The Effects of Mindfulness-Based Art Therapy on Stress and Cortisol Levels in Graduate and Professional-Level Students

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ABSTRACT

The field of art therapy has gained momentum in its collaboration with neuroscience in the quest for greater empirical evidence for the efficacy of the field. While there have been a few studies testing the applicability of salivary testing of cortisol with this type of research, no concrete studies have been conducted involving analyzing the effects that multiple sessions of art therapy have on stress. This study obtained empirical evidence determining the effects that a 4-week, mindfulness-based art therapy (MBAT) group had on cortisol concentration and perceived stress from participants.

This study employed a quasi-experimental interrupted time-series research design allowing for comparative data between a pretest and posttest value of cortisol in graduate and medical students. Comparisons were made between the cortisol concentrations in all participants before and after the first and last session as well as between the data sets from each session to determine the longevity of effects. In addition, the participants’ perceived stress was quantitatively analyzed through the Perceived Stress Scale (PSS). The intervention being tested was MBAT in a group setting. The information gathered from the cortisol testing has implications for supporting the need for stress reducing programming for graduate-level students, as well as has important implications for using MBAT as a stress reduction tool.
CHAPTER 1
INTRODUCTION

In recent years, art therapy researchers have gained momentum in their quest for biological support for their practices. Researchers have started to analyze biomarkers, such as hormones, to determine the biological implications of psychological practice. Due to the innovative nature of this type of research, there is much missing in the knowledge base of the biological implications of art therapy. One such absent component in the literature is the collaborative basis of biological research in regards to stress and MBAT.

One of the most prevalent biomarkers present in current art therapy research is the stress hormone, cortisol. The majority of the research that has been conducted with cortisol and art therapy has focused on the effects of a single art making session on cortisol levels (Kaimal, Ray, & Muniz, 2016; Visnola, Sprūdža, Baķe, & Piķe, 2010). However, there has not been extensive study on the effects of a group therapy model on cortisol, nor on the effects of MBAT. Therefore, testing cortisol could be useful in determining the contribution a mindfulness-based group art therapy model may have on stress reduction, as well as the creation of positive change within a client.

Justification

Stress has been documented as one of society’s most pertinent problems, particularly in postgraduate student populations (Stecker, 2004; Wyatt & Oswalt, 2013). Stress can have adverse impacts on an individual’s physical and mental health, as well as their academic performance (Wyatt & Oswalt, 2013), and immune function (Mercer, Warson, & Zhao, 2010). Art therapy has been shown to have stress relieving qualities (Abbott, Shanahan, & Neufeld, 2013). Art therapy is a therapeutic approach that utilizes psychotherapy and various art
modalities to promote human development and healing (Siegel, Iida, Rachlin, & Yount, 2016). In an academic setting, art therapy has been effective in assisting students with time management, managing stress, controlling emotions, and impulsivity, while also positively impacting academic performance (Isis, Bush, Siegel, & Ventura, 2010). Greater knowledge about the biology behind stress would be beneficial in understanding the implications of specific art therapy approaches and how they may relate to stress reduction. The intent of this research is to assist in treatment planning, as well as advocacy for self-care and mental health in students. In addition, greater knowledge about how to cope with stress could be beneficial in improving health conditions and academic performance. The utilization of quantifiable measures allows for a method of measuring the mediation tactics for stress and may assist in promoting earlier intervention and even prevention of stress (Lee, Kim, & Choi, 2015).

**Study Purpose**

The objective of this research was to examine the stress-reducing benefits of MBAT among groups of graduate and medical students. This involved investigating the correlation of MBAT interventions with decreases in cortisol concentration and decreases in perceived stress, as well as variations in change over time. While previous studies have identified the likelihood that art therapy does cause a fluctuation of cortisol, the purpose of this study is to identify variations with the use of mindfulness-based theory and a group model, as well as investigate the potential of multiple-session therapy to have a greater effect than a single art making session. Scientific evidence can be difficult to refute, therefore the acquisition of knowledge regarding how the changes in salivary cortisol are directly associated with art therapy could prove beneficial to advancing the field of art therapy and promoting the use of stress reduction techniques for students.
Research Question

The purpose of this study was to examine cortisol and perceived stress in graduate and medical students before and after a MBAT group in order to determine the effects of MBAT on stress reduction. The first hypothesis was that through participation in MBAT, cortisol concentration would decrease. The second hypothesis was that in a four-week period, participation in weekly MBAT would cause participants’ perceived stress to decrease. The third and final hypothesis was that through participation in multiple sessions of MBAT, cortisol concentration would decrease at a greater rate in the last session compared to the first.

Overview of the Study

The process of the study intervention took place over a period of four weeks during which time the primary researcher provided MBAT to groups of students pursuing a graduate or medical degree. The participants completed a background questionnaire and the Perceived Stress Scale (PSS), as well as provided salivary cortisol samples before and after the first and last session. Participants were placed into a treatment group based on their schedule and availability. Each session consisted of different MBAT interventions that promoted components such as self-expression, awareness, positive thinking, and acceptance. At the end of the study, all participants completed the PSS, which was later statistically compared with their original. The salivary cortisol samples were tested utilizing an enzyme-linked immunosorbent assay (ELISA) and statistically analyzed using GraphPad Prism 7.01 and SPSS. The cortisol results were compared with the students’ perception of their stress from the PSS data.
Conclusion

The prevalence of stress is high in graduate and medical students, but remains largely unaddressed on many campuses within the United States. This current study addresses this issue by investigating the stress-reducing benefits of MBAT groups with graduate and medical students in an effort to advocate for the use of such protocols with greater ubiquity among colleges, as well as to increase the biological evidence supporting the use of art therapy. The following dissertation contains a review of relevant literature and related studies concerning stress, therapeutic approaches, and salivary cortisol analysis, followed by the procedures that guided the course of the study and the culminating results of the research.
CHAPTER 2

LITERATURE REVIEW

Previous studies have indicated that art may cause fluctuations in brain activity, and additionally, contribute to neuroendocrine responses. This collaboration of neurobiology and art therapy research has started to accumulate empirical evidence for the field of art therapy and has set a platform for future discoveries between the two fields. Many of these studies focus on the art media, rather than the biological implications of the mechanisms of art therapy, especially specific art therapy protocol. The biological effects of MBAT, particularly in a group setting, leave much to be explored in regards to the collaboration of art therapy and neurobiology. The following literature review will focus on the recent biological discoveries in relation to art therapy, as well as the implications of mindfulness, art therapy, and the combination of both on stress. In addition, the prevalence of stress in graduate and professional-degree seeking students will be reviewed, as well as the effects stress may have on their mental health.

Neuroscience in Art Therapy as a Growing Field

Historically, researchers have primarily utilized observational and anecdotal techniques depicting positive evidence in support of the effectiveness of art therapy (Mirabella, 2015). However, this research is limited in regards to clinical and empirical evidence, but could be accomplished through a quantitative scientific study. A greater implementation of scientific approaches could additionally provide advanced vocabulary and understanding regarding the practice of art therapy, as well as offer an empirical outlook on subjective experience (Kapitan, 2014). The presence of neuroscience in conjunction with art therapy has gained momentum and
increased awareness about the physiological relationship between art and the brain (Belkofer & Konopka, 2008).

Neuroscience has started to play a larger role in art therapy research, particularly in support of empathy, learning, and consciousness, which can be gained from art therapy (Kapitan, 2010). It is the intent of neurobiologically-based art therapy researchers to develop a more thorough knowledge of how visual imagery is processed in the brain and what emotional and behavioral implications result. Subsequently, this knowledge could give foundational support to further analysis, explanation, and refinement of current practices in the field of art therapy (Belkofer & Konopka, 2008).

**Understanding Art Therapy as a Brain Science**

Art therapists have speculated that art therapy could unlock healing potential within an individual’s neural pathways by targeting the structural levels of the brain through the arts, subsequently influencing new learning (Kapitan, 2010). Through the preliminary neurobiological research that has been conducted on art therapy, there is strong evidence supporting the claim that neural processes may play a role in the experience of art therapy (Kruk, Aravich, Deaver, & Debeus, 2014). Experience is the primary road to learning, which results in alterations of brain pathways and function through changes in gene expression. These changes in gene expression may also have biological implications on individuality and self-formation (Kandel, 1998). With the advancement of brain imaging technology, a greater understanding of the processing of information in the brain has been obtained, as well as the internal processes that occur in response to creativity and art (Lusebrink, 2004).
The complex processes resulting from art making are highlighted by the many activation points in the brain. Artistic expression results in emotional, cognitive, sensory, and motor activity (Lusebrink, 2004). Many different parts of the brain are activated in processing these different modalities. Kinesthetic and sensory responses to art are processed in the parietal lobe of the brain. This cortex is also utilized for perceptual and spatial information, as well as emotion, interpretation, and memory. These operations are associated with perceptual, affective, cognitive and symbolic processes in an art and art therapy context. The perceptual modality may also be associated with the temporal lobe for its processing of sequencing an organization, as well as with the occipital lobe for its interpretation of color and other visual concepts (Lusebrink, 2004).

Art-induced Fluctuations in Brain Activity Related to Stress

Some researchers have observed fluctuations in brain activity in response to art making (Farias, Davis, & Harrington, 2005; Belkofer & Konopka, 2008; Belkofer, Hecke & Konopka, 2014; Kruk et al., 2014). Few studies, however, have compared multiple media in association with art therapy and brain activity as most previous research has dealt with a specific medium. For instance, Farias et al. (2005) found that drawing proved to be an effective mode of therapy for clients with aphasia, through empirical evidence of fMRI imaging. These images depicted an integration of hemispheres of the brain, allowing clients to improve communication. Belkofer et al. (2014) also found that there was a significant difference in brain activity before and after drawing. They found that drawing for 20 minutes caused significant differences in brain activity regardless of previous drawing experience. These results were consistent with a previous study, in which utilizing an EEG, Belkofer and Konopka (2008) found that alpha and beta frequencies increased in brain activity while delta and theta frequencies decreased after drawing and
painting. In this single-subject study, alpha and beta waves increased in the parietal, occipital, and temporal lobes after the subject made art using paints and charcoal.

Another EEG study compared the effects with the use of clay and drawing on brain activity for 14 female participants who were attending a Northern American medical school. Participants were allowed to freely express themselves using clay, while a directive was given with drawings. Both were found to alter brain activity in the right medial parietal lobe, reiterating the significance that art making may have for memory function, relaxation, and spatial processing (Kruk, et. al., 2014).

The studies explored here depict that changes in brain activity can occur as a result of art making, and further suggest that art may have a relaxation component, as noted by the relaxed alert, mental state associated with alpha waves. Because alpha waves are also associated with memory function, this also has implications for how art can serve as a useful means for stress reduction and memory (Belkofer & Konopka, 2008).

**Salivary Cortisol as a Biomarker for Stress**

Cortisol is a glucocorticoid, which has been widely utilized as a biomarker for stress (Clements, 2012). Salivary cortisol has a greater identification of bioavailable cortisol, rather than total cortisol found in serum form (Siegel, Iida, Rachlin, & Yount, 2016). Salivary cortisol collection is a simple and noninvasive process, causing it to be a more frequently utilized biological indicator of stress within the past few decades (Clements, 2012). In addition, the assays performed for salivary cortisol analysis are relatively inexpensive and easily executed. Cortisol in any form, including salivary, follows a natural rhythm, the highest levels typically in the morning, and the lowest at night (Clements, 2012). Additional secretions of cortisol may
occur in response to stressors. These factors require researchers to be diligent about collecting samples at consistent times, collecting multiple samples, and ensuring that adequate information about the individual providing the sample is obtained.

**Art-Induced Reductions in Cortisol**

Art therapy researchers have conducted recent studies targeting biomarkers of stress, such as cortisol, investigating biological correlations with art therapy. In a quasi-experimental study, Kaimal, Ray, and Muniz (2016) showed the reduction of cortisol levels in healthy adult subjects who participated in a one-hour art making session. In addition to the scientific data, participants provided written responses to their experience, many of whom noted that the art making made them feel more relaxed, helped them learn about themselves, along with providing a sense of freedom. They also commented on the concept of flow, which was defined as feeling like they got lost in the art making process.

In a similar study, Siegel et al., (2016) measured cortisol levels following one art therapy session with hospitalized children. The researchers designed this study with a wait-list control group, which allowed for the comparison of mood questionnaires taken by all of the children. The children in the experimental group completed the questionnaire before and after their art therapy session. After art therapy, compared with the control group, the children displayed a trend in mood improvement, which was consistent with the decrease in cortisol levels that was found in the experimental group. This study did not test the cortisol of the control group, which could be a beneficial addition to future studies.

Work-related stress seems to be a prevalent issue in society, and one that crosses international boundaries. Latvian researchers, Visnola et al. (2010), studied employee health,
noting that stress is considered the number one health problem of our time, by examining the effects of art therapy on stress and anxiety in health care workers, all of whom were women. Through using a quantitative, quasi-experimental design, 30 women were placed in a control group, and 30 in an experimental group. All of the participants provided saliva samples three times per day after having been trained in appropriate collection methods. The saliva samples were analyzed for cortisol with high-performance liquid chromatography (HPLC). All participants also completed a stress questionnaire and the State-Trait Anxiety Inventory (STAI). The experimental group participated in nine sessions of group art therapy, broken into stages of situation determination, acquiring methods of stress reduction and overcoming anxiety, and awareness of self-conception and strengthening potential. These art therapy sessions were two hours in length and occurred once per week for nine weeks. The stress levels in the questionnaires were consistent with the cortisol levels recorded, in that both depicted a statistically significant decrease within the experimental group. These values were lower than those in the control group, indicating that art therapy has stress reducing benefits.

