial meditative focal point. Week 2 focused on mindfulness of bodily sensations and letting go of burdens. To illustrate these concepts, participants were guided through a walking meditation. The focus on the feet and legs during a normal everyday activity served as a powerful metaphor for literally turning one's attention away from the chattering thoughts in one's head toward a more distant part of the body. For participants who are unable to walk, this meditation can easily be adapted to other forms of movement as noted by the author. The focus of Week 3 was emotions. Participants were taught to note their emotions, and patterns of emotions, without clinging to any particular emotion. Similarly, they were instructed to observe and "be with" emotions as they arise without imparting any judgement in regard to their experience of the emotion; or if they found themselves forming judgements they were to simply note their tendency toward doing so. Finally, Week 4 focused on cultivating compassion and acceptance toward one's self and others. Participants were guided through a loving-kindness meditation. This meditation uses a series of positive phrases (e.g., "May you be happy") directed toward one's self, a loved one, a neutral person, and a difficult person as the point of focus and interested attention.

Each week, participants were provided with and asked to listen to two audio tracks. The first track each (approximately two to four minutes long) described the focus of the week's meditation. The second track guided participants through the meditation for the week. After initially listening to and following the meditation on Day 1 of each week, participants were asked to repeat the same meditation daily until the next week's audio recording was provided. Each meditation lasted approximately 15 minutes. Utilizing pre-recorded mindfulness training ensured

that all participants received identical instructions. Participants also received the printed weekly instructional book and were asked to read excerpts on Day 1 of each week. Each week's reading was planned to take no longer than 30 minutes.

Measures

Upon enrollment, all participants were asked to complete a series of self-report inventories selected to measure levels of mindfulness, empathy, and anxiety. These include the Mindful Attention Awareness Scale (MAAS), Interpersonal Reactivity Index (IRI), and State-Trait Anxiety Inventory (STAI) (see Appendix D: Data Collection Instruments). During the study, participants were asked to continue to complete each measure twice weekly, on Day 1 and Day 4 of each week. Additionally, participants were asked to confirm completion of weekly readings and daily exercises. All inventories were administered electronically and when combined, could be completed within 20 minutes. A brief description of each of the three assessments follows.

Mindful Attention Awareness Scale. The Mindful Attention Awareness Scale (MAAS) is a 15-item scale designed to assess a key characteristic of trait mindfulness, specifically, receptive awareness of and attention to what is occurring in moment-to-moment experience. Participants rate level of experience with a series of statements on a scale from one ("Almost Always") to six ("Almost Never"). Items include statements such as: "I tend to walk quickly to where I'm going without paying attention to what I experience along the way", and "I find it difficult to stay focused on what's happening in the present". Higher scores reflect higher mindfulness. This scale, which shows strong psychometric properties, has been validated with multiple populations. Internal consistency (Chronbach's alphas) of the scale was determined to range from .80 to .90 Studies have demonstrated that the MAAS addresses a unique quality of

consciousness that is both related to and predictive of a various self-regulation and well-being constructs (Brown & Ryan, 2003). Normed population data for the MAAS demonstrated a mean score of 4.2 (standard deviation 0.69) in community adults and 3.83 in college students (standard deviation 0.70) (Brown & Ryan, 2003).

Interpersonal Reactivity Index. The Interpersonal Reactivity Index (IRI) is a 28-item inventory that measures four dimensions of one's own empathic abilities. Responses to items are indicated on a 5-point Likert scale ranging from 0 ("does not describe me at all") to 4 ("describes me very well"). Each sub-scale is comprised of seven items, resulting in possible scores ranging from a minimum of 0 and a maximum of 28. The IRI is a multidimensional measure intended to provide separate scores on four distinct aspects of empathy; it is not intended to yield a global measure of empathy. The four dimensions include Perspective Taking Scale, Fantasy Scale, Empathetic Concern Scale, Personal Distress Scale (M. H. Davis, 1983). Perspective taking refers to the penchant to see situations from the perspective of others (e.g., I try to look at everybody's side of a disagreement before I make a decision). The fantasy scale identifies the respondent's tendency to identify with fictional characters in terms of situation and feelings (e.g., "I really get involved with the feelings of the characters in a novel"). Empathetic concern deals with one's propensity to care about the needs and emotions of others (e.g., "I often have tender, concerned feelings for people less fortunate than me"). The personal distress scale measures the inclination to experience discomfort and anxiety in difficult social situations (e.g., In emergency situations, I feel apprehensive and ill-at-ease"). All four scales have acceptable internal (from 0.71 to 0.77) and test-retest (from 0.62 to 0.71) reliabilities (M. H. Davis, 1983). The IRI was administered in its entirety as a means to maintain validity of the use of this tool; data analysis

was focused on the two subscales (Empathetic Concern and Personal Distress) most closely aligned with the theoretical construct of empathy being examined in this study.

State-Trait Anxiety Inventory. The State-Trait Anxiety Inventory (STAI) is a commonly used measure of both trait and state anxiety (Spielberger, et al,1983). It consists of 40 items which are rated via the use of Likert scales. For the state anxiety portion of the measure, respondents are asked to indicate how they feel "right now, that is at this moment" by scoring 20 descriptive statements with a scale ranging from 1 ("Not at all") to 4 ("Very much so"). Items include statements such as "I feel strained" and positive, reversed-scored statements such as "I feel calm". The trait anxiety portion of the measure consists of 20 statements which respondents score from 1 ("Almost never") to 4 ("Almost always") in regard to how frequently they experience various thoughts and feelings in general. Items include statements such as "I feel nervous and restless" and positive, reversed-scored statements such as "I feel pleasant." Higher scores reflect higher levels of anxiety. Considerable evidence demonstrates construct validity of the scale. Internal consistency coefficients for the scale have ranged from .86 to .95; test-retest reliability coefficients have ranged from .65 to .75 over a 2-month interval (Spielberger et al., 1989).

Incentive for participation

Research has demonstrated that individuals opt to participate in research studies for altruistic as well as egoistic (e.g. financial rewards) motives (Singer & Couper, 2008). Additionally, in at least two meta-analyses it was demonstrated that, in the absence of other motivations, money is more motivating than non-cash incentives (Singer & Couper, 2008). It may seem that offering more money to participants would ensure optimal participation, however, the American Association for Public Opinion Research (AAPOR) makes it clear that researchers

must avoid excessive incentives that may coerce or unduly influence vulnerable populations ("AAPOR Guidance for IRBs and Survey Researchers - AAPOR," n.d.). It was estimated that the protocol for this study would require a maximum of 14 hours of each participant's time. Therefore, based on the current minimum national wage of $7.25 per hour, a reasonable estimate of maximum financial incentive is $101.50. Keeping in mind potential altruistic incentive for participation, a more conservative incentive of $75 was offered to participants for completion of this study. In exchange for their time and effort, all participants received a $10 gift card for a coffee shop upon completion of the initial interview. Then they received gift cards, valuing $20, to a discount chain store at a study mid-point, and an additional $30 worth of gift cards upon completion of the study. In addition to the total of $60 in gift cards, all participants who enrolled in the study received their own copy of Sharon Salzberg's *Real Happiness: The Power of Meditation: A 28-Day Program* book and audio CD for their future reference, which has a value of approximately $15. All study incentives were obtained through private donations.

Anticipated Risks and Benefits of Participation

In addition to the aforementioned incentives, participants had the potential to experience one or more of the following personal benefits as result of the study: learning a potential self-care strategy they can utilize over their lifetime, health and well-being outcomes as described in the literature review, and exposure to a healthcare technique that they can utilize with their future patients. No significant risks were anticipated with this study. However, paying close attention to bodily sensations can be overwhelming for some individuals. Recruits were informed of this potential and provided with contact information for mental health services as a precaution.

Analysis of Data

To date, there are no agreed upon standards for statistical analysis for single-case designs (Kratochwill et al., 2013; Smith, 2012). Therefore, interpretation relies primarily on visual inspection and analysis of the data to determine if a relationship exists between the treatment and the outcome variables and, if so, what the magnitude of that relationship is. Per the standard recommendations, a second reviewer visually analyzed the data in addition to the analysis performed by the primary researcher. Reviewers sought to 1) confirm establishment of an appropriate baseline; 2) inspect within-phase data for patterns - such patterns may include: level of change, trending, variability, presence of anomalies, immediacy of effect, overlap of data between phases, and consistency of patterns across phases; 3) compare data points in adjacent phases to determine if the manipulation of the independent variable is reliably linked to an effect or predicted change.

Results

Hypotheses

The purpose of this study was to investigate the following questions: 1) Can exposure to a fourweek individual mindfulness training affect a change in nursing students' level of mindfulness, empathy, or anxiety? and, if so, 2) when do such changes take place? 3) Are the changes in mindfulness concurrent, precipitant of or following changes in empathy? Reduction in participant anxiety scores as a result of treatment was anticipated. Specifically, a downward trend in state anxiety scores as measured by the STAI was expected over the course of the study. Additionally, it was hypothesized that rises in mindfulness and empathy scores would be

observed as a result of participation in the treatment protocol. Increased levels of mindfulness (as measured by the MAAS) and empathy (as measured by the IRI) were expected to occur from midpoint through the end of the treatment. Furthermore, we predicted that the increased mindfulness scores would be precipitant of increased levels of empathy.

Completion of surveys

Each participant was asked to complete the battery of instruments (described in Methods) via a compiled online survey twice weekly after initial interview and survey. The time taken to complete the survey ranged from a low of 3.2 minutes to a high of 4.2 hours (the abnormally long times reflected occasional participant failure to close-out the survey after completing the final question). The median time for completion of the survey was 6.5 minutes. All participants confirmed completion of the weekly readings and daily meditation exercises throughout their enrollment in the study.

