EFFECTS OF A WORKSITE-BASED YOGA PROGRAM ON MINDFULNESS

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ABSTRACT

Many yoga teachers and students boast the positive effects that yoga practice has on their health and wellness, making claims that yoga is capable of cleansing the body, burning fat, and reducing stress. These claims have kindled considerable popularity in yoga practice, as well as, skepticism in its “mystical powers”. Mindfulness is a relatively new concept defined as the state of being attentive to and aware of what is taking place in the present. There are many different ways mindfulness can be cultivated. Mindfulness has been shown to lower psychological distress (Rosenzweig, et al 2003). By combining yoga with mindfulness, there is great potential for designing effective interventions for reducing stress. Yoga and mindfulness may not always coexist; therefore, it is important to be able to assess the changes that are occurring with respect to mindfulness whenever a mindfulness-based stress reduction program is applied. Many yoga and mindfulness-based stress reduction programs take a considerable amount of time and are thus likely to have low adherence. The purpose of this study was to test the effects of a worksite-based mindful-yoga program on mindfulness. It was hypothesized that a 6-week mindful-yoga program will significantly increase mindfulness in the treatment group. Forty-six full-time faculty and staff of The Ohio State University participated in the study. Each
participant was randomly assigned to treatment (n=22) or waitlist control (n=20) groups. The treatment group participated in one instructor-guided mindful-yoga session (60 minutes) and four individual office yoga sessions (20 minutes each) each week for six weeks. The Mindful Attention Awareness Scale (MAAS) was used as the outcome measure. The MAAS was given at pretest and posttest to both groups. Dependent samples t-test was used to detect significance (p<.05). The treatment group significantly increased MAAS scores pre to post-intervention (p=.015). The waitlist control group did not significantly change MAAS scores pre to post-intervention (p=.729). The program and design were able to increase mindfulness in the treatment group.
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CHAPTER 1

INTRODUCTION

Background

Yoga is an ancient art form that has its roots in meditation, breathing, and movement. Many participants of yoga will state that yoga has many healthful benefits. There have been a number of yoga studies examining the positive effects yoga has on health (e.g., Gura, 2002; Parshad, 2004). Pinpointing the causal factor in the improvements in wellness related outcomes is a challenge. Part of this complexity stems from the broad range of outcomes. Yoga has shown to have improvements in physical variables, such as strength (Jatiya, Udupa, & Bhavanani, 2003), as well as psychological variables, such as depression (Woolery, Myers, Sternlieb, & Zeltzer, 2004). Despite this complexity, few will argue against yoga’s ability to improve wellness related outcomes.

Yoga uses purposeful physical actions in order to strengthen the body. Therefore, a yoga participant will have an enhanced ability to deal with situations involving physical challenges. For example, yoga can relieve some of the stress on the joints through increasing strength in flexibility, thereby, making daily living less strenuous.
Mindfulness is present-centered attention and awareness without judgment. Awareness can be thought of as the gross tuning of a microscope; the image comes into sight but is still rough and hazy looking. Attention can be thought of as the fine tuning of a microscope; the image now becomes clear and focused. Mindfulness is not forced awareness or attention. It is a naturally occurring ability that exists on a continuum from low levels of mindfulness to high levels of mindfulness. Development of this ability can be beneficial. Programs that focus on developing mindfulness-meditation have shown positive outcomes for wellness related variables (e.g., Carlson, Speca, Patel, & Goodey, 2004).

Mindfulness develops the mind in much the same way that yoga develops the body. It enables the participant to better handle a mental challenge, such as stress. While the role of mindfulness in wellness related outcomes has not been directly examined, it is thought that mindfulness may enhance wellness by optimizing moment-to-moment experiences (LeBel & Dube, 2001). Becoming more aware of one’s own mental processes, listening more attentively, becoming more flexible, and recognizing bias and judgments are some of the goals of mindfulness (Epstein, 1999). Flexibility refers to the ability of awareness or attention to be divided, without detracting from the quality of engagement with what is focally present (Brown & Ryan, 2003).

To many yoga instructors, the concepts of mindfulness and yoga are synonymous. Typically, all yoga is thought of as mindful yoga. However, it is important to understand that this may not always be true; not all yoga is mindful in nature. For example, Hatha yoga is a type of yoga that focuses on poses and
breathing. It exercises the body physically, in order to facilitate the meditative process by removing the body as a potential obstacle (Anatole, http://www.abhidhyan.org/Teachings/Hatha_Yoga.htm, 2005). Furthermore, yoga may not be necessary for mindfulness to be achieved. Tai Chi Chuan is another method in which mindfulness may or may not be cultivated. Since yoga and mindfulness may not always coexist, it becomes important to be able to assess the changes that are occurring with respect to mindfulness whenever a mindfulness-based stress reduction program is applied.

Training in mindfulness meditation has been around for several years (Kabat-Zinn, 1982). Mindfulness training has been associated with improvements in stress management, reductions in anxiety, and reductions in panic attacks (Rosenweig, Reibel, Greeson, & Brainard, 2003; Miller, Fletcher, & Kabat-Zinn, 1995; Kabat-Zinn, Massion, Kristeller, Peterson, Fletcher, Pbert, Lenderking, & Santorelli, 1992). Despite the implications that mindfulness meditation has on a number of wellness related outcomes, there has been little work examining the concept of mindfulness. Skeptics may argue that mindfulness is not responsible for the improvements on wellness related outcomes; the improvements may be contributed to improvements in mood or affective status.

In fact, mindfulness has been measured using a number of instruments that may or may not directly measure mindfulness (e.g., Kabat-Zinn, Lipworth, & Burney, 1985). The Profile of Mood States (McNair & Droppleman, 1971) has been used to assess affective status, and indirectly measure mindfulness (e.g., Rosenweig et al., 2003). Recently, an instrument has been developed to measure
mindfulness. The Mindful Attention Awareness Scale (MAAS) has been shown to be a valid and reliable instrument to directly measure this construct (Brown & Ryan, 2003).

**Problem statement**

A number of yoga studies have been done measuring the effect of mindfulness-based stress reduction on various health and wellness related outcome variables, such as quality of life, mood, and stress (e.g., Carlson et al., 2004). Despite the claim that the stress reduction program is mindfulness-based, few studies have included a measure of mindfulness to ensure that mindfulness does indeed change. Furthermore, those studies that have measured mindfulness have measured it indirectly through attributes such as acceptance, generosity, nonjudgmentalness, or the various other attributes that have been associated with mindfulness (Shapiro & Schwartz, 1999). It is suggested here that some consistency in the measurement of mindfulness needs to be implemented in future mindfulness-based yoga studies.

The purpose of the present study is to test the effects of a worksite-based mindful-yoga program on mindfulness. If it is a mindful-yoga program, does mindfulness actually change? If the program is capable of changing mindfulness, does it increase or decrease?
Research hypothesis

It is hypothesized that a 6-week worksite-based mindful-yoga program will significantly increase mindfulness as measured by the MAAS in the treatment group. Furthermore, it is hypothesized that the wait-list control group will have no change in mindfulness as measured by the MAAS.

