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The Effects of Mandala Coloring on Reducing Stress in Corporate Employees: A Quasi-Experimental Pilot Study

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Abstract

Job demands and extended hours contribute to chronic employee stress, leading to physical and psychological health problems. Workplace wellness programs (WWPs) strive to improve employee's physical health and wellbeing, but lack holistic options addressing stress reduction for the mind, body, and spirit. The purpose of this project is to describe the effects mandala coloring has on reducing objective and subjective stress levels in corporate employees. This empirical, quasi-experimental pilot study sampled 14 employees (n = 6 experimental, n = 8 control) measuring blood pressure, pulse, and perceived stress levels over a course of three weeks of coloring. Participants of this convenience sample were randomly sorted into the control or experimental group. Data was analyzed and interpreted using IBM SPSS Statistics 24. An RMANOVA showed no statistical significance between coloring mandalas versus coloring sheets in reducing objective and subjective stress levels in corporate employees over a three-week time period. Our pilot study provides a starting point for future research and possible implications for WWPs. Our suggestions for future research include: recruiting a larger sample size to represent the population as a whole, increasing both the duration of the study and time spent coloring for participants, incorporating qualitative data, and testing cortisol levels as another determinant of stress reduction. Furthermore, as the demands of corporate employees continue to cause chronic stress to rise, it is necessary to provide more evidence for stress reduction encompassing holistic modalities, such as mandala coloring, in a workplace setting.

Keywords: stress reduction, mandala coloring, corporate employees, workplace wellness

Introduction

In the United States, stress is on the rise (Centers for Disease Control and Prevention, 2014). Stress caused by either the frustrations of everyday life or an acute traumatic incident, activate the fight or flight stress response (Sapolsky, 2004). This response disrupts homeostasis, and the body releases a series of primary mediators, hormones, and anti-inflammatory cytokines to restore balance (Ganster & Rosen, 2013). If these primary mediators are released appropriately, there are no adverse effects on the body. When these mediators remain above or below normal ranges for an extended period, as seen in chronic stress, it leads to physical and mental debilitation (Ganster & Rosen, 2013; Sapolsky, 2004).

A common source of stress derives from workplace demands. Stressors within the workplace vary from demands of the job position, the amount of workload, understanding of the job role, and perceived pressures (Lee & Ashforth, 1996). A survey conducted by Northwestern National Life (now called ING) (as cited by Centers for Disease Control and Prevention, 2014), reported 40% of employees experience extreme stress at work. The demands of the workplace warp the stress response to chronically wreak havoc on the body (Rodgers & Micozzi, 2011). These workplace stressors have the potential to harm employee health in the long term, often resulting in physical and psychological issues (Ganster & Rosen, 2013). Some examples of these conditions range from diseases of the heart, depression, type II diabetes, and poor sleep (Ganster & Rosen, 2013, Lee & Ashforth, 1996; Nixon, Mazzola, Bauer, Krueger, & Spector, 2011).

High-stress levels at work can negatively impact companies due to high employee absenteeism, increased healthcare insurance costs, and lost productivity (Childs & Stoeber, 2012). In fact, Mattke et al. (2013) report that 60% of large companies (1,000 or more employees) and 70% of mid-sized companies (50-999 employees) saw a significant increase in

healthcare costs and anticipate this cost continuing to increase year to year. To counter these costs, workplace wellness programs (WWPs) became popular in the 1960s (Carlson, 2014). Carlson (2014) defines WWPs as "employer sponsored services designed to improve the health and well-being of employees" (p. 20). By focusing on improving the well-being of employees, companies experience higher productivity, fewer absences, and in return save money (DeVries III, 2010). While large corporations are more likely to offer WWPs due to greater financial means, investing in and maintaining the health of employees is cost effective for all companies (Baicker, Cutler, & Song, 2010; Barringer & Orbuch, 2013; Carlson, 2014; DeVries III, 2010; Ganster & Rosen, 2013). It is no surprise that 90% of U.S. companies with over 200 employees have WWPs (Walsh, 2015).

A majority of WWPs include fitness and diet interventions, annual flu vaccinations, biometric screenings, and farmer's markets (Barringer & Orbuch, 2013; Carlson, 2014; Jarman, Martin, Venn, Otahal, & Sanderson, 2015). Mattke et al. (2013) illustrates WWPs place emphasis on improving physical health behaviors from a conventional standpoint, with 63% of programs focusing on exercise, 53% on weight loss, and 60% on smoking cessation. There is little focus, however, on whole person wellness encompassing mind, body, and spirit. In fact, a recent survey regarding WWPs from the International Foundation of Employee Benefit Plans (2016) indicates only 24% of such programs include stress management. Despite the prevalence of workplace stress, current WWPs lack holistic modality interventions for reducing workplace stress in employees (Barringer & Orbuch, 2013; Jarman et al., 2015; Machen, Cuddihy, Reaburn, & Higgins, 2010).

Although WWPs lack holistic stress-reducing options, researchers suggest certain holistic techniques reduce stress. Art modalities (AMs) are a promising holistic outlet for reducing stress

in the studied populations (Abbott, Shanahan, & Neufeld, 2013; Carsley, Heath, & Fajnerova, 2015; Franklin, 2010; Sandmire et al., 2015; Stinley, Norris, & Hinds, 2015; Van Der Vennet & Serice, 2012). Examples of AMs are viewing art, making art, mandala coloring or creating, and collage making (Sandmire et al., 2015). The therapeutic properties of AMs are significant because they can decrease depression, fatigue, and impact the user's overall mood, which are all related to stress (Ando & Ito, 2014).