**Art Therapy and Stress Reduction**

The investment in the art making allows for relaxation through focusing on something intentionally for an extended period of time (Siegel et al., 2016). In addition, the use of art media, particularly structured media, can give an individual a sense of control and allow them to transform the image in a safe manner, looking at it from a new perspective and enabling them to associate it more positively and with a calmer state of mind (Hass-Cohen & Findlay, 2015). For instance, in a study comparing the effects of artistic tasks and non-artistic tasks, the artistic tasks were found to have greater stress reduction capabilities (Abbott et al., 2013). Motor symptoms, such as restlessness were found to accompany anxiety and stress, causing the kinesthetic aspects
of working with art materials to be a beneficial attribute of art therapy for stress reduction (Abbott et al., 2013).

The concept of focus, and shifting one’s focus, is a feature of art and art-related techniques, such as guided imagery, that may assist a client in organizing their thoughts and reducing stress. In this manner, intentional focus through the arts can be a beneficial tool in problem solving as well. Fully processing a stressful experience can help in the healing process and lead to academic improvement. By processing the stress, or the stressful event, the individual develops a level of understanding and is able to incorporate it into their self-concept, making it less stressful and more manageable to cope with (Curl, 2008).

In a study comparing the effects of negative cognition and positive cognition during artistic activity, those that employed a positive focus reported significant reductions in their stress levels (Curl, 2008). This report, obtained from the State-Trait Anxiety Inventory (STAI), was consistent with lowered heart rate measured in this group. Similarly, a group of scientific literacy students were found to have a reduced pulse after participating in a 50-minute guided image art therapy session, indicating the capacity to control and reduce one’s stress (Cooke-Ariel, 2015). In another application of guided imagery, medical students and staff were found to have reduced stress and anxiety reduction (Mercer et al., 2010). In this study, participants were led in guided imagery visualization followed by visual journaling. This intervention focused on breathing, identifying stress-inducing emotions, and self-exploration. In addition to a decrease in anxiety and stress, the general trend of participants affect showed an increase, supplementing previous conjectures of the role of positive affect in stress reduction.

Due to the disturbing images that health care professionals are often exposed to, Huss and Sarid (2014) utilized art to reduce the work-related stress of individuals in the health care field.
The process involved physicians recalling a disturbing image, reflecting on its elements such as shape, size, texture, and color, and reorganizing them to alter the composition. In this process, the stressful image is transformed in a concrete form. This study found a decrease in subjective discomfort levels after the health care professionals transformed the stressful images. This suggests that nonverbally transforming a stressful image can be an effective technique in lowering distress. This could be due to a sense of control and resourcefulness the participants were able to achieve through guided imagery and creative process.

**Stress Reduction as a Result of Groups and Art Therapy**

Researchers have studied the relationship of peer interaction with stress reduction, as well as the promotion of community which results from common interactive experience, such as art making. Lack of social support can be a contributing factor to the rise of psychological emotional experiences and stress (Visnola et al., 2010). Siegel et al. (2016) noted that support systems, including, but not limited to, family, friends, and community, are an imperative part of the healing process. Social support has also been found to have an impact on reducing the prevalence of depression, as well as provide a defense for graduate students against the negative effects of stress (Johnson, et al., 2008; Stecker, 2004). For example, medical students have found that talking with their peers can be an effective coping mechanism when dealing with stress (Lee & Graham, 2001).

Communication and collaboration with others, as well as the self-conception that may be associated with art, may assist in stress reduction, as seen in art therapy groups (Visnola et al., 2010). Huet and Holtum (2016) investigated the effects of art therapy-based groups on work-related stress. In the study 20 health care workers utilized art-viewing as well as art making to convey their emotions and thoughts about their occupational situations and stresses. Participants
noted the art was an integral part of the group, many commenting that the art instigated the process of identifying emotions. In addition, the group setting allowed for participants to feel less isolated and gain a sense of relief. The group model allowed participants to feel comfortable articulating their stresses and the difficult emotions involved. This was partially due to the components of relational aesthetics and joint attention. Relational aesthetics refers to the process of judging an artwork based upon the interpersonal relations that it evokes or exemplifies (Huet & Holttum, 2016). Joint attention fosters social interaction and the appreciation of differences and the perspectives of others. These qualities of the group experience allowed participants to benefit from group interaction as the art allowed them to feel safe, free from the fear of personal exposure associated with verbal therapy. Many participants expressed that the art revealed to them some unknowns about their work stress and the experience encouraged them to make positive changes in their lives. Additionally, some participants continued viewing and making art after the end of the study as a coping mechanism for stress. Consequently, the authors concluded that art was the catalyst for the engagement of the participants.

**Implications of Mindfulness on Stress**

Research has indicated that the use of mindfulness techniques can reduce an individual’s stress level, as well as promote greater emotional well-being (Shapiro et al., 1998; Lengacher et al., 2012). Mindfulness is based upon centering on the present moment and focusing on non-judgmental awareness. It has been shown to be effective for increased quality of life, improved mood, overcoming trauma, and spiritual growth (Ando & Ito, 2016). Mindfulness can be useful in concepts of acceptance, addressing avoidant behavior, and emotion regulation (Kalmanowitz, 2016). The Mindfulness-Based Stress Reduction (MBSR) technique has been an effective treatment in reducing distress and anxiety for a variety of populations (Duncan, Moskowitz,
Neilands, Dilworth, Hecht, & Johnson, 2012; Lengacher et al., 2012; Shapiro, Schwartz, & Bonner, 1998).

Shapiro et al. (1998) found that participation in an 8-week mindfulness-based stress reduction intervention can reduce anxiety, reduce psychological distress such as depression, increase empathy, and increase spirituality. In a study conducted with premedical and medical students, a mindfulness intervention was modeled after a program developed by Kabat-Zinn, and implemented techniques such as sitting meditation, body scan, Hatha yoga (stretches informing awareness and balance), mindful breathing, and “loving kindness” and “forgiveness” meditations. Participants were also taught about the psychological and physical effects of stress, as well as coping skills. There was also a social component to the program as participants formed small groups to facilitate discussion and empathy. The students reported a decrease in depression and anxiety and increases in spirituality and empathy, as a result of the mindfulness intervention.

Lengacher et al. (2012) conducted a study with cancer patients and their caregivers participating in MBSR. In this study the patients were the most significantly affected, however, the caregivers showed improvement in quality of life as well. The patients experienced decreased stress and anxiety as a result of the 6-week MBSR. Both the caregivers and the patients showed decrease in post-session cortisol levels, compared with the pre-session sample for weeks 1 and 3. Week 6 showed no significant change when comparing the pre-session and post-session samples, however, the cortisol levels at week 6 were lower than the baseline measurements at week 1. In addition, the levels of interleukin-6 (IL-6) were reduced in both caregivers and patients. Similar to the cortisol levels, IL-6 also showed an overall reduction. IL-6 is an inflammatory protein which is a part of the immune response. Like cortisol, it increases during times of stress (Lengacher et al., 2012). As a result of the study, Lengacher et al. (2012) concluded that
extended or repeated mindfulness therapy may have a prolonged effect on cortisol levels and stress.

Cohen and Miller (2009) used a format of mindfulness modeled after MBSR, Interpersonal Mindfulness Training (IMT) with counseling graduate students. The IMT model emphasized bringing awareness to their self and others through focusing both internally and externally (Cohen & Miller, 2009). In this study, participants showed an increase in mindful awareness, decrease in perceived stress, increase in social connectedness, increase in emotional intelligence, and decrease in anxiety (Cohen & Miller, 2009). The researchers concluded that this relationally-oriented form of mindfulness supports the notion that group therapy could benefit populations in a stress-relieving manner.

The acquisition of internal and external resources plays a significant role in resilience and an individual’s capacity to overcome adversity and the stressors in their life (Kalmanowitz, 2016). Mindfulness allows the individual to recognize and accept these resources in a non-judgmental way. The concept of flow is a cooperating element of mindfulness in its integration with art therapy. With the practice of mindfulness, a person in a state of flow is completely engaged in the art process, having quieted the mind, and they are totally present within the moment. In this process, the individual also has the opportunity for reflective distancing, stepping back and observing the art for what it is and what it is in a mindful way (Rappaport & Kalmanowitz, 2014). The concept of flow has been shown to be effective in improving creativity and overall well-being (Chilton, 2013). Flow has also been found to improve concentration, positive emotions, self-expression, self-confidence, and sense of control (Chilton, 2013).
Mindfulness-Based Art Therapy Effects on Stress

MBAT has been shown to decrease anxiety and stress through increases in cerebral blood flow. A study by Monti et al. (2012) showed that the combination of MBSR and expressive arts over an 8-week period decreased stress in breast cancer patients. This model of MBAT combined MBSR with art tasks intended to promote self-expression, self-regulation, and coping strategies. The evidence from this group art therapy model suggests that the supportive social network and opportunity for relaxation and self-discovery can have beneficial effects on stress and anxiety reduction.

An application of mindfulness to art therapy is the concept of the inhabited studio. In this model, one practices being present in the studio and proceeding in a non-judgmental way (Kalmanowitz, 2016). In the inhabited studio, curiosity, acceptance, and openness are encouraged, and symbolic representation is emphasized. Participants in the inhabited studio gain a sense of control and emotion regulation as the mindfulness art therapy provides a catalyst for working through the body toward expression and symbolism. The mindfulness meditation, which accompanies the art in this approach, can be challenging for some clients, but ultimately they report gaining a sense of calmness from the experience. In working with refugees, Kalmanowitz (2016) used mindfulness art therapy and the inhabited studio model to give them a sense of internal safety, identify and observe their emotions, acceptance, and self-awareness. Ultimately, the implications of this model are to provide clients with tools to promote internal strength and growth, particularly when confronted with the stressors of everyday life. This mindfulness model coincides with the notion that stabilization and a sense of safety in one’s life contributes to one’s adaptability to stress, which allows the individual to feel a sense of safety, self-control, acceptance, and resiliency (Hass-Cohen & Findlay, 2015).
In a randomized controlled clinical trial with women with cancer, MBAT was effective in reducing stress and improving quality of life (Hass-Cohen & Findlay, 2015). Through the interaction of verbal and nonverbal experiences in art therapy, particularly through group discussion and participation in sensory art experientials, neural integration was promoted and stress was reduced (Hass-Cohen & Findaly, 2015). This study highlighted the physiology of stress and receptive attention resulting from participation in mindfulness-based art tasks, suggesting that this could be an effective model for improving self-care and stress reduction.

**Stress in Graduate and Professional-level Students**

Students seeking graduate and professional-level degrees have been largely under-researched, as much of the research conducted in regards to post-secondary students has been focused on undergraduates (Kernan, Bogart, & Wheat, 2011). College campuses are impacted by the poor mental health of their students, particularly in regards to academic performance and student retention (Wyatt & Oswalt, 2013). In reference to this population, Stecker (2004) deemed stress “inevitable,” noting high rates of depression, stress, and substance use reported by graduate and professional-level students.

As stress in post-secondary education seems to be a prevalent and increasing issue in society (Wyatt & Oswalt, 2013), researchers in psychological fields have acknowledged the necessity of developing coping strategies (Johnson, Batia, & Haun, 2008; Tyssen, Vaglum, Grønvold, & Ekeberg, 2001) and encouraging mental health services for students (Garcia-Williams, Moffitt, & Kaslow, 2014; Stecker, 2004). In a study examining health science graduate students, Kernan, Bogart, and Wheat (2011) found that health concerns they most self-reported were those involving upper respiratory infections, interpersonal concerns, mental health, and
stress. Some of these students indicated that depression, anxiety, and stress had a negative impact on their academics.

In a comparative study examining mental health issues among undergraduate and graduate students, the source of stress may be different. For undergraduates, this is a time of greater independence and decision-making. In addition, many mental health disorders have an onset around this time of young adulthood. The pressure to do well academically and make a career choice is also a cause of undergraduate stress. However, for graduate students, their perceived stress tends to stem from academic pressure, finances, assistantship responsibilities, and workload. They often seem to experience a disconnection from social and cultural activities, placing the majority of their attention on their academics (Wyatt & Oswalt, 2013).

A significant consequence of stress is its potential effect on immune function. Academic stress in medical students has shown to be a cause of increased stress in other areas of life, as well as weaken their immune system (Mercer, Warson, & Zhao, 2010). In a recent study, researchers found that academic stress in post-graduate students increased cortisol levels, subsequently inhibiting neutrophil function in the immune system. Neutrophils are an integral part of the immune processes surrounding tissue injury (Ignacchiti, Sesti-Costa, Marchi, Chedraoui-Silva, & Mantovani, 2010).