Definition of terms


Yoga: An ancient art form that has its roots in meditation, breathing, and movement. The practice of yoga is a process that culminates with a union of body and mind.

Wellness: “Optimal health and vitality, encompassing physical, emotional, intellectual, spiritual, interpersonal and social, and environmental well-being” (Fahey et al., 2005, p. 2).

Health: “Absence of disease” (Fahey, Insel, & Roth, 2005, p. 2).
Tai Chi Chuan: An ancient Chinese martial art form characterized by its soft hand blocking and attacking, as well as, its fluid transitional movements.

Limitations of the study

Participants who participated in the study were not randomly selected. They were a convenience sample who volunteered to be in the study.

Participants were not blinded to which group they were in, that is, treatment group or wait-list control group.

Participants in this study were primarily female (74%). The national intercensal estimates for April 1, 2000 were 51% female (U.S. Census Bureau, 2000). Therefore, external generalizability is poor.

Sample size (n=42) was small; hence, the ability to detect statistical significance may have been low.

This study is part of a larger study – power was calculated based on the ability to detect a significant change in salivary cortisol, a biological marker of stress.
CHAPTER 2

LITERATURE REVIEW

Definitions of mindfulness

Mindfulness is an abstract concept with a multitude of definitions. Mindfulness is open to individual interpretation; therefore, the meaning may differ from person to person. This section of the review will serve to describe the foundations of mindfulness.

        Mindfulness has been described as detached, self-observation (Kabat-Zinn, 1982). Mindfulness is a meditative process that gradually expands attention; hence, it takes time to develop. Mindfulness meditation has its origins in Theravada Buddhism, a southern form of Buddhism now found mainly in Thailand, Sri Lanka, and Myanmar (Nyanaponika, 1962). This form of Buddhism referred to mindfulness as insight. Over the years, the definition of mindfulness has grown more complex. Currently, mindfulness is thought of as a state of consciousness. In order to attend to present experiences, one must be conscious of their occurrence.
Attention by itself is not mindfulness. Kabat-Zinn (1990) described seven qualities of mindfulness: non-striving, non-judging, acceptance, patience, trust, openness, and letting go. Non-striving refers to not forcing things. Non-judging is observing the present without evaluation. Acceptance does not mean passivity or resignation, rather a clearer understanding of the present so one can more effectively respond. Allowing things to unfold in their time defines patience. One must also trust that as life unfolds, it is unfolding as it is supposed to. Openness is creating possibility by paying attention to all feedback in the present moment. Letting go means not holding on to thoughts, feelings, or experiences; however, letting go does not mean to suppress those thoughts, feelings, or experiences.

Shapiro and Schwartz (1999) have elaborated on the concept of mindfulness by adding five additional attributes: gratitude, gentleness, generosity, empathy, and loving-kindness. These qualities were incorporated to address the affective qualities of mindfulness. For completeness, these qualities are included here, although, their importance to mindfulness has not been well defined.

More recently, mindfulness has been characterized by clarity and vividness of current experience, void of automaticity (Brown & Ryan, 2003). Automaticity refers to a mindless functioning, such as with habitual actions. Many times these habitual actions can lead to unhealthy behavior patterns. The biting of fingernails is an unhealthy behavior pattern that many people automatically do when nervous. The Theravada Buddhist concept of insight refers to awareness. However, mindfulness combines both awareness and
attention to present experiences. Mindfulness meditation is not deliberate; instead, it is a naturally occurring process that should happen without forcing it to.

Many times, people can engage in unhealthy habits without being conscious of their occurrence. Compulsive and automatic behaviors can have negative consequences. For example, many drivers may change lanes automatically without checking their blind spot, basing their safety on the assumption that another car will not be there. If this occurs over and over again, it becomes a habit to change lanes without checking the blind spot. Mindfulness may be important in disengaging individuals from unhealthy behavior patterns, such as the example above (Brown & Ryan, 2003).

The nature of mindlessness

In order to better understand mindfulness, it is necessary to understand those qualities that are not mindful. Those qualities that detract from present awareness are not considered mindful.

Mindfulness is present-centered attention and awareness without judgment. As mindfulness develops, it becomes a cultivated awareness. During development of mindfulness, one must practice and force oneself to be mindful; however, mindfulness is considered not to be forced consciousness. Only during the development of mindfulness is it forced or directed. Mindfulness is not blunted consciousness. Blunted consciousness refers to behaviors that reduce the clarity of the present, such as absorption in the past or anxieties about the future.
In sharp contrast with mindfulness, mindlessness represents the absence of present-centered attention and awareness. In emotionally charged situations, situations of uncertainty, and high pressure situations, mindless states occur more frequently (Epstein, 1999). Buddhist practitioners who have practiced meditation for periods of 15-40 years have an increased ability to enter a meditative state compared to controls (Lutz, Greischar, Rawlings, Ricard, & Davidson, 2004). This suggests that in situations that may elicit mindlessness, long-term meditators are able to respond appropriately and return faster to a mindful state.

Public self-consciousness is the tendency to be concerned about the self as perceived by others. The awareness of self is important for mindfulness; however, public perception of self can cause problems with autonomy detracting from present awareness. Public self-consciousness leads to rumination, which may cause needless anxiety.

Reflexive consciousness is a type of self-awareness that operates within thought and feeling. This describes more cognitive processing. Mindfulness operates on thought and feeling; hence, is a perceptual process. Cognitive processing is similar to a video that contains mental accounts about the self, while perceptual processing is similar to a snapshot that only shows what is taking place.

Mindfulness is not self-monitoring. There is no evaluative component to mindfulness. Stimuli are perceived as they exist and appreciated as they are. Self-monitoring involves evaluation of self. Mindfulness does not involve assessment of the present; rather, it is awareness of the present.
Benefits of mindfulness

Many studies have been done investigating the effects of mindfulness on a wide range of wellness related outcomes. This section will describe the details of a number of these studies highlighting some of the important variables and outcomes.

Kabat-Zinn (1982) measured the effects of a 10-week stress reduction and relaxation program on 51 chronic pain patients who had no improvements with traditional medical care. The stress reduction and relaxation program utilizes training in a form of mindfulness-based meditation. The 18 males and 33 females (aged 22-75) completed one of three 10-week cycles of the stress reduction and relaxation program. The Pain Rating Index (PRI) was used as the outcome measure. The PRI was considered to be the best non-technological method available during the time of the study for the measurement of pain. At the end of the 10-week program, 50% of the subjects reported a 50% reduction in mean scores on the PRI. A 33% reduction in mean scores on the PRI was reported from 15% of the subjects in the study (in addition to the 50% reporting a 50% reduction). It is important to note that no direct measure of mindfulness was included in the study. Mindfulness was measured indirectly through a host of instruments including the SCL-90-R and POMS. The SCL-90-R is a 90-item clinical symptom checklist covering a range of common psychological symptoms (Derogatis, 1977). The SCL-90-R was used to determine change in overall anxiety status, measuring both somatic anxiety and cognitive anxiety. The POMS was used to measure change in emotional affect and mood. These instruments,
while valid at measuring constructs such as anxiety and mood, are not valid in measuring mindfulness. In addition, the author did not assess whether or not mindfulness actually changed during the 10-week program.