Mandala coloring, an art modality (AM), reduces stress in various populations (Babouchkina & Robbins, 2015; Clarkson, 2010; Van Der Vennet & Serice, 2012). The coloring of a mandala, a circle that contains symbols, designs, and colors, is a cost effective, time efficient and easily obtainable modality for the general population (Barrett, 2015). Currently, there are only a handful of studies focusing on coloring mandalas for stress reduction (Babouchkina & Robbins, 2015; Clarkson, 2010; Van Der Vennet & Serice, 2012). To date, there is no known research supporting the use of mandalas in WWPs to reduce stress in corporate employees. Therefore, the purpose of this research study is to describe the effects mandala coloring has on objective and subjective stress levels in corporate employees.

Our project begins with a literature review describing the research related to stress, workplace stress, WWPs, AMs, and mandalas as a holistic stress reduction technique. Next, we discern our research paradigm and culture of inquiry, theoretical lenses, and the personal and professional lenses through which we interpret the research. Then, in the method chapter, we provide information regarding how we conducted the study. Finally, we state the results, discuss our findings, and implications for future research and holistic health within WWPs.

Literature Review

The purpose of this chapter is to review current findings on stress and stress reduction techniques workplace wellness programs (WWPs) use, and the utilization of art modalities (AMs), specifically mandala coloring. First, we provide the definition of stress and the harmful consequences stress has on a person's mind, body and spirit. Next, we describe the state of workplace stress and how WWPs work to improve employee health and wellness. Lastly, we look at how holistic modalities, specifically AMs and mandala coloring, help reduce stress and the need to describe the effect mandala coloring has on stress reduction in corporate employees.

Stress

First, we provide definitions of stress and how it can affect health, followed by a closer look at workplace stress. Stress is a subjective experience for each person because it is the anticipation of an event or a psychological or physiological disturbance in the body (Sapolsky, 2004). The American Psychological Association (2016) defines stress as "the pattern of specific and nonspecific responses an organism makes to stimulus events that disturb its equilibrium and tax or exceed its ability to cope" (para. 56). Stress creates tension and excessive worry with accompanied physical changes, such as increased pulse and blood pressure (American Psychological Association, 2016).

If excess stress, whether acute or chronic, overwhelms the body's ability to cope adequately, a multitude of diseases or illnesses can manifest (Rodgers & Micozzi, 2011). Sapolsky (2004) describes the harmful impact excessive stress has on the body: decreased immune function, increased risk for diseases, such as cardiovascular disease, stroke, potentially cancer, increased risk for depression and anxiety, and poor sleep. Workplace demands are one

common source of psychological or perceived stress (Lewis, 2014). Next, we describe research findings on workplace stress.

Workplace stress. Ganster and Rosen (2013) define workplace stress as "the process by which workplace psychological experiences and demands (stressors) produce both short-term (strains) and long-term changes in mental and physical health" (p. 1088). Many American workers spend more time at work than anywhere else. According to Saad (2014), Americans work an average of 47 hours a week. Working long hours is one cause of rising stress in the workplace (Centers for Disease Control and Prevention, 2014).

Other causes of stress triggered by the workplace environment result from the type of hours worked, personal conflict between employees, or a sense of lacking control (Nixon et al., 2011). Per DeVries III (2010), a survey conducted by Staying@Work reported 48% of employees experience enough stress to decrease business performance. Workplace stress is a serious issue that needs realistic solutions to improve the well-being of employees, and in return benefit the company by reducing the number of sick days, lowering healthcare costs, and increasing employee productivity (DeVries III, 2010).

Employee absenteeism is costing corporations millions of dollars due to lost productivity. In the United Kingdom, companies lose an estimated 3.7 billion pounds ($5.8 billion U.S. dollars) per year due to employee sick days (Childs & Stoeber, 2012). Childs and Stoeber (2012) state that stress is the main reason for these absences. Unhealthy employees are also expensive due to rising healthcare insurance costs. The World Bank's (2016) research shows healthcare cost per capita in the United States increased from $8,524 in 1996-2000 to $9,403 in 2011-2015. The healthcare cost in the United States is drastically higher compared to the world's healthcare expenditure per capita of $1,060 (World Bank, 2016). To combat the detrimental financial losses

accrued as a result of unhealthy employees, companies need ways to improve the health and well-being of their employees. Next, we review WWPs, one attempt many companies are making to better the welfare of their employees.

Workplace Wellness Programs

The application of WWPs to improve the health and well-being of employees began in the 1960s and continues to evolve (Carlson, 2014). The evolution of WWPs is not surprising considering researchers suggest for every dollar spent on wellness programs, medical costs fall by about $3.27 (Baicker et al., 2010). There is a vast array of WWPs and they range greatly depending on the company. Some components of WWPs include opting for walking meetings, smoking cessation classes, participating in a yoga class during the workday, or buying fresh food from a farmer's market located on site (Carlson, 2014). The majority of these interventions focus on improving the physical health of employees.

WWPs focus on improving physical health parameters through fitness and diet interventions to aid in preventing chronic disease and maintaining a healthy weight (Carlson, 2014; Barringer & Orbuch, 2013; Machen et al., 2010; Nash, 2015). Also, many WWPs offer employees discounts at fitness centers, provide health seminars or award employees who participate in physical activity, maintain a healthy diet and weight, and are tobacco free (Pomeranz, 2014). In fact, Nash (2015) depicts the hallmark workplace wellness program (WWP) to include: on-site medical clinics, healthy food options, chronic disease management, and exercise programs. These wellness options target employees' physical health while only a few focus on the overall wellness of employees. However, with the continual rise in workplace stress (Centers for Disease Control and Prevention, 2014), it is important for WWPs to go

beyond improving physical health, but also promote whole person wellness to decrease employee stress (DeVries III, 2010).

Barringer and Orbuch (2013) explore the relationship between workplace stress and its effects on well-being and search for ways to reduce employee stress. In the study, the researchers initiate a WWP within their facility to improve the well-being and reduce the stress of compliance workers (Barringer & Orbuch, 2013). The researchers aim to reduce workplace stress; however, the focus is primarily on utilizing physical health parameters, like fitness and diet interventions, to deal with stress (Barringer & Orbuch, 2013). Additionally, the positive outcomes participants' experience, such as greater energy levels, better ability to handle problems, and lower burnout rates, are solely based on anecdotal evidence provided by the participants. The researchers' WWP lacks holistic modalities to serve the mind, body, and spirit of the stressed employees (Barringer & Orbuch, 2013).