If students are unable to effectively cope with their stress, they may develop physical or psychological health problems (Johnson, Batia, & Haun, 2008). Common physical problems associated with student stress include headaches, nausea, and sleep disturbances. Psychological issues that many students experience as a result of chronic stress are anxiety attacks, depression, and burnout (Johnson, et al., 2008). Stecker (2004) linked depression to levels of perceived stress and lack of social support in medical students. Similarly, Dyrbye, Thomas, and Tait (2006)
suggested that a number of factors including academic pressure, financial stress, lack of sleep, and exposure to their patients’ suffering may have an adverse impact on the mental health of medical students. They found that psychological distress was greater in medical students than in the general population, particularly in regards to the prevalence of anxiety and depression.

Mental health seems to becoming a greater concern for graduate students as it has been indicated that they have an elevated risk for suicide (Garcia-Williams et al., 2014). Their suicidal ideation seems to be congruent with symptoms such as depression, hopelessness, impulse control, and unhealthy eating habits. As previously mentioned, many of these conditions can be a side effect of stress. In a study of Norwegian medical students, it was found that suicidal ideation could be predicted by lack of control, personality, negative life events, anxiety, and depression. The most significant of these were anxiety and depression. However, independent of that, job stress, and vulnerability were important factors (Tyssen et al., 2001).

Through a study examining medical students’ perception of stress and the potential of implementing a wellness elective course, researchers concluded that students felt that wellness should be of greater importance to physicians, and that many of the students acknowledged their neglect of their own wellness (Lee & Graham, 2001). Many of the students found the wellness elective to be helpful in aspects such as socializing with their peers and engaging in wellness activities without feeling guilty. This research highlights the importance of making time for personal wellness, specifically in student populations.

Conclusion

The development of neurobiological research has allowed the field of art therapy to gain greater understanding of how art expression relates to brain structures and functions, providing
insight into healing and progress for clients and potential clients (Lusebrink, 2004). Visual arts are able to activate multiple areas and pathways in the brain, giving the practitioner the opportunity to target or emphasize a particular aspect of information processing through the arts. In particular, the multimodal effects of art therapy on the brain offer benefits, such as stress reduction and communication improvement, to the clients through bilateral activation, and reframing improvements resulting from neuroplasticity along with the creation of new neural pathways (Hass-Cohen & Findlay, 2015).

The advancements in brain imaging technology have allowed researchers to discover the types of activation the arts produce in the brain, such as the increased expression of alpha waves and the activity in the various parts of the brain, particularly the parietal lobe (Belkofer & Konopka, 2008; Belkofer et al., 2014). In addition to brain imaging, the preliminary studies have indicated that neuroendocrine testing of the stress hormone cortisol is an effective measure for empirical evidence in neurobiological art therapy research (Kaimal et al., 2016; Siegel et al., 2016; Visnola et al., 2010). These neurobiological findings support the experiential evidence depicted in art therapy studies suggesting its stress reducing effects (Abbott et al., 2013; Curl, 2008; Huet & Holttum, 2016; Huss & Sarid, 2014; Mercer et al., 2010). Mindfulness studies have shown similar results (Duncan et al., 2012; Lengacher et al., 2012; Shapiro et al., 1998).

This review of the literature has supported the notion that MBAT in a group format may be beneficial to reducing stress and anxiety in students pursuing a graduate or professional-level degree. Therefore, the focus of this study will be to acknowledge the severity of stress in graduate and medical students and the necessity of a means by which they can cope and overcome that stress. While the focus of previous studies has been on the biological implications and effects of art making, the focus of this study is on the effects of a specific art therapy
protocol, highlighting the therapeutic value of the mechanism of MBAT with a biological assessment.
CHAPTER 3

METHODS

The evidence supporting the stress-reducing properties of mindfulness and the arts prompted this study in an effort to research the efficacy of MBAT on reducing stress in students pursuing a graduate or professional-level degree. The study utilized MBAT interventions with students to compare their stress levels over a period of time. The research design, participants, and instrumentation will be explained in this section.

The Positivist Paradigm

The methodological paradigm this study employed was positivism, which is associated with quantitative research. This paradigm suggests that the scientific method and empirical data produce current operative knowledge (Fraenkel & Wallen, 2009). Quantitative evidence was analyzed through salivary cortisol and the comparative analysis of the pre- and post- test results of the Perceived Stress Scale (PSS) questionnaires. Following the positivism paradigm, this is the best method to solve this problem and will contribute greatly to learning and adding to the art therapy biological knowledge base. Positivism maximizes objectivity while minimizing biases. In addition, the positivism paradigm supports peer support, which is particularly helpful in interpreting data. This study utilizes this supportive component through the interdisciplinary nature of the study. The triangulation component of the positivism paradigm considers multiple sources of data. This was applied in the study through the varying time points of sample acquisition, as well as the background questionnaire data, the Perceived Stress Scale data, and participant response (Rubin & Bellamy, 2012).
Research Design

The purpose of this study is to gain empirical evidence to help determine if participation in MBAT groups has an effect on cortisol and stress levels. Understanding implications of MBAT on stress could lead to the development of more effective and efficient models for treatment plans and stress reduction. This study employed a quasi-experimental interrupted time-series research design. Experimental research has a greater potential for conclusive, scientific results, which is the main purpose of this study (Fraenkel & Wallen, 2009). The interrupted time-series design employs the method of comparing pretest and posttest data of a treatment group (St. Clair, Hallberg, & Cook, 2016). This research design has been shown to produce consisted results with experimental findings, and has been considered one of the strongest of the quasi-experimental designs (Penfold & Zhang, 2013). This was a 4-week study with 1-hour interventions for two groups, participating at the same time on consecutive days. It took approximately 20 minutes in the first session to obtain informed consent, background information, administer questionnaires, and collect saliva samples from all participants. Following the administrative protocol, the participants engaged in 30 minutes of MBAT, leaving 10 minutes for therapeutic processing to end the session. Following these sessions, all participants provided another saliva sample. During the fourth week, all participants provided a saliva sample at the beginning and end of the session hour and completed another PSS at the end of the hour. The hypotheses were that through participation in MBAT, cortisol concentration and perceived stress would decrease and that the cortisol would decrease at a greater rate in the last session compared to the first.
Sample

The participants were recruited from the Florida State University Medical School as well from the FSU Graduate School. The study was advertised throughout the FSU campus and through faculty contacts within the graduate colleges. Participants were recruited on a volunteer basis, constituting a convenience sample. A total of 13 participants demonstrated interest, 7 participated in the study, and 5 completed the study. Smokers were identified through a background questionnaire administered at the beginning of the study due to the potential effects of nicotine on cortisol data (Clements, 2012). The participants were placed into treatment groups according to their availability, initially constituting two groups – Group 1 containing four members, and Group 2 containing 3.

Instrumentation

The primary instrumentation in this study is quantitative and employed an enzyme-linked immunosorbent assay (ELISA). This is one of the most common analytical measurements of salivary cortisol (Clements, 2012). This technology detects and quantifies specified biomarkers, such as peptides, proteins, antibodies, and hormones. The information collected from the ELISA was used to determine the fluctuation of the participant’s cortisol levels. The salivary data was compared from pre- and post- interventions, as well as from week 1 to week 4. This method is nonintrusive and has been used in multiple studies (Kaimal et al., 2016; Siegel et al., 2016; Visnola et al., 2010), proven to be an effective and reliable tool. The salivary cortisol was collected by passive drool into test tubes and participants were asked not to eat for 60 minutes prior to collection. The samples were stored on ice during the remaining hour of the sessions in which they were collected. The samples were stored in a secured freezer at -20°C in a biomedical...
research lab at the FSU College of Medicine. The instrumentation was utilized and processed according to the Salimetrics protocol accompanying the ELISA kits.

In accordance with the Salimetrics cortisol ELISA protocol, all reagents were removed from the refrigerator 1.5 hours before beginning the assay and saliva samples were removed from the freezer to begin thawing. The thawed saliva samples were placed on a vortex and centrifuged at 1500 x g for 15 minutes. 25μl of standards, controls, and saliva samples were pipetted into individual wells within the plate. 25μl of assay diluent was pipetted into 2 standard zero wells and into 2 non-specific binding (NSB) wells. 200μl of enzyme conjugate solution (enzyme conjugate and assay diluent at a 1:1600 ratio) was added to all of the wells with a multichannel pipette and the plate was placed on a plate rotator for 5 minutes at 500rpm. The plate incubated at room temperature for 1 hour and then washed 4 times with 200μl of wash buffer in each well. Then 200μl of TMB substrate solution was added to each well with a multichannel pipette and the plate was placed on the plate rotator for 5 minutes at 500rpm. The plate was incubated at room temperature in the dark for 25 minutes then 50μl of stop solution was added with a multichannel pipette. The plate was placed on the plate rotator for 3 minutes. Within 10 minutes of adding stop solution the plate was read at 450nm utilizing Gen5 1.11 software. This data was exported to Excel and GraphPad Prism 7.01.

At the start of the study, participants completed a background questionnaire containing information about the participant and their daily habits. The questionnaire included information about the participants hobbies, interests, previous art experience, current mood, menstrual cycles, medications, use of oral contraceptives, eating habits, sleeping habits, levels of activity, caffeine intake, smoking habits, and inquiries about the participant’s age, gender, ethnicity, and other defining characteristics (see Appendix A). During this time the participants also completed a
Perceived Stress Scale (PSS) assessment to determine a baseline for how they appraise their stress (see Appendix B). Participants also completed this assessment at the end of the study. The PSS-14 is the original version and has been used internationally to assess individual perceptions of stress. It has proven to be a reliable and valid assessment tool (Cohen, Kamarck, & Mermelstein, 1983). The PSS-10, however has been shown to be superior to PSS-14, and was the form which was utilized in this study (Lee, 2012).

**Study Procedures**

The primary researcher recruited participants to engage in a MBAT study by posting flyers advertising the study and distributing an email to department heads of graduate programs throughout FSU. The participants who demonstrated interest were broken into two groups to accommodate participant schedules. These groups met on consecutive days from 6:00 PM to 7:00 PM.

The first Session, week 1, began with all of the participants providing a salivary sample via passive drool as indicated by the Salimetrics protocol. All salivary samples were obtained at a consistent time of day due to natural fluctuation in cortisol that occurs throughout the day (Clements, 2012). Following their saliva sample collection, participants completed a background questionnaire as well as the Perceived Stress Scale (PSS) to measure subjective distress (Cohen & Miller, 2009). The background questionnaire included questions regarding the menstrual cycle phase and use of oral contraceptives for females due to the potential difference in cortisol levels they may cause. In addition, information about gender, age, caffeine intake, smoking, and exercise habits, were obtained as some cortisol differences may be attributed to them (Clements, 2012). The acquisition of this data allowed the researcher to notice any fluctuations or patterns related to these factors. The participants proceeded by participating in a MBAT group session. At
the close of the hour session, all participants gave a second salivary sample via passive drool into test tubes.

During week 2 and week 3, the participants attended the art therapy group where they completed MBAT tasks and discussion for a 1-hour session. Week 4 protocol was the same as week 1, where the groups provided saliva samples at the beginning and end of the hour session. Following the session, all participants completed the PSS for comparative analysis with their original, as well as provided a written reflection of their experience in the group.

**Mindfulness-Based Art Therapy Intervention**

**Week One**

The MBAT sessions were based upon four previously tested mindfulness art experiences (Hass-Cohen & Findlay, 2015). The MBAT session in week 1 began with a mindful breathing exercise inspired by MBSR practices. Participants flipped through magazines and ripped out the pages one by one. They placed the images that appealed to them on one side, and the discarded images on their other side. Then all of the discarded images were placed in the center and participants were given the opportunity to pick out images that appealed to them despite having been rejected by others. Participants proceeded to create a collage with their selected images. The art therapy portion of the session concluded with a discussion about acceptance and how the process could relate to the self. In addition, highlighting the application of the “chore-like” process in a mindful manner, and how that may be applied to everyday life.
Figure 1. Sequence of Procedures

Week Two

The MBAT in week 2 began with a mindful walking exercise, surrounded by art materials previously laid out by the facilitator. Participants were encouraged to draw awareness to their breathing and to their steps, and encouraged to focus on internal positive sentiments for each step. When instructed to do so, the participants stopped at the nearest table and began to mindfully examine the materials. They picked up the material in front of them and placed marks
on a large shared paper on the table, paying close attention to their movements and the experience of marking on the page. Then they moved to another table to experience another art media. This process continued until each table had been visited by each participant. The session ended with a discussion about the process and the movements, as well as how the participants were able to become more alert and attentive throughout the process. In addition, the artwork they created as a group was examined and central themes were noticed and discussed.

**Week Three**

During the MBAT in week 3 participants experienced a mindful body scan. They began by placing a paper (which had been cut to fit the height of their body) on the floor. While lying on their paper, the participants were guided through a meditation drawing awareness to each part of their body. At the close of the meditation, participants used a marker to reach over their body to trace their own body outline. Participants used paints of their choosing to depict their mindful body scan experience through color onto their body outline. The session concluded with discussion on non-judgmental acceptance and a kind acceptance of experiences, as well as drawing awareness to the body and things that are out of our control and seeing them for what they are. This kind of acceptance can be integral in reducing tension and reinforcing relaxation (Hass-Cohen & Findlay, 2015). In addition, participants were able to externalize the experience of their stress and view it from an outside perspective, noticing where they feel their stress most within their body.