In a follow-up study, 90 chronic pain patients were enrolled in a 10-week stress reduction and relaxation program (Kabat-Zinn et al., 1985). There were 60 females and 30 males in the study. As expected, results were similar to that of the study by Kabat-Zinn (1982). Statistically significant improvements in mean scores for measures of pain, mood disturbance, and psychological symptomatology were observed. Improvements in these measures appeared to operate independently of gender. This study expanded on the previous study by including a traditional treatment group for comparison. The comparison group did not show statistically significant improvements in the outcome measures. Furthermore, the improvements observed in the intervention group were maintained at a 15-month follow-up. This study suggests that both male and female participants will benefit equally from a stress reduction and relaxation program, that this program is effective over traditional treatments for chronic pain, and that these effects are able to be maintained long-term (Kabat-Zinn et al., 1985). Despite the use of mindful meditation in the title and throughout the article, no direct assessment of mindfulness was included.

Mindfulness meditation-based stress reduction has been correlated with statistically significant improvements in subjective and objective symptoms of anxiety (Kabat-Zinn, Massion, Kristeller, et al., 1992). Potential study participants were screened with a clinical interview to assess the degree of
generalized anxiety disorder or panic disorder. Twenty-four participants were chosen to be in the study. Of these, twenty-two participants completed the 10-week intervention. The subjects ages ranged from 26 to 64 years (mean 38); there were 5 males and 17 females. Significant reductions in anxiety and depression scores after the 10-week treatment were documented for 20 of the participants. Furthermore, the number of participants suffering from panic symptoms was substantially reduced.

A recent study by Davidson et al. (2003) examined the effects of an 8-week training program in mindfulness meditation. The program was applied in a work environment with 25 healthy employees serving as the treatment group and 16 healthy employees serving as the wait-list control group. Brain activity was measured both before and after the training program. The treatment group demonstrated significant increases in left-sided anterior activation as compared with the wait-list control group. This pattern of brain activity has been associated with positive affect (Davidson et al., 2003). After the 8-week training program in mindfulness meditation, immune function was assessed via antibody titers to an injection of the influenza vaccine. The treatment group demonstrated significant increases in antibody titers to the influenza vaccine, while the wait-list control group did not. These data suggest that, even among healthy individuals, mindfulness meditation can have effects on wellness related outcomes, both affective outcomes and health outcomes.

Carlson et al. (2004) examined the effects of mindfulness-based stress reduction on a host of wellness related components including quality of life, mood,
and symptoms of stress. The study subjects were 59 patients with breast cancer and 10 patients with prostate cancer. An 8-week mindfulness-based stress reduction program was used as the intervention for this study. For brevity, the types of instruments used in the study will not be discussed here. For the subjects who completed both pre-and post-intervention questionnaires, statistically significant improvements in quality of life were seen. Attendance or amount of home practice of the mindfulness-meditation did not significantly correlate with changes in quality of life, indicating that duration of the intervention may not be the most critical factor in mediating changes in various wellness outcomes. Changes in mood scores did not reach significance, perhaps due to a floor effect, as pre-intervention mood scores were already quite low. A significant decrease in self-reported stress symptoms was seen over the course of the intervention. However, the average daily mean of three cortisol values did not change from pre-to post-intervention. Cortisol is considered to be a biological marker of stress (Dickerson & Kemeny, 2004). This decrease in self-reported stress symptoms without a concomitant decrease in cortisol concentrations may suggest an improvement in the ability to deal with stressors perhaps through the outlet of mindfulness meditation. Perceiving a stressor as a positive stressor, feeling in control of one’s life, and having a productive outlet for handling the stress are some ways of improving an individual’s ability to deal with stressors. In this way, an individual may biologically respond to a stressor; however, may not perceive the event as stressful. With time, perhaps the biological response will habituate to the perceptual response to various stressors.
A recent study by Lutz et al. (2004) investigated the involvement of mental training in neuronal changes. Eight long-term Buddhist practitioners ranging in age from 34 to 64 years represented the comparison group. Ten healthy student volunteers ranging in age from 19 to 23 years of age represented the control group. The Buddhist practitioners underwent mental training for 10,000 to 50,000 hours over time periods ranging from 15 to 40 years. Their training consisted of eight hours per day of sitting meditation. The control group had no previous experience with meditation. The control group was trained in meditation for one week prior to collection of the data. Electroencephalogram (EEG) measurements were collected during four 60-second time blocks. These measurements served as the baseline. Both groups were instructed to generate three meditative states. EEG measurements were collected for 60-seconds during the meditation. At baseline, the ratio of gamma-band activity compared to slow rhythms was significantly higher for Buddhist practitioners compared to controls. During meditation, the Buddhist practitioners demonstrated high-amplitude gamma oscillations in the EEGs. The data suggest that the degree of training can influence brain function. The change from a normative state to a meditative state is not immediate, but typically decreases with hours of meditative practice. The Buddhist practitioner group demonstrated a more meditative-like brain functioning during rest than the control group, suggesting that there is an overlap between everyday life and meditation practice for long-term meditators. Lutz et al. suggest that this may reflect an improved quality of moment-to-moment
awareness. Hours of practice, but not age, predicted brain function; which reflects the possibility that these are flexible skills that can be trained.

**Mindful Attention Awareness Scale (MAAS)**

Prior to the MAAS, the only other known scale that measures mindfulness is the Mindfulness/Mindlessness Scale (MMS; Bodner & Langer, 2001). The MMS assesses individual differences in the propensity to achieve mindful states. Bodner & Langer (2001) define mindful states as the awareness of behavioral routines. Therefore, this scale does not adequately measure the construct of mindfulness as presented in this review.

The MAAS developed by Brown and Ryan (2003) assesses individual differences in the frequency of mindful states over time. It is a 15-item Likert scale ranging from 1 (almost always) to 6 (almost never). Higher scores represent a higher frequency of mindfulness. The items reflect the experience of mindfulness and mindlessness, and include variations in awareness of and attention to actions, thoughts, emotions, interpersonal communication, and physical states.

The five affective attributes of mindfulness chosen by Shapiro and Schwartz (1999), gratitude, gentleness, generosity, empathy, and loving-kindness, were not focused on during the development of the MAAS. Rather, Brown and Ryan (2003) focused on the presence or absence of attention to and awareness of what is occurring in the present. While the present-centered awareness and attention recognized by Kabat-Zinn (1982) and Brown and Ryan (2003)
represents the foundation of mindfulness, the five affective attributes represent a possible tributary of mindfulness and are not central to the understanding of mindfulness.