The National Wellness Institute (2017) depicts wellness as including six categories: physical, social, intellectual, spiritual, emotional, and occupational. A holistic WWP reaches beyond just physical health, and encompasses all of these categories into a program, tending to the mind, body, and spirit of the employees (Walsh, 2015). In America, individuals are demanding a holistic approach to health (Walsh, 2015). Regardless of this demand for holistic wellness initiatives, most WWPs still only cater to improving employees' physical health.

Carlson (2014) argues WWPs are more holistic, focusing on improving the work population as a whole and addressing mind, body, and spirit. However, Carlson (2014) does not provide specific details about the actual holistic interventions utilized by companies. According to Carlson (2014), relaxation training is one of the only holistic modalities currently used in WWPs.

DeVries III (2010) suggests WWPs provide holistic stress management programs. The stress management programs range from "employee stress management coaching, worksite exercise programs, discounted gym memberships, massage therapy, free relaxation audios and discounts on spa visits" (DeVries III, 2010, p. 49). While some of these modalities are considered holistic, there are many other comprehensive options WWPs can integrate to support employees and decrease stress.

There is a need for a greater presence of holistic stress-reducing modalities in WWPs to benefit employee health and reduce costs to the company (Barringer & Orbuch, 2013; Jarman et al., 2015; Machen et al., 2010). In the next section, we define holistic in greater detail and outline holistic modalities for reducing stress.

Holistic Techniques for Stress Reduction

Thus far, we have explained the need for stress reduction techniques within WWPs and the lack of holistic interventions to reduce stress in the workplace. In this section, we define the concept of holistic health and examine AMs to reduce stress. Lastly, we look closely at a specific AM, mandalas.

Holistic health. To understand the concept of holistic techniques for stress reduction, we first define the term holistic. Holistic refers to complete systems rather than individual parts (holistic, n.d.). The word health comes from the root "hale, meaning to make whole" (Engebretson, 2013, p. 689). Holistic health, then, is a focus on the connection between the mind, body, and spirit which makes up the whole person in a continually changing world (Burkhardt & Keegan, 2013; Engebretson, 2013; Pizzorno, Snider, & Katzinger, 2011; Walter, 1999).

When one part of the whole is not working, there is an imbalance in the entire system (Burkhardt & Keegan, 2013; Engebretson, 2013; Pizzorno et al., 2011; Walter, 1999). The goal

of holistic health is to help people maintain balance to achieve well-being and to have a quality of life which gives meaning to the individual (Burkhardt & Keegan, 2013; Engebretson, 2013; Pizzorno et al., 2011; Walter, 1999). Next, we go one step further and discuss holistic approaches to stress reduction.

Art modalities. AMs are a variety of creative art techniques used to improve well-being. The modalities described by researchers are journaling, drawing, coloring, clay-making, knitting, painting, photography, and viewing art (Abbott et al., 2013; Carsley et al., 2015; Franklin, 2010; Sandmire et al., 2015; Stinley et al., 2015; Van Der Vennet & Serice, 2012). The research on AMs includes multiple populations from varying ages, college students, cancer patients, post-traumatic stress disorder (PTSD) sufferers, and individuals with stress, anxiety, and depression (Franklin, 2010; Monti et al., 2006; Peterson, 2015; Sandmire et al., 2015; Stinley et al., 2015; Van Der Vennet & Serice, 2012).

A variety of AM interventions decrease stress in the studied populations (Abbott et al., 2013; Ando & Ito, 2014; Babouchkina & Robbins, 2015; Caddy, Crawford & Page, 2012; Henderson, Rosen & Mascaro, 2007; Monti et al., 2006; Peterson, 2015; Sandmire et al., 2015; Stinley et al., 2015; Trevisani et al., 2010; Van Der Vennet & Serice, 2012). Curl (2008) found participating in an art activity reduces stress in elderly retirement home residents. It does not matter if participants drew or made collages, their stress levels decreased (Curl, 2008). Sandmire et al. (2015) examined subjective and objective variables on art making before final exams for college students. After a 30-minute art making intervention, all three groups reduced their stress levels compared to the control group (Sandmire et al., 2015). The short-term reduction in stress is attributed to the idea first coined by Foster (1992) that producing art stimulates a creative high, and therefore leads to stress reduction.

Caddy et al. (2012) explore art modalities and the potential impact on participants' mental health. Over a five-year span, the researchers conducted art therapy activities with mental health patients in addition to their prescribed treatment plans. From the time of admission to discharge, the researchers established statistically significant improvements in the patients' related anxiety level, quality of life, viewpoint of their illness, and capacity to be a functioning member of society (Caddy et al., 2012). The researchers suggest the improvements in the patient's mental health were partly attributed to art therapy (Caddy et al., 2012). In an additional study conducted by Ando and Ito (2014), AMs show a positive change in mood in a group of healthy people. Ando and lto's (2014) findings are favorable for using AMs to enhance disposition, as well as decrease tension, anxiety, fatigue, depression, and increase vitality.

In two other studies, AMs demonstrate effectiveness as a coping mechanism in women with various types of cancer, a diagnosis that can cause high levels of stress (Monti et al., 2006; & Peterson, 2015). The researchers suggest AMs reduce anxiety and provide a healthier outlook on life (Monti et al., 2006; & Peterson, 2015). Peterson (2015) also established connections between AMs impacting the quality of life and aiding in decreasing emotional turmoil experienced by cancer patients.

