EXPLORING A CHANGE IN MEDITATION PRACTICE USING NOISE-CANCELING HEADPHONES

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ABSTRACT

Perceived stress is a rising health issue related to daily stressors. Cumulative effects of stress have physical, mental, and emotional consequences. Meditation is a safe, self-care activity with demonstrated effectiveness in reducing stress. One impediment to successful meditation practice is the ability to maintain focus.

The purpose of this pilot study was to explore the use of noise-canceling headphones to increase attention during meditation and reduce stress levels. Specific aims were to 1) explore the effectiveness of two types of meditation on the ability to transition into a meditative state, and 2) explore the effectiveness of two types of meditation on perceived stress levels.

The study was a mixed methods, crossover design. The sample consisted of employed adults, randomly divided into two groups. Two types of meditation were compared: 1) Zen Meditation and 2) a new method called Silent Heart Meditation, where noise-canceling headphone were utilized to eliminate external noise. One group practiced Zen meditation for the first two weeks and then Silent Heart for the next two weeks. The second group practiced Silent Heart for the first two weeks and then Zen for the next two weeks. Outcomes were measured using the Perceived Stress Scale (PSS), Mindfulness Attention Awareness Scale (MAAS), and a qualitative questionnaire.
Compared to pre-scores, mindfulness was significantly increased in both groups combined over four-weeks, indicated by significantly higher MAAS scores at mid ($p<.01$) and post ($p<.01$). Stress reduction was also significant in both groups combined, compared to pre-scores, indicated by PSS scores significantly lower at mid ($p<.001$) and post ($p<.01$), regardless of group. MAAS scores had a steeper increase when Silent Heart was tried first, but the difference was not statistically significant ($p=.438$). A significantly steeper decrease in PSS scores occurred when Silent Heart was tried first ($p=.03$). Qualitatively, most participants reported having decreased stress levels, and improved mindfulness, attention, and awareness.

Findings indicate that both meditation types improved focus and attention and reduced perceived stress levels, suggesting useful application for nursing practice. Silent Heart Meditation may assist with transition to attentiveness and stress reduction earlier than with Zen practice.
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# TABLE OF CONTENTS

Chapter 1 Introduction .................................................................................................................. 1  
   Description and Statement of Problem .................................................................................... 1  
   Background and Significance of Problem .............................................................................. 2  
   Organizational Needs Assessment ......................................................................................... 6  
   Research Question ............................................................................................................... 8  
   Theoretical Framework ...................................................................................................... 8  
   Definition of Terms ........................................................................................................... 9  

Chapter 2 Review of the Literature .......................................................................................... 10  
   Introduction to Search Criteria ........................................................................................... 10  
   Critique and Synthesis of Previous Evidence .................................................................... 13  
   Evaluation of the Evidence .................................................................................................. 14  
   Synthesis of the Findings .................................................................................................... 15  
   Recommendation Based on the Evidence .......................................................................... 16  
   Rationale for Project .......................................................................................................... 16  

Chapter 3 Methods ................................................................................................................. 19  
   Study Design ...................................................................................................................... 19  
   Population .......................................................................................................................... 21  
   Instruments ........................................................................................................................ 22  
   Procedures - Timeline ........................................................................................................ 24  
   Instrument Completion Process .......................................................................................... 26  
   Outcome Measurements and Data Analysis ....................................................................... 28
LIST OF FIGURES

Figure 1. MAAS scores over time by stress .................................................................32
Figure 2. PSS scores over time by sex ........................................................................33
Figure 3. PSS scores over time by marital status ........................................................33
Figure 4. PSS scores over time by number of children living at home .........................34
Figure 5. PSS scores over time by stress ....................................................................34
Figure 6. MAAS scores by group over time ...............................................................39
Figure 7. PSS scores by group over time ..................................................................41
LIST OF TABLES

Table 1. Participant Characteristics .................................................................30
Table 2. Amount of Meditation by Type of First Meditation.................................36
Table 3. Mean MAAS Scores by Time and Group..................................................37
Table 4. Mean PSS Scores by Time and Group......................................................40
Chapter 1

Introduction

With the demands of our current fast-paced society, life and daily stressors and the dynamics of the world, stress is omnipresent. The pernicious and cumulative effects of stress on the body can result in physical manifestations, emotional disturbance, and mental distress (Singh, Sharma, & Talwar, 2012). Perceived stress is a significant health issue and its prevalence is on the rise (The American Institute of Stress, n.d.). Unmanaged stress affects health outcomes, finances, work productivity, quality of life (QOL), and society as a whole. Meditation is a safe, self-care activity that has been shown to be effective in reducing stress levels (Wolever, et al., 2012). Perceived stress is a significant health issue that is on the rise (Anderson, et al., 2012). One of the impediments to successful meditation practice is the ability to direct attention and maintain focus during practice (Wolever, et al., 2012). The intent of this project was to explore the effectiveness of the utilization of noise-canceling headphones during meditation.

Description and Statement of Problem

Perceived stress is a major health issue in the United States (U.S.) because it negatively affects health, coping, relationships, and work productivity (American Psychological Association, 2007). Evidence shows that the number of individuals experiencing daily stress is increasing (The American Institute of Stress, n.d.). Stress in the biological context is defined as the body’s reaction to any type of demand (NIH, n.d.). Stress manifests through, mental, physical, emotional, and autonomic symptoms, subsequently influencing quality of life (QOL), and functioning. A moderate amount of stress can be beneficial by improving productivity, increasing energy (via the sympathetic nervous system), motivating, and boosting memory (NIH, n.d.). Conversely, as a detriment, it can result in feeling fatigued, anxious, nervous,
unmotivated, overwhelmed, angry, or unable to concentrate (NIH, n.d.). Once stress is internalized, the subsequent mind and/or body reaction will influence its resultant benefit or detriment. In a 2014 survey, frequent and specific symptoms that were reported included insomnia (42%), anger (37%), nervousness or anxiety (35%), loss of motivation or interest (34%), and depression and/or sadness (32%) (American Psychological Association, 2015). Further, stress impacts relationships; with reported yelling or becoming impatient with a spouse or partner (41%), and being short tempered with a co-worker (18%) (Anderson, et al., 2015). Stress impacts not only individuals themselves but also the people around them, and in a multitude of aspects of life. Because stress is a highly subjective phenomenon, defining, quantifying, and treating it poses a challenge (Anderson, et al., 2015). This problem affects many work environments, and as a result, productivity, safety, and retention. Stress is not only a national issue, but also of worldwide scope. There are benefits of employee stress management promotion for administrative personnel with regard to retention and recruitment of employees, financial aspects, QOL, and health outcomes.

**Background and Significance of Problem**

When stress is left unaddressed, it can lead to unhealthy coping mechanisms, unhealthy lifestyle habits, and health detriments. According to the 2014 Stress in America survey conducted by The American Psychological Association, 75% of Americans affirmatively responded to experiencing a minimum of one stress symptom within the prior month (Anderson, et al., 2015). This staggering statistic justifies the magnitude and significance of this problem. The prevalence of stress is rising as evidenced by the growing number of reported millennial and generation X individuals (Anderson, et al., 2015). It was also reported that stress affects relationships, emotions, and decision-making capabilities (Anderson, et al., 2015). Therefore,
stress can impact individuals, families, and entire communities behaviorally and emotionally. Because of this, there are increased medical costs, decreased productivity, and effects on others. Additionally, a substantial number of subjects admitted to unhealthy lifestyle behaviors as a result of feeling stressed. These included consumption of unhealthy foods, drinking alcohol, smoking, drug use, and watching television in excess (Anderson, et al., 2015). When stress is not dealt with effectively, there are consequences relating to work outcomes, quality of work, social interactions, self-care, and the ability to make ethical decisions.

Stress has shown to contribute to psychological and physical conditions including hypertension, cardiovascular disease, dermatological disorders, respiratory disorders, and overall, most organ systems (American Psychological Association, 2015). Likewise, reported stress increased with a diagnosis such as depression or obesity (American, 2012). Populations at high risk of experiencing stress include female gender, low-income families, millennial generation (younger population), the working population, and parents and caregivers, among others (American, 2012). Women have consistently reported higher levels of stress than men (Anderson, et al., 2015). Finances and work have consistently been the leading cause of stress in the U.S. population (American, 2007). Since the number of Americans experiencing stress is so significant, and with resultant health consequences, treatment options need to be explored. This study focused on the working population.

One example of an employed population that has been studied is nurses. A previous study concluded that nursing is one of the most stressful jobs (Roberts, Grubb, & Grosch, 2012). The effects of nursing stress not only affect the nurses, but also the healthcare organization. Evidence shows that stress negatively affects healthcare costs, retention and turnover, increases incidence of formal grievances and lawsuits, affects patient safety, job satisfaction, and patient outcomes
Therefore, the effects of stress are influencing healthcare organizations financially. The estimated cost to replace a registered nurse (RN) is two times an annual salary (Jones, 2005). The Joint Commission estimates the RN turnover rate at approximately 18-26%, with a cost of $62-67,000 per RN (Jones, 2005). Stress affects patient and RN safety, resulting in burnout and decreased alertness, thus compromising the ability to provide high quality care (Shanafelt, Bradley, Wipf, & Back, 2002). The nursing staff at any hospital are especially vulnerable to stress and therefore caregiver burnout (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002). The contributors for increased stress levels include increasing amount of workload, shortage of nurses, long hours of work, increased paperwork, time constraints and physician controlled work environments (Aiken et al., 2002; Bourbonnais, Comeau. & Vezina, 1999; Asuero et al, 2014; Fortney, Luchterhand, Zgierska, & Rakel, 2013). This evidence impacts and justifies a need for practice change regarding prevention and interventions for stress.