**Week Four**

The final MBAT session, completed in week 4, was a mindful mandala. Participants were given a sheet of blank paper and provided with a variety of colors of oil and chalk pastels.
They traced a circle onto their paper and discussed what a mandala is. Then they sat in a comfortable seated position with their eyes closed and began a brief meditation. When the meditation ended, they began to draw on their circle, encouraged to trust the process and utilize the materials they were drawn to in a non-judgmental manner. Participants picked a color that appealed to them and began to draw. The art portion of the session concluded with a discussion about being grounded and centered, and the role of those in self-development, followed by a termination discussion to end the MBAT group.

**Analysis**

The cortisol data obtained from the ELISA was entered into GraphPad Prism 7.01 and imported into SPSS. The pretest and posttest cortisol results from sessions 1 and 4 were statistically compared with a paired samples t-test. The PSS data was entered into SPSS. The pretest and posttest scores was statistically compared with a paired samples t-test.

**Internal Validity**

The location remained constant throughout the study, which decreases the location threat of internal validity (Fraenkel & Wallen, 2009). The same instrumentation was used throughout the experiment. If it began to deteriorate, this could be a threat to internal validity, however the instruments were properly cared for and there was no indication that degradation occurred. In addition, the same protocol was used for all participants as a means for collecting and analyzing data. Participants were guided in proper passive drool technique prior to providing their initial saliva sample and were asked not to eat within the hour before the session in accordance with the Salimetrics protocol, to eliminate possible effects of consumed nutrients. This reduced the threat of data collector bias to internal validity. The sample collections occurred at a standardized
consistent time to control for natural variability in individual fluctuations of cortisol in the body. Because the primary researcher was the only one providing treatment, the therapist’s characteristics may have played a role in the outcome of the participants’ scores. Due to the acquisition of additional information about participants at the beginning of the study and the standardization of location, instrumentation, and therapeutic protocol, threats were minimized to internal validity.

**External Validity**

The generalizability of the study cannot be accounted for due to the convenience sampling model, however, the background questionnaires that participants completed at the beginning of the study provided information regarding the representation of the sample. This increased validity and assisted in the potential for the study’s replication. External validity would increase if the study were to be replicated, which could be a potential implication for further research. The conditions in which the study took place, as well as the protocol utilized by the primary researcher was clearly defined in order to account for ecological generalizability and the capacity for the study to be replicated.

**Limitations**

The major limitations of this study are the short length of time in which it was conducted, the sample size, and the lack of a control group. Further studies might increase the number of weeks and therapy sessions the experimental group participates in, and increase the number of participants, as well as perhaps employ a randomized experimental design with a control group. This study may also serve as a platform for further investigation involving a broader demographic.
Conclusion

This study is exploratory in nature, developing a foundation of empirical evidence, which may be explored more thoroughly with a greater number and larger variety of participants. Utilizing a quantitative, quasi-experimental interrupted time-series research design, salivary cortisol concentration and perceived stress was compared to indicate fluctuations in stress before and after participation in MBAT groups in a specific group of people. The purpose of the study was to gain a greater understanding of the implications MBAT groups may have on stress. This understanding was obtained through the recruitment of graduate and medical students for participation in a four-week MBAT group, the collection of salivary cortisol samples, as well as the comparison of the PSS scores before and after the completion of the study. The analysis of the data collected resulted in contributions to the knowledge base of neurobiology and art therapy, particularly in regards to stress. Greater knowledge of stress-reduction strategies could have positive implications benefitting both student populations and other populations who experience stress as a side effect of other ailments.
CHAPTER 4

RESULTS

Quantitative results are reported from seven participants in medical or graduate school at Florida State University. In this section, greater detail will be provide about each participant and their experience in the MBAT group. The participant’s response to each session will be described and accompanied by images of the artwork they created in session.

These will be included in individual case study formats and presented as qualitative evidence supporting quantitative claims. Then, the data obtained from participants’ salivary cortisol will be presented and explained, followed by the results from their Perceived Stress Scale questionnaires. This section will conclude with a cross-sectional comparison of each mode of data collection, demonstrating the main points extrapolated from the results.

Recruitment Response

Students completing their first or second year at the FSU College of Medicine were contacted via email, as were graduate students in the graduate program for Speech Language Pathology. Other various graduate departments were contacted but the students could not be contacted in adequate time for the study. Of the students who were contacted, 13 responded with interest. Of those 13, 8 committed to a group day and time for the four sessions. Of those 8, 7 provided an initial sample and completed at least one session. Of those 7, 5 completed the study in its entirety, providing a post sample as well as a Perceived Stress Scale posttest and narrative account of a reflection of their experience.
### Table 1

**Participant Demographic and Background Information**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Gender</th>
<th>Age</th>
<th>Race</th>
<th>Program of Study</th>
<th>Typical hours of sleep/night</th>
<th>Typical exercise</th>
<th>Caffeine intake</th>
<th>Smoker?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Ava</td>
<td>Female</td>
<td>23</td>
<td>White</td>
<td>Medical school</td>
<td>6-7</td>
<td>Occasional walking</td>
<td>2 cups of coffee/day</td>
<td>No</td>
</tr>
<tr>
<td>2 - Bailey</td>
<td>Female</td>
<td>24</td>
<td>White</td>
<td>MS - speech language pathology</td>
<td>Weeknight: 3-6, Weekend: 8-12</td>
<td>2-3 times per month</td>
<td>2 cups of coffee, I diet coke/day</td>
<td>2-5 cigarettes/day</td>
</tr>
<tr>
<td>3 - Chelsea</td>
<td>Female</td>
<td>23</td>
<td>White</td>
<td>MS - speech language pathology</td>
<td>6-8</td>
<td>Run 4 times per week</td>
<td>4 or more cups of coffee/day</td>
<td>On the weekends</td>
</tr>
<tr>
<td>4 - Diana</td>
<td>Female</td>
<td>28</td>
<td>White</td>
<td>MS - speech language pathology</td>
<td>5</td>
<td>None</td>
<td>5 diet cokes/day</td>
<td>6-7 cigarettes/day</td>
</tr>
<tr>
<td>5 - Elena</td>
<td>Female</td>
<td>24</td>
<td>Black</td>
<td>MS – medicine</td>
<td>6-7</td>
<td>Very active, hip-hop teacher</td>
<td>None</td>
<td>No</td>
</tr>
<tr>
<td>6 - Fiona</td>
<td>Female</td>
<td>30</td>
<td>White</td>
<td>MS - speech language pathology</td>
<td>6-7</td>
<td>None</td>
<td>None</td>
<td>No</td>
</tr>
<tr>
<td>7 - George</td>
<td>Male</td>
<td>27</td>
<td>White</td>
<td>Medical school</td>
<td>8</td>
<td>Somewhat regularly</td>
<td>None</td>
<td>No</td>
</tr>
</tbody>
</table>

*Note. Participant names are pseudonyms.*

**Participant 1**

Ava is a 23-year-old white female in her first year of medical school. She reported that she gets 6-7 hours of sleep per night and does not engage in exercise other than occasional...
walking. Ava drinks about 2 cups of coffee per day and does not smoke. She reported that she does not have any previous art experience. She said of her experience in the study,

I usually felt stressed getting to these Sessions and immediately relaxed once I was here. Outside of this, I have found better balance between school and relaxation and have been relaxing more without compromising my performance. Over summer, I would like to incorporate more art into my life.

Participant 2

Bailey is a 24-year-old white female in her second year of graduate school to earn a Master of Science in Speech Language Pathology. She reported getting 3-6 hours of sleep on weeknights and 8-12 hours of sleep per night on weekends. Bailey reported that she exercises 2-3 times per month. She consumes about 3 caffeinated beverages per day and smokes 2-5 cigarettes per day. Her previous experience with art was recreational painting, which she enjoyed as a hobby. She reported that she never took art classes. Reflecting on her experience in the study, she wrote,

I found this study to be extremely enjoyable. The guided meditation was helpful in remembering that I do need to stop, breathe and take just a couple minutes to give my mind and body a break. The art aspect was helpful in reminding me of healthier ways to cope with stress and express myself/relieve stress.

Since beginning the study, Bailey reported to the group that she attempted to practice some of the mindful techniques, which were practiced within the group. In addition, she stated that she noticed herself thinking of the word “mindful” often in her daily life, prompting her to pay more attention to the present moment. Bailey also reported,
I have begun using a mantra frequently when I feel as though I cannot handle all the things going on in my life, which helps ground myself. I enjoyed all aspects of this study and will try to continue meditations and art afterwards. I also have found myself being more mindful of my body and mind as a unit that both need care and attention, and if my mind isn’t healthy or have a break it is directly reflected in my body and how I treat it.

**Participant 3**

Chelsea is a 23-year-old female in her first year of graduate school to earn a Master of Science in Speech Language Pathology. She reported getting an average of 6-8 hours of sleep per night and runs 4 times per week. Chelsea reported consuming 4 or more cups of coffee per day and smokes on the weekends. Her previous experience with art was art class in high school. Participant 3 was an active participant in Sessions 1-3, but was regrettably unable to attend the last session due to unforeseen circumstances.

**Participant 4**

Diana is a 28-year-old female in her first year of graduate school to earn a Master of Science in Speech Language Pathology. She reported sleeping an average of 5 hours per night and does not typically exercise. Diana reported drinking about 5 diet cokes per day in regards to caffeine consumption, and smokes 6-7 cigarettes per day. She explained her previous experience with art as being “big into art in middle/high school.” In regards to her experience in the study, she reflected,

I found this study to be extremely enlightening and grounding. It made me see how little I focus on myself in the sense of ‘checking in’ on how I am doing personally outside of the obligations in life. It has made me mindful in that I see the benefits of taking these
moments of self-reflection. It also has made me want to seek out other opportunities after
it has ended that encourage and help facilitate me “checking in”.

Participant 5

Elena is a 24-year-old African-American female in her first year of graduate school to
earn a Master of Science in Medicine. She reported sleeping an average of 6-7 hours per night
and exercising regularly. She described herself as “very active,” explaining that she is a hip-hop
teacher. Elena does not consume caffeine and does not smoke. Her previous experience with art
includes visual arts and dance. Elena was only able to attend the first session and dropped out of
the study due to unforeseen scheduling conflicts.

Participant 6

Fiona is a 30-year-old white female in her second year of graduate school to earn a
Master of Science in Speech Language Pathology. She reported sleeping an average of 6-7 hours
per night and does not typically exercise. Fiona does not drink caffeinated beverages and does
not smoke. Her previous experience with art has been with computer art, in which she took 3
years of classes in high school. Of her experience in the study, she reflected,

This experience has given me more time to reflect on how things are going in my life.
I’ve been able to relate the art to what I’m currently feeling and therefore identify these
feelings better than I maybe had been before. I found the activities to be relaxing and the
subsequent discussions to be insightful.
Participant 7

George is a 27-year-old white male in his second year of medical school. He reported that he does not have any previous art experience. He reported sleeping an average of 8 hours per night and exercises “somewhat regularly.” He does not drink caffeinated beverages nor does he smoke. George missed the first session and completed pretest data collection during week 2. He reflected on his experience in the study stating,

I felt the experience overall was relaxing and inspiring. I felt it stimulated my creativity, which I hardly ever get to use. It was a nice chance to get back to a meditative state of mind. I have had a really rough month and I think this has helped keep me a little more grounded.

Individual Response to Sessions

Session 1

Group 1. The participants arrived with a timid presentation, but appeared curious, as evidenced by their questions, attentive listening, and looking around the therapy space. Throughout the art intervention, participants were invested in the process, and focused on each instruction. This intervention involved mindfully tearing pages out of magazines and placing them into a “yes” or “no” pile. Some participants began looking more intently at the images, taking more time to carefully decide, but through the process became more methodical and instinctual about placing images in the different piles. The participants described the process of tearing the pages out of the magazines as soothing, and they commented on how focused they were on their own experience, oblivious to those around them.
Ava described her image (see Figure 2) as having a lot of color and noticed that it contained what she needed to remember, speaking in terms of self-care. Bailey described her image (see Figure 3) as “comfort.” She elaborated: “I’m not sure if it describes me, or what I want.” Chelsea carefully and intentionally placed her images on the paper, arranging them as she wanted, before gluing them down. She stated about her image (see Figure 4): “I feel like if I was in this picture things would be good; I would feel good.” Diana completed her image (see Figure 5), with precision and intentionality. When reflecting on her artwork, she asked herself “how do I get this side (left) to be more a part of my life?” explaining that the left side of her image contained more of the things that she liked, while the right was more constricted and stressful. The participants described their emotional state upon ending the first session as calmer, relieved, and content.

Figure 2. Ava’s art response to Session 1, created with collage materials.
Figure 3. Bailey’s art response to Session 1, created with collage materials.

Figure 4. Chelsea’s art response to Session 1, created with collage materials.
Group 2. The participants arrived to the first session eager to see what would be in store. They were calm and compliant to each direction. Throughout the magazine tearing, each participant was focused on their individual experience, and both commented on not noticing the other or what the other was doing.