Confirmatory factor analysis was performed from a sample of 327 university students (aged 17-28 years). The internal consistency for this sample was .82. A second sample was tested to explore whether or not the factorial model would hold among non-college adults. A sample of 239 adults (aged 18-77 years) was used for this cross-validation. The sample alpha was .87. A third sample of 60 psychology students (26 men, 34 women; mean age 19 years) was used for test-retest reliability. The analysis found that there was no difference between mean scale scores of two separate time points four weeks apart, and the intraclass correlation was .81 (Brown & Ryan, 2003).

It was hypothesized that the MAAS would be able to reliably distinguish between individuals who cultivate awareness and attention through meditative practices known as Zen meditation and members of the general adult population. Fifty students of Zen and 50 age- and gender-matched controls were used for comparison. Each group consisted of 21 men and 29 women (mean age 41.08 years). The MAAS scale scores were totaled and divided by 15, thereby creating a potential range of 1-6. The Zen practitioner group averaged 4.29 (SD = 0.66), while the comparison group averaged 3.97 (SD = 0.64). The difference between groups was significant, t = 2.45, p < .05. The amount of time currently practicing meditation was not related to the MAAS score; however, the number of years of meditative practice was positively related to the MAAS score (Brown & Ryan,
2003). This suggests that mindfulness is not a trait and can be changed through practice.

Higher scores on the MAAS predict more autonomous activity and higher level of emotional well-being (Brown & Ryan, 2003). Two samples were selected to undergo experience-sampling. Sample 1 consisted of 74 participants (aged 18-62 years), and sample 2 consisted of 92 participants (aged 18-21 years). Both samples completed the MAAS before the experience-sampling phase of the study. During the experience-sampling phase of the study, participants were sent pager signals at 3 random times per day. Upon being paged, participants were instructed to record their experiences on identical forms bound into a small pad. The participants rated their experiences during each page using scales that assessed affect, state mindfulness (sample 2 only), autonomy, and emotional state. It was unclear as to why the researchers measured state mindfulness in sample 2 only. The results indicate that the pretest MAAS scale scores were correlated with day-to-day autonomy, and were strongly and inversely related to unpleasant affect experiences. Hence, MAAS-assessed mindfulness predicted higher levels of day-to-day autonomy and lower levels of unpleasant affect (Brown & Ryan, 2003).

Mindfulness-based stress reduction program can be effective in reducing anxiety (Kabat-Zinn et al., 1992), reducing pain (Kabat-Zinn, Lipworth, & Burney, 1985), and reducing symptoms of stress (Carlson et al., 2004). Due to the lack of measures of mindfulness, past research has been unable to determine whether it is mindfulness itself that enhances well-being. Brown and Ryan (2003)
enrolled patients into an 8-week mindfulness-based stress reduction program in order to measure changes in MAAS-measured mindfulness. It was hypothesized that changes in MAAS-measured mindfulness over the training period would predict changes in emotional disturbance and stress. Data from 41 individuals (aged 37-76 years) with either breast or prostate cancer were used in the analyses. Physical functioning and symptoms was assessed pre-intervention using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ; Aaronson et al., 1993). Total mood disturbance was assessed using the Profile of Mood States (POMS; McNair et al., 1971). Physical, psychological, and behavioral responses to stressful situations were assessed using the Symptoms of Stress Inventory (SOSI; Leckie & Thompson, 1979). The MAAS was administered pre- and post-intervention, as were the other instruments used in this study. EORTC QLQ scores indicated that daily functioning was high for these participants, and fatigue and pain were relatively low to moderate. SOSI scores decreased significantly over the intervention period, while MAAS and POMS scores did not change significantly. However, increased MAAS scores were a significant predictor of both decreased SOSI and POMS scores. Hence, higher levels of mindfulness were correlated with lower levels of mood disturbance and stress both before and after the mindfulness-based stress reduction intervention (Brown & Ryan, 2003). This study did not include a randomized control group, which was addressed as a flaw in the research design.
Benefits of yoga

Yoga practice has been shown to bring about seizure reduction in patients of epilepsy (Panjwani et al., 1996). Thirty-two patients with idiopathic epilepsy were divided into three groups: treatment group (n=10), sham group (n=10), and control group (n=12). The treatment group practiced Sahaja yoga for 6 months, while the sham group mimicked the practice of Sahaja yoga for 6 months. Sahaja yoga is a type of yoga that focuses primarily on meditation (http://www.sahajayoga.org.ua/eng/what/index.html, 2005). The sham group mimicked the movements of the treatment group, but was not given instruction on the meditative aspect of yoga. At the end of the 6-month yoga treatment, the treatment group reported an 86 percent decrease in seizure frequency. No significant changes were found in either the sham or control groups (Panjwani et al., 1996).

Symptoms of depression have been shown to be alleviated through yoga practice (Woolery, Myers, Sternlieb, & Zeltzer, 2004). Twenty-eight volunteers (without significant yoga experience) ages 18 to 29 were randomly assigned to a yoga group or wait-list control group. Participants in the yoga group attended two 1-hour yoga classes each week for 5 weeks. Interestingly, the focus of the yoga intervention was on yoga postures such as back bends, standing poses, and inverted poses, and not on meditation. Participants in the yoga group demonstrated statistically significant decreases in symptoms of depression and trait anxiety, and improvements in mood. The wait-list control group

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demonstrated no statistically significant changes in depression, trait anxiety, or mood (Woolery et al., 2004).

In a study by Bastille & Gill-Body (2004), a yoga-based exercise program was implemented for stroke patients. Due to the small sample size (n=4) and lack of a control group, the details of this study will not be presented here. The results of the study did not reach statistical significance. However, the results suggest that yoga-based exercise may be beneficial for stroke patients (Bastille & Gill-Body, 2004).

There is limited research studying the effects of yoga on the cardiovascular system. Perhaps, this is due to the fact that the largest improvements on the cardiovascular system are made by doing cardiorespiratory exercise (American College of Sports Medicine, 2000). Yoga is not considered cardiorespiratory exercise. Despite this, yoga practice has been shown to correlate with an improved cardiovascular system in subjects above 40 years of age (Bharshankar et al., 2003). Fifty, inactive control subjects were compared with fifty study participants who had been practicing yoga for 5 years. Pulse rate, systolic and diastolic blood pressure, and Valsalva ratio were examined in both groups. The yoga group demonstrated a significantly lower pulse rate, systolic blood pressure, and diastolic blood pressure. The Valsalva ratio was significantly higher in the yoga group. These comparative analyses suggest that long-term yoga practice reduces the age related deterioration in cardiovascular functioning (Bharshankar et al., 2003).
Jatiya, Udupa, and Bhavanani (2003) examined the effect of yoga on physiological measures including handgrip and pulmonary function. Twenty participants, ages 12-15 years, were assigned to the treatment group. Twenty age and gender-matched participants were used for the control group. The treatment consisted of 6 months of training in yoga postures and breathing exercises. After 6 months of yoga training, the treatment group demonstrated significant improvements in handgrip strength and endurance, while the control group did not demonstrate significant improvements. Furthermore, the treatment group demonstrated significant improvements in pulmonary function as measured by maximum expiratory pressure, maximum inspiratory pressure, forced expiratory volume, forced expiratory volume in the first second, and peak expiratory flow rate. The increases in these measures for the control group, on the other hand, were not statistically significant. These data suggest that yoga at a young age can improve physiological functions, overall health, and performance (Jatiya et al., 2003).