In addition to using AMs for women with cancer, Trevisani et al. (2010) created a photographic display for an inpatient medical unit to discern whether the presence of art had a positive influence on patients' hospitalization. The researchers illustrate that over half of the patients found the artwork made their time in the hospital more enjoyable (Trevisani et al., 2010). The evidence also supports the use of artistic displays as an inexpensive method to accompany traditional healthcare (Trevisani et al., 2010).

The research presented suggests AMs are an effective way to reduce stress in certain populations (Abbott et al., 2013; Ando & Ito, 2014; Babouchkina & Robbins, 2015; Caddy et al., 2012; Henderson, Rosen & Mascaro, 2007; Monti et al., 2006; Peterson, 2015; Sandmire et al., 2015; Stinley et al., 2015; Trevisani et al., 2010; Van Der Vennet & Serice, 2012). However, after review of the current literature, there are no studies utilizing AMs in WWPs to reduce workplace stress. Next, we explore mandalas, a specific type of AM.

Mandalas. There is evidence for the use of mandala coloring as an effective intervention for reducing stress (Babouchkina & Robbins, 2015; Clarkson, 2010; Henderson et al., 2007; Stinley et al., 2015; Van Der Vennet & Serice, 2012). The implementation of mandala coloring is a time efficient and economically reasonable option for reducing stress, making it a simple modality to incorporate into WWPs. In this section, we describe mandalas and then review research studies utilizing mandalas aiding in stress relief.

Mandalas emerged between the fourth and seventh century in Eastern Asia to help bridge the connection between the universe and human beings (Huh, 2010). The word mandala is broken down into two parts, “manda, meaning center or essence, and ‘la’ meaning container or possessor” (Huh, 2010, p. 20). A mandala, commonly used by Buddhists, combines religion, philosophy, and literature in the form of circles, shapes, symbols, and colors to guide the human being toward enlightenment (Huh, 2010). This journey towards enlightenment is calming and expanding. Due to the healing properties of a mandala, researchers are investigating its effectiveness in minimizing stress in different situations. Interest in mandalas as a form of art therapy arose when Carl Jung, a popular psychotherapist, explored the symbolism of a mandala (Stinley et al., 2015). Mandala coloring is thought of as a mindful activity, potentially reducing stress (Stinley et al., 2015).

Stinley et al. (2015) explore the relationship of mandala making or coloring on reducing pain and distress in pediatric patients before undergoing a needle stick. The treatment group received a 5-minute intervention before having blood drawn, which included coloring a mandala provided on an iPad. Fewer participants from the treatment group experienced stress behaviors during the needle stick than the control group. The researchers conclude that the AM, mandala coloring, is an economically responsible, efficient option to reduce stress in pediatric patients having blood drawn (Stinley et al., 2015).

Clarkson (2010), a music psychotherapist, studied the impact drawing mandalas had on a young woman over the course of three years. The patient progressed from a deep-seated depression to embracing a renewed passion for life. Similarly, Henderson et al. (2007) developed a study revealing the benefit of art therapy versus writing therapy in people who have experienced traumas. The participants saw the drawing of mandalas as a less anxiety-provoking outlet to express their experiences than writing therapy (Henderson et al., 2007).

Van Der Vennet and Serice (2012) found coloring a mandala significantly decreased anxiety in students compared to coloring a square plaid design and free-form coloring. While all interventions significantly reduced anxiety from pre-and post-test, the mandala coloring showed the greatest decrease in anxiety. In fact, the mandala coloring is the only intervention that reduced the participants' anxiety below baseline (Van Der Vennet & Serice, 2012). Similarly, Babouchkina and Robbins (2015) sample college students and study the healing abilities of circles compared to squares by comparing self-ratings of mood pre-and post-art activity. The two circle coloring groups demonstrated substantial improvements in mood compared to the two groups who colored in a square (Babouchkina & Robbins, 2015). To conclude, we summarize the literature and outline why further research supporting mandala coloring in WWPs is needed.

Summary

Stress is a common and debilitating problem affecting millions of individuals (Ganster & Rosen, 2013; Nixon et al., 2011; Rodgers & Micozzi, 2011; Sapolsky, 2004). One cause of stress comes from within the workplace. Therefore, WWPs need to find effective ways to reduce employee stress (Centers for Disease Control and Prevention, 2014; DeVries III, 2010; Nixon et al., 2011). Specifically, there are a lack of holistic options within WWPs (Barringer & Orbuch, 2013; Jarman et al., 2015; Machen et al., 2010) despite holistic modalities, like AMs and mandala coloring, for reducing stress (Abbott et al., 2013; Ando & Ito, 2014; Babouchkina & Robbins, 2015; Caddy et al., 2012; Henderson, Rosen & Mascaro, 2007; Monti et al., 2006; Peterson, 2015; Sandmire et al., 2015; Stinley et al., 2015; Trevisani et al., 2010; Van Der Vennet & Serice, 2012).

Researchers studied the effectiveness of AMs for reducing stress throughout a range of populations. Researchers explored an expansive array of AMs in reducing stress in individuals with PTSD, pediatric and cancer patients, healthy individuals and collegiate level students (Abbott et al., 2013; Ando & Ito, 2014; Monti et al., 2006; Sandmire et al., 2015; Stinley et al., 2015; Van Der Vennet & Serice, 2012).

While these populations are heavily researched and show positive results from AMs in reducing stress (Abbott et al., 2013; Ando & Ito, 2014; Monti et al., 2006; Sandmire et al., 2015; Stinley et al., 2015; Van Der Vennet & Serice, 2012), these modalities are not researched within WWPs. This gap suggests a need for research utilizing holistic stress reduction modalities, like mandala coloring, within WWPs. Therefore, the question for this research study is: Can mandala coloring effectively reduce objective and subjective stress levels in corporate employees?

Lenses

The purpose of this chapter is to discuss our culture of inquiry and research paradigm framing our research project. Below, we describe our theoretical lens, holism, to help the reader have a better understanding of how the theory lays a foundation for the evolution of our study. Additionally, we discuss our personal and professional lenses and how they relate to our research project. The intention for this part of the chapter is to provide the reader a thorough understanding of how we connect with the research, at the same time allowing for transparency of our underlying beliefs both personally and professionally. This section allows the reader to judge our work accordingly.