When asked what she would ask her image (see Figure 6), Elena asked, “what is the table missing?” She reflected on the idea and asked herself “What am I missing?” She noted that the image reminded her of family and the holidays, and stated that she was hungry, which could have also drawn her more toward choosing images of food. Both participants used the word “comforting” in describing their artwork. Fiona also added that it was “homey.” When asked what she would ask the image (see Figure 7), Fiona initially questioned, “How do you keep your plants alive?” and after some thought added, “How am I going to stay flourishing for the rest of
the semester?” relating her artwork to herself. At the end of the session, the participants described their emotional state as pensive, tired, and meditative.

Figure 6. Elena’s art response to Session 1, created with collage materials.

Figure 7. Fiona’s art response to Session 1, created with collage materials.
Session 2

**Group 1.** The participants arrived to an altered set-up of the room, enhancing their curiosity for what would occur in the session. Although initially skeptical of the walking meditation, the participants were compliant in following directions. As they walked past the materials, they noted that each time they passed them they noticed more. The group agreed that they all had difficulty remaining focused during the walking meditation, but got more involved when they started using the art materials. They agreed that the art materials were grounding. Throughout the experience, the group members appeared invested and attentive, and they followed directions carefully. The participants stated in regards to the group experience that they were not really aware of the group and they felt more isolated and focused on what was in front of them.

Ava, a medical student, mentioned that she had been learning about the lungs in school so it was difficult for her to focus only on her breathing because she kept visualizing the anatomy. She stated that her favorite material was the charcoal, but interestingly, she did not like the chalk pastel. She found the chalk (which was harder than the soft charcoal) to be too resistive, but liked the messiness and fluidity of the charcoal (see Figure 8). When asked about her emotional state at the end of the session, Ava stated that she felt calm.

Bailey revealed that she had been trying to remember to be more mindful throughout the week since the last session. She stated that she called her attention to her breathing and now that she knows that mindfulness exists, she feels like it is her “only hope” to get through all the stress she has been enduring. She admitted that she would notice her breathing for about 30 seconds and then go back to being stressed, but said that it was better than nothing, like before the study, and agreed that it would take practice to be able to fully implement mindfulness into her life.
When asked about her emotional state at the end of the session, Bailey described herself as enthused, intrigued, and entertained, and stated that this was “the most [she] enjoyed something in a while.”

Chelsea reflected that the walking meditation felt preparatory, and noted that she felt more comfortable starting when using the art materials. She was particularly exploratory with the materials, fully engaged in the process. When using the oil pastels, she used her fingers to rub them against the paper, and continued to engage her hands in a sensory experience of each material. On the pencil drawing (see Figure 8), Chelsea added the word “wellbeing,” which she said was indicative of her reflecting that she is “the vehicle for her own wellbeing.” When asked her emotional state following the experience, Chelsea described herself as content.

Diana chose to think of a mantra during the walking meditation, and chose to reflect on “I am grounded.” She was surprised to enjoy the pencil the most, stating that she found it comforting and familiar. She elaborated that she appreciated the control that the pencil gave her and liked the sound that it made, which she was able to notice and focus on in her meditative state unlike her uses of pencils in her everyday life. When asked about her emotional state following her experience, Diana reflected that she felt depleted, but in a good way, as if she was “releasing something bottled up.”

**Group 2.** The group members were attentive and engaged in the process. They followed directions appropriately and remained focused on the tasks in front of them. Like group one, they appeared to have some difficulty getting into the walking meditation, but immediately became focused once the art materials were introduced into the experience. The participant noted a difference in approaching a paper that another had marked on verses an empty page, noting that the empty page was more intimidating than one that had already been added to. Both participants
agreed that time moved quickly and they didn’t realize how much time had passed while they were making art.

Figure 8. Artwork exploring various media. Each participant from Group 1 contributed to each image. From left to right, top to bottom, artwork was made with graphite pencils, markers, oil pastels, chalk pastels, charcoal, and acrylic paint.
Fiona found the experience to be peaceful and cathartic. She engaged more with fluid media, even coming back to the paint after experiencing all of the media. Fiona discussed how the chalk felt in her hands and how she moved it across the page, as well as how much more she was able to notice when she was more mindful.

This was George’s first session, as he had not been able to attend Session 1. He exhibited curiosity and enthusiasm, as well as dedication to the process. He noted that he got lost in the process and “lost a sense of time.” He talked about how he went with the process, without having a plan for the direction of what he would create, and enjoyed the opportunity to create something that he does not normally have. He especially liked what came out of the chalk pastel drawing, comparing his contribution to a fetus (see Figure 9). When asked about his emotional state at the end of the session, George explained that he was nervous, but also happy. He elaborated that he was nervous about being judged and about what would be next.

Comparatively, the participant experience of Session 2 was consistent across groups. While they struggled getting into a meditative state through simply walking, the art materials acted as a vehicle for their focus, grounding them in the present. Each participant remained focused on the task in front of them, seemingly oblivious to those around them. None of the participants cared for the markers, all agreeing that they were too restrictive. This may be observed in Figure 8 and 9 as the artwork with the least amount of space covered in each group was that on which the marker was used. This is indicative of the lack of exploration and engagement the markers facilitated for these participants. Both groups had a tendency to begin with cool colors, traditionally associated with calmness. Additionally, many participants had a tendency to use circular or curved motions in the artmaking, indicative of grounding.
Figure 9. Artwork exploring various media. Each participant from Group 2 contributed to each image. From left to right, top to bottom, artwork was made with graphite pencils, markers, oil pastels, chalk pastels, charcoal, and acrylic paint.
Session 3

The groups were combined for Session 3 for the convenience of participants and in compliance with their schedules. Participants spread around the therapy space and laid upon body-sized sheets of paper as they experienced a body scan meditation. Upon completion of the body scan, they reached across their body and completed an outline of their self on the paper. Then they chose colors to represent their experience and what they felt in various areas of the body. The participants found this experience to be quite personal and some did not feel comfortable presenting their artwork to the group. They agreed that the large paper made it more personal and more real. They noted that it enabled them to more accurately depict what they were feeling than a smaller paper would because they didn’t have to think too much about the size, scale, or location of the feeling in regards to their body. Most participants agreed that the body scan was an accurate representation of their stress and that it felt good to release it and externalize it onto paper.

Ava felt frustrated because she had difficulty allowing herself to enter into the meditative state. She recognized the value of the body scan and was disappointed that her mind did not allow her to experience it to the fullest. In her artwork (see Figure 10) she focused more on the experience of the body scan and less on where her body feels stress. For example, she denoted a tingly feeling in her hands during the body scan meditation by painting a rust-colored stippling on her hands on the body outline. In the following session, she told the group that she had hung her body scan painting in the room where she studies.

Bailey stated that she felt insightful and vulnerable after the experience. She stated that her image was a little disconcerting because of all the stress she was feeling, but it was helpful
and insightful to see it in front of her. In her artwork (see Figure 11) she focused on the top part of her body because she said that is where she felt her stress.

Chelsea squeezed her paint directly onto the paper rather than using a palette as the other group members did. As seen in her artwork (see Figure 12) her brushstrokes were expressive with movement and energy. She noted that she had difficulty concentrating on the meditation and really getting into the body scan, but after the artmaking and the full experience, she explained her state of mind as “ambitious.”

Diana commented that she had some difficulty getting into the meditative state of mind. She used free, expressive strokes in her body scan (see Figure 13). She gravitated toward metallic colors and noted that they were perfect for describing her experience. Although she did not say much during the session or about her artwork, at the end of the session, Diana described her emotional state as insightful.

Fiona volunteered to talk about her artwork (see Figure 14). She was able to use the image to describe where she felt her stress the most in her body and afterward stated, “it is one thing to think about letting it go, but it’s another level to actually draw it out and release it.” At the end of the session Fiona described her current emotional state as content.

George did not speak much except to agree with what was being discussed within the group. He, like his group members, was invested in the process, and after the experience called his emotional state “vulnerable,” but added that it was not necessarily in a bad way. The image of his artwork is pictured in Figure 15.
Figure 10. Ava’s art response to Session 3, created by tracing her body onto a life-size paper and filling it with acrylic paint following a body scan meditation.
Figure 11. Bailey’s art response to Session 3, created by tracing her body onto a life-size paper and filling it with acrylic paint following a body scan meditation.
Figure 12. Chelsea’s art response to Session 3, created by tracing her body onto a life-size paper and filling it with acrylic paint following a body scan meditation.
Figure 13. Diana’s art response to Session 3, created by tracing her body onto a life-size paper and filling it with acrylic paint following a body scan meditation.
Figure 14. Fiona’s art response to Session 3, created by tracing her body onto a life-size paper and filling it with acrylic paint following a body scan meditation.
Figure 15. George’s art response to Session 3, created by tracing his body onto a life-size paper and filling it with acrylic paint following a body scan meditation.
Session 4

Group 1. The participants were focused on their individual experience and invested in the process of the artmaking. They commented on the freedom they felt within the boundary of the circle, and appreciated that it made the blank paper feel less intimidating to begin creating. The participants also collectively commented on the increased focus that they experienced during the session.

Ava stated that she didn’t like the outcome of the final product of her mandala, but she didn’t mind because she really enjoyed the process. She noted that she was not able to have as much control as she wanted while using the pastels, but she let it go and was ok with it. She recognized that she could apply the things she was saying about her art and her experience to her life. During the process she reflected that she lost track of time and felt that time seemed to move more quickly while she was making art. She called her artwork “Oak” (see Figure 16) and noted that she generally uses blue colors, but this time she was drawn to green and brown. When asked to describe her emotional state after the experience she stated “peace.”

Bailey stated that she “kind of drew what [she] saw during the meditation” and elaborated that she “saw this kind of form opening and closing” (see Figure 17). She found it difficult to title her piece, stating that she had a clear head and was thinking of nothing. She settled on “patience” for the title of her mandala. She noted that she is always drawn to green, but never inclined to use the other two colors that she chose. Throughout the process, Bailey reflected that some of the parts of the art making were annoying due to the asymmetry and the lines resulting from her mark making, but that she let it go and accepted them and was able to allow herself to enjoy the process and get past the things that weren’t going as she had intended. When asked to describe her emotional state after the experience, Bailey stated “fulfilled and grounded.”
Diana used her fingers to fill in the mandala, smoothing the chalk pastel in an almost rhythmic pattern. She stated that she is normally a structured planner and enjoyed the “unstructured structure” that the mandala provided. She also noted that despite her planning tendencies she was able to go with the process and be ok with it. Diana titled her artwork “unforeseen” (see Figure 18), comparing the image to a crystal ball. She stated that it was fluid, and “like going into the unknown.” She was able to relate that feeling to her life with a sense of peace. When asked to describe her emotional state after the experience, Diana stated, “proud.”

*Figure 16. “Oak.” Ava’s art response to Session 4, created using oil and chalk pastels to fill in a mandala following a sitting guided meditation.*
Figure 17. “Patience.” Bailey’s art response to Session 4, created using oil and chalk pastels to fill in a mandala following a sitting guided meditation.

Figure 18. “Unforeseen.” Diana’s art response to Session 4, created using chalk pastels to fill in a mandala following a sitting guided meditation.
**Group 2.** Throughout the session the participants were focused and attentive to the process, and in particular, focused on their artwork. The participants collectively agreed that it was easy to go into the process of art making from the meditation. They noticed that they experienced an increased level of focus and stated that they didn’t really have any outside thoughts throughout the process.

Fiona appreciated the “fluidity” of the media. During the art making, she found herself having judgmental thoughts such as “am I messing up? How could I make this better? Am I doing this right?” but then let the thoughts go and allowed herself to go with the process. Fiona titled her artwork “daybreak” (see Figure 19) and was able to relate the title to recognizing some new beginnings in her life. When asked to describe her emotional state after the experience she stated it was “inspiring.”

George appreciated the boundary of the circle. He stated that “the artwork is kind of like [his] life – messy and chaotic, but still kind of calming and beautiful.” He stated that he wasn’t used to the art process, but decided to “just kind of go for it, not really knowing what [he’s] doing, not sure if [he’s] messing up or making it better, but who’s to say what is ‘good’.” He was able to recognize similarities between the process he described and his life. George titled his artwork “eye” (see right image in Figure 20). When asked to describe his emotional state after the experience he stated “calm and creative.”

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Figure 19. “Daybreak.” Fiona’s art response to Session 4, created using oil and chalk pastels to fill in a mandala following a sitting guided meditation.

Figure 20. “Eye.” George’s art response to Session 4, created using oil and chalk pastels to fill in a mandala following a sitting guided meditation.

Cortisol Analysis

Changes in participants stress levels before and after Session 1 and Session 4 were measured by salivary cortisol. The purpose of these measurements was to determine the change in stress in single session as well as over a period of time. The salivary cortisol was analyzed by using an Enzyme-linked Immunosorbent Assay (ELISA). The ELISA plate was analyzed using a
plate reader and GEN 5 1.11 software, through which concentrations, optical density, and percent of cortisol bound was obtained. GraphPad Prism 7.01 was utilized to further analyze this data.