There have been numerous yoga studies examining the effects of yoga on stress (e.g., Parshad, 2004). It is important to note that there are many different types of yoga. Some styles of yoga emphasize meditation and breathing, while others emphasize movement. The majority of yoga studies that look at stress as the dependent variable utilize more of the meditative-type yoga. However, a recent study tested the effects of Hatha yoga on perceived stress (West, Otte, Geher, Johnson, & Mohr, 2004). Hatha yoga focuses more on the physical aspect of yoga. Sixty-nine college students volunteered to participate in the study. The
participants were divided into one of three groups, Hatha yoga group (n=18), African-dance group (n=21), and control group (n=30). The African-dance group will not be included for discussion here. The ratio of females to males was 3 to 1, and the mean age of the participants was 19. The duration of the study was one college semester. Each group attended one 90-minute session per week. The Hatha yoga group practiced yoga, while the control group attended a biology lecture. Perceived stress was measured using the Perceived Stress Scale (PSS). The practice of Hatha yoga significantly decreased perceived stress compared to the biology class (West et al., 2004).

Summary

Mindfulness is present-centered attention and awareness without judgment. This definition has been expanded on over time; however, the core concept of mindfulness remains the same. Anything that detracts from present awareness, such as absorption in the past, mindlessness, and public self-consciousness, are not considered to be mindful behaviors. On the other hand, those things that enhance present awareness, such as nonjudgmental attention, are considered to be mindful behaviors. Higher levels of mindfulness have been related to lower levels of mood disturbance, anxiety, and stress (Brown & Ryan, 2003). Mindfulness is able to be cultivated; it is a flexible skill that can be changed (Lutz et al., 2004). Hence, the improvements in wellness associated with improvements in mindfulness are attainable.
Much of the research on mindfulness-based stress reduction programs have been done without the benefit of a scale to measure mindfulness (eg. Kabat-Zinn, 1982). Some of this research has been conducted during a time when a scale to measure mindfulness was available (eg. Carlson et al., 2004). The development of the MAAS will enable researchers to correlate improvements in wellness with improvements in mindfulness, and determine if, indeed, their interventions are training subjects to be mindful.

Yoga practice and mindfulness are historically thought to coexist. As one makes improvements in yoga, mindfulness increases. However, this idea has not been thoroughly researched. There are types of yoga that emphasize physical movements to a certain extent more than meditation or mindfulness. One might suspect that those types of physical yoga would not be as effective in improving mindfulness; although, this idea has not been studied as of yet.
CHAPTER 3

METHOD

Research design

A randomized, pretest-posttest, control group design was used to evaluate the proposed hypothesis. The independent variable was divided into two levels: mindful-yoga intervention and no mindful-yoga intervention. The dependent variable was depicted as a change in MAAS mean scores. Significance was determined using statistical analysis.

Participants

Participants were chosen on a voluntary basis. Participants were eligible to participate in the study if they met the following inclusion criteria: (1) currently employed full-time at The Ohio State University; (2) ages 18-60; (3) exercising less than 30 minutes on most days of the week; (4) not pregnant or nursing; (5) BMI<30; (6) not currently engaged in regular yoga practice; (7) not currently attending a weekly yoga class; (8) no recent or chronic illness that requires medication; (9) nonsmoking; (10) consume at most 2 alcoholic beverages per day; and (11) consume at most 6 beverages with caffeine per day.
A total of 46 full-time faculty and staff of The Ohio State University were enrolled in the study. Each participant was randomly assigned to treatment or waitlist control groups. One participant from the control group did not complete the pretest MAAS measures (age: 43 years; sex: female; height: 65 inches; weight: 140 pounds; race: Caucasian; job category: faculty). A second participant from the control group did not complete either the pretest or posttest MAAS measures (age: 48 years; sex: female; height: 65 inches; weight: 140 pounds; race: Caucasian; job category: professional/technical/research). One participant from the treatment group did not complete the pretest MAAS measures (age: 54 years; sex: female; height: 64 inches; weight: 120 pounds; race: Caucasian; job category: mid-level management). One participant from the treatment group did not adhere to the yoga intervention (age: 25 years; sex: female; height: 67 inches; weight: 190 pounds; race: Caucasian; job category: student). These four participants were not included in the MAAS analyses. As such, data from 42 participants were available for the pretest-posttest analyses of mindfulness scores. Twenty-two participants were included in the treatment group, and 20 participants were included in the control group.

This study is a portion of a larger study in which sample size was calculated based on power for salivary cortisol. Twenty participants were needed in each group for adequate power (.80) to determine a significant difference. Additional participants were recruited to control for a potential drop-out rate of 15-20%.
Instruments

Demographics and medical history form

Demographic information including age, sex, ethnicity, job classification, and marital status was obtained on a form created for this study (see Appendix A). Medical history including type of illness, dates of diagnosis, date of last medical exam, and current medications was collected. All current medications, vitamins, and/or drugs were recorded. The Godin Leisure-Time Exercise Questionnaire (Godin & Shephard, 1985) was included as part of the demographics and medical history form. It was used in order screen participant’s activity levels pretest and posttest.

Mindful Attention Awareness Scale (MAAS) (Brown & Ryan, 2003)

The MAAS was used to establish the level of mindfulness pretest and posttest (see Appendix B). The MAAS is a 15-item scale designed to assess individual differences in the frequency of mindful states over time. The respondents are instructed to rate the frequency with which they experience various statements on a 6-point scale ranging from almost always to almost never on a day to day basis. Variance components analysis was done to assess reliability. The alpha level was .81 (p < .0001). The raw scores (range: 15-90) are divided by the number of items in the scale (15) to calculate the mean scores.
The typical group mean for a general adult population (N = 74) is 3.94, SD = 0.64 (Brown & Ryan, 2003). The mean scores will be reported here.

**Recruitment**

Participants were recruited from The Ohio State University during summer of 2004. Participants were primarily recruited with pamphlets around the university and by word of mouth. Volunteers attended 1 out of 3 information sessions, held in a classroom in a centrally located building on The Ohio State University’s main campus. The research proposal and possible risks of participation in this study were explained to the participants during these information sessions. The object of the research study was explained to the participants in detail, and the researcher allowed for any questions to further clarify the procedures and purpose of the study. The potential participants were asked to sign the informed consent form in accordance with the Institutional Review Board Human Subjects’ Committee rules and regulations (see Appendix C). Participants who wished to volunteer for the study completed and returned one copy of the consent form and were given a copy of the consent form for their personal files. The demographic questionnaire was filled out at this time as well.

The participants’ confidentiality was protected by assigning a personal identification (ID) number. Only the researcher, his adviser, co-investigator, and graduate assistant had access to data collection forms that had both the participants’ names and personal ID numbers on them. All other questionnaire
forms were identifiable by the personal ID number alone. The participants’ forms were kept in labeled file folders in the researcher’s office.