Paradigm and Culture of Inquiry

We set this research project within a post-positivist paradigm. Our ontology is a belief that reality exists in the world and is driven by natural laws. In the post-positivist paradigm, we consider ourselves objective critical realists. Also in a post-positivism paradigm, reality is fixed, but a critical review can mediate (Creswell, 2013). All of us stem from an epistemology that maintaining objectivity in research is the ideal relationship between the knower and the known, but this is not fully attainable. Therefore, this research project reflects an objective reality utilizing blood pressure and pulse measurements, with the integration of a subjective perception using a quantitative measurement of a perceived stress meter.

In the post-positivist paradigm, we display an axiology encompassing order, prediction, and control. A strength of this axiological view of research is the use of measurements and observations of what the world holds, with data in the form of numerical values to explain a phenomenon or situation (Creswell, 2013). This style of research is typically seen as the gold standard of scientific research and is the research frame in which we reside.

However, there are some limitations to residing within a post-positivist paradigm. In this paradigm, researchers impose a reductionist viewpoint and place ideas into set categories or labels (Creswell, 2013). In our study, we reduced measurements of stress to blood pressure, pulse, and a perceived stress meter. Stress is a subjective experience (Sapolsky, 2004), so through collecting mostly objective measures of stress, we missed gathering specific data on how participants feel and experience the mandala coloring. Next, we describe the theoretical lenses that frame our research.

Theoretical Lenses

Smuts (1927) described holism as a system being greater than all of its parts. In turn, when one part changes all parts change (Pizzorno et al., 2011). Therefore, when we talk about holism we are looking at the whole person, the physical, mental, and spiritual aspects and how each component connects to the other. The concept of holism is directly related to wellness and the promotion of health, with a focus on prevention, not just treating an illness when one occurs (Burkhardt & Keegan, 2013; Engebretson, 2013; Pizzorno et al., 2011; Walter, 1999). This is important because a focus on prevention and the promotion of health relates to stress reduction. The theory of holism supports the need for more holistic stress reduction techniques available in workplace wellness programs (WWPs). We founded the conceptual framework of this study on the premise of holism.

Our framework relates to the principle of the constitution of the World Health Organization (2016) that "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (para. 1). This approach relates to our study in the idea that WWPs do not have programs offering much more than diet and exercise. There is existing evidence that mandala coloring is effective in reducing stress in various populations

(Babouchkina & Robbins, 2015; Clarkson, 2010; Henderson et al., 2007; Stinley et al., 2015; Van Der Vennet & Serice, 2012), but little empirical evidence supporting the use of mandala coloring in a corporate setting as a part of a worksite wellness program. Next, we discuss our personal and professional lenses.

Personal and Professional Lenses

In this section, we express our personal and professional lenses. We provide the reader a context to better understand how our life experiences influence the development, implementation, and interpretation of our research project.

Kelly Asplin. I grew up in a comfortable, loving, Midwestern family. My parents instilled in me a love of traveling and the importance of giving back to the community. My love of traveling and volunteering led me to a two-year stint in AmeriCorps NCCC. Living and working with ten other young adults, from all different backgrounds, challenged and rewarded me. For the first time in my life, I disagreed with people with opposing opinions and viewpoints. My firm viewpoints and beliefs from childhood began to adapt and expand as I explored the world and its diverse cultures.

Working as an oncology nurse over the past nine years also influenced by outlook on life. A quality nurse uses her head and her heart to care for her patients. How I collect my patients' data and assessment is based on my critical realist ontology. My critical approach uses my intuition and previous nursing experience while my realist approach uses my physical assessment skills and lab values to determine a nursing diagnosis and care plan for my patient. My nursing experience influenced the design of this project to include objective blood pressure and pulse measurements and subjective stress levels. It also impacted the implementation of this project because I used my nursing experience to correctly measure the participant's blood pressure and

pulse and created a calm and quiet environment that could possible impact the participant's vital sign readings. I then used my nurse's eye to interpret the participant's vital sign readings to determine if other factors positively or negatively influenced the measurements and ultimately the data analysis.

Over the past three years, I became interested in holistic ways of helping my oncology patients manage their side effects from chemotherapy. Through my personal experience and education from the Master of Arts in Holistic Health Studies program at St Catherine University, I learned about energy healing, aromatherapy, and meditation. Fortunately, I passed this knowledge onto my patients to use alternative therapies to reduce chemotherapy side effects. My training as a nurse and my acquired knowledge of holistic health modalities impacts my viewpoint on research and desire to determine if coloring can impact stress levels.

My epistemology in the post-positivist paradigm uses the objectivity and pre-existing knowledge from my childhood, and with an open heart and mind from life experiences and world travels, combine to impact my viewpoint on research. Therefore, these post-positivism viewpoints led me to this quasi-experiment looking at the impact coloring mandalas has on employee stress levels.

I am drawn to this research topic through personal experiences with coloring to lower stress levels. When I have a rough shift at work, coloring helps reduce my anxiety so I can forget about my worries and stress. I wanted a research methodology that uses mostly objective data (blood pressure, pulse, and perceived stress levels) to determine if coloring mandalas can reduce stress levels in employees. I feel there is also a holistic aspect of the study because it involves coloring.

Olivia Augustin. My life is deeply rooted in holistic health practices. As a young child, doctors diagnosed me with an immune-deficiency disorder. After numerous blood tests searching for a cure, the immunologists lacked ideas on how to treat the diagnosis. As a last resort and going out on a whim, the doctors suggested I eat nothing but natural, whole food to give my immune system a fighting chance. At a young age, I adapted to a lifestyle filled with nutritious, real food, regular exercise and activity, yoga, and meditation. This lifestyle change improved my disorder and made me the healthy human I am today.