Two participants, Arin and Alex, completed one week of baseline measurements prior to intervention. Two participants, Bailey and Blake, completed two weeks of baseline measurements prior to intervention. Two participants, Casey and Chris, completed three weeks of baseline measurements prior to interview. Three participants, Dakota, Dana, and Drew, received no intervention and remained in baseline throughout the study. Note that one baseline data point is missing from Blake because she started the study a couple of days late as a replacement for the participant who dropped out after the initial interview. After completing baseline and four weeks of the intervention, Bailey withdrew from the study due to personal reasons - this resulted in the loss of her final data points.

Individual results

Table 1 represents a summary of scores including level, trend, and variability for each participant on each measure within and across phases of the study. Below are further detailed descriptions of this data.

Mindfulness

The MAAS scores of Alex reflected no significant change in level of mindfulness throughout the study (slope across phase 0.0). After a slight drop in scores from 4.5 at the initial intake to 3.9 at the second data point three days later, her scores remained consistent throughout the remainder of the study with an average of 4.0 (standard deviation 0.2) in both treatment and follow-up phases.

The MAAS scores of Arin demonstrated a consistent upward trend in level of mindfulness over the course of the study (slope across phases 0.6). Her scores ranged from a low of 3.3 in baseline to a high of 4.9 during both treatment and follow-up phase. This 1.6 change in scores represents a noticeable increase.

Like Arin, Bailey's MAAS scores represented a stable baseline (average 3.7, slope 0.0, standard deviation 0.2) and an upward trend from baseline through treatment (slope across phases 0.2). Bailey did not complete the follow-up phase.

Blake's MAAS scores yielded a stable baseline with an increase at treatment that was maintained through follow-up. Her baseline average was 3.8 (slope 0.0, standard deviation 0.2). Her average score during the treatment phase was 4.3 (slope 0.1, standard deviation 0.4). Her average score remained consistent at 4.3 (slope 0.0, standard deviation 0.1) through follow-up.

Overall, Blake's scores reflected a slight increase in mindfulness throughout the study (slope across phases 0.2).

Casey had an initial MAAS score of 4.1 which dropped to an average of 3.6 during baseline. Her average score rose 3.7 with a consistent upward trend (slope 0.1, standard deviation 0.3) during treatment. The trend continued, and her follow-up score was 4.0. Like Blake, Casey's scores reflected a slight increase in mindfulness throughout the study (slope across phases 0.2).

The MAAS scores of Chris, showed consistency throughout baseline and the first half of the treatment phase. Scores raised slightly in the latter part of the treatment phase and remained elevated through follow-up. Overall, her scores yielded an upward trend (slope 0.4). This consisted of an average score of 3.6 in both baseline (slope 0.0, standard deviation 0.2) and treatment (slope 0.1, standard deviation 0.3) phase and a score of 4.3 during follow-up. Chris's MAAS scores demonstrated a moderate increase in mindfulness over the course of the study (slope across phases 0.4).

In the absence of any intervention, Dakota's scores indicated a moderate upward trend in mindfulness over the eight-data collection period. Her MAAS scores ranged from a low of 4.5 at the initial intake to high of 6.0 throughout much of the later weeks. During the debriefing, Dakota commented that the process of completing the survey twice per week made her pay more attention to things and increased her self-awareness; the upward trend of her MAAS scores supports this self-assessment.

Dana's MAAS scores were somewhat variable during the first couple weeks of the study but then remained consistent. Her overall average MAAS score was 3.3 (slope 0.0, standard deviation 0.3). She received no treatment.

Drew's MAAS scores were consistently lower than those of the other participants throughout the study. Her scores ranged from a low of 2.3 to a high of 2.9. Drew's average MAAS score was 2.7 (slope 0.0, standard deviation 0.3).

Anxiety

Considerable variability in both state and trait levels of anxiety were demonstrated by Alex's STAI scores during baseline phase. During baseline, state anxiety levels ranged from 24 to 37 and trait anxiety varied from 44 to 59; both showed an upward trend through baseline. During treatment phase Alex's anxiety scores were more consistent and showed a slight downward trend. This trend continued, but was less evident during follow-up phase.

The patterns of Arin's STAI scores for both state and trait anxiety were similar to each other throughout the study. During the baseline phase both scales showed an increase from initial to the second data point. Arin's average baseline level for state anxiety was 42.3 (slope 4.7, standard deviation 7.9). Arin's average baseline level for trait anxiety was slightly lower than that of state 41.5 (slope -2.7, standard deviation 9.0). Arin's scores for both trait and state anxiety were lower during treatment. During the treatment phase, Arin's state anxiety scores demonstrated a slight downward trend in anxiety (level 34.8, slope -1.4, standard deviation 6.7) while her trait anxiety remained fairly constant and (level 26.1, slope 0.1, standard deviation 2.9). The decrease in anxiety levels from baseline through treatment were maintained throughout Arin's follow-up phase.

Bailey's STAI scores represented the largest decrease of anxiety over the course of the study as compared to other participants. Somewhat surprisingly her trait anxiety scores (slope across phases -13.5) were more variable and yielded greater change than her state anxiety scores (slope across phases -6.3). The greatest variability was seen in baseline (state: level 51.8, slope 1.5, standard deviation 4.0; trait: level 56.7, slope 2.5, standard deviation 12.9) and she withdrew from the study early, so it is difficult to determine the actual of effect of treatment.

Blake's initial STAI scores were 54 for state anxiety and 46 for trait anxiety these dropped at the second data point to 41 and 40 respectively and then were consistent through the remainder of baseline. While Blake's trait anxiety showed a fair amount of variability her state anxiety scores remained consistent during the treatment phase. Overall her trait anxiety decreased from baseline through follow-up phases (slope across phases -5.6). Her state anxiety also decreased over the course of the study to a lesser extent than her trait anxiety (slope across phases -3.5).

Casey's STAI scores represent decreases in both state (slope across phases -3.9) and trait anxiety (slope across phases -5.9) levels over the course of the study. Visual inspection of her state anxiety scores reflected several fluctuations during both baseline and treatment phases. However, her overall variability during each phase was relatively low. During baseline her overall variability was 2.3 and during treatment it was 2.2. She had one data point during the follow-up which represented slight decreases from 25.6 in treatment to 22.0 and from 32.5 in treatment to 31.0 in state and trait scores respectively.

Visual inspection of Chris' STAI scores show a consistent baseline, in regard to state anxiety, after an initial increase from starting point followed by a steady decrease during treatment (slope across phases -5.3). Her trait anxiety scores demonstrated more fluctuation but

also decreased during the study (slope across phases -6.4). Her one follow-up data point maintained the decreases obtained during treatment.

With the exception of an initial low score of 25, Dakota's state anxiety scores were fairly consistent throughout the study and yielded an average of 37.7. Her trait anxiety scores showed more variability (standard deviation 9.5) and a slight decrease (slope -0.6) over the course of the study.

After an initial increase from start-point to second data point, Dana's STAI scores represent remarkable consistency at an average level of 42.7 for state anxiety. Her trait anxiety scores were slightly more uneven and averaged at 39.5 for throughout the study.

Drew's STAI scores demonstrated the lowest overall trait anxiety averaging to a level of 26.8. Her state anxiety scores remained consistently at a moderate level that average 39.0 over the course of the study.

Empathy

Alex's IRI showed a slight increase in empathetic concern over the course of the study with scores averaging 23.0 (standard deviation 2.9), 25.9 (standard deviation 1.7), and 27.2 (standard deviation (1.3) in baseline, treatment, and follow-up phases respectively. In regard to personal distress, within-phase scores remained fairly consistent for Alex. A slight decrease from baseline (average 10.3; standard deviation 1.5) to intervention (average 8.3; standard deviation 2.3).

Arin's scores reflect consistent levels of empathy throughout the study until the end of the treatment phase where there was a noticeable increase in personal distress and a decrease in empathetic concern. During baseline her baseline level of empathetic concern was 26.3 (slope

0.5; standard deviation 2.1) and her level of personal distress was 2.5 (slope -1.2; standard deviation 2.1). Her scores were similar during the treatment phase with empathetic concern averaging 26.5 (slope -0.5; standard deviation 3.0) and personal distress averaging 1.9 (slope 0.2; standard deviation 3.0). During the follow-up phase it appears as if Arin may have inadvertently reversed the response scales as her scores were consistent until the third data point of the follow-up where we see a flipping in the scores of both the empathetic concern and personal distress scales.

Bailey's empathy scores also reflect fairly consistent levels over the course of the study. She had a slight increase in empathetic concern during baseline that was maintained through treatment. Her overall level of empathetic concern increased slightly (slope across phases 0.1) while her personal distress decreased somewhat (slope across phases -2.9).

The most variability in empathy scores was reflected in Blake's responses as compared to others'. Visual inspection reveals an upward trend in empathetic concern through baseline (average 21.4; slope 1.6; standard deviation 2.9) that continued to a lesser extent during treatment (average 24.4; slope 0.1; standard deviation 3.3) and then trended downward during follow-up (average 21.0; slope -3.0; standard deviation 3.5). Her personal distress scores remained consistently low after an initial drop midway through baseline. During baseline her scores averaged 9.8 and then dropped to 7.3 and 7.0 in treatment and follow-up phases respectively.

Casey's scores reflect a fairly steady upward trend in scores over baseline (slope 0.8) reaching the maximum score of 28 that was maintained throughout most of the remainder of the study. Her personal distress scores followed a similar but opposite pattern with a downward trend across phases (slope across phases -1.6) with scores that bottomed out at 0.0.