The 2014 Stress in America survey revealed that the most frequent self-stress management technique practiced by Americans is listening to music (44%) followed by exercising (43%), watching television (40%), and internet use (38%) (American, 2015). With the exception of listening to music, the above listed activities do not have documented health benefits. Currently, medication and psychological/emotional counseling are prescribed for clinically diagnosed consequences of stress, such as anxiety and depression. If anger is the main manifestation, anger management is suggested. Some advocate for behavioral changes such as exercise, yoga, and meditation. Since stress has been identified as a problem among the population at large, new and innovative treatment, management, and preventative health initiatives must be explored.
Recently, stress reduction programs (SRP) including mindfulness and meditation have been shown to be effective as a method to reduce stress among nurses (Kemper et al., 2011). More importantly, efforts that take up little time to effectively influence the adverse physiological effects of stress may be more attractive to the affected individuals. Regular aerobic exercise, while an effective method to deal with stress, needs to be done for a minimum of 25 minutes a day to reap the purported health benefits (Kemper et al., 2011). Meditation for as little as 10-15 minutes a day, three times per week may be very effective in reducing stress levels. (Dobkin & Zhao, 2010; Fortney, Luchterhand, Zgierska, & Rakel, 2013; Foureur, Kesley, Burton, Yu, & Crisp; 2016).

Buddhist Zen meditation is a major component of the practice of Buddhist monks in their daily lives. Mindfulness is a component of Buddhist meditation techniques. Buddhist spiritual teachings suggest that this practice brings freedom from suffering and dissatisfaction and facilitates happiness and joy to the practitioner (Chiesa, & Malinowski, 2011). This concept for the practice of meditation appears far-reaching with spiritual underpinnings than simply being a stress-reducing tool. Concerns have been raised as to whether the modern mindfulness based interventions are entirely consistent with the classical concepts of mindfulness as intended in the spiritual sense (Chiesa, & Malinowski, 2011). Additionally, a clear operative definition for “mindfulness” is an ongoing debate (Chiesa, & Malinowski, 2011). Therefore, a technique that does not have its origin in a spiritual will be more favorable.

Zen meditation originated during the 6th century (Religion Library, 2016). The environment, culture and living conditions of humanity have seen drastic changes in the past few centuries that have spanned the time between the origin of Zen Buddhism and modern times (European Environment Agency, 2016). It is questionable whether a technique that may have
been well suited to the living conditions at the time of its origin, is suitable for current living conditions of the Western civilization. For example, one of the main characteristics of Zen meditation is to be aware of the breathing, and the meditator is to detach from the external stimuli such as environmental noise and sounds. However, one could contest that the noisiest environment or surroundings for a meditator many centuries ago during the time Buddhist Zen meditation originated would be “ultra silent” compared to the noise pollution we face in the cities of Western countries with the presence of telephones, televisions, motor vehicles, airplanes, other household appliances, and noises, etc (Goines, & Hagler, 2007). This raises questions as to how successful the practice by research participants would be even if a westerner is adequately trained in the technique. Therefore, a technique that eliminates the need to dissociate one’s self from the external noise through awareness during the practice of meditation may be easier and more suitable for people living in modern times.

**Organizational Needs Assessment**

Two organizations in Scottsdale, Arizona were used for implementation of the project. Stress has been identified within each organization based upon anecdotal reports to the researcher by individuals at each site. Site one is a real estate investment firm in which employees were recruited to be study participants. Site two is a medical practice at which patients (all of whom are employed) were invited to participate. When conducting research within an organization it is essential that the organizations are aligned with the problem and support the research at all system levels (Donteje, 2007). Further, the problem that is the subject of research needs to be an organizational priority. This problem is important because it not only affects health outcomes negatively, but also workplace productivity, safety.
A SWOT analysis was carried out for both sites. Current strengths that were assessed for site one were: the available space which was used for the educational sessions, current policies congruent with this project, supportive administrators and stakeholders in regards to communication and alignment with the project, willingness to participate, and acceptance of meditation was a viable and safe intervention method. Weaknesses included; lack of participation, or compliance with the intervention requirements. An opportunity, meditation could be easily implemented into daily routines. A threat to the study was the potential for participant dropout.

In the second site, the following strengths were identified: stress is addressed during patient visits, and meditation is already encouraged. Weaknesses included the number of available participants for the study and the lack of current meditation instruction offered within the practice. Opportunities at this site included the ability to implement meditation instruction during patient visits and to teach meditation as a group. Meditation can be easily implemented into stress management. The threats included; possible patient discomfort issues if they participate, decline, or dropout of the study, and the time and support required.

As a leader, influential techniques to work through or avoid these barriers were implemented. These included educating management regarding the benefits of meditation and subsequent results of job retention and satisfaction, improved time management and patient safety, potential for improved quality of care and nursing self-improvement. Understanding the economic and health-related implications of stress may motivate management support for meditation training. Educating the staff regarding the benefit of meditation and implementing incentives for individuals to take part in the study helped overcome the barriers with regard to recruitment and retention of study subjects in the research.
Research Question

The research question is: Is the use of noise-canceling headphones during meditation practice more effective than Zen meditation in achieving a meditative state and in reducing perceived stress in employees? The population is adults working at one of two sites in Scottsdale, Arizona. The intervention of “Silent Heart Meditation”, a type of meditation intervention that utilizes noise-canceling headphones, was compared to a Zen meditation, which is a silent form of sitting meditation. The outcome measures were psychological parameters of stress and mindful awareness. Additionally, qualitative questionnaires (description of experience) were completed. The time frame was four weeks.

Theoretical Framework

The Health Belief Model (HBM) was used as a guiding framework and subsequent application of evidence into practice. Psychologists developed this model as a result of the unwillingness of individuals to take prevention measures (Janz & Becker, 1984). Within the HBM theoretical framework, individuals had an opportunity to take health forward actions with the adequate, realistic, and justifiable information that was given. Perceived susceptibility, severity, benefits, and barriers are the four constructs that make up this model (Bensley & Brookns-Fisher, 2009). The individual’s perception towards vulnerability and treatment was emphasized. This relates to the phenomenon of interest because employees are highly susceptible to stress and the subsequent ill health effects. The perceived severity of the impact and consequences of stress varied among different individuals. The perceived benefits were based upon autonomic and reported results. Perceived barriers were based upon the ability to carry out the intervention successfully, time allowance, and commitment of each individual to the intervention practice. The cues to action prompted the individual to take action. Lastly, self-
efficacy was important as the individual’s willingness to actively participate as instructed, and their level of confidence and motivation influenced their outcomes (Changing, 2016). In the Stress in America Survey, 35% of participants reported that they would make lifestyle modifications if they were diagnosed with a chronic disease (America, 2015). The primary motivators were the desire to improve symptoms (60%), reduce stress (45%), and improve self-esteem and image (41%). Each of these desires, as well as the chronic disease interplay with their perceived level of stress. The prevention intervention to reduce stress and its subsequent health risks was hypothesized to benefit the patient and serve as a primary prevention method. The theoretical framework structured and guided the project.

The HBM theoretical framework aligned with the PICOT clinical question and closely related to stress and the health forward initiatives that were taken. Employees were able to take a proactive healthcare approach to better control their reaction or internalization of stress. This framework was identified several times within the literature.

**Definition of Terms**

- **Attention**- A continuous flow of selected/relevant information (Sanger, Bechtold, Schoofs, Blaszkewicz, & Wascher, 2014).
- **Meditation**- Technique used to facilitate mind/body functions and symptoms through focus, and mindful thoughts, sensations, and feelings (Goyal, et al., 2014).
- **“Silent Heart Meditation”**- Meditation practice that utilizes noise-canceling headphones.
- **Perceived Stress**- “self-reported sensation of tension, irritability, nervousness, anxiety or sleeplessness associated with poor health, family relationships, living arrangements, finance, work and stressful life events” (Booth et al., 2015).
Chapter 2

Review of the Literature

Current literature for applicable and rigorous meditation studies were reviewed, along with psychological instruments for validity and applicability. This chapter summarizes the literature related to meditation as an intervention to explore its effect on stress, attention and focus stress, as well as measurement tools.

Introduction to Search Criteria

A search to collect relevant articles was conducted using the CINAHL, Cochrane Library, Embase, and Medline (PubMed) databases. An expert research librarian at the Dahlgren Library, Georgetown University assisted in the beginning stages of this search. The general key words used to search for articles were; meditation, mindfulness, stress, occupational stress, physiological stress, psychological stress, and an additional search term of “nurses”. These key words were used based upon the key elements of the PICOT question. The “Boolean” phrase was also used within the CINAHL and Medline searches. A Boolean operator is a mode to refine a search using the words “AND”, “OR”, “NOT” (University of Alaska, 2014). The specific search words used within the CINAHL and Medline databases were “meditation” “OR” “Mindfulness”, “AND” “stress” “OR” “occupational stress” “OR” “physiological stress” “OR” “psychological stress”. The term “OR” means that any combination of the search words will populate, and “AND” means all of the search words must be included. Additionally, the following limits were added to all searches; year 2011-2017, adult population, and English language.

To narrow the results of each literature search, inclusion and exclusion criteria were used to manually eliminate articles that were not relevant to the PICOT question. The inclusion criteria were related to meditation or mindfulness intervention, and/or employees, and/or patient-
oriented outcomes; stress, and/or QOL, and attention or focus. Exclusion criteria were students, unemployed, specific disease-oriented outcomes (ex. insomnia, cancer, posttraumatic stress disorder, attention deficit disorder, etc.), duplications, unavailability of article. Then to further narrow results, more specific inclusion and exclusion criteria were added. Inclusion criteria were specific to the type of meditation; Zen, transcendental, or mindfulness. Exclusion criteria were mindfulness methods specific to yoga, deep breathing, and tai-chi. After conducting searches in each of these databases, the following search term was added; “noise-canceling headphones”.