Using SPSS, a paired-samples t-test was conducted on the pre- and post- concentrations for Session 1 and Session 4 (see Table 2 and Table 3). As seen in Table 2 and Table 3, a paired-samples t-test was conducted to compare participant cortisol concentrations in no MBAT (prior to Session 1) and participation in MBAT (after Session 1) conditions. There was a significant difference in the scores for no MBAT (M= 0.12, SD= 0.055) and participation in MBAT (M= 0.068, SD= 0.057) conditions in session 1; t(4)= 2.8, p= 0.051. A paired-samples t-test was also conducted to compare participant cortisol concentrations in no MBAT (prior to Session 4) and MBAT (after Session 4) conditions. There was no significant difference in the scores for no MBAT (M= 0.24, SD= 0.16) and participation in MBAT (M= 0.082, SD= 0.096) conditions in Session 4; t(3)= 2.07, p= 0.13. Data collected from George was not included in the cortisol analysis due to producing samples with concentrations of cortisol which were too low to analyze.

Salivary cortisol concentration was measured in micrograms per deciliter (ug/dl). As seen in Figure 21, the average scores for cortisol concentration reduced after the art therapy intervention in both Session 1 and Session 4. Before the art therapy intervention in Session 1 the mean cortisol concentration was 0.13 ug/dl and reduced to 0.068 ug/dl after the intervention. In Session 4, the mean cortisol concentration was 0.24 ug/dl and reduced to a mean of 0.082 ug/dl. Individual cortisol levels (see Figure 22) ranged from 0.21 ug/dl to 0.050 ug/dl in the pretest for Session 1. Participant cortisol levels ranged from 0.14 ug/dl to 0.0050 ug/dl in the posttest for Session 1. In Session 4, individual participant cortisol concentrations ranged from 0.41 ug/dl to 0.061 ug/dl in the pretest, and 0.25 ug/dl to 0.029 ug/dl in the posttest.
Table 2

*Paired Samples Statistics of Cortisol Concentration Before and After Session 1 (pair 1) and Session 4 (pair 2).*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
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<th>Std. Deviation</th>
<th>Std. Error Mean</th>
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<td>concentrationpost1</td>
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<td>.057</td>
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<tr>
<td></td>
<td>concentrationpost2</td>
<td>.082</td>
<td>4</td>
<td>.096</td>
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</table>

Table 3

*Paired t-tests of Cortisol Concentration Before and After Session 1 (pair 1) and Session 4 (pair 2).*

<table>
<thead>
<tr>
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<th>Paired Differences</th>
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<td>Mean</td>
<td>Std. Error Mean</td>
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<td>concentrationpost2</td>
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<td>.077</td>
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</table>
Figure 21. Average salivary cortisol concentration in each participant before and after the first and last MBAT Session.

As can be seen in Figure 22, each participant’s cortisol concentration lowered after each intervention in which cortisol was measured. In Session 1 Ava experienced a cortisol reduction of 0.044 ug/dl, and in Session 4 she experienced a cortisol reduction of 0.098 ug/dl. In Session 1 Bailey experienced a cortisol reduction of 0.19 ug/dl, and in Session 4 she experienced a cortisol reduction of 0.14 ug/dl. In Session 1 Chelsea experienced a cortisol reduction of 0.049 ug/dl. Chelsea was unable to provide a sample for Session 4. In Session 1 Diana experienced a cortisol reduction of 0.039 ug/dl and in Session 4 she experienced a cortisol reduction of 0.022 ug/dl. In Session 1 Elena experienced a cortisol reduction of 0.0050 ug/dl. Elena was unable to provide a sample for Session 4. The concentration of Fiona’s posttest sample was too low to be measured, indicating that she experienced a cortisol reduction in Session 1 as her pretest concentration was measureable and had a value of 0.21 ug/dl. In Session 2 Fiona experienced a cortisol reduction of 0.38 ug/dl. Fiona’s posttest cortisol concentration from Session 4 was lower than her initial
pretest cortisol concentration from Session 1. The mean cortisol reduction for all participants in Session 1 was 0.066 ug/dl and the mean cortisol reduction for all participants in Session 2 was 0.16 ug/dl. As seen in Figure 23, Diana showed reduction in cortisol concentration throughout the study. Her cortisol concentrations reduced during each session as well as from the first session to the last session.

Figure 22. Participant salivary cortisol concentration before (blue) and after (orange) Session 1, and before (grey) and after (yellow) the last Session (Session 4).
Figure 23. Participant salivary cortisol concentration across the span of the study. Sample numbers correspond with the time the sample was collected. Sample 1 was collected before Session 1, sample 2 was collected after Session 1, sample 3 was collected before Session 4, and sample 4 was collected after Session 4 at the end of the study. The concentration of Fiona’s sample for sample 2 was too low to be measureable and therefore is indicated by a dotted line. Chelsea and Elena were unable to attend Session 4 and therefore were unable to provide data samples for samples 3 and 4.

Perceived Stress Scale Analysis

Participant perception of their stress was measured via the Cohen’s Perceived Stress Scale (PSS). Through this assessment, participants were able to appraise their own stress before the first session and after the last session. According to the guidelines of the PSS, scores around 13 are considered average and scores of 20 or higher are considered high stress.

As seen in Table 4 and Table 5, utilizing SPSS a paired-samples t-test was conducted to compare participant perception of their stress in no MBAT (prior to Session 1) and participation in MBAT conditions (after Session 4). There was no significant difference in the scores for no MBAT (M= 23, SD= 5.8) and participation in MBAT (M= 19, SD= 10) conditions; t(4)= 1.7, p= 0.17.
Table 4

*Paired Samples Statistics of Pretest and Posttest Scores from the Perceived Stress Scale From All Participants Who Completed the Study*

<table>
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<tr>
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<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
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</tr>
<tr>
<td>post</td>
<td>19</td>
<td>5</td>
<td>10</td>
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Table 5

*Paired t-test of Pretest and Posttest Scores From the Perceived Stress Scale From All Participants Who Completed the Study*

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<th>Paired Differences</th>
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<th>Std. Error Mean</th>
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<th>d.f</th>
<th>Sig. (2-tailed)</th>
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</thead>
<tbody>
<tr>
<td>pre - post</td>
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<td>6.1</td>
<td>2.7</td>
<td>-3.0</td>
<td>1.7</td>
<td>4</td>
<td>.17</td>
</tr>
</tbody>
</table>

*Note.* Participants who completed the study were participant 1, 2, 4, 6, and 7.

Each participant who completed a posttest showed a reduction in their perception of their stress, except for George (see Figure 24). Ava’s perception of her stress decreased from a score of 20 to a score of 18. Bailey’s perception of her stress decreased from a score of 27 to a score of 19. Diana’s perception of her stress decreased from a score of 26 to a score of 17. Fiona’s
perception of her stress decreased from a score of 15 to a score of 6. George showed an increase in his perception of his stress from a score of 29 to a score of 34.

Figure 24. Perceived Stress Scale (PSS) outcomes measuring each participant’s perception of their stress before and after their participation in the study. Chelsea and Elena were unable to attend Session 4 and therefore do not have posttest values to repost.

As seen in Table 6 and Table 7, utilizing SPSS a paired-samples t-test was conducted to compare female participant perception of their stress in no MBAT (prior to Session 1) and participation in MBAT conditions (after Session 4). There was a significant difference in the female scores for no MBAT (M= 22, SD= 5.6) and participation in MBAT (M= 15, SD= 6.1) conditions; t(3)= 4.2, p= 0.025.
Table 6

*Paired Samples Statistics of Pretest and Posttest Scores from the Perceived Stress Scale
Completed by Female Participants Who Completed the Study*

<table>
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<tr>
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</thead>
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<td>5.6</td>
<td>2.8</td>
</tr>
<tr>
<td>post</td>
<td>15</td>
<td>4</td>
<td>6.1</td>
<td>3.03</td>
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Table 7

*Paired t-test of Pretest and Posttest Scores from the Perceived Stress Scale Completed by Female Participants Who Completed the Study*

<table>
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<th>Paired Differences</th>
<th>95% Confidence Interval of the Difference</th>
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<td>12</td>
<td>4.2</td>
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*Note.* Female participants who completed the study were participant 1, 2, 4, and 6.

**Conclusion**

The MBAT sessions and data collection was completed by five participants in its entirety. Chelsea and Elena were unable to complete the study due to personal conflicts. Feelings of insight, contentment, peace, vulnerability, and grounding permeated throughout the sessions for
the participants. At the end of the study 4/5 participants who completed the study mentioned an intention for future use of the skills they learned and practiced in the group. All of the participants who completed the study reported a sense of relief or relaxation at the end of the study. All of the participants reported an experience of self-reflection or enlightenment, two out of five recognizing a need for balance in their life. Many of the participants addressed the benefits of the art in their final reflections, demonstrating the ability of the art to enhance the mindfulness experience.

All of the female participants who completed the study exhibited reductions in their perception of their stress via the Perceived Stress Scale. One participant, a male, exhibited an increase in the perception of his stress. All participants exhibited reductions in cortisol concentration from the beginning of a session to the end of the session. Diana demonstrated a reduction in cortisol concentration throughout the study. According to the data collected in this study, the use of MBAT with graduate and medical students has the potential to assist in stress reduction as well as encourage the use of those skills beyond the end of therapy.
CHAPTER 5
DISCUSSION

In this study three methods of analysis were utilized to determine the effects of a four-week MBAT group on stress reduction in graduate and medical students at Florida State University. Seven students participated in the study, and five completed the study. Analysis of salivary cortisol, scores from the Perceived Stress Scale, and participant feedback indicated a relationship between MBAT and stress reduction. However, the longevity of the effect remains unknown.

Mindfulness-based Art Therapy Effects on Cortisol

In this study, cortisol and perceived stress in graduate and medical students was measured before and after a MBAT group in order to determine the effects of MBAT on stress reduction. The first hypothesis was that participation in a MBAT group would decrease cortisol levels and therefore also decrease participants’ stress. The researcher tested this through analyzing cortisol samples collected from participants before and after Session 1 and Session 4 of the MBAT group. Additional methods were also used to test this hypothesis, which included participant reflection and feedback, as well as the observation of their experience in the group.

The first hypothesis was supported by the cortisol results, as in all cases where there was a pre and post sample, the post sample was lower than the sample collected before the intervention (see Figure 22). Based on this, the data reveals a relationship between the participation in MBAT and decreased stress. Furthermore, participants’ reports of how they described how they felt at the end of each session consisted of soothing vocabulary such as “content,” “calm,” “relaxed,” “peaceful,” “happy,” and “insightful.”
Similar to results obtained from Kaimal, Ray, and Muniz’s study (2016) examining the effects of artmaking on cortisol level, the results obtained from this research indicated a positive correlation between the two variables. However, the current study, included a more comprehensive approach, through implementing planned therapeutic interventions rather than having participants engage in a single 1-hour art making session. Another difference between the study conducted by Kaimal et al. and this study was the variation in cortisol. In Kaimal et al.’s study there were only a few participants who experienced an increase in cortisol, while in this study all concentrations of cortisol reduced in each particular session (see figure 22). This difference could be attributed to the use of established art therapy protocol rather than a single-session art-making session.

Considerations of Variables on Cortisol

Cortisol has a natural diurnal rhythm which fluctuates throughout the day. High stress might cause the cortisol to increase above its natural level, confirming the premise for this study. However, other factors may affect the concentration of cortisol in an individual’s saliva, and must be considered in regards to experimental research (Clements, 2013).

Effects of physical activity on cortisol. Cortisol has been shown to rise following intensive exercise, but not with less intensive exercise (Clements, 2013). Elena reported exercising regularly, and Chelsea and George reported sometimes exercising, but did not indicate the intensity of the workout. The participants did not come to session immediately following their workout, and their exercising habits did not appear to have an effect on the results of their salivary cortisol concentrations. Contrary to Clements’s (2013) article, two out of three of the participants who regularly exercised exhibited a lower average concentration of cortisol than their peers in the study.
Effects of smoking on cortisol. Previous evidence has suggested that smoking is correlated with increased salivary cortisol (Badrick, Kirschbaum, & Kumari, 2007). Nevertheless, some studies suggest that significant differences in cortisol between smokers and non-smokers occur mainly after direct supra-pituitary stimulation. The two participants who reported engaging in daily habitual smoking (Bailey and Diana) did not produce salivary samples with significantly increased cortisol concentration in comparison with the other samples within the study. A study by Kudielka, Hellhammer, & Wüst (2009) found that significant increase in cortisol occurs following smoking 2 or more cigarettes. Therefore, it may be that the participants in this study who identified as smokers did not smoke immediately prior to sessions, therefore having limited effects on their cortisol concentrations. Overall, smoking is a variable that may be able to account for some variability within the group or within an individual’s samples. However, it does not appear to be a significant factor in these cases (Kudielka, Hellhammer, & Wüst, 2009).

Effects of caffeine on cortisol. There is some evidence to suggest that caffeine consumption could increase salivary cortisol. However, this evidence is inconsistent with other studies, which showed no effect on cortisol following coffee or tea consumption ((Kudielka, Hellhammer, & Wüst, 2009). Ava, Bailey, Chelsea, and Diana reported consuming 2 or more caffeinated beverages per day. Their cortisol concentration was higher than Elena’s, who reported consuming zero caffeinated beverages per day. However, Fiona’s cortisol concentration measured higher than all other participants at baseline on both Session 1 and Session 4, despite her reports that she does not drink caffeinated beverages. This inconsistency indicates that caffeine did not have a significant effect on participant cortisol concentration.
Decrease in Perception of Stress

The second hypothesis was that in a four-week period, participation in weekly MBAT would cause participants’ perceived stress to decrease. This was addressed in the study with the Perceived Stress Scale questionnaire, which participants filled out before and after the entire study. This question gained additional support from participant reflection and feedback, as many of them addressed their perceptions of their experience in relation to their stress.