Chris's high empathetic concern scores demonstrated a slight upward trend during baseline (slope 0.4) which leveled out to an average of 27.9 during treatment and were maintained through follow-up. Her personal distress reflected more variability, ranging from 4 to 10, and a modest downward trend over the course of the study (slope across phases -1.4).

Dakota's scores reveal a slight increase in empathetic concern over the course of the study (average 25.8; slope 0.4; standard deviation 2.5). Her personal distress scores were stable but higher than the other participants' throughout the study (average 14.8; slope 0.1; standard deviation 1.6).

Through visual inspection, Dana's empathy scores can be seen as consistent throughout the study after an initial slight downward trend in both empathetic concern and personal distress. Her average empathetic concern score was 19.4 (slope 0.2; standard deviation 1.5). Her personal distress score average at 11.3 (slope -0.1; standard deviation 1.3).

Drew's empathy scores also reflect stability over the course of the study. Her empathetic concern scores average 27.1 (slope 0.2; standard deviation 1.6). Her personal distress scores averaged 8.6 (slope -0.3, standard deviation 2.1) with the greatest change seen early in the study.

Patterns across individuals

Overall, results demonstrated relatively stable baseline mindfulness scores for all nine of the participants. Five of the six participants who received treatment trended upwards in their scores from baseline through follow-up (maximum slope across phases 0.6, minimum slope across phases 0.2). One participant, Alex, had average scores that were consistent throughout phases (slope 0.0). Visual inspection shows a slight upward trend in Alex's scores after a slight drop from an initial high point.

In regard to anxiety, nearly all of the participant scores revealed decreases in both state and trait anxiety over the course of the study. The exception to this was Alex who had a slight increase in state anxiety over the course of the study; her trait anxiety scores decreased however. The increase in her anxiety happened during baseline and then scores later decreased during treatment and follow-up. The largest decrease in anxiety scores was seen in Bailey's trait anxiety which decreased from an average of 56.7 in baseline to an average of 43.1 during treatment (slope across phases -13.5). Visual inspection demonstrates a reduction in anxiety scores during treatment for all of the participants who received treatment. The reduction in anxiety scores was fairly consistently maintained throughout follow-up.

Considering all of the participants, little change was demonstrated in empathy scores; this is true of both the empathetic concern and personal distress scales. When slight changes did occur, the scores of the two scales tended to be mirror images of each other (i.e., when an increase in empathetic concern occurred it was accompanied by a decrease in personal distress). All of the participant scores demonstrated very high levels of empathetic concern (range of average scores was 19.4 to 28) and low levels of personal distress (range of average scores was 0.0 to 14.8).

Discussion

The purpose of this study was to investigate the following questions: 1) Can exposure to a four-week individual mindfulness training affect a change in nursing students' level of mindfulness, empathy, or anxiety? and, if so, 2) when do such changes take place? 3) Are the changes in mindfulness concurrent, precipitant of or following changes in empathy? Reduction

in participant anxiety scores as a result of treatment was anticipated. Additionally, it was hypothesized that rises in mindfulness and empathy scores would be observed as a result of participation in the treatment protocol. Furthermore, we predicted that the increased mindfulness scores would be precipitant of increased levels of empathy.

Mindfulness

The results of this study partially supported our hypotheses. Baseline mindfulness scores were consistent with previously established norms for college students (Brown & Ryan, 2003). A slight but detectable increase in mindfulness scores was demonstrated by five of the six participants who received the intervention; however, due to the variability of scores within phases this increase can generally be considered meaningful in two of these participants – Arin and Blake. An increase in mindfulness scores was absent from the scores of two of the control participants. This suggests that short-term mindfulness training can impact mindfulness scores for some individuals; however, the collective results of this study do not allow one to conclude a functional relationship between the intervention and mindfulness scores. The literature does support the impact of training on increasing mindfulness scores,;however, this study does not allow a statement of consistency with that data. The small sample size and short time interval of the intervention limited any potential statistical significance.

Anxiety

A reduction in anxiety scores was observed as expected with the introduction of the mindfulness program. This is consistent with previously reported studies. Specifically, a decrease in trait anxiety scores was demonstrated over the course of the study for all participants.

Similarly, state anxiety scores of five out of the six participants decreased over the course of the study; while one participant, Alex, did have a slight initial increase during the baseline phase, her scores trended downward once the intervention was introduced.

This program was introduced to freshmen new to college. The start of the semester as freshmen is the first time students joined the campus community, were enrolled in classes, began living in dorms, and some had new campus employment in addition to school; As such, a higher level of anxiety would be expected, easing over the next few weeks as greater personal mastery was experienced. It would be expected that anxiety scores would drop, but then fluctuate as new challenges were experienced. Future studies that track students over time, either an entire semester or academic undergraduate experience, may show that even with fluctuations in anxiety, the use of mindfulness training could help decrease anxiety scores over time as greater personal mastery and experience is gained.

Empathy

The data was somewhat inconclusive regarding our hypothesis that exposure to the treatment protocol would yield increases in empathy scores. Considering all of the participants, little change was demonstrated in empathy scores; this is true of both the empathetic concern and personal distress scales. This may be, in part, explained by participants' empathy scores already being very high at the beginning of the study. This was expected as all of the participants had declared themselves as pre-nursing majors, a major that suggests higher than average empathy scores as nursing is a caring profession. Moreover, several of the participants demonstrated

increases in empathetic concern during the baseline phase. It is possible that act of repeatedly reflecting on aspects of empathy in responding to the questionnaires may have served to heighten participants' awareness of others. When slight changes did occur, the scores of the two scales tended to be mirror images of each other (i.e., when an increase in empathetic concern occurred it was accompanied by a decrease in personal distress). The fact that the scores on the empathetic concern and personal distress scales mirrored each other, rather than mimicking each other, underscores the importance of a multifaceted measure of empathy rather than a total score.

Scores did not yield any clear patterns regarding timing of changes in mindfulness and empathy. Therefore, a specific relationship between empathy and mindfulness can not be determined from this study.

Limitations

This study had several limitations that are important to note. First of all, it should be cautioned that results of single case studies are not designed to be generalizable to other populations. Specific threats to external validity may have included the sample of pre-service healthcare providers at an urban Midwestern urban campus not being directly representative of all pre-service healthcare providers. Additionally, due to the homogenous nature of the participant group, the generalizability of the study may be further limited. All of the study participants were attendees at the same academic institution; while the pool of recruits represented a diverse sample in regard to gender, religious background, and ethnicity, all of the participants who elected to complete the study were women. Expanding the study in the future

to include multiple institutions would likely provide a richer diversity of participants and greater generalizability to the study results.

Secondly, there was some lack of control of the delivery program materials. Each participant was given printed copies of the program materials at the onset of the study and agreed to access study materials per a pre-determined schedule; it is possible that some participants may have deviated from this schedule without reporting deviations to the researchers. Ideally, the program materials would be delivered electronically per the weekly schedule, rather than at the onset of the study, to allow for confirmation of materials being accessed via the established schedule. Additionally, electronic delivery of materials may be more appealing to the study population of Gen-Y and Gen-Z participants. Researchers reached out to the program's publisher to obtain permission for delivery via electronic means but received no response; to avoid potential conflicts with copyright law, legal counsel advised not to deliver the materials via electronic means.

A third limitation is that the data collection instruments may not be sensitive enough to detect subtle changes over a short period of time. The study design was unique in that it utilized bi-weekly measurements to allow for temporal investigation of potential changes in responses. This presented a challenge in that existing measurements of anxiety, empathy, and mindfulness were created to be used on a less-frequent basis. For instance, the STAI was designed to elicit more stable indication of levels of anxiety rather than short-term multiple repeated measures; the Beck Anxiety Inventory (BAI) may have provided better indication of more frequent changes in levels of anxiety; however, the publishers of that instruments explicitly prohibit its use in dissertation research. In addition, threats to internal validity may have included initial levels of empathy of enrolled students (i.e., despite repeated measures being considered for change over

time, it is conceivable that if a participant comes in with very high levels of empathy or mindfulness, changes will not be measurable due to effects of diminishing return). Development of instruments with increased sensitivity to daily change would allow future research to more fully explore the specific changes in participants as a result of exposure to individual program components. Additionally, this study relied on self-report measures which may have introduced higher levels of intake bias and inaccurate representations of overall changes. Such a bias may explain the general pattern of initially high levels of mindfulness reported at the study onset followed by an initial drop in level. Some of the constructs utilized in this study, such as mindfulness, cannot be outwardly observed; therefore reliance on self-report is necessary. However, aspects of anxiety can be both self-reported and objectively observed. Future studies, should incorporate the use of psychophysiological measures of anxiety (e.g., skin conductance, cortisol level, etc.) to corroborate self-reports.

Because this study used a quantitative research approach it is not possible to determine aspects of the participants' experience that were not identified previous to the start of the study that may have affected changes in their levels of empathy and mindfulness. Various cultural components may portend skewed initial levels of mindfulness training and/or empathy and receptivity to learning/practicing techniques provided in the treatment. Future studies may benefit from the use of qualitative or mixed methods approaches to more fully understand what is occurring from the participants' perspective.

Implications

As noted earlier, results of single case studies are not designed to be generalized to populations outside of those studied: however, I will discuss some possible implications of this study in terms of research, education, practice, and policy.