The total number of articles that resulted from the CINAHL search was 113. The search was further narrowed using an additional limitation of “systematic review” to identify quality evidence was used. This resulted in 12 articles, and of these, six were reviewed. The folder was further reduced by a cursory review to narrow and find applicable articles. This was accomplished by removing articles that did not meet the search term criteria, and further eliminated if the evidence was based upon opinion, or lacked rigor. This resulted in a total of 22 articles.

Within the Cochrane Collaboration data base, the key words used for the search were “meditation or mindfulness and stress” with a result of 17. The search was further narrowed by adding the limitation years of 2011-2016, with a result of 16. Of these articles, a reduction based upon applicability resulted in 3 articles. With the additional search term “noise-canceling headphones”, zero articles were retained.

Within the Embase database, a search was conducted using the “PICO” option. This search allows for input of population, intervention, comparison, and outcome. The search terms were “adults, meditation, and stress reduction”. This resulted in 58 articles. Next, the limitations of years 2011-2016, and adult population were added, with a result of 39. An option of
systematic review was not available. An additional limit of “randomized controlled trial” (RCT) was added, with a result of 18. Of these, six were added to a folder. Upon further appraisal five were rejected because they were not applicable, and the sixth was preliminarily accepted based upon the abstract, but the full article was unavailable.

A Medline (Pubmed) literature search was also carried out. The search terms mentioned above resulted in 4115 articles. This was further revised to “stress and meditation”, with a result of 1199 articles. This was further limited by publication year within the last five years, with a result of 603 articles. Next, the limitation of human species was added, with a result of 429 articles. When the only search words of noise canceling headphones were used, nine articles resulted. However, each of these nine utilized music therapy as the intervention. They were further reduced based upon applicability. Of the previous articles, five were relevant. The search term “healthy individuals” was added. This resulted in 132 articles, which was then narrowed to 22 based upon applicability. This was then narrowed to eight articles. An additional search term of “job performance” was added, and then reduced to two articles based upon applicability.

A search of the Pro Quest database was previously conducted for systematic reviews; 1 article specific to mindfulness and stress was located. The exact search terms are unknown as this review was obtained last semester. This systematic review will be critically appraised.

A total of 639 articles was initially yielded based upon the search terms “stress and meditation and/or mindfulness”. After narrowing the articles based upon inclusion and exclusion criteria to remain relevant to the PICOT question, a total of 49 articles was identified. These articles were further narrowed based upon the specific type of meditation and/or mindfulness and relevance. Most of the articles were then rejected if they were based upon opinion or were a
review article (not including systematic reviews). The final sample of literature that was located and relevant to the PICOT question was 15.

**Critique and Synthesis of Previous Evidence**

A comprehensive appraisal of the literature was necessary in order to identify reliable, valid, and applicable evidence. The literature search was aimed towards identifying a comprehensive compilation of articles that are high quality, minimize bias, and report findings were consistently positive. The literature was categorized based upon common themes, which were; positive effects of mediation practice, attentiveness during meditation practice, quality of life, recurring measurement tools, and high stress work environments.

**Positive Effects of Meditation Practice.**

Many studies that utilized meditative practices resulted in stress reduction, improved quality of life, improved work outcomes, ability to focus, and improved clinical symptoms including depression and anxiety (Bloise et al. 2016; De Vibe., 2012; Dickinson et al., 2009; Gauthier et al., 2015; Geary & Rosenthal, 2011; Kemper, K. J. 2015; Kozasa et al., 2012; Ravalier, Wegrzynek & Lawton, 2016, Santos et al., 2016, Wolever et al., 2012). The meditation practice was taught through single or multiple education sessions via in-person, internet, video, and/ or audio. Kemper (2015) concluded that immediate improvement in mindfulness can be achieved with brief online training.

**Stress Reduction.**

Multiple studies supported the benefit of meditation with regard to stress reduction. Wolever et al. (2012) conducted a randomized controlled pilot trial, which demonstrated that mind-body stress reduction interventions involving therapeutic yoga or mindfulness stress reduction positively impacted stress levels, sleep quality and autonomic balance in employees.
Another study by investigators at University of Texas, demonstrated that measured stress levels as well as self-reported stress levels were effectively reduced by Mindfulness Based Stress Reduction techniques (MBSR) up to one year post-intervention (Geary & Rosenthal, 2011). A Cochrane review by Dickinson et al. (2009) concluded that relaxation techniques may have small influence on reducing blood pressure although a definitive conclusion could not be reached due to the poor methodological qualities of the studies reviewed. On the other hand, a systematic review by Ravalier, Wegrzynek & Lawton (2016) from University of Bath concluded that mindfulness and meditation based interventions effectively and positively influenced psychosocial workplace health and work performance.

**Attention/Focus Improvement with Meditation Practice.**

Brandmeyer and Delorme (2016) found that with increased time and frequency of meditation practice, there was a reduction in mind-wandering. Kozasa et al., (2012), demonstrated that the practice of meditation resulted in increased sustained attention after training. Bloise et al. (2016) implemented a meditation intervention, which resulted in improved present moment awareness. Santos et al., (2016) studied the effects of meditation on nurses working in a hospital setting. The study concluded that both attention and awareness during the workday were improved. Wolever et al. (2012) concluded that mindfulness programs, including meditation may be as effective as stress levels were reduced, as well as improved awareness, and autonomic measures.

**Evaluation of the Evidence**

For the purposes of this appraisal, the SORT grading system was used. This acronym stands for strength of recommendation taxonomy (Ebell et al., 2004). This specific grading system uses a “1, 2, 3” numerical value to rate the quality of the evidence within the article.
There is an “A, B, C” grade to rate the strength of the overall literature recommendation (Ebell et al., 2004). For the purposes of this literature review, “attention” or “focus” was used interchangeably if mentioned within the article. Primary evidence and systematic reviews (SR) (secondary) were the only types of evidence accepted in identifying evidence. There is one additional secondary source that was utilized due to the applicability to stress and meditation (Smith, 2014).

**Synthesis of the Findings**

Overall, there is a plethora of research on mindfulness practices such as meditation, for stress reduction, in addition to symptom improvement, mental health, and improved quality of life. Buddhist Zen type meditation was a component of MBSR programs based on many of the studies reviewed herein. Substantial variations exist among the studies, in addition to a lack of rigor, based on the literature review that was conducted. The variations pertain to the variability of specific types of intervention, populations studied, the parameters evaluated, statistical methods used, and the tools used to assess the outcome in various publications. Additionally, most of the studies were not statistically significant. As a result of this disagreement, current guidelines are ambiguous about recommending meditative techniques for stress reduction to the population at large. However, from a clinical perspective, much of the evidence has shown that there is a positive effect on stress levels when a meditation intervention is incorporated into daily life. The degree and long-term effects however, are lacking evidence.

Unfortunately, much of the research is limited by the lack of long-term follow-up, size of the study, length of intervention and different teaching techniques, and teaching duration. Therefore, there are many gaps identified within the literature review. Additional gaps in the literature include the number of participants that continued the intervention after the study
completion, and long-term follow-up regarding the sustainment of positive meditation. Some of the hospital based MBSR programs have been implemented successfully such as the one at the University of Massachusetts Medical Center (Dobkin et al., 2011). This program was started 30 years ago for patients with chronic illness, and has shown promise with regard to stress management (Dobkin et al., 2011). While this has shown favorable results in an overall fashion albeit with its limitations as stated above, there is general consensus that MBSR programs such as those that incorporate Buddhist Zen meditation are useful with regard to physiological and psychological wellbeing in this and other developed countries.

**Recommendation Based on the Evidence**

Eleven studies were reviewed with regard to the positive effect of meditation. Four studies were reviewed with regard to meditation and stress reduction. Five studies were reviewed with regard to attention/focus improvement with meditation practice. Some studies reviewed, addressed more than one of the themes mentioned in this article. The level of evidence ranged from level 1-2. Based upon the overall quality, quantity, and consistency of the literature, the recommendation grade is a B (Ebell et al., 2004). While reported findings are not consistent and study limitations are identified, there is some evidence that the use of meditation as a stress prevention and management technique is safe and may be effective.

**Rationale for Project**

The purpose of this project is to compare the effects of a technique called “Silent Heart Meditation” to that of Buddhist Zen meditation. Research with regard to stress reduction and the utilization of meditation as a technique is an ongoing effort. Substantial inconsistencies exist based on the literature search that was conducted. The inconsistency pertains to the variability of specific types of intervention, populations studied, the parameters evaluated, statistical methods
used, and the tools used to assess the outcome in various publications. As a result of this inconsistency, current guidelines are ambiguous about recommending meditative techniques for stress reduction to a patient population at large. It may be beneficial to identify a technique that would foster elimination of some of the inconsistencies.

Although the evidence has shown that several types of meditation interventions are beneficial, it is not rigorous or statistically significant enough to justify building on it. A pilot study that compares the efficacy of the new technique called “Silent Heart Meditation” to that of well known and most studied Buddhist Zen meditation was carried out. The differences between the techniques addressed concerns that are contained in the above section. The “Silent Heart Meditation” intervention eliminated environmental noise and auditory input during meditation by using a noise-cancelling headphone. This may be a more suitable method for meditation, for the individual living with noise pollution in the modern world. Additionally, this technique does not originate as part of any religion and has no religious underpinnings. Therefore, it was suitable for participants from a wide variety of cultures, environments, and religions. Additionally, the new technique proposes mindful attention to the beatings of the heart during this silence, rather than breathing, potentially making it more feasible to transition into a meditative and mindful state.