Through this personal experience, I developed a strong desire to share the benefits of leading a healthy life through regular activity, a healthy diet, and positive mind with the world. It is safe to say that growing up within this holistic culture shaped my interest in holistic health and my interest in researching the benefits of holistic health options. My personal success with holistic health options influenced the development and implementation of a research project studying the effects a holistic option (mandala coloring) has on reducing stress and improving well-being.

After high school, I pursued an undergraduate degree in Kinesiology, Human Performance, and Health Promotion. In college, I had my first interaction with scholarly research. In my senior year, I conducted a research study comparing the effects of a moderate, steady-state exercise program and a High-Intensity Interval Training (HIIT) program on various outcome measures in college-aged students. My undergraduate research project used experimental methods and collected quantitative data. We found no statistically significant results, but while embedded in this research, I learned the importance of obtaining objective data and maintaining a lack of bias in research. It was my first exposure to the research world and set the stage for my personal views and opinions surrounding research. The positivist understanding

of research is ingrained in my mind as the most accepted method for conducting research. I carried this understanding of research with me and designed this project to focus on collecting objective measures of stress (blood pressure and pulse rate).

In my professional life, I work as a fitness specialist with people with spinal cord injuries. Everything we do in our clinic is research-based. Objective data is diligently collected and evaluated daily. At work, I am embedded within a positivist paradigm every day. My positivist understanding shaped this current project design through collecting and interpreting objective data through quantitative statistical analysis. My current work and past education center on a realistic, fixed, and objective view of the world. These experiences greatly impacted my selection of an empirical research study with an experimental design.

Interest in the specific project topic arose from my past professional experience working as a health coach within a WWP. It also set the stage for implementing a project conducted within a workplace setting. In this job, I learned to coach employees how to improve their health. I had certain coaching guidelines set by my health promotion company, focusing on improving employees' physical health. Examples ranged from increasing exercise, to fruit and vegetable intake, to eliminating soda or quitting smoking. As a holistic health studies student, I want to provide other options beyond exercise and diet within WWPs. Hence, we developed and implemented our project within a WWP.

Coloring mandalas is one simple, inexpensive option for WWPs to improve employee well-being beyond physical health. Adult coloring is a recent trend, sparking my own personal interest in the topic. Individuals suggest anecdotal evidence expressing benefits to improving mood and reducing stress through coloring.

After years of residing in a positivist paradigm throughout my personal life, school, and career, I learned of other research paradigms in the Master of Arts in Holistic Health Studies program at St. Catherine University. With a thorough understanding of many different ways of seeing the world, I recognize the importance of not only including objective, measurable outcomes within research, but also including personal experience and subjective data in research.

Both objective and subjective matters within research lead to important findings. While we intended to include both measures within our method, logistics and time only allowed us to focus mostly on collecting objective data. We thought this was the most important data to collect because it most closely aligned with our paradigm. We collected a subjective measure of stress levels via a perceived stress meter. However, we did not collect any in-depth, qualitative data reflecting participants' lived experiences. While I believe both are important and have a place within research, my research experience within a positivist paradigm overrules my current post-positivist outlook. All of my personal and professional experiences helped shape our project into "The Effects of Mandala Coloring on Reducing Stress in Corporate Employees: A Quasi-Experimental Pilot Study."

Jenna Burckhard. I am the older of two daughters, born and raised in South Dakota by my extremely hard working single mother. I went to college at South Dakota State University where I took classes recommended for a degree in nursing, but detoured and took a few creative writing, poetry and photography courses. At the time, I did not realize the classes outside of my chosen field of study taught me to decrease stress and care for myself.

Stepping away from the world of science for an hour twice a week, I gave my soul a break. The science courses helped me prepare for the medical side of nursing, and the freer formed nature of the artistic classes guided me through maneuvering the emotional side. The

theory of mandala coloring to reduce stress was an obvious choice for a research topic for me because it is both a practical and creative outlet.

During the summer and on weekends I worked for a company called Advance that specialized in working with adults with varying levels of special needs. At this company, I learned the value of listening to both your head and your heart when caring for people, especially those who have different ways of communicating with the world. Working with caregivers who had different viewpoints challenged my post-positivism ontology way of thinking. Additionally, this job created another kind of personal stress in my life- the stress of a caregiver.

After graduating college, I was fortunate to be offered a job as an RN as a general and plastic surgery nurse. As a nurse working within a post-positivism epistemology, I learned objectivity and subjectivity vary greatly while working with patients and doctors. It is critical in my practice that I understand having a purely objectivist epistemology, which seems like the only way to view things when working in a mostly scientific field, can hinder the care I give my patients. If I only focus on the objective data found in the chart, such as vital signs or blood work, I may miss something deeper. It is just as important to listen to how a patient is feeling, or even my own instincts. It is a miserable feeling to hear about a patient who deteriorated and thinking to yourself, ‘I knew that was going to happen, I should have spoken up’.

The realization that I would need to learn more about helping my patients heal more than just their bodies led me to pursue a Master’s degree in Holistic Health studies at St. Catherine University. Through the program, I learned new modalities that facilitate healing the mind, body, and spirit. I experienced first-hand the peace that comes from practicing mindfulness-based meditation and yoga while studying in India. In an effort to become a more knowledgeable

advocate of holistic health for my patients and coworkers, I received my certification as a board certified Holistic Nurse (HNB-BC).

The experiences I had in both my personal and professional life influenced my outlook on a research topic. Coloring mandalas has grown in popularity as a technique for calming the mind and reducing stress. It is beneficial to me specifically to have a stress outlet like mandala coloring, because not only does it help calm me, it does not pull all my focus from those I take care of. These attributes are especially beneficial when working in a demanding job setting. I am especially excited to show how something as simple as coloring for 10 minutes can have such a positive impact on one's health.