For research. Future research may benefit from considering several modifications that arose from this study. While the author of this study chose to use an existing intervention program due to it being easily obtained for potential wide-spread future use, future researchers may want to consider developing materials that would be free of potential copyright issues; doing so would allow for maximum control of delivery and usage tracking of the materials. Additionally, in order to better understand the real-time temporal effects of mindfulness practice, the development of more sensitive measures is warranted. Currently available self-report instruments of anxiety and empathy were not designed for multiple repeated measurements within short time periods and may not be sensitive enough to detect immediate effects of mindfulness practice. Also, future studies may benefit by including observable psychophysiological measures (e.g., skin conductance, HRV, salivary cortisol, etc.) of anxiety levels in participants. Some of the constructs of this study, like mindfulness, cannot be observed and, so, self-report is still needed in addition to observation. Finally, a mixed-methods approach with the addition of a qualitative research lens may be uniquely useful in filling-in nuanced knowledge gaps left by solely quantitative measures (Broom, 2005).

For education. It is essential to not overlook an important finding of this study, namely that over 50% of the targeted population of freshman pre-nursing students responded with interest to this study. This suggests that the incorporation of mindfulness skills practice may be a value-add to existing curriculums. Students who opted not to complete this study reported perceived time conflicts with other school, family, and work obligations; therefore, care should be taken to maximize in-class opportunities for practice and integration of the basic tenets of mindfulness. Due to a combination of developmental stage and stress associated with college life, students often experience the emergence of mental health concerns during their time in

college. University mental health clinics serve a crucial role in helping to address these concerns. However, due to numerous potential factors (e.g. stigma of seeking mental health services, limited access to clinic staff, time constraints, etc.) many students do not obtain help for such concerns. Incorporating mindfulness skills into curriculum could indirectly help to address the mental health needs of students.

For policy. It has been estimated that upwards of 30-40% of freshman do not complete their program of study (Mabel, Z., & Britton, T. A., 2018). Student drop out is costly, not only to the student, but also to universities and tax payers; it has been estimated that state and federal governments spend over $9 billion educating students who eventually drop out. High levels of stress have been reported as a barrier to student retention (Daugherty, T. K., & Lane, E. J., 1999). Moreover, numerous studies have shown that stress interferes with ability to learn; therefore, efficient prioritization of class-time to include stress-reducing strategies, such as mindfulness meditation, is likely to contribute to overall retention and higher levels of learning. Even after graduation, the risk of elevated stress and burnout for healthcare providers remains high and can have financial consequences; it has been estimated institutional costs of failure to retain a nurse range from $62,000-$145,000; this approximates a nurse's annual salary (Hillman and Foster, 2011). Such losses have direct and profound effects on the overall cost of healthcare.

Most theories of mindfulness suggest that mindfulness is something that is cultivated, sometimes over long periods of time. There is some evidence in the literature that benefits can be gained through shorter-term mindfulness interventions; the results of this study suggest that very brief, self-directed programs may not have immediate or profound effects. Therefore, programs wishing to incorporate mindfulness into curriculum may be better served by

introducing it as a regular and ongoing practice woven into the ongoing pedagogy rather than a one-time curricular add-on.

For practice. Participants noted increased levels of self-awareness as an unintended result of the periodic reflections integral to merely completing the assessments associated with this study. Ongoing time devoted to such reflections may have lasting benefits. Other research has demonstrated that increased self-awareness promotes better relationships (Beddoe & Murphy, 2004). Learning mindfulness skills to cultivate non-judgmental observation of self and others can increase this awareness. Once acquired, such skills can not only benefit the individual students, but also can contribute to improved communication among peers and more effective working environments. Because treating patients frequently involves patient education strategies, nurses are in a prime position to impart these skills to others and, thereby, create a ripple effect of these benefits. Moreover, previous research has demonstrated the persistence of practice and practice effects of mindfulness, therefore, even short -term interventions may affect long-term change (Kabat-Zinn et al., 1992;.J. J. Miller, Fletcher, & Kabat-Zinn, 1995). Therefore, nurses should consider teaching the basic skills of mindfulness to patients to help them better cope with their medical issues.

Summary

Studies have shown that healthcare providers feeling depressed, anxious, or burned out tend to be less empathetic, less present, and prone to make more mistakes; nurses may be at elevated risk of such consequences (Halbesleben, Wakefield, Wakefield, & Cooper, 2008; Omdahl & O'Donnell, 1999). Mindfulness meditation can offer a means of improving the well-

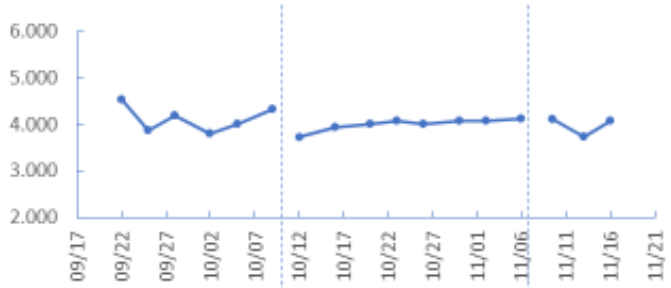
being of healthcare providers and the service they provide. This study utilized a multiple-baseline across subjects design to explore the effects of a four-week mindfulness intervention on a population of freshman pre-nursing students at a Midwestern urban university. Results from nine study participants were examined. Data demonstrates that a detectable decrease in anxiety levels can result from participation in self-directed mindfulness program as short as four weeks. Results regarding mindfulness and empathy levels were less conclusive. A specific relationship between empathy and mindfulness cannot be determined from this study. Because previous studies have demonstrated a persistence of skills, practice, and benefits acquired through mindfulness training it can be concluded that individuals exposed to a four-week program will continue to develop benefits beyond those initially expressed. The incorporation of a mindfulness training into nursing curriculum is likely to yield beneficial outcomes for the students and those that they serve throughout their career. Moreover, mindfulness can be incorporated into curriculum in cost-effective and scalable ways. Despite the noted limitations of this study, the results add to the overwhelmingly positive evidence regarding the beneficial outcomes of mindfulness; no significant drawbacks or side-effects of mindfulness practice have been demonstrated. Therefore, healthcare providers and healthcare educators should give real consideration to the practice of mindfulness. Further research is needed to determine optimal amount of practice needed for specific populations and to discern what specific psychological mechanisms are at play that may contribute the physical, social, cognitive, and emotional benefits described.

Table 1: Summary of results

	Alex	Arin	Bailey	Blake	Casey	Chris	Dakota	Dana	Drew
MAAS Trend Across Phases	0.0	0.6	0.2	0.2	0.2	0.4	n/a	n/a	n/a
MAAS Baseline Level	4.1	3.4	3.7	3.8	3.6	3.6	5.7	3.3	2.7
MAAS Baseline Trend	-0.2	-0.2	0.0	0.0	-0.1	0.0	0.1	0.0	0.0
MAAS Baseline Variabilty	0.3	0.3	0.2	0.2	0.2	0.2	0.5	0.3	0.2
MAAS Treatment Level	4.0	4.2	3.9	4.3	3.7	3.6	n/a	n/a	n/a
MAAS Treatment Trend	0.0	0.2	0.1	0.1	0.1	0.1	n/a	n/a	n/a
MAAS Treatment Variability	0.2	0.5	0.2	0.4	0.3	0.3	n/a	n/a	n/a
MAAS Follow-up Level	4.0	4.6	n/a	4.3	4.0	4.3	n/a	n/a	n/a
MAAS Follow-up Trend	0.0	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a
MAAS Follow-up Variability	0.2	0.2	n/a	0.1	n/a	n/a	n/a	n/a	n/a
IRI-PD Trend Across Phases	-0.9	1.6	-2.9	-1.4	-1.6	-1.4	n/a	n/a	n/a
IRI-PD Baseline Level	10.3	2.5	11.2	9.8	3.1	6.9	14.8	11.3	8.6
IRI-PD Baseline Trend	-0.9	-1.2	0.5	-0.8	-0.8	0.0	0.1	-0.1	-0.3
IRI-PD Baseline Variabilty	1.5	2.1	2.0	2.4	2.5	1.6	1.6	1.3	2.1
IRI-PD Treatment Level	8.3	1.9	8.3	7.3	0.3	7.5	n/a	n/a	n/a
IRI-PD Treatment Trend	-0.4	0.2	-0.1	-0.1	-0.1	-0.2	n/a	n/a	n/a
IRI-PD Treatment Variability	2.3	3.0	1.4	0.7	0.5	1.8	n/a	n/a	n/a
IRI-PD Follow-up Level	8.5	5.6	n/a	7.0	0.0	4.0	n/a	n/a	n/a
IRI-PD Follow-up Trend	0.2	0.0	n/a	-1.5	n/a	n/a	n/a	n/a	n/a
IRI-PD Follow-up Variability	1.0	12.5	n/a	2.1	n/a	n/a	n/a	n/a	n/a
IRI-EC Trend Across Phases	2.1	-1.9	0.1	-0.2	1.6	0.8	n/a	n/a	n/a
IRI-EC Baseline Level	23.0	26.3	27.2	21.4	24.9	26.4	25.8	19.4	27.1
IRI-EC Baseline Trend	1.0	0.5	0.5	1.6	0.8	0.4	0.4	0.2	0.2
IRI-EC Baseline Variabilty	2.9	2.1	1.2	2.9	2.7	1.4	2.5	1.5	1.6
IRI-EC Treatment Level	25.9	26.5	27.3	24.4	27.9	27.5	n/a	n/a	n/a
IRI-EC Treatment Trend	0.4	-0.5	0.1	0.1	0.1	0.0	n/a	n/a	n/a
IRI-EC Treatment Variability	1.7	3.0	1.0	3.3	0.4	0.5	n/a	n/a	n/a
IRI-EC Follow-up Level	27.2	22.4	n/a	21.0	28.0	28.0	n/a	n/a	n/a
IRI-EC Follow-up Trend	-0.1	0.0	n/a	-3.0	n/a	n/a	n/a	n/a	n/a
IRI-EC Follow-up Variability	1.3	12.5	n/a	3.5	n/a	n/a	n/a	n/a	n/a
STAI-State Trend Across Phases	1.5	-5.6	-6.3	-3.5	-3.9	-5.3	n/a	n/a	n/a
STAI-State Baseline Level	40.8	42.3	51.8	46.0	29.8	45.6	22.0	42.7	39.0
STAI-State Baseline Trend	6.5	4.7	1.5	-1.4	-0.5	1.4	1.2	0.2	0.1
STAI-State Baseline Variabilty	11.2	7.9	4.0	4.9	2.3	6.9	24.0	3.8	3.6
STAI-State Treatment Level	46.1	34.8	45.6	40.6	25.6	43.6	n/a	n/a	n/a
STAI-State Treatment Trend	-0.5	-1.4	-0.8	-0.6	-0.6	-1.9	n/a	n/a	n/a
STAI-State Treatment Variabili	2.0	6.7	2.9	3.1	2.2	5.1	n/a	n/a	n/a
STAI-State Follow-up Level	43.8	31.0	n/a	39.0	22.0	35.0	n/a	n/a	n/a
STAI-State Follow-up Trend	1.2	-0.6	n/a	0.5	n/a	n/a	n/a	n/a	n/a
STAI-State Follow-up Variabilit	3.0	2.6	n/a	1.5	n/a	n/a	n/a	n/a	n/a
STAI-Trait Trend Across Phases	-4.2	-7.3	-13.5	-5.6	-5.9	-6.4	n/a	n/a	n/a
STAI-Trait Baseline Level	46.8	41.5	56.7	38.6	42.8	46.9	32.4	39.5	26.8
STAI-Trait Baseline Trend	3.9	-2.8	2.5	-2.2	-0.5	-0.1	-0.6	-0.1	-0.4
STAI-Trait Baseline Variabilty	8.6	9.0	12.9	5.8	8.4	8.2	9.5	5.6	6.7
STAI-Trait Treatment Level	42.3	26.1	43.1	33.8	32.5	34.1	n/a	n/a	n/a
STAI-Trait Treatment Trend	-0.9	0.1	0.2	0.7	-0.8	-2.0	n/a	n/a	n/a
STAI-Trait Treatment Variabilit	4.5	2.9	8.2	9.8	9.1	7.2	n/a	n/a	n/a
STAI-Trait Follow-up Level	38.3	27.0	n/a	27.5	31.0	34.0	n/a	n/a	n/a
STAI-Trait Follow-up Trend	0.8	-0.8	n/a	-1.0	n/a	n/a	n/a	n/a	n/a
STAI-Trait Follow-up Variabilit	3.0	1.7	n/a	1.0	n/a	n/a	n/a	n/a	n/a