Within the framework of the HBM, the meditation intervention influenced participant’s behavior in a health-promoting manner. The participants that took time to manage their health via commitment to practice meditation were able to reduce their stress levels. Participants received a presentation on the seriousness and risks of susceptibility to stress, effects of stress, lifestyle modifications to allow for increased time to dedicate to this proactive, and benefits of meditation during pre-recruitment. It was anticipated that it would motivate individuals to participate in the study. Some of the benefits of taking the time for meditation practice were
decreased stress and improved focus. Therefore, if participants modified their current behavior by taking a small amount of time each day for meditation, they were potentially able to benefit. The barriers to practice daily meditation were time constraints, or current stress from their job or daily life that prevented them from initiating the practice, or lack of motivation. This was addressed by presenting the practice as just a short length of time daily. Participants learned the benefits of meditation, as well as participated in meditation during the educational training session. The informational and training sessions cumulatively served as motivation for individuals to participate and adopt this self-efficacy. Therefore, during each interaction with participants, perceived barriers, threats, benefits, and self-efficacy behaviors were presented and reviewed in order to influence participant’s perceptions and likelihood to engage in this health promoting activity.

The project was appealing to employees because it was easily implemented intervention method without anticipated side effects or harm, devoid of religious underpinnings, and was suitable for modern noisy environments. Many individuals could easily identify that they are stressed, and per the evidence, management and outcomes are ineffective. Because they were stressed, this intervention was appealing, and therefore motivated them to implement a new intervention as a means to manage or decrease their stress levels. In-turn, this improved their quality of life, health, and enhanced work outcomes.
Chapter 3

Methods

The Health Belief Model (HBM) was used as the framework for this project. The design, implementation and plan, sample recruitment and selection process, meditation intervention procedures, measurement instruments, processes, and approach to protection of human subjects are described in this chapter.

Study Design

The design for this project was an exploratory, mixed method, pilot study that used an adaptation of a crossover quasi-experimental design. Two types of meditation were compared to evaluate the self-reported ability to focus during meditation. The two types of meditation were traditional Buddhist Zen meditation and a new method of meditation called Silent Heart Meditation. Silent Heart Meditation utilizes noise-cancelling headphones to eradicate external auditory input to the brain, resulting in the inability to hear the surroundings and enhancing the individual’s ability to focus. Zen meditation is a silent form of meditation where the room is quiet but the practitioner can hear the surrounding noises. The new meditation method was being compared for superiority in improving the ability to focus.

In this crossover study, the meditation interventions for these groups were switched halfway through the intervention phase (after two weeks). The convenience sample of participants were assigned to one of two groups. The subjects who were engaged in Zen meditation first were named group Z. The subjects who were engaged in Silent Heart Meditation first were named group S. Group Z engaged in Zen meditation for the first two weeks. At the end of the two-week time period, Z group then crossed-over and underwent pre-intervention meditation training for Silent Heart Meditation and subsequently engaged in the two-week Silent
Heart Meditation. Likewise, group S engaged in Silent Heart Meditation during the first two weeks, and then, at the end of the two-week time period, S group underwent pre-intervention meditation training for Zen meditation and subsequently engaged in the two-week Zen meditation practice. This allowed each group to experience both types of meditation. Further, this crossover design allowed for participants to serve as their own control, offering a qualitative perspective related to their personal experience and outcomes. Additionally, the participant groups were compared to each other.

The research aims of the study were:

1) to explore the comparative effectiveness of Silent Heart Meditation and Zen meditation on the ability of individuals to focus or transition into a meditative state;

2) to explore the comparative effectiveness of Silent Heart Meditation and Zen meditation on perceived stress levels.

The research question is:

Is the use of Silent Heart Meditation more effective than Zen meditation in achieving a meditative state and in reducing perceived stress in employees?

Outcome measures of effectiveness included self-reported psychosocial parameters of stress, mindfulness attention, and a description of experience. The use of noise-canceling headphones not only eliminates external auditory noise, but it allows for the practitioner to hear their own heart beat. The focus point during this practice is one’s own heartbeat, versus focus on breathing, mantra, imagery, or counting. This will allow the practitioner to transcend into a deeper level of self-awareness.
**Human Subjects Review.**

Approval by the Georgetown University Institutional Review Board (IRB) was received prior to implementation of study to ensure protection of the human subjects of the research.

**Population**

The CEOs from two different sites were approached with rationale and aim for this project. Permission was obtained for site participation and participant recruitment. Site one is a real estate investment firm where employees were recruited and site two is a medical office where patients were recruited.

The population consisted of individuals residing in a city in the southwest U.S. and working in one of two pre-selected sites. Inclusion criteria were adults age 18-75, ability to sit for 20 minute duration of time, ability to breathe deeply, willingness to learn mediation and practice as stipulated in the study protocol, able to understand, read, and speak English language and sign a consent form, able to attend one of the education session, willingness to devote 20 minutes daily for the meditation intervention, willingness to complete the questionnaires within the timeframe, and employed full-time or part-time.

Exclusion criteria included; daily meditation practice of any form for length of time greater than eight weeks or already participating in a meditation or mindfulness study, self-reported severe or uncontrolled medical condition, inability to sit for 20 minutes or breathe deeply, unable to attend the educational sessions, no access in internet, and unstable vital signs including blood pressure greater than 159/99mmhg, heart rate greater than 99bpm, or respirations greater than 20 per minute on measurement obtained at the time of consent by the investigator. Inclusion and exclusion criteria were reviewed at the time of consent.
This pilot study enrolled 21 participants: 11 in Zen group and 10 in Silent Heart group. The small sample size allowed for more structure and organization and would allow for the testing of the feasibility of this type of meditation for employees.

**Instruments**

Two validated instruments were utilized to measure intervention outcomes. These were the Mindfulness Attention Awareness Scale (MAAS) (Appendix A) and the Perceived Stress Scale (PSS) (Appendix B). In addition, participants completed a demographic questionnaire and an open-ended, qualitative questionnaire (Appendix C).

**Mindfulness Attention Awareness Scale.**

Permission to use the Mindfulness Attention Awareness Scale is not required as the scale is in the public domain (VCU, n.d.). This 15-item scale assesses characteristics of mindfulness related to attention, consciousness, and observation (VCA, n.d.). This tool was used to assess present moment awareness (focus) in a study aimed at increasing awareness and acceptance (Bloise, Andrade, Machado, & Andreoli, 2016). This tool which has been tested for validity and reliability (Brown & Ryan, 2003; Carlson & Brown, 2005), has also been used in multiple meditation studies (Barrett et al., 2012; De Vibe, Bjorndal, Tipton, Hammerstrom, & Kowalski, 2012; Dobkin, et al., 2010; Gauthier, Meyer, Grefe, & Gold, 2014. The internal consistency was 0.87 (Carson & Brown, 2005). This tool will aid in the measurement of mindfulness and the ability of the individual to get into a meditative state. The tool takes approximately ten minutes to complete.

**Perceived Stress Scale.**

The Perceived Stress Scale is a ten-item measurement tool that assesses the degree to which an individual perceives an event as stressful (Cohen, Kamarck, & Memslstein, 1983).
Permission to use this tool is not required, as the scale is in the public domain (Friends National Resource Center, 2006). This instrument has been used in numerous meditation studies (De Vibe, Bjorndal, Tipton, Hammerstrom, & Kowalski, 2012; Dobkin, et al., 2010; Fortney et al., 2013; O’Leary et al., 2015; Prasad et al., 2011; Santos, Kozasa, Carmagnani, Tanaka, Lacerda, & Nogueira- Martins, 2016; Singh et al., 2012). Multiple correlations and consistencies were found among studies that utilized this tool to assess stress levels with different variables, and aided in its validation (reliability 0.72 and test-retest reliability was 0.55). (Cohen et al., 1983). This instrument has been utilized by the Center for Disease Control (CDC) and has been cited in multiple articles. The PSS will be utilized in this study to measure the stress reduction outcome. This instrument will aid in the measurement of stress at different intervals during the study. This likert-like scale has five response options from zero- four; zero= never- four= very often. The PSS associates life events with stress measures and anxiety (Prasad et al., 2011). Specifically, it was developed to measure the “degree to which individuals appraise situations in their life as stressful” (Cohen et al., 1983). The questions are about stress in general versus geared towards a specific event (Lee, 2012). A systematic literature search resulted in 19 articles which exhibited internal reliability, validity, and consistency (Lee, 2012). The PSS is an established, short, and user-friendly tool for use in general populations (Lee, 2012). The PSS takes approximately five minutes to complete.

**Demographic Questionnaire.**

Demographic information was collected after the recruitment phase of the study (Appendix D). This information included: age, sex, education level, marital status, number of children living at home, career type, and email address. Additionally, a preliminary “yes” or “no” screening question will be “Do you consider yourself to be stressed?” This question did not
exclude any participants. The demographic questionnaire took approximately three minutes to complete.

**Daily Participation Log.**

During the intervention phase, each participant completed a daily log (Appendix E). The participant daily log included check boxes for daily participation, along with the time of day that the meditation was started and length of practice time. This aided in measuring adherence. The daily log took approximately one minute to complete.

**Description of Experience Questionnaire.**

An open-ended questionnaire was completed twice per week during the intervention phase. This included information regarding the participants experience during the time of meditation.

**Procedures - Timeline**

**Pre-recruitment.**

Two weeks prior to the start of recruitment, a live presentation took place at site one to elicit potential participant interest. This 15-minute presentation, at which participants were present, consisted of project background, purpose and what the participants will be expected to do and the total amount of time spent in the activities, including the training and data collection. There was also an announcement for a raffle prize at the completion of the intervention.