Testing

Participants were randomized into an intervention group and a wait-list control group. Participants in the intervention group participated in a 6-week yoga program, “Mindful Office Yoga,” which was developed by Dr. Maryanna Klatt, who is the co-investigator of the larger study. Dr. Klatt is a certified Yoga Instructor. Every Tuesday for the 6-week intervention, the intervention group attended a one hour yoga session from 12:00-1:00. Prior to the first yoga session, both groups were instructed to fill out the MAAS pretest questionnaire. The completed forms were collected from the intervention group at the first yoga session, and from the wait-list control group via graduate assistants. Both groups were instructed to complete the MAAS posttest questionnaire following the six week intervention. Graduate assistants collected the completed questionnaires. The wait-list control group participated in the intervention following the completion of the study.

The intervention group was given an adherence booklet to ensure each participant was complying with the requirements of the study. Participants were instructed to check off the boxes adjacent to each week’s requirements. The booklets also contained additional instructional material of possible activities that could be done to enhance mindfulness; although, completion of these activities was optional.
Intervention

The “Mindful Office Yoga” program is a condensed version modeled after the Mindfulness-Based Stress Reduction program at the Stress Reduction and Relaxation Clinic, Massachusetts Medical Center, as developed by Kabat-Zinn (1990). The intervention was provided over the course of six weeks. Each week, participants attended one, hour long session taught in a group format to increase the efficiency of participant education. The weekly group sessions were held in a classroom in a centrally located building on The Ohio State University’s main campus from noon to one o’clock. The program developed by Kabat-Zinn consisted of a weekly, 3-hour group session and daily, 1-hour individual sessions. The program developed for the current study was a scaled down model.

Details of the Mindfulness-Based Stress reduction program, including objectives, structure, components, and content, have previously been described (Kabat-Zinn, 1982). The “Mindful Office Yoga” program used in the present study consisted of the following components: (1) body scan, (2) breathing awareness, (3) eating meditation, (4) yoga postures, (5) guided imagery, and (6) presentations and exercises to facilitate understanding of mindfulness.

(1) Body scan is a gradual examination through the body from head to feet with a sense of focus. Occasional suggestions of breath awareness and relaxation were used during the body scan. Since office yoga was the focus of the intervention, body scan was done in a seated position.

(2) Breathing awareness allows participants to focus on developing deep breathing. Participants were verbally encouraged to inhale deeply into the body
through the nose, and to exhale slowly through the mouth. Participants were told that breathing through the nose will cleanse and warm the air as it is inhaled. A breathing exercise to decrease respiratory rate was implemented during one of the sessions. Prior to the exercise, the participants were instructed to measure their respiratory rate for one minute. If a participant took 10 inhales during the minute, the breathing rate is equal to 1 breath per 6 seconds. During the exercise, the participants were instructed to breathe in though their noses and exhale through a plastic straw that was provided to them for one minute. After the exercise, the participants re-measured their respiratory rates.

(3) One of the weekly sessions included an eating meditation. Eating meditation is designed to increase participants awareness and enjoyment of the food they eat. Focusing on the sensory experience of eating has been shown to increase the pleasure of eating (LeBel & Dube, 2001). Raisins were used for the eating meditation in the current study. Participants were instructed to smell the raisins before placing them into their mouths. After placing the raisins into their mouths, participants were instructed to feel the texture and weight of the raisins with their tongues before chewing. Participants were then instructed to chew the raisins until all the pulp turned into juice, becoming aware of the flavor and noting how the taste changed as the raisins were digested with saliva before swallowing.

(4) The yoga postures utilized in this program were adapted to be done at the office, either seated or standing. The yoga postures help to exercise the musculoskeletal system while developing mindfulness during movement. Seated
postures included forward bending, spinal twisting, sideways leaning, back arching, leg lifting, and arm stretching. Standing postures included bending, arching, twisting, leaning, and stretching. All postures were adapted to fit into a small space. Participants were instructed to be mindful of their breathing and be aware of how their body felt during the yoga postures.

(5) Guided imagery can be a useful tool to enhance meditation by decreasing the tendency for the mind to wander. It allows participants to focus inwards bringing their attention into their bodies. During one session of “Mindful Office Yoga”, participants were instructed to picture a hurricane, noting the damage that is caused on the periphery. Participants were then shown an image of an eye of a hurricane, noting the peacefulness that is at the center. Participants were to imagine their lives are sometimes like that of a hurricane. There may be things that pull them outside into the path of the hurricane, but there may also be things that pull them back into the calm center. Participants were instructed to think of both of these things, things that balanced their lives and things that unbalanced their lives.

(6) Presentations pertaining to mindfulness and yoga were provided in the form of slide shows and handouts. An introductory slide show was used to educate participants on mindfulness and yoga. A few relevant research articles were provided to the participants. Handouts, such as an “adapted sun salutation” flyer, were provided to the participants. The participants could opt not to take the research articles or handouts if they chose to do so.
Each participant in the intervention group was provided with a compact disc created by Dr. Klatt. The compact disc contained soft music and daily yoga instructions. The yoga instructions consisted of verbal cues to guide the participants through an office yoga session; a session similar to that of the weekly group sessions. The intervention group was instructed to listen to the compact disc and practice yoga at the office for twenty minutes for four days of each work week during the 6-week intervention.

Data Analysis

SPSS 13.0 for Windows® statistical program (SPSS Inc.) was used to statistically analyze the data. T-test for dependent samples was used to assess the significance between the pretest and posttest means for each group (Vogt, W. P., 1999). The group means tested were the MAAS group mean for the treatment group and the MAAS group mean for the waitlist-control group. The hypothesis did not include a comparison between treatment and waitlist-control groups; hence, the dependent samples T-test was an appropriate statistical method for determining significant differences within each group. An alpha level of 0.05 was set a priori for all statistical analyses.
Figure 3.1: Timeline

* (Familiarization Session) Informed consent form, demographic form
† (Baseline) Pretest measures: MAAS
‡ (1-6, Intervention) Weekly group yoga session and office yoga sessions
§ (Posttest) Posttest measures: MAAS
CHAPTER 4

RESULTS

Descriptive Results

Thirty-three female and eleven male full-time employees of The Ohio State University between the ages of 27-59 years participated in this study. Descriptive statistics regarding the participants’ age, height, weight, and body mass index are presented in Table 4.1.