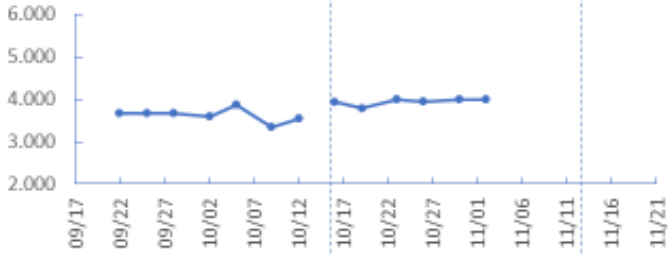
Figure 1: Graphed summary of results

MAAS

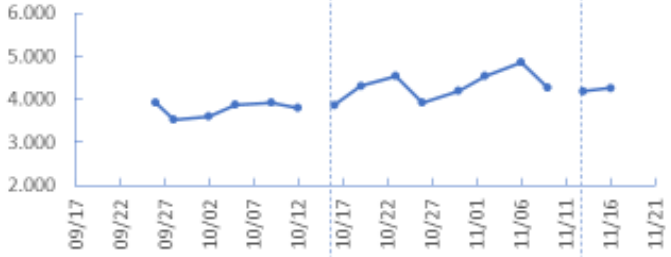


Alex -
Total MAAS

Arin -
Total MAAS



Bailey -
Total MAAS



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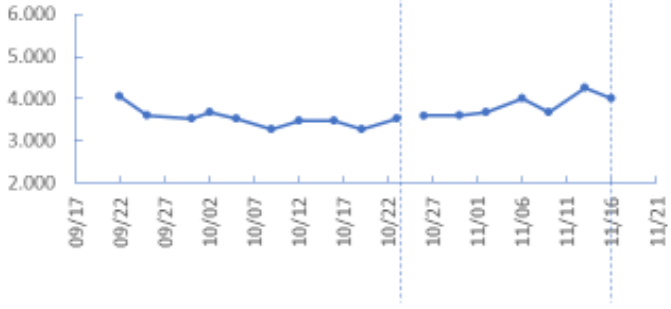
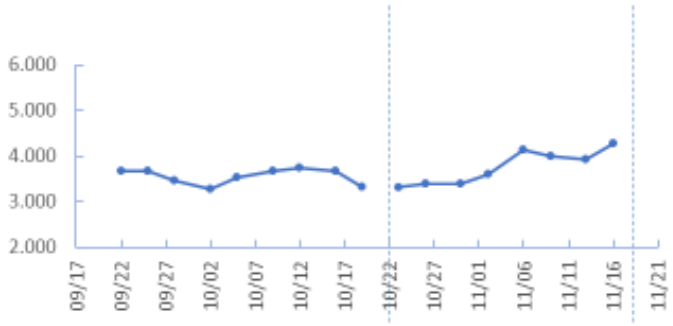
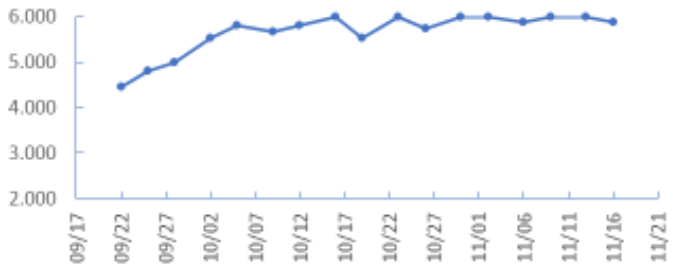


Casey -
Total MAAS

MAAS



Chris-
Total MAAS



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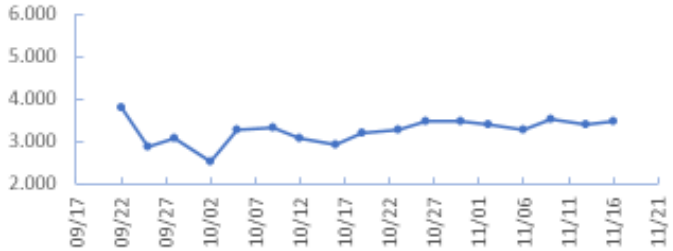
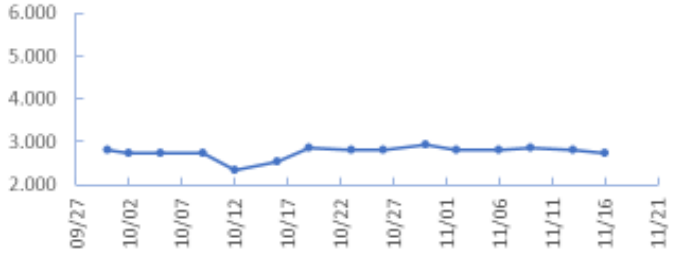
Total MAAS