**Recruitment.**

During the recruitment phase, interested participants replied to the principle investigator (PI) by email. Prior to any data collection, individual meetings were set up for each participant to consent. During this meeting a demographic screening form and basic medical screening questions were asked, but not recorded, to ensure that inclusion and exclusion criteria were met.
Next, a healthcare provider obtained vital signs. This enhanced safety measures and supported exclusions if necessary. Initial data collection questionnaires were completed at that time if all inclusion criteria were met. PI contact information was given to each participant via a business card at the time of consent and with all email communications.

The volunteer recruitment phase occurred over a one-month period. During the recruitment phase, a flier with study details was distributed to each employee during a staff meeting at site one. Additionally, the flier was individually emailed and placed within the break room. For site two, patient emails were sent in addition to a posted flier within the office. The email and flier included a brief introduction to the project, duration of participation time, dates, and contact information. The recruitment phase will end once the required sample size is achieved, or at the one-month period. Following recruitment, and preliminary screening, the consent process took place. Additionally, a prize for participants that completed the intervention and submitted all required documentation was raffled off at the end of the intervention phase.

**Pre-intervention Meditation Training.**

Before the beginning of the intervention, the respective pre-intervention meditation training took place. The participants were randomly placed into one of two groups. Group Z was first trained in Zen meditation and then practiced this technique for the next two-weeks. Group Z then attended training for Silent Heart Meditation, and practiced in it for the next two weeks. Likewise, group S first learned Silent Heart Meditation, and then Zen meditation after two weeks. The respective pre-intervention meditation training for crossing over into the second two-weeks took place on the last day of the first two-weeks (day 14).

A one-day training session was held for each group prior to the start of each meditation intervention. There was a second educational session per group, held only for participants who
could not participate in the first session. During the sessions, a certified meditation instructor taught the meditation technique. The same instructor was used for all educational sessions. Each educational training session was approximately 1.5 hours. All participant questions were also answered during this time. Instructions for the intervention were verbalized. The PI was available via email and phone throughout the intervention time periods for any additional questions.

**Instrument Completion Process**

**Instruments.**

During the initial education session, each participant completed the MAAS and the PSS on paper at the location of the first training session. They also completed the same questionnaires at the end of week two (intervention mid-point), week four (intervention conclusion), and submitted the completed questionnaires by email. The questionnaires were marked Z1, Z2 or S1, S2 based upon the group (Zen or Silent Heart Meditation) and time (first two weeks or second two weeks) of assigned intervention. This served as a data security measure. The pre-intervention questionnaires were completed on paper and collected in-person and the subsequent questionnaires were administered via email.

**Daily Participation Log.**

Each participant was instructed to complete a daily log documenting participation and length of practice time.

**Description of Experience.**

A qualitative questionnaire was completed on Wednesday and Saturday of each week during the intervention phase. The questionnaire was completed at the end of the meditation on the respective days. The questionnaires were emailed to participants the day before the
completion day. This was completed and submitted via email. The questionnaires were submitted by the end of the day.

**Meditation Descriptions.**

The meditation was practiced independently each morning at home for 20 minutes. The intervention took place for a total of four weeks; two weeks for the Zen meditation intervention and two weeks for Silent Heart Meditation.

**Loaned Headphone Process.**

The individual subjects received noise-canceling headphones to use during the period of the study. They were provided with the headphones on the day of training. The headphones were returned to either site one or site two on the last day of their two-week intervention period. There were extra headphones available in case participants forget to return their headphones by the assigned due date. The headphones were sanitized and then given to the next group during their education session. The headphones were returned after the conclusion of the intervention phase.

**Reminders.**

After the initial education training session, a daily text reminder was sent to each participant reminding them:

- To practice their daily meditation
- To complete and return the description of experience questionnaire on the respective days
- About their next intervention training for the second phase, sent the day before the two-week period is completed
- Submit their paper form daily log
- To return their loaned headphones at the end of the intervention phase
**Outcome Measurements and Data Analysis**

The primary goal of this project was to compare the effectiveness of two types of meditation techniques in improving focus to achieve a meditative state. The expected outcomes were:

1) Increased focus and mindfulness attention, as measured by MAAS scores
2) Reduced perceived stress as assessed by the tool PSS.

The data was collected at multiple time point intervals during the study: 1) pre-meditation; 2) midway through the intervention phase (two-weeks); and 3) at the conclusion of the meditation intervention. The two groups; Z and S were compared at mid-intervention and after completing the two types of meditation.

The ANOVA with repeated measures and chi square independence statistical tests were used. The PI met with the statistician to discuss the specific type of data analysis. Descriptive statistics were used to analyze demographic information (Connelly, 2013). Each of the questionnaires were examined for consistencies and any missed answers. Each subject was assigned a number in order to protect their identity, and data was reported anonymously. Themes were identified within the qualitative questions.

Research with regard to the use of meditation as a stress reduction method has expanded in recent years and continues to expand, with increases in concern about the role of stress in individual and population health and interest in effective approaches to stress reduction. This project was a pilot study to explore the comparative effectiveness of two mediation methods for stress reduction, using a convenience sample and a crossover approach to the quasi-experimental design.
Chapter 4

Results

The research question explored in this study was: Is the use of Silent Heart Meditation more effective than Zen meditation in achieving a meditative state and in reducing perceived stress in employed adults?

The specific aims of the study were:

1) To explore the comparative effectiveness of Silent Heart meditation and Zen meditation on the ability of individuals to focus or transition into a meditative state;

2) To explore the comparative effectiveness of Silent Heart meditation and Zen meditation on perceived stress levels.

Participants

Twenty-one adults voluntarily enrolled. One participant practiced for less than two-weeks and then withdrew, therefore, the participant’s data was excluded from data analysis. The participants were randomly assigned to one of two groups to begin the meditation practice. There were ten participants in each group, in which they participated in two weeks of one type of meditation, followed by another two weeks of the other type of meditation. Therefore, Z group started with two weeks of Zen meditation followed by two weeks of Silent Heart Meditation. This was completed in the same manner for S group; started with two weeks of Silent Heart Meditation followed by two weeks of Zen meditation respectively. Twenty participants completed the study requirements, practicing Zen meditation for two-weeks and then practicing Silent Heart Meditation for two-weeks or vice-versa.

One of the participants in Z group reported having positive effects from Zen meditation. However, after switching to Silent Heart Meditation the participant stated that “the silence with
use of the headphones caused anxiety”. He wanted to continue participating in the research so he
switched back to Zen meditation for the remainder of the study. The data was tested with his
results included and excluded and his purposeful switch had no effect on the statistical outcomes,
so the participant’s data was included in the final analysis.

Table 1. Participant Characteristics.

<table>
<thead>
<tr>
<th></th>
<th>Total (n=20)</th>
<th>Zen first (n=10)</th>
<th>Silent Heart First (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-30</td>
<td>15.0</td>
<td>20.0</td>
<td>10.0</td>
</tr>
<tr>
<td>31-40</td>
<td>30.0</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>41-50</td>
<td>10.0</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>51-60</td>
<td>30.0</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td>61-70</td>
<td>15.0</td>
<td>20.0</td>
<td>10.0</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>35.0</td>
<td>50.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Female</td>
<td>65.0</td>
<td>50.0</td>
<td>80.0</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>25.0</td>
<td>30.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Married</td>
<td>60.0</td>
<td>60.0</td>
<td>60.0</td>
</tr>
<tr>
<td>Divorced</td>
<td>15.0</td>
<td>10.0</td>
<td>20.0</td>
</tr>
<tr>
<td><strong>Children at Home</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>50.0</td>
<td>60.0</td>
<td>40.0</td>
</tr>
<tr>
<td>1</td>
<td>25.0</td>
<td>20.0</td>
<td>30.0</td>
</tr>
<tr>
<td>2</td>
<td>10.0</td>
<td>20.0</td>
<td>0.0</td>
</tr>
<tr>
<td>3</td>
<td>10.0</td>
<td>0.0</td>
<td>20.0</td>
</tr>
<tr>
<td>4</td>
<td>5.0</td>
<td>0.0</td>
<td>10.0</td>
</tr>
<tr>
<td><strong>Stress (Yes)</strong></td>
<td>85.0</td>
<td>80.0</td>
<td>90.0</td>
</tr>
</tbody>
</table>
Statistical analysis was completed using chi square tests of independence to compare the demographic information, and ANOVA with repeated measures to evaluate outcome measures of the PSS and MAAS.

**Demographics.**

Using chi square tests of independence to compare groups, there were no significant differences in any of the participant characteristics between Z group and S group. Because of the small sample, interactions between the two groups and demographic characteristics were unable to be tested. ANOVA with repeated measures was run to compare MAAS and PSS scores by age, gender, marital status, number of children, and stress. For MAAS, no significant differences existed by age, gender, marital status, or number of children in MAAS over time (Appendix F). There was a marginally significant difference in stress, $F(1, 18) = 4.29, p = .053$, with those who said yes to stress, having smaller increases in scores over time, than those who said no (Figure 1).

There were significant differences by sex in PSS scores, $(F(1, 18) = 6.46, p = .020)$. Females had consistently higher scores than males at all three times (Figure 2). Of note, there were almost twice as many female participants as males.

There was no significant main effect of marital status, but there was a significant interaction between marital status and time, $F(1, 18) = 5.59, p = .001$. Single people had continuously decreasing scores on PSS. Those who were married or divorced had a decrease from pre to mid, but increased post (Figure 3).