<table>
<thead>
<tr>
<th></th>
<th>Yoga (22)</th>
<th></th>
<th>Control (20)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Age (years)</td>
<td>43.41</td>
<td>10.19</td>
<td>46.80</td>
<td>9.15</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>167.99</td>
<td>8.37</td>
<td>168.21</td>
<td>8.65</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>64.93</td>
<td>10.66</td>
<td>67.22</td>
<td>10.45</td>
</tr>
<tr>
<td>Body Mass Index (kg.m^-2)</td>
<td>22.91</td>
<td>13.83</td>
<td>23.74</td>
<td>3.15</td>
</tr>
</tbody>
</table>

Table 4.1: Demographics of Participants

The distribution of the participant’s gender, job classification, and marital status are presented in Table 4.2.
<table>
<thead>
<tr>
<th></th>
<th>Yoga (n=22)</th>
<th>Control (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender (Female)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>72.7%</td>
<td>85.0%</td>
</tr>
<tr>
<td>African American</td>
<td>9.1%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Latino</td>
<td>4.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Asian</td>
<td>0.0%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Other</td>
<td>13.6%</td>
<td>5.0%</td>
</tr>
<tr>
<td><strong>Job Classification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive</td>
<td>4.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Senior Level Management</td>
<td>9.1%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Mid-level Management</td>
<td>31.8%</td>
<td>30.0%</td>
</tr>
<tr>
<td>Faculty</td>
<td>13.6%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Professional/Technical/Research</td>
<td>22.7%</td>
<td>30.0%</td>
</tr>
<tr>
<td>Clerical</td>
<td>4.5%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Student</td>
<td>13.6%</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>13.6%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Married/Partner</td>
<td>72.7%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Divorced</td>
<td>13.6%</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

Table 4.2: Gender, Ethnicity, Job Classification, and Marital Status
Job classifications consisted of the following: executive, senior level
management, professional/technical/research, faculty, mid-level management,
clerical, and student. A more detailed description of the job classifications can be
found in Appendix D.

The distribution of the participants’ number of medical conditions, ranging
from 0-3, is presented in Table 4.3. Table 4.3 does not describe severity of the
medical conditions, only quantity from a generic listing of medical conditions.

<table>
<thead>
<tr>
<th>Medical Condition</th>
<th>Yoga (n=22)</th>
<th>Control (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>One</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Two</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Three</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 4.3: Medical conditions

MAAS Scores

The research hypothesis tested stated that a 6-week worksite-based
mindful-yoga program will significantly increase mindfulness as measured by the
MAAS in the treatment group. MAAS pretest and posttest data was collected for
22 participants in the treatment group and 20 participants in the waitlist control
group. Brown and Ryan (2003) reported a typical group mean for a general adult
sample to be 59.10. The pretest and posttest means for the treatment group were 55.14 and 60.50, respectively. The pretest and posttest means for the waitlist control group were 63.15 and 63.70, respectively.

The statistical analysis using dependent samples T-test showed a statistically significant difference from pretest to posttest for the treatment group, while no statistical significance was shown from pretest to posttest for the control group. The paired samples statistics are presented in Table 4.4.

<table>
<thead>
<tr>
<th>Group</th>
<th>95% Confidence</th>
<th>Mean</th>
<th>Std. Error Mean</th>
<th>Lower</th>
<th>Upper</th>
<th>T</th>
<th>DF</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yoga</td>
<td>PRE-POST</td>
<td>-5.36</td>
<td>9.49</td>
<td>-9.57</td>
<td>-1.16</td>
<td>-2.65</td>
<td>21</td>
<td>.015</td>
</tr>
<tr>
<td>Control</td>
<td>PRE-POST</td>
<td>-.550</td>
<td>7.01</td>
<td>-3.83</td>
<td>2.73</td>
<td>-.35</td>
<td>19</td>
<td>.729</td>
</tr>
</tbody>
</table>

Table 4.4: Dependent samples T-test results
The MAAS mean scores for the treatment group and the control group are presented in Figure 4.5. The control group did not change from pretest to posttest. The treatment group showed a significant increase from pretest to posttest (p<.05).

![MAAS Mean Scores](image)

Figure 4.5: MAAS Mean Scores: Mean ± SE Mindful Attention Awareness Scale (MAAS) scores for treatment and control groups pretest and posttest, * p = .015.
CHAPTER 5

DISCUSSION

The results of this study supported the hypothesis that a 6-week worksite-based mindful-yoga program will significantly increase mindfulness as measured by the MAAS in the treatment group. Furthermore, the control group did not change mindfulness as measured by the MAAS. The power analysis conducted on salivary cortisol for the larger study predicted a sample size of 40 participants in order for a change to be seen. This sample size was large enough for a change to be seen in MAAS scores. Since the development of a mindfulness instrument, few studies have been done reporting scores for mindfulness. Hence, this study represents one of the first studies to measure mindfulness during a “Mindful Office Yoga” program.

Groups were randomized to either the treatment group or the wait-list control group. Because of randomization, it was assumed that the groups would be equivalent. In fact, the groups were equivalent across all items on the demographic data form. On the other hand, the groups were statistically different on MAAS scores at pretest (p = .0225). This inequality may be considered a flaw
in the research. In the future, it would be important to ensure that the treatment and control groups are matched for scores on mindfulness.

The statistical analysis used in this study was a dependent samples t-test. This method was used based on the hypothesis that the treatment group would show a significant increase in mindfulness over the 6-week intervention period. A 2x2 ANOVA with repeated measures may have been a more ideal method of statistical analysis, yet the statistically significant increase in mindfulness for the treatment group was washed out. Hence, sample size may be considered a limitation of this study. Had the sample size been larger, perhaps more comparative statistics could have shown significant changes in mindfulness.

The results for the control group may indicate a ceiling effect. Perhaps, the control group was already as mindful as they could become. In addition, the treatment group could have started at the lowest possible mean MAAS score; therefore, they could only improve. It is this researcher’s opinion that since mindfulness increases with training duration, scores on the MAAS would continue to increase for those long-term mindful practitioners.

The MAAS is a newly developed scale used to measure mindfulness. Its use in stress reduction and relaxation programs needs to be increased, or else the claim that those programs are mindful in nature could be argued. Its use on different populations from long-term meditators to mindless participants needs to be increased in order for an accurate range of MAAS scores to be made. The stratification of scores on mindfulness is important to future research in order to address possible ceiling and floor effects.
The use of the MAAS has only been utilized pre-intervention and post-intervention. In the future, weekly repeated measures of mindfulness during a mindfulness-based yoga intervention should be done. This will enhance the familiarization of the measured items; therefore, allowing for more accurate participant responses. It will also enable researchers to analyze weekly changes in mindfulness due to the intervention or other moderating variables.

It was an important finding in this study that mindfulness can increase in just six weeks for only one hour of weekly mindful practice. Participant compliance was high, 91.3%, which was well above the cutoff of 80% used in this study. Future research needs to be directed towards defining the rate at which people can change their mindfulness. It may be that mindfulness increases at a slow rate during the earlier parts of mindful training, but reaches a threshold value in which a higher rate of mindfulness is obtained. This threshold value may be similar to reaching enlightenment, in which the enlightened one has a deeper understanding of the world and self.
APPENDIX A

DEMOGRAPHICS FORM
Demographic Information

Name ___________________________ Date ____________

The following statements ask you to identify some basic information about yourself. Please fill in the blank or check the appropriate spaces.