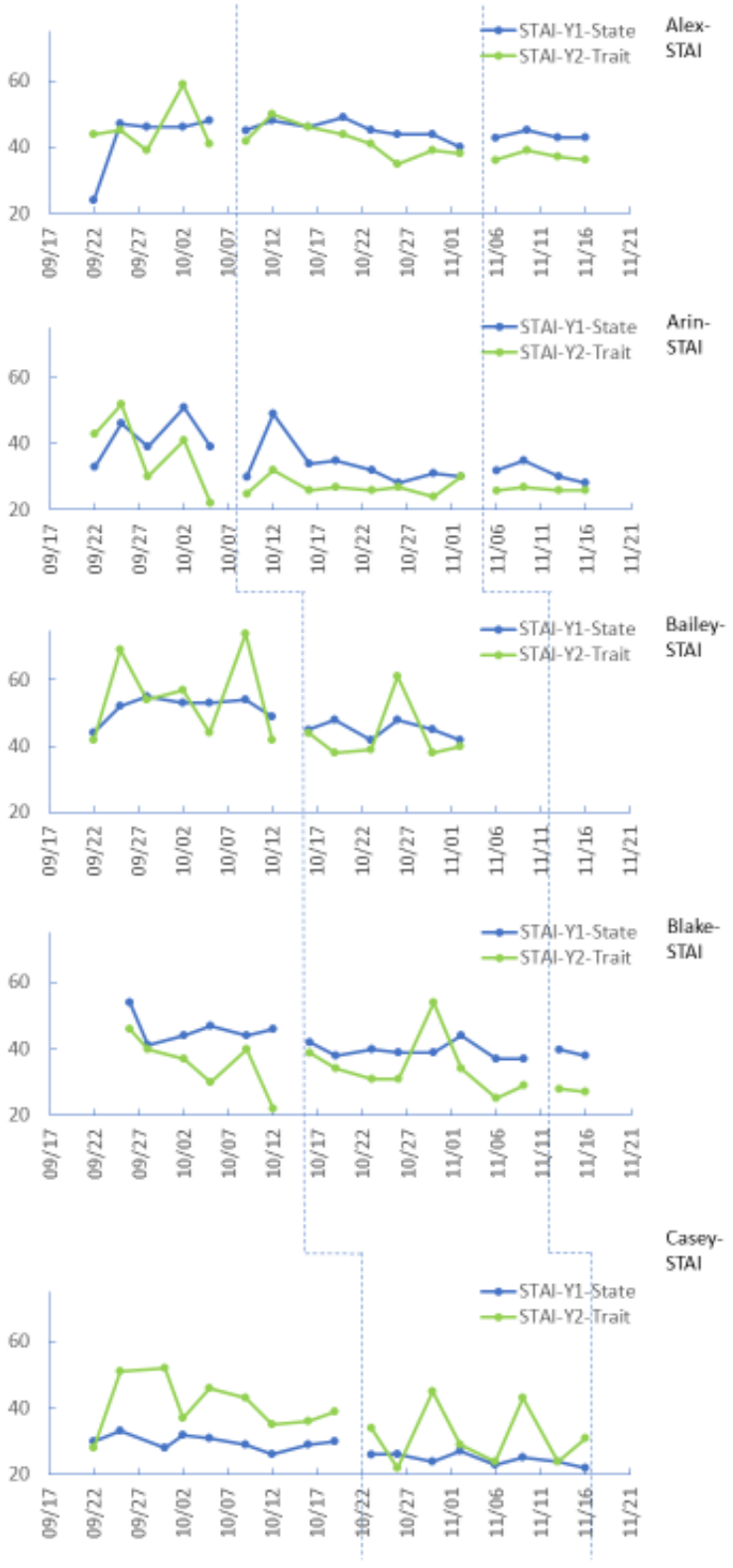


Dana-
Total MAAS



Drew-
Total MAAS

STAI


Alex-STAI
STAI-Y1-State
STAI-Y2-Trait
Arin-STAI
STAI-Y1-State
STAI-Y2-Trait
Bailey-STAI
STAI-Y1-State
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Blake-STAI
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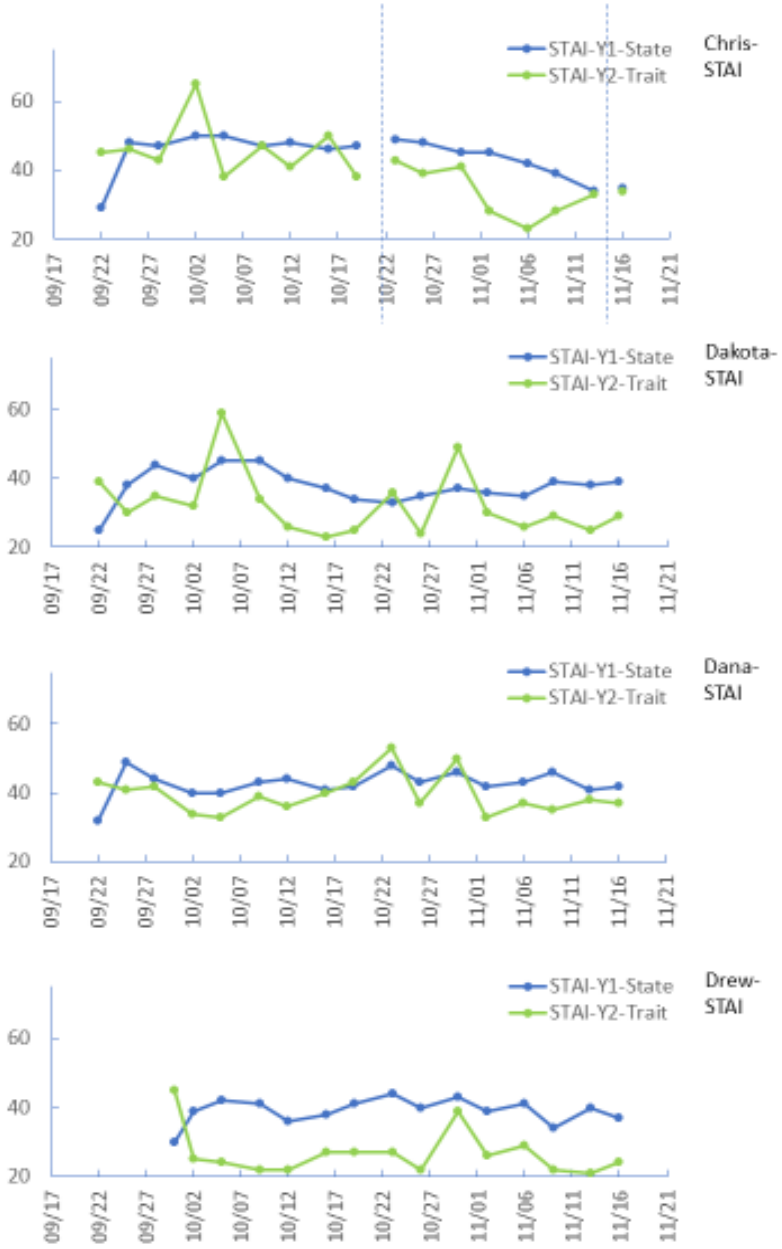
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IRI

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IRI-Personal Distress
RI-Empathic Concern
Arin- IRI
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IRI-Empathic Concern
Bailey-IRI
IRI-Personal Distress
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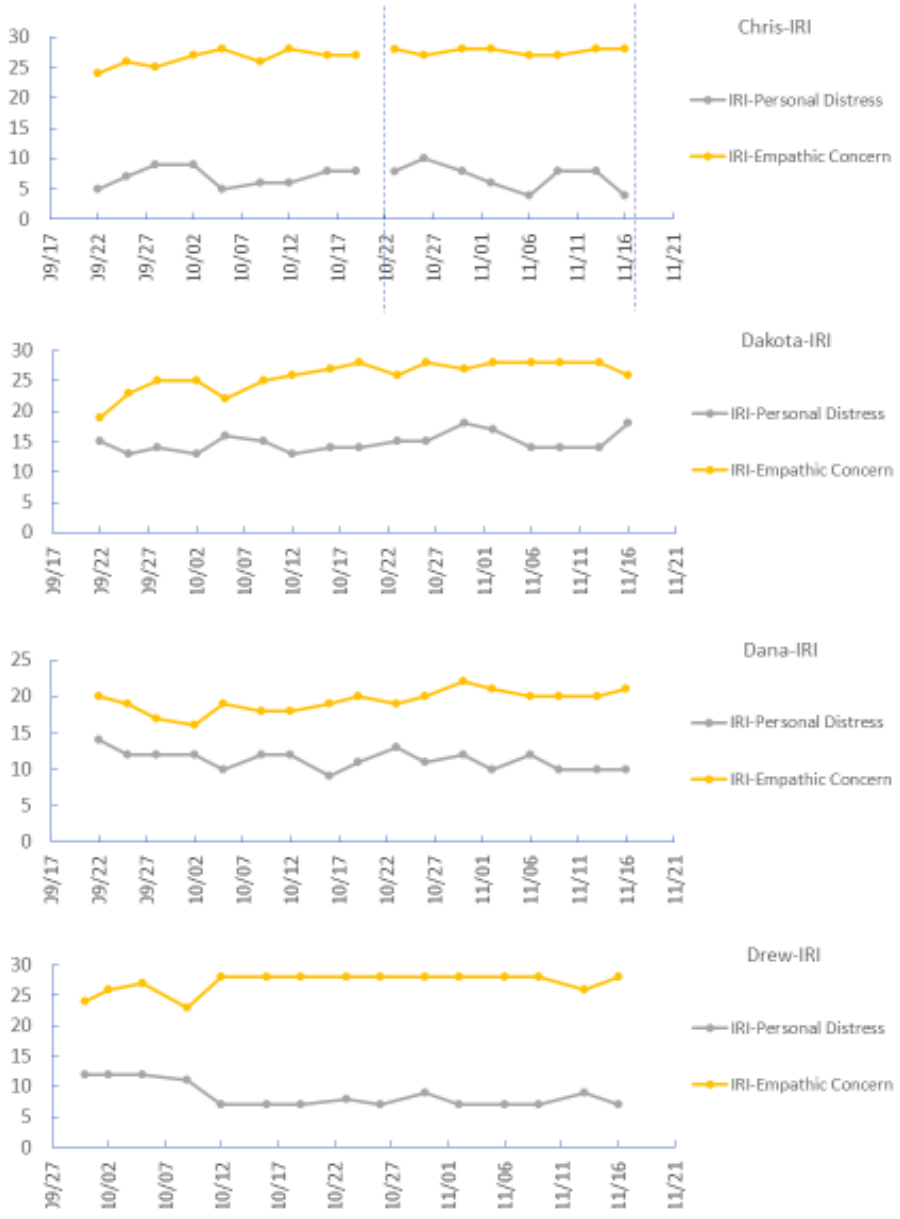
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IRI-Empathic Concern
Drew-IRI
IRI-Personal Distress
IRI-Empathic Concern

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Appendices

Appendix A: Introductory Script

Script for in-class introduction of study:

Hi, my name is Debra Klich and I am doctoral student across campus in the Counseling Psychology program. I am here today to ask you to consider participating in my dissertation study. It is a cool study that is relatively short and has the potential to help the nursing profession and each of you individually (and help me to graduate!). There are a few incentives for completing the study. I am passing out a flyer that outlines the details of the study and encourage you to sign up if you qualify. If you are interested in enrolling in the study please go ahead and list your name and campus email address on the sign-up sheet being passed around so that I can connect with you. I will also be outside of this room after to class to answer any questions you may have. Thank you for your time and consideration!