There was no main effect of the number of children on PSS scores. There was a significant interaction between number of children and PSS scores, $F(1, 18) = 4.87, p = .003$. 


Those with no children had continuously declining PSS scores from pre to post; those with any children living at home had decreasing scores from pre to mid, but increased post (Figure 4).

There was a marginally statistically significant main effect of stress on PSS scores, $F(1, 18) = 4.35, p = .051$. Those with stress had consistently higher scores on PSS at all times than those who said no to stress (See Figure 5).

There were no significant differences by age group in PSS scores (Appendix G).

![Figure 1. MAAS scores over time by stress.](image)
Figure 2. PSS scores over time by sex.

Figure 3. PSS scores over time by marital status.
Figure 4. PSS scores over time by number of children living at home.

Figure 5. PSS scores over time by stress.
Compliance with Meditation Practice

The requirement was to practice meditation daily for 20 minutes, for a total of 28 days. During the first 14 days of intervention, 70% of the participants meditated all 14 days. The minimum number of days of meditation was 10. During the second 14 days of intervention, 75% of the participants meditated all 14 days, with 11 as the minimum days of meditation. Over the entire 28-day period, 55% of the participants meditated every day, 10% meditated 27 days, 10% 26 days, 20% 25 days, and 5% 24 days. There were no significant differences between the groups with the type of meditation practiced.

The Z group averaged slightly more days of participation than S group. This difference was greater in the 2nd phase, when Z group averaged almost one day more of practice when they switched to Silent Heart than S group when they switched to Zen. The differences were not statistically significant, however. The amount of time spent meditating on days of participation did not differ between groups. Note that meditation was almost always in the morning. Only three meditation sessions of the 533 mediation sessions that occurred during the 28 days took place in the afternoon/evening.

All but two of the participants meditated for 20 minutes each time they meditated. One participant had meditation sessions of 15 minutes once and one meditated only 15 minutes 4 times. Mean length of meditation was 19.94 (SD = 0.18).

There were no correlations between number of days of meditation or average length of meditation and MAAS or PSS scores.
Table 2. Amount of Meditation by Type of First Meditation.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Zen first</th>
<th>Silent Heart first</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Days of Participation, First 2 weeks</td>
<td>13.35 (1.18)</td>
<td>13.40 (1.08)</td>
<td>13.30 (1.34)</td>
</tr>
<tr>
<td>Daily Length of Time, First 2 weeks</td>
<td>19.91 (0.33)</td>
<td>19.86 (0.45)</td>
<td>19.96 (0.11)</td>
</tr>
<tr>
<td>Days of Participation, Second 2 weeks</td>
<td>13.45 (1.05)</td>
<td>13.90 (0.32)</td>
<td>13.00 (1.33)</td>
</tr>
<tr>
<td>Daily Length of Time, Second 2 weeks</td>
<td>19.95 (0.20)</td>
<td>20.00 (0.00)</td>
<td>19.91 (0.29)</td>
</tr>
<tr>
<td>Days of Participation, Total</td>
<td>26.80 (1.67)</td>
<td>27.30 (1.06)</td>
<td>26.30 (2.06)</td>
</tr>
<tr>
<td>Daily Length of Time, Total</td>
<td>19.94 (0.18)</td>
<td>19.93 (0.23)</td>
<td>19.94 (0.13)</td>
</tr>
</tbody>
</table>

Outcome Measures

Comparison of Groups and Expression of Scores.

The timing of scores are expressed as “pre” indicating prior to beginning the study, “mid” indicating the mid-point just before crossing over to the next type of meditation and “post” indicating post study. The scores are expressed as mean value ($M$) with standard deviation ($SD$).

The $Z$ group completed their 14-day Zen meditation practices and crossed over to Silent Heart Meditation for the next 14 days, and the $S$ group finished their first 14 days of Silent Heart meditation and crossed over to Zen meditation for the next 14 days. Statistical analysis for MAAS and PSS scores was performed within each group for the three; “pre, “mid”, and “post” time points and between groups for the same time points. Additionally, analysis was performed for both groups combined.
Mindfulness Attention Awareness Scale.

The first specific aim was to explore comparative effectiveness of Silent Heart meditation and Zen meditation on the ability of individuals to focus or transition into a meditative state as assessed by MAAS.

Comparison of Influence of the Two Meditation Practices on MAAS.

Mean MAAS scores by time and group are given below in Table 3. When both groups were combined (total) mean MAAS scores differed significantly over the study period, Wilks Lambda = .435, F(2, 17) = 6.5, p < .01. This was tested using repeat measures ANOVA with type of first meditation as the between subjects factor (grouping variable). Post hoc testing indicated that scores were significantly higher at mid (p < .01) and post (p < .01) than at pre-meditation, using Bonferroni correction, regardless of which type of meditation was started first. There was no statistically significant difference between mid and post scores for total group (Table 3).

Table 3. Mean MAAS Scores by Time and Group.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre M (SD)</th>
<th>Mid M (SD)</th>
<th>Pre-mid p value</th>
<th>Post M (SD)</th>
<th>Pre-post p value</th>
<th>Mid-post p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Z group (n = 10)</td>
<td>56.4 (8.4)</td>
<td>61.8 (13.0)</td>
<td>NS</td>
<td>65.4 (10.2)</td>
<td>&lt; .05</td>
<td>NS</td>
</tr>
<tr>
<td>#S group (n = 10)</td>
<td>53.7 (9.3)</td>
<td>62.6 (9.5)</td>
<td>&lt; .01</td>
<td>60.4 (10.8)</td>
<td>&lt; .05</td>
<td>NS</td>
</tr>
<tr>
<td>Total (n=20)</td>
<td>55.1 (8.7)</td>
<td>62.2 (11.1)</td>
<td>&lt; .01</td>
<td>62.9 (10.5)</td>
<td>&lt; .01</td>
<td>NS</td>
</tr>
</tbody>
</table>

*Practiced Zen for first two weeks and crossed over to Silent Heart for last two weeks.
#Practiced Silent Heart for first two weeks and then crossed over to Zen for last two weeks.

M=Mean; SD=Standard deviation.

For Z group, no statistically significant difference was observed when scores were compared pre to mid (p=NS) but a statistically significant difference was observed pre to post (p<.05). No significance was observed when mid to post scores were compared (p=NS). The S
group on the other hand had statistically significant difference for both pre to mid ($p<.001$) and pre to post ($p<.05$) comparison but no statistically significant difference ($p=NS$) for mid to post comparison.

There was no significant interaction between MAAS score timing and group, Wilks Lambda = .914, $F(2, 17) = 0.8$, $p > .05$. Z group showed continually rising scores from pre to mid to post testing and S group showing a rise in MASS score from pre to mid, but drop in scores from mid to post (when the group switched to Zen) suggesting that the Zen meditation may not have been as effective (Figure 6) even though there was overall improvement when pre and post scores were compared for this group (Table 3). Even though Silent Heart Meditation had statistically significant results in the pre to mid period ($p<.01$) compared to Zen meditation during the same period ($p=NS$), between group analysis did not reach statistical significance ($p=.438$) for superiority during this period.

In regard to the first study aim - to explore the comparative effectiveness of Silent Heart Meditation and Zen meditation on the ability of individuals to focus or transition into a meditative state - the findings suggest that Silent Heart meditation, while not superior to Zen meditation in influencing an individual’s ability to focus and transition into meditation, is as effective as Zen meditation. It is notable (Figure 6) that Silent Heart Meditation produced a steeper transition compared to Zen meditation as measured by MAAS in the first two weeks.
The second specific aim was to explore the comparative effectiveness of Silent Heart meditation and Zen meditation on perceived stress levels.

**Comparison of Influence of the Two Meditation Practices on PSS**

Mean PSS scores by time and group are given below in Table 4. When both groups were combined (Total) mean PSS scores differed significantly over time, *Wilks Lambda* = .178, *F*(2, 17) = 39.3, *p* < .001. This was tested using repeat measures ANOVA with type of first meditation as the between subjects factor (grouping variable). Post hoc testing indicated that scores were significantly lower at mid (*p* < .001) and post (*p* < .01) than at pre-meditation, using
Bonferroni correction, regardless of which type of meditation was started first. There was no statistically significant difference between mid and post scores for either group (Table 4).

**Table 4. Mean PSS Scores by Time and Group.**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre M (SD)</th>
<th>Mid M (SD)</th>
<th>Pre-mid p value</th>
<th>Post M (SD)</th>
<th>Pre-post p value</th>
<th>Mid-post p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Z Group (n = 10)</td>
<td>20.5 (6.2)</td>
<td>16.3 (6.8)</td>
<td>&lt; .01</td>
<td>13.9 (6.7)</td>
<td>&lt; .05</td>
<td>NS</td>
</tr>
<tr>
<td>#S Group (n = 10)</td>
<td>22.5 (7.3)</td>
<td>14.9 (5.6)</td>
<td>&lt; .001</td>
<td>19.9 (7.0)</td>
<td>&lt; .05</td>
<td>NS</td>
</tr>
<tr>
<td>Total (n=20)</td>
<td>21.5 (6.6)</td>
<td>15.6 (6.1)</td>
<td>&lt; .001</td>
<td>16.9 (7.3)</td>
<td>&lt; .01</td>
<td>NS</td>
</tr>
</tbody>
</table>

*Practiced Zen for first two weeks and crossed over to Silent Heart for last two weeks.

#Practiced Silent Heart for first two weeks and then crossed over to Zen for last two weeks.

*M=Mean; SD=Standard deviation.