When the time came to choose a research project, I was excited to pursue an avenue that was not only entertaining to explore, but would also include data that was measurable. The topic we choose, mandala coloring to reduce stress reduction, satisfied my post-positivist side. Incorporating coloring satisfied the side of me that has become more interested in the holistic modalities involved in healing.

Katie Jacobson. I was born and raised in the southwestern corner of Minnesota. My family consists of a mother who was a nurse, a father who was a pharmacist, both of whom are retired, and two older siblings. I was brought up as a middle class, white female. From a young age, my family taught me the importance of respecting all people, a strong work ethic, a questioning, yet receptive, outlook on life, and that thinking outside set ideas/norms is beneficial.

Even though I grew up in rural Minnesota, with family members predominantly working in the medical field, I was aware of holistic health modalities. For as long as I can remember members of my maternal side of the family use homeopathy, acupuncture, yoga, and meditation. These modalities were never a routine part of my upbringing, but are a large part of my life

currently. I am a firm believer in the effectiveness of acupuncture, mindfulness meditation, and yoga. Through my personal background with holistic health, I see the need for promoting the use of alternative avenues for the prevention or treatment of disturbances in the body which can lead to poor health. This viewpoint directly ties to the research we did on mandala coloring to reduce stress, in that, it adds to the academic body of literature on holistic modalities.

In relation to our research topic of mandala coloring, I utilize coloring as a means to reduce stress on a weekly basis. I know from personal experience coloring, namely mandalas, makes me feel less stressed, but began questioning whether the same was true for other people. In recent years, the rise in marketing claiming that coloring is a mindful activity, which reduces stress, also made me wonder whether there is any evidence to back up said statements. My paradigm is rooted in post-positivism, so for me using objective data to determine the effectiveness of coloring mandalas to reduce stress was intuitively the direction to take our research design.

My professional nursing journey started by graduating from an Associate Degree Nursing program from Rochester Community and Technical College. Shortly after, I went on to complete my Bachelors of Science in Nursing through Viterbo University in La Crosse, Wisconsin. Currently, I am enrolled as a graduate student in the Master of Art in Holistic Health Studies (MAHS) at St. Catherine University. As part of my elective curriculum in the MAHS program, I completed my certification as a Holistic Health Nurse through the American Holistic Nurses Credentialing Corporation.

My professional background as an RN is a driving force for choosing a quasi-experimental design for our research project. My experience working in a paradigm rooted in evidence-based practice plays a role in the design, implementation, and interpretation of our

research study through the utilization of objective data (blood pressure and pulse). Even though objective measurements play a substantial role in my nursing practice, I rely greatly on intuition and the subjective nature of a patient's experience. Through my critical realist ontology, I know people with the same health problems do not all fit into one specific category/disease, and people manifest their illness/disease through emotional, mental, spiritual, and physical aspects. Falling into the category of a positivist at the start of my nursing career twelve years ago, my viewpoint now leads me to a post-positivist perspective.

The combination of my nursing practice and status as a student in the MAHS program are teaching me ways in which there is a coming together of Western medicine and complementary and integrative therapies to care for patients. As a healthcare provider, I want to empower patients to play an active part in their health. Accordingly, I am continually looking for researched holistic modalities for use in my practice. Hence, my reasoning for researching the effectiveness of mandala coloring in reducing stress levels for corporate employees. I see mandala coloring as a universal tool with uses in various environments including corporations or hospitals.

Method

The purpose of this chapter is to describe the method used to answer our question, can mandala coloring effectively reduce objective and subjective stress levels in corporate employees? We set our research project within a post-positivist paradigm. Therefore, our ontology is a belief that reality exists in the world and is driven by natural laws (Creswell, 2013). In the post-positivist paradigm, we consider ourselves objective critical realists. Additionally, because our project is set within a post-positivist paradigm, reality is fixed, but a critical review allows for an adjustment to this reality (Creswell, 2013). We think this paradigm is important for this project because many art modalities (AMs) and mandala coloring studies only measure subjective stress levels of participants. There are limited studies focusing on obtaining objective data (Babouchkina & Robbins, 2015; Clarkson, 2010; Henderson et al., 2007; and Van Der Vennet & Serice, 2012). In scientific research, objectivity is ideal, and we strive to achieve this for acceptance into the world of academic literature.

To begin, we provide a framework and rationale for our culture of inquiry and method, outlining the strengths and limitations. Next, we present the sampling procedures, including a detailed outline of the instrumentation and tools, data collection procedures, and data analysis procedures. Lastly, we address the protection of human subjects, rigor, limitations, and strengths of our study.

Rationale for Culture of Inquiry and Method

Set within a post-positivist paradigm, we grounded the project within an empirical culture of inquiry. In this culture of inquiry, researchers collect and analyze data to find relationships between variables (Bentz & Shapiro, 1998). Researchers who execute designs crafted from the empirical culture of inquiry test how a specific treatment will affect the desired outcome, predict outcomes for large populations, and generalize results to the public (Creswell, 2013).

One limitation of grounding research within the empirical culture of inquiry is the inability to collect the lived experience of the participants. We lack details regarding how the participants personally felt during their coloring experience and exclude substantial in-depth qualitative data. In this study, the individual participants are not accounted for, but rather viewed as a generalizable group (Bentz & Shapiro, 1998). This culture of inquiry assumes the results of the studied sample apply to everyone in the chosen population, when in reality, this is unlikely (Bentz & Shapiro, 1998). Lastly, as researchers within this culture of inquiry, we are simply observers, and not involved in the process the participants are undergoing, seen as a limitation by some who believe complete objectivity is not possible (Bentz & Shapiro, 1998).

Consistent with the study's post-positivist paradigm and empirical culture of inquiry, we chose a quasi-experimental method for conducting this study. The quasi-experimental method selects groups and tests different variables without a random pre-selection process (Rallis & Rossman, 2012). Within this approach, researchers can compare the pre-test with the post-test measurements and garner any potential changes. While a truly random sample is ideal, our project relied on convenience sampling due to the availability of participants. Convenience sampling is one limitation of the chosen method because without a random sampling, there is limited generalizability. Also, the quasi-experimental method lacks rigor when compared to a true experimental design (Rallis & Rossman, 2012).