Appendix B: Recruitment Flyer

Opportunity to participate in cool research project

to help the practice of nursing

"An investigation of the effects of a mindfulness program on pre-nursing students."

As you are probably aware, careers in the health care field (including nursing) can be pretty stressful. There are ways to help individuals deal more effectively with such stress and improve their well-being. Some research suggests that the earlier in your career you learn such techniques, the better things will be for you and your patients. This study will investigate the potential effects of a mindful meditation program on pre-nursing students.

If you agree to participate, you will be asked read emails, complete online surveys twice per week for 9 weeks, and refrain from discussing study details (including with other participants). Additionally, you may be asked to complete short weekly readings, listen to an audio CD, and complete daily focus/meditation exercises.

What do I have to do? Well, technically you don't *have* to do anything. It's completely voluntary. If you do volunteer you will be asked to do a few simple things….some of the things are kinda fun (like learning and practicing new self-care techniques) and others may be a little mundane (like completing online surveys) but it's all good.

How long will it take? In total, it will probably take you less than 14 hours max over a 9-week period

What will I get? So, you'll learn a new skill that you can use in your life and with your future patients that can help to cope with stress (but, you don't have any of that, right?) and improve your well-being. PLUS, you will be compensated **$60** in gift cards for completion of the study and be given a book and a CD that you get to keep.

Why should I do this? It's your chance to pay-it forward and contribute to helping future nurses (and help me finish my degree!)

Do I qualify? Yes, as long as you….are at least 18 years old, are enrolled in NURS 103, have daily access to campus emails, have some way of listening to an audio CD, have had no training in mindfulness and are fluent in written and spoken English

What do I do to get started? Put your name and campus email address on the sign-up sheet that is being passed around class today, or shoot me an email at dlklich@uwm.edu. Then we will set up a time to meet next Friday to discuss the details.

Appendix C: Consent to participate

University of Wisconsin – Milwaukee
Consent to Participate in Research

Study Title: An investigation of the effects of a mindfulness program on pre-nursing students.

Person Responsible for Research: Dr. Stephen Wester (PI), Debra Klich (SPI)

Study Description: The purpose of this research study is to better understand the potential effects (e.g., focus, relaxation, concentration, etc.) of a mindfulness meditation program on pre-nursing students. Approximately 8-20 subjects will participate in this study.

If you agree to participate, you will be asked to open and read all study emails, adhere to all study schedules, complete online surveys (about yourself, attitudes and day-to-day experiences) twice per week for 9 weeks, and refrain from discussing study details (including with other participants). Additionally, you may be asked to complete short weekly readings, listen to an audio CD, and complete daily focus/meditation exercises. This will take a total maximum of approximately 14 hours of your time over the next 9 weeks. It may be several weeks before you are asked to do anything besides read emails and complete surveys for this study. You acknowledge that timing of study activities is very important and agree to not work ahead or behind schedule on readings, audio CD, or exercises.

Risks / Benefits: Risks that you may experience from participating are considered minimal. There are also no costs for participating. You will have the potential to experience one or more of the following personal benefits as result of the study: learning a self-care strategy you can utilize over your lifetime, potential positive health and well-being outcomes and exposure to a healthcare technique that you can utilize with your future patients. Additionally, you will receive a free book and audio CD, and $60 total in gift cards, awarded in increments, for completion of the study. You will need to meet a study representative in-person at a pre-determined time/location to receive these incentives.

Confidentiality: Identifying information such as your name and email address name will be collected for research communication purposes. Your responses will be treated as confidential and only accessible by the study PI and SPI. All reasonable efforts will be made so that no individual participant will be connected with his/her answers. The research team will remove your identifying information after collection of data and all study results will be reported without identifying information so that no one viewing the results will ever be able to match you with your responses. Any publication or dissemination of the data collected will use pseudonyms rather than real participant names. Electronic data from this study will be accessed via a password-protected computer and paper notes and forms will be stored in a locked file drawer accessible only by the PI and SPI. Only study staff will have access to your information. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review this study's records.

Voluntary Participation: Your participation in this study is voluntary. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with the University of Wisconsin Milwaukee. If you do not complete a portion of the study, this will be considered as your decision to withdraw from the study at that time. You will not receive any further compensation not yet awarded to you after withdrawing from the study but you may keep incentives given to you prior to withdrawing.

Who do I contact for questions about the study: For more information about the study or study procedures, contact:

- For study-specific questions (e.g., clarification of instructions, difficulty accessing surveys, etc.): Debra Klich dlklich@uwm.edu or Stephen Wester at srwester@uwm.edu

- For any physical or mental health concerns: Norris Health Center (414) 229-4716
- For general technical difficulties (e.g. can't access your campus email): UWM Help Desk 414-229-4040

Who do I contact for questions about my rights or complaints towards my treatment as a research subject? Contact the UWM IRB at 414-229-3173 or irbinfo@uwm.edu.

Research Subject's Consent to Participate in Research:
By signing the consent form, you are giving your consent to voluntarily participate in this research project. Additionally, you agree to the following statements:

- I am at least 18 years of age and am currently enrolled in the Freshman Nursing Seminar (NURS 103) at UWM
- I am fluent in written and spoken English
- I have had no previous training in mindfulness meditation and will not participate in any meditation training during this study other than that provided by the study
- I understand that I will receive multiple emails from Debra per week for about 9 weeks and I will open and read them all (approximately 3 emails/week). Additionally, if I do not receive the expected emails I will contact Debra at dlklich@uwm ASAP
- I am willing and able to complete a series of online surveys about myself and day-to-day experiences twice a week (Mondays and Thursdays)
- I am willing and able to read weekly reading assignment from a book I will be given about meditation (Mondays)
- I have access to a device on which I can listen to an audio CD and am willing and able to listen to a CD I will be given.
- I understand that I will have a unique study ID that I will need to use to complete all surveys and I need to remember this ID. My study ID is: _____

_____
Printed Name of Subject/Legally Authorized Representative

_____ _____
Signature of Subject/Legally Authorized Representative Date

Appendix D: Data Collection Instruments

Data Collection Instruments

Note: *demographic information was collected only on the initial survey. All other questions were collected bi-weekly. All instruments were distributed via Qualtrics online survey tool. Minor alterations to instructional text were to optimize understanding for digital delivery (ie, change "circling the number" to "selecting the number").

Enter your study ID: _____

*What is your age? _____years

*What is your biological sex? ___Female ___ Male ___ Decline to answer

*Which most accurately describes your racial/ethnic background?

_ White

_ Black or African American

__American Indian or Alaska Native

__ Hispanic or Latino/a – A person having origins in t

__Asian

__Native Hawaiian or Other Pacific Islander

*What is your religious/spiritual background?_____

Have you completed all of the daily activities since the previous survey? ___ Yes ___No ___ I have not been asked to complete any activities besides this survey since the previous survey.

If no, how many days did you complete the assigned activities? ____

Please describe which activities you did/did not complete and what prevented you from completing all of the activities every day? _____

INTERPERSONAL REACTIVITY INDEX

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: A, B, C, D, or E. When you have decided on your answer, fill in the letter on the answer sheet next to the item number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

ANSWER SCALE:

A	B	C	D	E
DOES NOT				DESCRIBES ME
DESCRIBE ME				VERY
WELL				WELL

1. I daydream and fantasize, with some regularity, about things that might happen to me. (FS)

2. I often have tender, concerned feelings for people less fortunate than me. (EC)

3. I sometimes find it difficult to see things from the "other guy's" point of view. (PT) (-)

4. Sometimes I don't feel very sorry for other people when they are having problems. (EC) (-)

5. I really get involved with the feelings of the characters in a novel. (FS)

6. In emergency situations, I feel apprehensive and ill-at-ease. (PD)

7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it. (FS) (-)

8. I try to look at everybody's side of a disagreement before I make a decision. (PT)

9. When I see someone being taken advantage of, I feel kind of protective towards them. (EC)

10. I sometimes feel helpless when I am in the middle of a very emotional situation. (PD)

11. I sometimes try to understand my friends better by imagining how things look from their perspective. (PT)

12. Becoming extremely involved in a good book or movie is somewhat rare for me. (FS) (-)

13. When I see someone get hurt, I tend to remain calm. (PD) (-)

14. Other people's misfortunes do not usually disturb me a great deal. (EC) (-)

15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments. (PT) (-)

16. After seeing a play or movie, I have felt as though I were one of the characters. (FS)

17. Being in a tense emotional situation scares me. (PD)

18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.
(EC) (-)

19. I am usually pretty effective in dealing with emergencies. (PD) (-)

20. I am often quite touched by things that I see happen. (EC)

21. I believe that there are two sides to every question and try to look at them both. (PT)

22. I would describe myself as a pretty soft-hearted person. (EC)

23. When I watch a good movie, I can very easily put myself in the place of a leading character. (FS)

24. I tend to lose control during emergencies. (PD)

25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while. (PT)

26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me. (FS)

27. When I see someone who badly needs help in an emergency, I go to pieces. (PD)

28. Before criticizing somebody, I try to imagine how I would feel if I were in their place. (PT)

Mindful Attention Awareness Scale

Day-to-Day Experiences

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

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

I could be experiencing some emotion and not be conscious of it until some time later.	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5	6
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
I forget a person's name almost as soon as I've been told it for the first time.	1	2	3	4	5	6
It seems I am "running on automatic," without much awareness of what I'm doing.	1	2	3	4	5	6
I rush through activities without being really attentive to them.	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5	6
I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6