With regard to PSS scores, both groups had statistically significant results. For Z group, a statistically significant difference was observed when scores were compared at pre to mid time point (*p*<.01) and at pre to post time point (*p*<.05). No significance was observed when mid to post scores were compared (*p*=NS). The S group also had statistically significant difference for both pre to mid (*p*<.001) and pre to post (*p*<.05) comparison but no statistically significant difference for mid to post comparison (*p*=NS).

There was a significant interaction between PSS score timing and group, *Wilks Lambda* = .406, *F*(2, 17) = 12.4, *p* < .001, with the Z group scores continually dropping from pre to mid to post testing. The S group showed a drop in PSS score from pre to mid, but raised scores from mid to post (when the group switched to Zen) suggesting that the Zen meditation may not have been as effective (Figure 7), even though there was overall improvement when pre and post scores were compared for this group (Table 4). When the pre to mid period for both groups were considered, both groups not only had statistically significant results with regard to PSS but also
had statistical significance in suggesting Silent Heart superiority ($p<.03$), when between group analysis was performed for this time period.

Therefore, in regard to the second aim – to explore the comparative effectiveness of Silent Heart Meditation and Zen meditation on perceived stress levels - the findings suggest that Silent Heart meditation may not only be as effective as Zen meditation in reducing perceived stress levels as measured by PSS scores but may also be superior to Zen meditation.

**Figure 7.** PSS scores by group over time.
Description of Experience

The qualitative responses were examined for themes. Many responses in both groups were similar in that they found this experience to be helpful in reducing stress levels and improving focus. The majority of participants described feelings of “calm”, “peace”, “appreciation”, and “relaxation”. During the first week, multiple individuals reported feeling no change, but by week two both groups reported improved attention, focus, and more easily identified stress triggers. However, two of the individuals who started with Silent Heart meditation reported being able to “get into a meditative state quickly” and “time passes quickly” in the first week.

Themes

Emotions.

Emotions of restlessness, anxiety, and frustration were expressed intermittently by a few. However, most those emotions were reported to be correlated to events going on in their life, changes, disease, job, and relationships. Several reported these emotions as a result of the 20-minute length of time. The majority reported the time going faster after practicing meditation for 2-4 weeks. Two participants specifically reported that they felt less anxiety with Silent Heart meditation.

Distractions.

More distractions were reported with Zen meditation such as noise, pets, air conditioners, and voices. Distracting thoughts was reported more often with Zen meditation. One participant reported that after switching from silent heart meditation to Zen she had to turn on a white noise machine, as she was unable to focus without complete silence. A few participants reported that specifically “Silent Heart blocked noise” and “could hear my heart beat”. They did not expand
on that experience. Several participants who started with Silent Heart mediation reported “less distracted” by the end of week 1. Two participants from the Zen group reported “less distracted” during the 2\textsuperscript{nd} week. A participant reported sometimes “distracted by finding my heart beat when I lose it”.

**Engagement.**

Responses were very positive about continued participation in the study. Responses such as “I enjoy meditation and want it to become a habit”, “I like my energy when I am participating in meditation and people respond differently to me”, “I am enjoying it”, “it helps manage my stress” it seemed that most of the participants enjoyed participating. Additionally, most of the 12 participants reported wanting to incorporate meditation practice in their everyday life as a way to control feelings, manage stress in a healthy way, and finding peace and calm within. The element that was consistent was the participants’ attempts to develop a consistent habit.

**Handling Stress.**

As the experience progressed, participants began to report being more objective when encountered with a stressful situation. Stress triggers were more easily identified as the participation progressed. As participants became more mindful, they were able to handle stressful situations at a different level of intensity. Fourteen participants reported focusing on deep breathing and letting.

**Time Constraints.**

It appears that each week’s progress was different based on work, daily life and travel schedules. One participant reported that “some day’s meditation feels easy and others it is difficult”. Time constraints were a consistent theme. “Need to find a time in a daily routine” was reported multiple times. One participant who started with Silent Heart meditation reported,
“deteriorating from last week” after switching to Zen (3rd week). It was not specifically reported if this was due to the meditation or stress at work, which was reported that week as well.

Overall, responses about the meditation practice in general were positive with growth and awareness in being more mindful. Attention was improved as the study progressed, irrespective of which type of meditation was practiced. At first it was reported to be difficult, but gradually improved with comments of being “more present and easier to get into a meditative state”. All participants reported benefiting from the meditation practice with improved focus and decreased stress levels. With practice, many participants were able to handle stressful situations in a more objective and efficient manner. Additionally, they were able to identify stress triggers, and therefore handle more effectively. By the end, many reported making meditation part of their daily routine as it was becoming a habit. Many participants reported preferring Silent Heart Meditation.
Chapter 5

Discussion and Conclusions

This study is the first study to ever compare a new type of meditation utilizing noise-canceling headphone to the standard practice of Zen meditation. When both groups are assessed together, our findings are consistent with previous research in indicating that meditation reduces perceived stress levels and improves focus and attention (Bloise et al. (2016); Brandmeyer & Delorme (2016); Dickinson et al., (2009); Geary & Rosenthal, (2011); Kozasa et al., (2012); Ravalier, Wegrzynek & Lawton (2016); Santos et al., (2016); Wolever et al. (2012).

Instruments

Mindful Attention Awareness Scale.

There was increased mindfulness in both groups combined (total) over a four-week period as indicated by the values at mid and post study points compared to pre-scores. The aim of our study with regard to MAAS was to evaluate if Silent Heart Meditation is either as effective (non-inferior) or superior to the standard Zen meditation, which is widely accepted and has been studied previously. The results indicated that both meditation practices were effective in increasing MAAS scores over a four-week period.

The results of the MAAS scores after the first two weeks of practice were compared to the pre-meditation scores. The S group had a statistically significant increase in mean MAAS scores while the Z group’s increase in MAAS scores during this period was not statistically significant. The mean score increase for MAAS did however reach statistical significant for both groups when analyzed over the entire four week study period. When the scores were plotted in the graph, the S group showed a steeper increase in scores (Figure 6). These findings suggest that Silent Heart Meditation may have a more favorable effect on mindfulness compared to Zen
meditation among new meditators. However, this observed difference in scores did not meet statistical significance when these two groups were compared for the first two weeks of effectiveness. Therefore, when the first two weeks or the entire 4-week period of results were taken into consideration, there was statistically significant evidence that Silent Heart Meditation is non-inferior to Zen mediation in improving focus and mindfulness. The same cannot be said for superiority assessment.

The mean MAAS scores continuously increased (mid-post scores) in the Z group (started with Zen and finished with Silent Heart Meditation) as opposed to the S group (initial practice of Silent Heart Meditation) that produced an increasing trajectory of mean scores (pre-mid) but when the participants switched to Zen meditation (mid-post), the mean scores decreased. This observation suggests that Zen mediation is not as effective as Silent Heart Meditation or that Silent Heart Meditation may be superior. However, due to the fact that both groups did not have statistical significance for score improvement in this time period (mid to post), no definitive conclusion can be made. Also, the two groups were not compared for between group differences for the same reason. Based on this, it could be concluded that superiority of either type of meditation over the other cannot be ascertained based on the results obtained.

An alternate argument for the above observation could be that in Z group, the positive effects of having practiced Zen meditation during the first two weeks facilitated the continued increase in mean MAAS scores during the second two-week period when participants practiced Silent Heart. Alternatively, the decline in MAAS scores in the S group may mean that Silent Heart during the first two weeks did not produce long-term effects rendering continued improvement in scores for the second two-week period. Because of the crossover nature of this study, the effects of one meditation practice rendering long lasting effects that may potentially
influence the results of another type of meditation with regard to MAAS scores cannot be determined. Likewise, a conclusion regarding the effects of these meditation practices on MAAS scores beyond a two-week period also cannot be reached.

**Perceived Stress Scale.**

There was decreased perceived stress in both groups combined (total) over a four-week period as indicated by the values at mid and post study points compared to pre-scores. The aim of our study with regard to PSS was to evaluate if Silent Heart Meditation is either as effective (non-inferior) or superior to the standard Zen meditation. The results indicated that both meditation practices were effective in decreasing PSS scores over a four-week period.

In contrast to the above-mentioned MAAS results, when the results of the PSS scores after the first two weeks of practice were compared to the pre-meditation scores, both meditation practices produced statistically significant results. When the scores were graphed, the S group showed a steeper decrease in scores compared to the Z group (Figure 7). These findings suggest that Silent Heart Meditation may have a more favorable effect on perceived stress reduction compared to Zen meditation among new meditators. This observed difference in scores did demonstrate statistical significance when these two groups were compared for the first two weeks of effectiveness. Therefore, when the first two weeks or the entire 4-week period of results were taken into consideration, there is statistically significant evidence that Silent Heart Meditation is not only non-inferior to Zen mediation in reducing stress, but also may be superior.

The mean PSS scores continuously decreased (mid-post scores) in Z group (started with Zen and finished with Silent Heart Meditation) as opposed to S group (initial practice of Silent Heart Meditation) that produced a steeper reduction trajectory of mean scores (pre-mid) but when the participants switched to Zen meditation (mid-post), the mean scores increased. This
observation lends itself to the notion that Zen mediation is not as effective as Silent Heart Meditation. However, just like in regard to MAAS scores, due to the fact that both groups did not have statistical significance for score reduction in this time period (mid to post), no definitive conclusion can be made. We also did not compare the two groups for between group differences for the same reason.