The second hypothesis was supported in the case of the female participants, but not with the male. All of the female participants demonstrated a decrease in the score on their Perceived Stress Scale questionnaire from before the study to the end (see Figure 24) and the female scores yielded a statistically significant reduction (see Table 7). George scored higher on his posttest than his pretest. However, he indicated that he “had a really rough month” which may have influenced his responses on the questionnaire to a greater degree than his participation in the study.

The participants’ perception of their stress was lower in each of their personal reflections at the end of the study. Ava reported that she “usually felt stress getting to these sessions and immediately relaxed once [she] was here.” Similarly, Fiona “found the activities [during the study] to be relaxing,” and George “felt the experience overall was relaxing and inspiring.” Fiona, Diana, and Bailey demonstrated an altered perception of their stress in their reflections on their newfound empowerment to implement change and take care of their self. Fiona reported an improvement in her ability to identify her feelings, as well as “reflect on how things are going in [her] life.” As a result of the study Diana noticed how little she “checked in” with herself and took time for herself. She stated that the study helped her “see the benefits of taking moments of self-reflection.” Bailey reported a stronger ability to cope with and relieve stress, as well as
recognizing a need for her to give her mind and body a break. These personal reflections indicate a positive correlation between participation in MBAT and a decrease in perceived stress.

**Effects of Multi-Session Art-Making**

The third hypothesis was that there would be a greater reduction of the participants’ cortisol levels following the last of the four art therapy sessions compared with the first. This was addressed by comparing the cortisol data from Session 1 to that of Session 4, as well as comparison of the results to current literature which examined the effects of a single art making session on cortisol levels.

The third hypothesis was not fully supported by the results of this study. In most cases, the participants exhibited higher cortisol concentrations in the pre-sample in Session 4 than in the pre-sample for Session 1 (see Figure 22). It was expected that the fourth session would yield lower levels of cortisol, indicating an effect of extended MBAT. While the samples from before the Session 4 intervention were higher than expected, in 3 out of 4 cases the post sample from Session 4 yielded a lower concentration than the initial sample from Session 1 (see Figure 22). Ava, Bailey, and Fiona experienced a greater amount of change in cortisol concentration in Session 4 than in Session 1, while Diana, whose change was not greater in Session 4, experienced a steady decrease in cortisol throughout the study (see Figure 22). As seen in Figure 21, the rate of change in Session 4 increased from that in Session 1, demonstrating that the average cortisol concentration in Session 4 decreased more than the average cortisol concentration in Session 1. This evidence indicates a relationship between the participation in multiple sessions of MBAT and a more rapid decrease in cortisol concentration. Furthermore, this shows an area of the study that warrants further research to determine if providing more
sessions of art therapy would increase the amount of change in cortisol, and if the rapidity of the change could increase after participation in more sessions.

In a study conducted by Siegel et al. (2016) with hospitalized children, they found a reduction in cortisol after 1 art making session. This finding supports both the results of Kaimal et al. (2016) and this current study. Participants’ cortisol levels reduced after a single session in all three studies, however, over time their cortisol levels did not steadily decline. Siegel et al. (2016) and Kaimal et al. (2016) did not study the effects of multiple session, however this current study employed a four-session model. Another difference between these studies is that Siegel et al. (2016) and Kaimal et al. (2016) did not utilize a directive art therapy protocol, whereas this current study demonstrated a reduction in cortisol following an established art therapy protocol.

It was expected that the current study would yield similar results to a study conducted by Visnola et al. (2010). The researchers in Visnola’s study found a significant decrease in cortisol and responses to stress questionnaires following nine weeks of 2-hour group art therapy sessions. Compared with the findings in this current study, Visnola et al.’s research indicates that longer session times and a greater number of weeks could result in a more significant reduction of cortisol over time.

**Advocacy for Stress-Reducing Programming for Students**

The results of this study supported and elaborated on previous studies supporting the necessity of stress-reduction opportunities for students. For instance, in a study conducted by Lee and Graham (2001) medical students indicated that they felt wellness should be of greater importance to physicians and many acknowledged their neglect of their own wellness. The study
supported the notion of implementing a wellness elective, and the student participants agreed, stating they felt less guilt taking time for their own wellness and there was a necessity of means to cope with and overcome stress. Similarly, in this study, Bailey indicated that the experience “was helpful in reminding [her] of healthier ways to cope with stress and express [herself].” Ava stated that she “found a better balance between school and relaxation and had been relaxing more without compromising [her] performance,” supporting the notion that an elective form of focusing on mindfulness can help reduce guilt related to not doing school-related work. George elaborated on this stating that the MBAT group helped to keep him grounded during a particularly rough month. These participant statements supported the claim made by Isis et al. (2010) that art therapy is effective in an academic setting to assist students with time management, managing stress, controlling emotions, controlling impulsivity, and positively impacting academic performance.

Written responses in Kaimal et al.’s (2016) study indicated that participants felt more relaxed, learned about their self, and that the experience was “freeing,” as a result of completing a single session of non-directive art making. Similarly, participants in this study often reported a sense of relaxation, peace, calm, and/or contentment. They also indicated that their participation gave them an opportunity for self-reflection, many of them also using words such as “insightful” and “enlightening” to describe their experience. A few times the participants stated that they got “lost” during making their artwork and that they couldn’t believe how quickly time had passed, which seemed to indicate a sense of freedom from their pervasive stressful thoughts and everyday lives. Chilton (2013) described a similar experience, by referring to as the flow state, in which an individual is completely engaged in the art process, without entertaining outside
thoughts, and fully present in the moment. The collaboration of art therapy and mindfulness lends itself to this process, as seen within this dissertation study.

**Significance of the Art in Mindfulness-Based Art Therapy**

Including art in the mindfulness model was significant for the participants. For example, George stated that he felt the study stimulated his creativity. Bailey stated that the “art aspect was helpful in reminding [her] of healthier ways to cope with stress.” Whereas, Fiona stated that she was “able to relate the art to what [she’s] currently feeling and therefore identify these feelings better than [she] maybe had been before.”

Furthermore, Curl (2008) highlighted the significance of self-reflection in psychotherapy, and the vital role that art and creativity can play in that process. In support of this, Diana stated that the experience in the study made her “mindful in that [she] sees the benefits of taking these moments of self-reflection.” Participants in an art therapy study conducted by Huet and Holttum (2016) considered the art to be an essential part of the group, and the researchers agreed, perceiving the art as the catalyst for engagement of the participants as well as prompting the process of identifying emotions. This was observed within the current study, as each participant became focused and invested in the process when engaging with the art media. Engagement was particularly seen in Session 2, when participants collectively agreed that they had difficulty with the walking meditation until the art materials were introduced, at which point they were able to become immersed in the process and developed greater focus on what was in front of them.

At the end of the study, many participants reflected that they intended to implement some of the mindfulness techniques and art making into their lives beyond the study in order to continue to cope with their overwhelming stress. At the end of the study, Diana reflected that the
study “made [her] want to seek out other opportunities after it has ended that encourage and help facilitate [her] ‘checking in’.” Similarly, Bailey indicated that she was already beginning to implement some mindful exercises in her life, and stated that the art aspect of the study reminded her of “healthier ways to cope with stress and express [herself].” This result was similar to a study conducted by Monti et al. (2012) in which the addition of arts to MBSR protocol helped to promote self-expression, self-regulation, and coping strategies.

The art media itself was found to play an important role as well, giving the participants a sense of control with more structured media and engaging in a safe manner. This was found to help the participants look at things from a different perspective and furthermore reframe their association to a more positive and calmer state (Hass-Cohen & Findlay, 2015). This was demonstrated in the study by Diana in Session 4 when she described her appreciation of the “unstructured structure” of the mandala and comfort that the boundary of the circle provided for her (see Figure 18). She also reflected on the safety of structure in Session 2 when she stated that she enjoyed the safety and familiarity of the graphite pencils, which gave her a greater sense of control (see Figure 8).

Chilton (2013) indicated that flow achieved through artmaking can facilitate self-expression, sense of control, creativity, and a sense of well-being. In Session 2, also while utilizing graphite pencil, Chelsea contributed the word “wellbeing,” indicating that she is “the vehicle for her own wellbeing” (see Figure 8). In this session, participants discussed their increased level of focus while using the art media, and the atmosphere in the room was indicative of a sense of flow in which participants were fully engaged in the process.

This study demonstrates the significance of art therapy utilized in conjunction with a mindfulness model. The art was a catalyst for the changes that occurred, promoting stress
reduction within participants. Contrary to similar studies examining cortisol in relationship to art making, the therapeutic value of the mechanism of art therapy was conveyed in the current study. In Fiona’s reflection following the study, she stated, “I found the activities to be relaxing and the subsequent discussions to be insightful,” displaying the benefit of both the art itself and the value of processing what was created. The combination of creating art and the therapeutic processing, in conjunction with the mindfulness model demonstrated a reduction in stress, rather than previous studies in which the art making alone was the catalyst for change. This current study demonstrated the value of processing the artwork as opposed to art making alone.

**Therapeutic Benefits of the Inclusion of Mindfulness Protocol**

Many of the techniques utilized in mindfulness-based stress reduction (MBSR) were included in the protocol employed in this study. Some such techniques were sitting meditations, body scan and mindful breathing. Similar to an MBSR study conducted with premedical and medical students, the participants in this study also benefitted from the social nature of the group setting’s capacity to promote discussion and empathy (Shapiro et al., 1998). Often the participants agreed with what others were saying within the group and were able to related to what each other was saying.

Mindfulness also demonstrated significance in terms of intentionality and focus. The investment in the art making allowed for relaxation through focusing on something intentionally for an extended period of time (Siegel et al., 2016). Throughout the current study, many of the participants noticed their increased level of focus during the art making after having completed a mindfulness-based meditation.
In an MBSR study conducted by Langacher et al. (2012) caregivers and patients demonstrated a decrease in cortisol levels from pre-session to post-session in weeks 1 and 3. In week 6, the last week of the study, there was no significant change between pre-session and post-session cortisol samples, however the cortisol levels at week 6 were lower than the baseline levels at week 1. Similarly, in some cases, the participants in this study had posttest cortisol levels in the last session which were lower than the pretest baseline from Session 1. The study by Lengacher et al. (2012) indicated that there could be prolonged effects of extended mindfulness therapy. This study does not confirm or deny that claim, but does indicate that there could be a correlation.

Many of the same techniques inspired by Kabat-Zinn (2005) were utilized in this study, as in another study conducted with premedical and medical students by Shapiro et al. (1998). Shapiro’s (1998) study did not include art, but implemented the sitting meditation, mindful breathing, and body scan that was utilized in this dissertation research. The groups in Shapiro’s (1998) study mirrored those in this study as they discussed their experience, facilitating empathy for one another as well as a social component achieved by the mindfulness group setting.

Similar to a study conducted by Cohen and Miller (2009), students demonstrated an increase in mindful awareness after participating in a mindfulness-based group. For instance, in this current study, Bailey stated that she found herself “being more mindful of [her] body and mind as a unit that both need care and attention.” Another commonality between the two studies was that most participants demonstrated a decrease in perceived stress. Therefore, highlighting the benefit of utilizing an established therapeutic protocol to facilitate positive change within clients, in particular, to reduce stress and increase focus on the present.
Changes in MBAT Protocol

The protocol for the MBAT groups was derived from the experiential practice of Hass-Cohen and Findlay (2015). They utilized their model with a group of art therapists, exhibiting how the practice could benefit others and how they might implement it. Because the sample of participants differed for this research, slight changes were made to the protocol. The first change was that participants were asked to create a collage (see Figures 2, 3, 4, 5, 6, and 7) with their selected images after Session 1, rather than keeping them for later use. The participants in the art therapy group could see the benefit of mindfully selecting images for later use and as a result, they learned to see it as an opportunity for bringing awareness to their senses and engaging the mind and body, rather than viewing it as a chore. The inclusion of the creation of the collage also provided the opportunity for a richer discussion, as well as closure for the activity and a more creative experience in engaging with the art materials.

Another alteration was made to the group discussions following each art experience. Hass-Cohen and Findlay’s (2015) protocol seems to suggest a client-led discussion, while the participants in this study required some prompting with questions that led them to metaphor or personal insight. Specifically, the participants were asked about the experience, as well as asked mindfulness directed questions about what they noticed and what they were able observe. The artwork was directly referenced and participants were given a directed opportunity to describe what they created and what they saw within their art. For instance, in Session 1 participants were asked what question they would ask their artwork, allowing them to gain another perspective on what they created. While in Session 4, participants were asked to give their artwork a title, a request through which many of them found further meaning about the insights derived from the art.
Implications of Results

Some of the participants made statements that pointed to the need for more strategies and opportunities for students to incorporate something such as MBAT into their everyday lives. For instance, Diana stated that the study motivated her to “want to seek out other opportunities after it has ended that encourage and help facilitate [her] ‘checking in’.” Similarly, Bailey indicated that she would “try to continue meditations and art” after the study ended, continuing to implement the skills that she learned and found helpful. Ava also found value in the study, as evidenced by her intention to “incorporate more art into [her] life.” This also supports the need for future research on such activities and how they may be made available, as well as encouraged for students, reiterating the findings of other psychological researchers supporting the necessity for helping students develop strategies for coping with stress (Johnson, Batia, & Haun, 2008; Tyssen, Vaglum, Grønvold, & Ekeberg, 2001).