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

I drive places on 'automatic pilot' and then wonder why I went there.	1	2	3	4	5	6
I find myself preoccupied with the future or the past.	1	2	3	4	5	6
I find myself doing things without paying attention.	1	2	3	4	5	6
I snack without being aware that I'm eating.	1	2	3	4	5	6

State-Trait Anxiety Inventory

SELF-EVALUATION QUESTIONNAIRE STAI Form Y-1

Please provide the following information:

Name_____Date_____S_____

Age_____ Gender (*Circle*) **M** **F** T_____

DIRECTIONS:

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel *right* now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel indecisive	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel confused	1	2	3	4
19. I feel steady	1	2	3	4
20. I feel pleasant	1	2	3	4

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STAIP-AD Test Form Y
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SELF-EVALUATION QUESTIONNAIRE

STAI Form Y-2

Name_____ Date_____

DIRECTIONS

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21. I feel pleasant	1	2	3	4
22. I feel nervous and restless	1	2	3	4
23. I feel satisfied with myself	1	2	3	4
24. I wish I could be as happy as others seem to be	1	2	3	4
25. I feel like a failure	1	2	3	4
26. I feel rested	1	2	3	4
27. I am "calm, cool, and collected"	1	2	3	4
28. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
29. I worry too much over something that really doesn't matter	1	2	3	4
30. I am happy	1	2	3	4
31. I have disturbing thoughts	1	2	3	4
32. I lack self-confidence	1	2	3	4
33. I feel secure	1	2	3	4
34. I make decisions easily	1	2	3	4
35. I feel inadequate	1	2	3	4
36. I am content	1	2	3	4
37. Some unimportant thought runs through my mind and bothers me	1	2	3	4
38. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
39. I am a steady person	1	2	3	4
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

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Curriculum Vitae

Debra L. Klich

EDUCATION

2019	Ph.D.Counseling Psychology University of Wisconsin-Milwaukee
1999	M.S. Education Purdue University, West Lafayette, Ind.
1995	B.S. Biological Sciences Purdue University, West Lafayette, Ind.

DISSERTATION

Investigation of the Relationship Between Mindfulness and Empathy in Pre-Nursing Students Exposed to a 4-week Mindfulness Training Chair: Dr. Stephen Wester

LICENSES and CERTIFICATIONS

May 2016	American Society of Clinical Hypnosis Training and supervision completed in fulfillment of certification Bloomingdale, Ill
March 2016	Introduction to Acceptance and Commitment Therapy (ACT) Association for Contextual Behavior Sciences (ACBS)
January 2016	Professional Counselor Training License (Wis. License #2867)
June 2011	Mindfulness-Based Stress Reduction in Mind-Body Medicine 62.5 hrs CE/CME Omega Institute, Rhinebeck, New York
March 2011	NCBTMB Board Certified (#602789-11)
September 2011	Collaborative IRB Training Initiative Program Human Research Protection Certification Medical College of Wisconsin
April 2011	Massage Therapist or Bodywork Therapist License (Wis. License # 10800-146)
November 2009	Reiki Master Teacher Certification Usui Reiki Ryoho—Master Dr. Cary Loose Brookfield, Wis
June 2007-2013	American Heart Association BLS Instructor Certification
January 2007 (current)	American Heart Association HeartSaver AED Certification

INTERNSHIP and PRACTICUM EXPERIENCE

July 2018-July 2019 Psychology Intern
U.S. Department of Veterans Affairs Medical Center Danville, Ill

Aug 2014-June 2016 Practicum Intern
Medical College of Wisconsin, Wauwatosa, Wis.

May 2013-Dec 2013 Practicum Intern
Froedtert Hospital, Wauwatosa, Wis.

PROFESSIONAL EXPERIENCE

Owner/Therapist

2009-present Orange Energy, Wauwatosa, Wis.

National Administrator
February 2007-June 2014 Children's Hospital of Wisconsin, Milwaukee, Wis.

Experiential Marketing Developer
July 2004-Dec 2006 Derse Exhibits, Milwaukee, Wis.

Gallery Experience Coordinator
July 2000-July 2004 Denver Museum of Nature and Science, Denver, Colo.

Educational Outreach Developer
January 1997-July 1999 Eli Lilly and Company, Indianapolis, Ind.

PUBLICATIONS and PRESENTATIONS

Klich D. *Promoting Health Equity.* VA Illiana Health Care System Clinical Diversity Committee Diversity Workshop (2019).

Klich D. *Complementary and Integrative Health (CIH) Therapies for the Treatment of Psychological Distress.* VA Illiana Health Care System Psychology Internship Training Seminar (2019).

Klich D. *Pain Management 101.* VA Health Care System Psychology Internship Training Seminar (2018).

Klich D. *Ethical Considerations of the Integration of CAM Practices in Psychotherapy.* (submitted for publication)

Klich D, Gale S, Sturgill D, Berger S, Simpson P, Nugent, M. *Assessment of AED Programs in Wisconsin Schools: How are we doing protecting our children?* (submitted for publication)

Berger S, Campbell R, Ellison A, Klich D, Neumann-Schwabe R, Kessel M, Drezner J. *Saving Lives with School-Based CPR/AED Programs: Awareness, Education, Planning, and Partnerships*. Sudden Cardiac Arrest: Meeting the Challenge, The Joint Commission. 2011;47-54

Berger S, Campbell R, Ellison A, Drezner J, Klich D, Neumann-Schwabe R, Kessel M, and Wilson J. *Saving lives in schools: School-based CPR-AED Programs. Awareness, Education, Planning and Partnerships.* Abstract and Poster Presentation at American Heart Association Meeting, Chicago, Ill., (2010)

Klich D, Ellison A, Main D. *AEDs and Public Access Defibrillation Programs*. 5th Annual Parent Heart Watch Conference, Arlington, Texas (2010)

Klich D, Neuman-Schwabe R. *Implementing and Evaluating Your School's AED Program Using the Project ADAM Model and Skill Drill Instruction*. Wisconsin Association of School Nurses Spring Conference. Middleton, Wis. (2010)

Neumann-Schwabe R, Klich D, Murphy M K, Riojas, A. *Innovations in AED Programs: Community Partnerships*. National Association of School Nurses 42nd Annual Conference. Chicago, Ill. (2010)

Moderator/Presenter: *Implementing School-Based PAD programs* (pre-conference workshop). Emergency Cardiovascular Care Update – International Educational Conference and Exposition. San Diego, Cal. (2010)

Retreat Leader: PEO (International Philanthropic Education Organization) Chapter DT Annual Retreat. Cedar Valley Retreat Center, West Bend, Wis. (2011)

Editor: *Project ADAM: Automated Defibrillators in Adam's Memory – Public Access Defibrillation Implementation Manual: AEDs in Schools* v3.1 (2009)

Production supervisor: *Project ADAM Saves Lives* educational video (2008)

HONORS, SCHOLARSHIPS, FELLOWSHIPS, and AWARDS

Chancellor's Graduate Student Award Recipient 2013, 2014
Kuehnsiesen TNE Scholarship 2015, 2016, 2017

PROFESSIONAL ORGANIZATIONS

Educational Psychology Student Association Member 2013-present
Secretary 2013-14

Counseling Psychology Student Association Member 2013-present

American Psychological Association Member 2013- present
Divisions of Counseling Psychology, Health Psychology, Hypnosis, and Consulting Psychology

American Massage Therapy Association Member 2010-Present

VOLUNTEER AND SERVICE WORK

2013 Volunteer Staff, Camp Ujima, Children's Service Society of Wisconsin, Milwaukee, Wis. Utilized music therapy techniques to facilitate dialogue and healing among adolescents traumatized by gun violence.

2012 Creator/Teacher: Crazy, Wacky Science Club for young families. Bay View Community Center, Bay View, Wis.

2011-2013 Co-creator/Teacher/Coordinator: Mindfulness Meditation an 8-week course to reduce your stress and improve your health. Children's Hospital of Wisconsin/Medical College of Wisconsin

June 2010 Massage Volunteer, Trek 100, Waterloo, Wis.
Performed pre- and post-event sports massage on clients who participated in an endurance bike event

July 2010 Massage Provider, Washington County Fair, Grafton Wis.
Provided 10-20 min chair massage for fair attendees of all ages. Educated interested individuals in the process of becoming a massage therapist and the services that Wisconsin School of Massage Therapy provides.

TEACHING, RESEARCH and CLINICAL EXPERIENCE

August 2016- May 2017 Graduate Assistant
Medical College of Wisconsin, Wauwatosa, Wis

August 2013-May 2016 Graduate Assistant
University of Wisconsin- Milwaukee, Milwaukee, Wis.

August 2001-present Research Associate
Multimedia Research, Bellport, N.Y.

August 1997-December 1998 Instructor
Department of Biological Sciences, Purdue University, West Lafayette, Ind.

August 1997-September 1998 Graduate Assistant
School Mathematics and Science Center, Purdue University, West Lafayette, Ind.
.

June 1995-August 1997 Laboratory Technician
Hillenbrand Biomedical Engineering Center, Purdue University, West Lafayette, Ind.

January 1995-May 1995 Microbiology Teacher
Department of Biological Sciences, Purdue University, West Lafayette, Ind.

May 1994-August 1994 Laboratory/Field Intern
National Biological Survey, Porter, Ind.

1992-1993 Laboratory Assistant
Laboratory of Dr. Dennis J. Minchella, Purdue University, West Lafayette, Ind.

1992 Laboratory Technician
Clinipath Laboratories, Inc., Valparaiso, Ind.

1990-1991 Veterinary Assistant
Vale Park Animal Hospital, Valparaiso, Ind.