An alternate argument for the above observation could be that in Z group, the positive effects of having practiced Zen meditation during the first two weeks facilitated the continued decrease in mean PSS scores during the second two-week period when participants practiced Silent Heart. Alternatively, the increase in PSS scores in S group during the second two weeks meant that Silent Heart, during the first two weeks did not lay such long-term facilitative effect for continued decline in scores for the second two-week period for this group. However, this argument can be rebutted with regard to PSS by the fact that comparison of pre to mid mean PSS scores for both groups were statistically significant and analysis of between group differences for the first two-week period were statistically significant in favor of Silent Heart Meditation suggesting that Silent Heart Mediation was more effective in reducing perceived stress levels, via reduction in mean PSS scores compared to Zen meditation in two-weeks. With regard to MAAS however, this rebuttal did not reach statistical significance for between group differences for this time period. Because of the crossover nature of this study, the effects of one meditation practice rendering long lasting effects that may potentially influence the results of another type of meditation with regard to PSS scores cannot be determined from this study. Likewise, a conclusion regarding the effects of these meditation practices on PSS scores beyond a two-week period cannot also be reached.
In Geary & Rosenthal’s study where 54 participants participated in meditation over a one-year time period, there was a reduction of 9.59 points on the PSS (2011). In Wolver et al., (2012) study where 96 participants completed meditation training, there was a reduction of 8.86 points in PSS scores which were statistically significant ($p<.001$). In the current study, similar point deductions were derived in a shorter period of time and are consistent with the previous standards in the meditation studies.

**Amount of Meditation.**

Overall, both groups participated in most all of the meditation days. Z group’s participation slightly increased during the second two-weeks (Silent Heart Meditation), whereas S group’s participation slightly decreased during the second two-weeks (Zen). One potential explanation could be that Silent Heart Meditation was preferred, making participants more compliant with practice.

**Qualitative Results.**

Overall, all participants reported benefiting from the meditation practice in general. These personal statements are in alignment with objective findings gathered through MAAS and PSS questionnaires. With practice, many participants reported being able to handle stressful situations in a more objective and efficient manner. Additionally, they were able to identify stress triggers, and therefore handle them in a more effective way. Therefore, with the practice of meditation, they were able to sustain the benefits throughout the day.

Two participants that in the S group (started with Silent Heart Meditation) reported transitioning into a meditative state during week one, versus during week two with Zen meditation. This indicates that Silent Heart may result in a faster transition into a meditative state.
In assessing the subjective and objective outcomes related to benefits and disadvantages of meditation practice, overall meditation appears to be a healthy intervention for stress management and its related side effects. In comparison to treatment for traditional stress side effects such as depression or anxiety, meditation may be a safer and possibly equivalent or superior method evidenced by reported calm feelings, bliss, and improved energy. This is based upon both the quantitative questionnaire outcomes, as well as reported outcomes.

The study results indicate that participants will most likely benefit in mindfulness and reduced stress levels with either type of meditation. However, the practice of Silent Heart Meditation may offer results at a steeper and more effective pace. Starting to learn Zen meditation and then transitioning into Silent Heart Meditation may also show some benefit, but not as significant as with Silent Heart alone. Starting with Silent Heart and then switching to Zen does not seem to have as favorable of outcomes. Overall, analysis of the results suggests that Silent Heart Meditation may have more significant effects given that the intervention resulted in significantly greater positive results, and when not used, participants regressed.

**Limitations**

The number of participants studied was small. The duration of meditation practice was short (two-weeks for each type of practice) and only one education session was held to teach each type of meditation. While results were encouraging, the effect of a larger number of participants and longer duration of practice remains unestablished. At the medical practice site, the researcher is the health care provider. While this was not coercive in any way, it may have influenced participation.

Another important characteristic about this study is its crossover nature. Only the first two weeks of data were used for comparative effectiveness of the two types. After the
participants crossed over into the other type of medication, the data was thought to be contaminated for the second two-weeks related to the introduction of the other type of meditation. Although a subject’s assignment into the initial group was randomized, the groups served as their own controls due to the crossover nature of the study. Therefore, the results of this study serve as proof of concept and pave a pathway for a larger confirmatory study.

Responses were collected in several different format, including email, fax, and in-person, which could have affected details provided. There were advantages and disadvantages to both. An advantage of email and fax was ease of in-home completion; which meant completing questionnaires at a convenient time and privately. An advantage of in-person completion was ease of submission while attending training. A disadvantage to email or fax submission was ensuring that each participant submitted their response in a timely manner; as several participants missed email reminders and completed questionnaires later than expected. A disadvantage to completing in person was the individual’s comfort level of completion while being in the same room as other participants, or the possibility of feeling pressured to complete in a quicker manner than in the leisure of their home. In future studies, a single method for response completion and submission is recommended for ease and consistency.

The objective for utilizing a qualitative component was to identify personal experiences and specific characteristics related to meditation experience, as well as differences between the two types. However, after analyzing each of the questionnaires, most participants reflected only on their meditation experience in general, versus differences between the two types.

**Recommendations for Practice**

The results of this study suggest that Silent Heart Meditation is as effective in achieving a meditative state and in reducing perceived stress in employees, as Zen meditation. There are also
indications that it may be preferred based upon the MAAS, PSS, and qualitative results. The study was conducted on employed adults and cannot be extended to non-working adults or children. Overall, meditation practice appears to reduce stress levels and continued meditation enhances focus and attention. No definitive conclusion can be reached from this study due to the limitations above and the exploratory nature of the study.

There are several implications for nursing practice. Nursing is one of the most stressful jobs (Roberts, Grubb, & Grosch, 2012). Stress reduction programs including mindfulness and meditation have been shown to be effective as a method to reduce stress among nurses. In this study, both meditation types improved focus and attention and reduced perceived stress levels, suggesting useful application for nursing practice. Both nurses and their patients may benefit from Silent Heart Meditation as a fast, safe, and effective manner to reduce stress, and improve attention/focus. Further research on Silent Heart Meditation is warranted; with the hopes that this may be a future first-line treatment for stress management.

**Future Research**

This study provides data to inform continued and more comprehensive study of Silent Heart Meditation in comparison to Zen meditation. There is indication that this new form of meditation may in fact afford better ability to focus and improve attention and awareness. There is also a possibility that Silent Heart Meditation’s ability to reduce stress levels in employed adults is as good as or better compared to Zen meditation. Future larger randomized controlled studies need to be conducted to definitively confirm the results observed in this study. Further, the study can also be extended to non-working adults, children and other populations at risk. If proven to be superior, this type of meditation may become very useful tool in employed adults for stress reduction.
Conclusion

This small pilot study suggests that the new type of meditation (Silent Heart Meditation) is not only as effective but also may be superior in reducing stress in employed adult population compared to Zen meditation. With regard to mindfulness, Silent Heart Meditation was non-inferior but did not reach statistical significance for superiority. From a qualitative perspective, most all of the participants reported having improved stress levels, as well as increased mindfulness, attention, and awareness. These results need to be confirmed in future randomized controlled trials of a statistically sufficient number of subjects.
Appendix A

Mindfulness Attention Awareness Scale (MAAS)

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=Almost Always 2=Very Frequently 3=Somewhat Frequently 4=Somewhat Infrequently 5=Very Infrequently 6=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 need 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

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

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

I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.
1 2 3 4 5 6

I do jobs or tasks automatically, without being aware of what I'm doing.
1 2 3 4 5 6

I find myself listening to someone with one ear, doing something else at the same time.
1 2 3 4 5 6

I drive places on "automatic pilot" and then wonder why I somehow.
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
Appendix B

Perceived Stress Scale (PSS)

Perceived Stress Scale
The questions in this scale ask you about your feelings and thoughts during the two weeks. Please bold or underline your answer.

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

In the last month, how often have you been upset because of something that happened unexpectedly?
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

In the last month, how often have you felt that you were unable to control the important things in your life?
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

In the last month, how often have you felt nervous and “stressed”?
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

In the last month, how often have you felt confident about your ability to handle your personal problems?
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

In the last month, how often have you felt that things were going your way?
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

In the last month, how often have you found that you could not cope with all the things that you had to do?
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

In the last month, how often have you been able to control irritations in your life?
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

In the last month, how often have you felt that you were on top of things?
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

In the last month, how often have you been angered because of things that were outside of your control?
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often
Appendix C

Description of Experience

Description of Experience:
What emotions do you feel when you are meditating?
Why are you continuing to participate in the study?
Please give a brief description to the following questions irrespective of whether your answer is a “yes” or “No”.
Briefly describe actions you have taken to deal with stress in the past few days of meditation practice.
Since starting meditation practice do you feel the same intensity of stress that you have previously felt when faced with a similar event, thought, or feeling?
Do you feel that you are more efficient in performing your tasks at home or work since incorporating meditation into your daily life?
How do you react to triggers of stress as you progress through the study?
How has your attention level improved during meditation practice, and in daily life?
How has your meditation practice improved this week?
What factors affected your ability to get into a meditative state this week?
Appendix D

Demographics Questionnaire

Demographic Questionnaire

Age: __________
Sex: __________
Education Level: __________
Marital Status: __________
Number of children living at home: __________
Career Type: __________

Additional Questions:
Why are you participating in the study?
________________________________________________________________________
________________________________________________________________________
Do you consider yourself to be stressed?
________________________________________________________________________
On average what is your daily stress level (1-10)?
________________________________________________________________________
Are you able to identify your stress triggers? How do you identify them?
________________________________________________________________________
Briefly describe the actions that you take when you feel stressed?
________________________________________________________________________
### Appendix E

**Daily Participation Log**

<table>
<thead>
<tr>
<th>Participation Day</th>
<th>Participation today (y/n)</th>
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Appendix F

MAAS Graphs

F.1 MAAS scores over time by sex.

F.2 MAAS scores over time by age group.
F.3 MAAS scores over time by marital status.

F.4 MAAS scores over time by number of children living at home.
Appendix G

PSS Graph

PSS scores over time by age group.
Bibliography


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