1) Age: ______________

2) Sex: _____ male  _____ female

3) Height: _____  Weight _________ (Pounds)

4) Race: “X” all that apply  
   _____ African American  
   _____ Asian American  
   _____ Caucasian  
   _____ Hispanic  
   _____ Other: please specify  ____________________

5) Do you work?  
   _____ No  
   _____ Part-time (total hours worked per week ____________)  
   _____ Full-time  
   Job title: __________________________________________

6) Marital status:  
   _____ Single (Never married)  
   _____ Married/partnered  
   _____ Separated  
   _____ Divorced  
   _____ Widowed
7) With whom do you currently live? "X" all that apply
   _____ Alone
   _____ Spouse/domestic partner
   _____ Roommate(s)/friend(s)
   _____ Parent(s)/guardian(s)
   _____ Other relatives
   _____ Children

8) Do you have children? ______ NO ______ YES
   IF YES: Number Ages
   Girls ______ ______
   Boys ______ ______

9) Have you had or do you currently have any of the following:

<table>
<thead>
<tr>
<th>Had</th>
<th>Have</th>
<th>Ailment</th>
<th>Had</th>
<th>Have</th>
<th>Ailment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pain in heart or chest</td>
<td></td>
<td></td>
<td>Anemia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heart attack</td>
<td></td>
<td></td>
<td>Cancer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rheumatic fever</td>
<td></td>
<td></td>
<td>Diabetes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diseases of the arteries</td>
<td></td>
<td></td>
<td>Epilepsy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Varicose veins</td>
<td></td>
<td></td>
<td>Bronchitis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heart murmur</td>
<td></td>
<td></td>
<td>Asthma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abnormal EKG</td>
<td></td>
<td></td>
<td>Pneumonia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abnormal chest X-ray</td>
<td></td>
<td></td>
<td>Multiple sclerosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hypertension</td>
<td></td>
<td></td>
<td>Autonomic disorders</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pregnancy</td>
<td></td>
<td></td>
<td>Arthritis of arms or legs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Scarlet fever</td>
<td></td>
<td></td>
<td>Swollen/stiff/painful joints</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dizziness/fainting</td>
<td></td>
<td></td>
<td>Chronic back pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kidney disease</td>
<td></td>
<td></td>
<td>Orthopedic injuries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Raynaud's disease</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explanation or comments:

If female: Is there reason to believe that you could be pregnant? ______ YES ______ NO
   Date of last menstrual period ____________________________

45
10) Date of last medical exam:__________________________________________________________
   Were results normal? _____YES _____NO
   If NO, please explain:______________________________________________________________
   ________________________________________________________________________________
   ________________________________________________________________________________
   ________________________________________________________________________________

11) List any medications or drugs you are now taking:
   ________________________________________________________________________________
   ________________________________________________________________________________
   ________________________________________________________________________________
   ________________________________________________________________________________
   ________________________________________________________________________________

12) Have you used the following tobacco products? "X" all that apply
   ___Cigarettes  Age started_____  Age quit_____________
   #/day____
   ___Cigars/Pipes  Age started_____  Age quit_____________
   #/day____
   ___Snuff/dip/chew  Age started_____  Age quit_____________
   #/day____

13) Do you know of any medical problems that might make it dangerous or
   unwise for you to participate in mild exercise? _____YES
   _____NO
   If YES, please explain:______________________________________________________________
   ________________________________________________________________________________
   ________________________________________________________________________________
   ________________________________________________________________________________

46
14) Considering a 7-day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time? Write on each line the appropriate number.

a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY)
(for example, running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, roller skating or blading, vigorous swimming, vigorous long-distance biking)

b) MODERATE EXERCISE (NOT EXHAUSTING)
(for example, fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, down-hill skiing, popular and folk dancing)

C) MILD EXERCISE (MINIMAL EFFORT)
(for example, yoga, archery, fishing from river bend, bowling, horseshoes, golf, snow-mobiling, easy walking)

Considering a 7-day period (a week), during your leisure-time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?

OFTEN       SOMETIMES       NEVER / RARELY


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APPENDIX B

MINDFUL ATTENTION AWARENESS SCALE
Mindful Attention Awareness Scale

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.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Almost Always</td>
<td>Very Frequently</td>
<td>Somewhat Frequently</td>
<td>Somewhat Infrequently</td>
<td>Very Infrequently</td>
<td>Almost Never</td>
</tr>
</tbody>
</table>

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

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

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

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

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

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

7) It seems I am “running on automatic,” without much awareness of what I’m doing. 1 2 3 4 5 6

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

9) 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

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

11) I find myself listening to someone with one ear, doing something else at the same time. 1 2 3 4 5 6
12) I drive places on 'automatic pilot' and then wonder why I went there.

13) I find myself preoccupied with the future or the past.

14) I find myself doing things without paying attention.

15) I snack without being aware that I’m eating.
MAAS Scoring

To score the scale, simply compute a mean of the 15 items. Higher scores reflect higher levels of dispositional mindfulness (Brown & Ryan, 2003).
APPENDIX C

CONSENT FORM
CONSENT FOR PARTICIPATION IN SOCIAL AND BEHAVIORAL RESEARCH

Protocol title: The Effects of “Mindful Office Yoga” on Physiological and Psychological Indicators of Stress in Healthy Adults

Protocol number: _____

Principal Investigator: Janet Buckworth, Ph.D.

I consent to my participation in research being conducted by Janet Buckworth of The Ohio State University and his/her assistants and associates.

The investigator(s) has explained the purpose of the study, the procedures that will be followed, and the amount of time it will take. I understand the possible benefits, if any, of my participation.

I know that I can choose not to participate without penalty to me. If I agree to participate, I can withdraw from the study at any time, and there will be no penalty.

I have had a chance to ask questions and to obtain answers to my questions. I can contact the investigators at 614-292-0757, buckworth.1@osu.edu (Janet Buckworth) or klatt.8@osu.edu (Maryanna Klatt). If I have questions about my rights as a research participant, I can call the Office of Research Risks Protection at (614) 688-4792.

I have read this form or I have had it read to me. I sign it freely and voluntarily. A copy has been given to me.

Print the name of the participant:

________________________________________

Date:                     Signed:

________________________________________

Signed:                   Signed:

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(Principal Investigator or his/her authorized representative)  (Person authorized to consent for participant, if required)

Witness: ________________________________

(When required)
APPENDIX D

JOB CLASSIFICATIONS
Job Classifications

1) Executive (Administrative/Executive)
   - Provosts
   - Deans
   - Directors
   - Chairs
   - Other top-level administrators

2) Senior level management
   - Senior management engineer
   - Senior auditor

3) Professional/Technical/Research (non-management in nature)
   - Counselors
   - Researchers
   - Trained hospital personnel

4) Faculty
   - Faculty
   - Lecturers
   - Instructors

5) Mid-level management
   - Human resources
   - Fiscal
   - Program directors
   - Program coordinators
   - Administrative assistants

6) Clerical
   - Secretaries
   - Information assistants
   - Front desk personnel

7) Student
   - Graduate/undergraduate student employees
REFERENCES