This study demonstrates the value of utilizing an established therapeutic protocol, MBAT, to reduce stress in students. Rather than focusing on the therapeutic benefit of the art making itself, this study focused on the mechanisms of art therapy and demonstrated that MBAT can reduce stress in students. This reduction was confirmed in decreased cortisol, decreased scores on the perceived stress scale, and in the final reflections of participants, all of whom benefited from participation and/or intend to continue engaging in tasks and mindsets related to the protocol and what they learned following the study.

Limitations

This study proved to have a number of difficulties. Due to the population of people targeted, recruitment was difficult, as many graduate and medical students already had
overloaded schedules. In addition, asking them to commit to a four-week study during the end of the semester added another layer of difficulty to the task. Scheduling proved to be an issue, as 6 additional students demonstrated interest in the study, but were unable to participate due to scheduling conflicts and 2 participants in the study dropped out of the study due to scheduling conflicts. Recruitment and retaining of participants was likely also affected by the timing of the study which was in the last four weeks of the semester, when preparation and completion of final exams was occurring. This time was chosen in order to recruit participants with a higher stress level, however it also possibly prevented some students from participating.

Furthermore, recruitment was on a volunteer basis, and therefore did not yield a diverse demographic. This limits the study due to the inclusion of only 1 male, only 1 minority participant, and only 2 medical students (who completed the study). This, as well as the small sample size, limited the ability of the researcher to compare the study results based on gender, ethnicity, or field of study.

Due to the lower participation level there was not a control group to compare with the experimental group of participants. It is possible that the cortisol decrease from before to after each session was due to the diurnal variation that cortisol naturally goes through during the day. Controls would be needed to determine to what extent the MBAT effected the cortisol concentration. The control group would also help to determine if the participants’ higher levels of cortisol in the pretest sample from Session 4 compared with those of Session 1 were due to the final exams or another factor such as participation in the study or a lengthier storage of samples from Session 1 than samples from Session 4. It could be possible that the cortisol in samples from week 1 degraded in vitro as they were frozen for several weeks before being tested with the Session 4 samples.
Recommendations for Further Research

Due to the limitations discussed, it is recommended that the study be replicated with a larger sample size encompassing a wider demographic. This would allow for more comparisons, as well as increased validity of the findings. It is possible that a larger sample size could yield more statistically significant results and/or confirm the results presented in this study. It is also recommended that the future studies include a posttest sample after the completion of the study in order to provide more insight into the longevity of the effects of the protocol, as well as to support or refute the hypothesis acquired from this study: that increased participation in MBAT causes a greater reduction of cortisol concentration at a faster rate. In addition, obtaining cortisol samples from participants in the weeks prior to the therapeutic intervention could help to create a baseline and further support the findings.

Conclusion

The purpose of this study was to increase empirical evidence supporting the stress reducing benefits of art therapy, in particular, MBAT in a group setting. This study presents an exploratory argument, which recommends that students engage in stress-reducing activities, such as MBAT, throughout their schooling. The evidence demonstrates that MBAT interventions have a reducing effect on cortisol levels and overall perception of stress. The longevity and extent of the effects remain unknown, but the study shows promising evidence to support the potential for a correlation. Future research containing a control sample, and wider range of participants can continue to explore the implications of this study. The results from this study may be utilized for further research, as well as to inform clinical practice. Ultimately, MBAT may provide an effective means for reducing stress in student populations.
APPENDIX A

BACKGROUND AND DEMOGRAPHICS POTENTIALLY INFLUENCING CORTISOL FLUCTUATIONS

1. What is your gender?
   □ Male □ Female
   PARTICIPANT # ________

2. What is your age? __________

3. What is your ethnicity? ______________________________

4. What is your program of study? _____________________________________________

5. What are your hobbies/interests? _____________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

6. Do you have any art experience? If so, explain. _________________________________
   __________________________________________________________________________
   __________________________________________________________________________

7. What is your current mood? _________________________________________________
   __________________________________________________________________________

8. Do you take any medications? If so, please list. _________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________

9. Do you take oral contraceptives? _______________

10. If you are a female, when was your last menstrual cycle? __________________________

11. How many meals do you eat in a typical day, and approximately at what times? _______
   __________________________________________________________________________
   __________________________________________________________________________

12. How many hours of sleep do you typically get per night? _________________________
   __________________________________________________________________________

13. How active are you? Do you exercise regularly? ________________________________
   __________________________________________________________________________

14. Approximately how much caffeine do you consume in a typical day (ex. cups of coffee)?
   __________________________________________________________________________

15. Do you smoke? If so, how often/how much? ___________________________________

16. What is your understanding of the risks and benefits of your participation in this study?
   __________________________________________________________________________
17. Do you have any concerns about your participation in this study? If so, please explain.
APPENDIX B

COHEN PERCEIVED STRESS SCALE

COHEN PERCEIVED STRESS

The following questions ask about your feelings and thoughts during THE PAST MONTH. In each question, you will be asked HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are small differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don’t try to count up the exact number of times you felt a particular way, but tell me the answer that in general seems the best.

For each statement, please tell me if you have had these thoughts or feelings: never, almost never, sometimes, fairly often, or very often. (Read all answer choices each time)

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Fairly Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.1. In the past month, how often have you been upset because of something that happened unexpectedly?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>B.2. In the past month, how often have you felt unable to control the important things in your life?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>B.3. In the past month, how often have you felt nervous or stressed?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>B.4. In the past month, how often have you felt confident about your ability to handle personal problems?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>B.5. In the past month, how often have you felt that things were going your way?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>B.6. In the past month, how often have you found that you could not cope with all the things you had to do?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>B.7. In the past month, how often have you been able to control irritations in your life?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
B.8. In the past month, how often have you felt that you were on top of things?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>

B.9. In the past month, how often have you been angry because of things that happened that were outside of your control?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>

**Perceived Stress Scale Scoring**

Each item is rated on a 5-point scale ranging from never (0) to almost always (4). Positively worded items are reverse scored, and the ratings are summed, with higher scores indicating more perceived stress.

PSS-10 scores are obtained by reversing the scores on the four positive items: For example, 0=4, 1=3, 2=2, etc. and then summing across all 10 items. Items 4, 5, 7, and 8 are the positively stated items.

Your Perceived Stress Level was ________

Scores around 13 are considered average. In our own research, we have found that high stress groups usually have a stress score of around 20 points. Scores of 20 or higher are considered high stress, and if you are in this range, you might consider learning new stress reduction techniques as well as increasing your exercise to at least three times a week. High psychological stress is associated with high blood pressure, higher BMI, larger waist to hip ratio, shorter telomere length, higher cortisol levels, suppressed immune function, decreased sleep, and increased alcohol consumption. These are all important risk factors for cardiovascular disease.
APPENDIX C

APPROVED CONSENT FORM

FSU CONSENT FORM (Bio-Medical Study)
The Effects of Mindfulness-Based Art Therapy on Stress and Cortisol Levels in Graduate and Professional-level Students Consent Form

You are invited to participate in a research study of Mindfulness-based Art Therapy techniques in a group setting to determine the stress-reducing benefits of this intervention. You were selected as a possible participant because you are an FSU student in a graduate or professional-level program, a population notorious for experiencing stress. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by Rebecca Allen, a Masters of Art Therapy student, with her Bachelors of Science in Biology. It is funded by [Indicate study sponsor, if any and state if the sponsor is also the manufacturer of the drug/device being studied if applicable].

Study Purpose

The purpose of the study is to determine the stress-reducing benefits of Mindfulness-based Art Therapy in a group setting over a four-week period, based on fluctuations in the stress hormone: cortisol. The art therapy protocol selected has been developed and tested behaviorally by a professional art therapist, yielding a decrease in stress response. This study hopes to confirm her results with biological markers, as well as investigate the longevity of the effects.

Study Procedures

If you agree to participate in this study, we would ask you to do the following: commit to one hour per week for four weeks to engage in an art therapy group utilizing mindfulness techniques, provide four saliva samples (at the beginning and end of the hour on week 1 and week 4) by swabbing your mouth, give some background information for analysis of the saliva, and take a pre- and post-test assessing your own stress. The assignment to the control and experimental groups will be random, but the control group (not receiving therapy) will be offered services following the study if the study yields positive results.

Risks of Study Participation

The study has the following risks: those in the control group will not immediately be receiving the services hypothesized to have stress-reducing benefits indicating that their stress relief may be postponed. Those participating in the experimental group may experience heightened awareness or delve deeper into their thoughts and emotions than intended. This is unlikely due to the carefully planned art therapy directives which aim to relax and encourage present-minded thinking.

Benefits of Study Participation

FSU Human Subjects Committee approved on 02/16/2017, valid after 01/29/2018. HSC#2017.20481
The benefits to study participation are: experiencing a decrease in your stress, as well as learning simple techniques for stress reduction that you can use on your own.

**Alternatives to Study Participation**

If you are experiencing extreme discomfort or anxiety as a result of your stress, this study may help you, however, an alternative would be to utilize the services at the University Counseling Center, or consult your doctor to see if medication is right for you.

**Study Costs/Compensation**

The only costs that you might accrue are transportation costs to get to the FSU campus. Participants will not be compensated for their time or inconvenience, however it is important to note that you will be receiving free therapy services as a result of your participation.

**Research Related Injury**

There is no expected risk for research related injury.

**Confidentiality**

The records of this study will be kept private and confidential, to the extent allowed by law. In any publications or presentations, we will not include any information that will make it possible to identify you as a subject. Your record for the study may, however, be reviewed by departments at the University with appropriate regulatory oversight. No information will be recorded in participants' medical record, and the study data will not be transmitted over the internet.

**Protected Health Information (PHI):**

Your PHI created or received for the purposes of this study is protected under the federal regulation known as HIPAA. Refer to the HIPAA authorization for details concerning the use of this information.

**Voluntary Nature of the Study**

Participation in this study is voluntary. Your decision whether or not to participate in this study will not affect your current or future relations with the University. If you decide to participate, you are free to withdraw at any time without affecting those relationships.

**Contacts and Questions**

FSU Human Subjects Committee approved on 02/16/2017, void after 01/29/2018. HSC#2017.20481
The researcher conducting this study is Rebecca Allen. You may ask any questions you have now, or if you have questions later, you are encouraged to contact them at [Redacted]. You may also contact their faculty advisor, Dr. Theresa Van Lith at (850) 645-9890, or Dr. Gregg Stanwood at (850) 644-2271.

If you have any questions or concerns regarding the study and would like to talk to someone other than the researchers, you are encouraged to contact the FSU IRB at telephone number 850-644-8633. You may also contact this office by email at humansubjects@fsu.edu, or by writing or in person at 2010 Levy Street, Research Building B, Suite 276, FSU Human Subjects Committee, Tallahassee, FL 32306-2742.

You will be given a copy of this form for your records.

Statement of Consent

I have read the above information I have asked questions and have received answers. I consent to participate in this study.

Signature of Subject __________________________ Date _____________

Signature of Investigator __________________________ Date _____________

FSU Human Subjects Committee approved on 02/16/2017, void after 01/29/2018. HSC#2017.20481
APPENDIX D

IRB APPROVAL MEMORANDUM

Florida State University

Office of the Vice President for Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-6673 · FAX (850) 644-4592

APPROVAL MEMORANDUM

Date: 01/30/2017

To: Rebbecca Allen [REDACTED]

Address: [REDACTED]

Dept.: ART EDUCATION

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research

The effects of mindfulness-based art therapy on stress and cortisol levels in graduate and professional-level students

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 01/30/2018, you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to ensure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000445.

Cc: Theresa Van Lith, <tvanlith@fsu.edu>, Advisor
HSC No. 2017-2018
REFERENCES


BIOGRAPHICAL SKETCH

Rebecca Allen is currently in her second year of study in the Masters of Art Therapy program at Florida State University. She will graduate with a Master of Science in August 2017. Rebecca is a member of the FSU Art Therapy Association and served as the Vice President of the organization. During the past two years Rebecca participated in practicum experiences working with adolescent boys in the juvenile justice system, women recovering from addictions, hospitalized children, and adults undergoing treatment for cancer. Rebecca has also worked with intellectually and developmentally disabled youth in her work with the organization VSA Florida. These experiences provided her with opportunities for clinical applications of educational learning, as well as valuable experiences with insight into clients, treatment planning, assessments, and individual and group art therapy. She looks forward to continuing to gain knowledge throughout her art therapy career and to obtaining professional licensure as a Registered Art Therapist (ATR) and Licensed Professional Counselor (LPC). Rebecca has been developing an interest in research since her undergraduate work on protein expression and gene pathways in cancer, as well as peptide synthesis in alternative pain killer research. Her current research interest is in fusing the fields of art therapy and biology in order to further empirical evidence supporting the efficacy of art therapy.