Ultimately, despite a few limitations, the best method to answer the proposed research question, "can mandala coloring effectively reduce objective and subjective stress levels in corporate employees?" is a quasi-experimental method gathering hard, objective data through systolic blood pressure (SBP) and pulse (HR). We also incorporate a post-positivist epistemology by including a perceived stress meter (SL) in the experiment. This type of

experiment is more accepted within the scientific community and can provide statistically significant data, furthering and benefiting the current literature around stress, WWP, holistic health, AM, and mandala coloring.

We hypothesize the coloring of mandalas reduces stress in corporate employees through a reduction of SBP, HR, and SL. We propose mandala coloring as an additional avenue in stress reduction, allowing corporate employees to achieve overall wellness. Next, we explain the process to recruit participants for the study and the data collection process.

Sampling Procedures

We studied corporate employees in a WWP setting and selected the representative sample through convenience sampling. We emailed friends and family working for corporate companies. After email communication with multiple companies, the CEO of an insurance company in the Midwestern United States agreed to allow employees to participate in the research study.

We created a written synopsis (Appendix A) giving an overview of the study to recruit participants at the company. We finalized the data collection dates with the company and created an email address to communicate with interested participants. The Wellness Program Coordinator at the company posted the pre-written recruitment (Appendix A) content onto the company's internal communication system, where nearly 500 employees viewed the research opportunity, on January 11th, 2017. The post contained our contact information for interested participants to email us by January 18th, 2017 and sign-up for the study. As interested participants emailed us, we responded with a follow-up e-mail (Appendix B) overviewing the study. This email included the dates and times of the coloring sessions and a participant copy of the consent form (Appendix C) and intake form (Appendix D). Next, we detail all the

instruments and tools used to complete the data collection process and outline the entire data collection procedure.

Instrumentation

This section provides detail about the instruments we used to complete the study: blood pressure machine and a perceived stress meter (Appendix E). We name, describe, and detail each instrument, and note any strengths or limitations. Also, we address the reliability or validity of each instrument and actions taken to increase reliability and validity where relevant. Lastly, we discuss in greater detail the reliability and validity of each instrument utilized for data collection.

Blood pressure machine. To obtain blood pressure and pulse measurements, we used two calibrated blood pressure machines with adult regular sized cuffs (Omron BP785). To determine the reliability of the machines, all four of us measured and recorded our blood pressure and pulse readings on both machines before all three coloring sessions. We know our normal blood pressure and pulse ranges and both machines gave similar readings, therefore we concluded the machines were correctly calibrated and ready for use. There is no established reliability or validity for the Omron BP785 blood pressure machine.

Perceived stress meter. We used Rollison's (2016) stress meter (Appendix E). This meter is a half-circle shape ranging from number zero on the left side to number ten on the right side. On this meter, zero is "totally relaxed," while ten is "Danger!" We used the meter to ask the participants how stressed they felt in the moment, unlike many stress meter which measure stress levels over days, weeks, and months. Participants responded by pointing to a number on the meter that represented their current stress levels, which we then recorded on the participant log form (Appendix I). We were unable to locate any published reliability and validity metrics on Rollison's (2016) stress meter (Appendix E) at the time of our study. To address reliability and

validity, we pilot tested this meter on five different participants not involved in the official study. Through the pilot study, we discovered that to collect accurate data regarding perceived stress levels, we must clearly state to the participants they are only allowed to choose one number from the meter (as opposed to a range of numbers). This stress meter helped us determine if coloring reduces stress in corporate employees. Next, we describe in detail the tools used in our method.

Tools

In this section, we provide detail about all tools: intake form, mandala coloring pages, coloring sheets, and colored pencils. We name, describe, and detail each tool and note any strengths or limitations. Then, we address the reliability and validity of each tool and actions taken to increase reliability and validity where relevant.

Intake form. We created an intake form to collect demographic information, medication use, and participants' experience with coloring (Appendix D). Demographic information is important so we learn about the characteristics of the participants involved in the sampling group, and therefore have a better understanding of our research sample. It is imperative for us to inquire about medication use because medications to regulate blood pressure, pulse, and anxiety levels may influence the vital sign readings and perceived stress meter levels. Information on previous coloring experience is important because it could show bias on why the participants wanted to participate in the study and possibly influence the results. Before the data collection process began, we conducted a pilot test of the intake form (Appendix D) with five people, not involved in the official study, to determine if the intake form questions were reliable and valid.

Mandala coloring pages. A mandala is a circular design containing shapes, symbols, and colors to guide the human being toward enlightenment (Huh, 2010). We used three different mandala drawings (Appendix F) selected from a free website, Pinterest (www.pinterest.com), for

the experimental coloring group. We chose three different styles of mandalas (Appendix F), so participants had a variety of mandalas to color. Each participant received a total of 15 mandala coloring pages (Appendix F), five of each chosen mandala, enough to color one sheet a day. We chose the mandala coloring pages (Appendix F) for this study for their simple designs, and there is no established reliability and validity at the time of our study.

Coloring sheets. The control group colored three different coloring sheets (Appendix G) we selected from the free website Pinterest (www.pinterest.com). One of the coloring sheets (Appendix G) is a picture of a tree, the second sheet is a picture of a hot air balloon in the clouds, and the third sheet is a picture of dragonflies. We selected coloring sheets (Appendix G) that did not resemble a mandala, and there is no established reliability and validity at the time of our study for the coloring sheets (Appendix G). The control group received the three different coloring sheets (Appendix G), five of each, for a total of 15 pages, similar to the mandala coloring group.

Colored pencils. The next tool we used was colored pencils. We chose colored pencils because the research is unclear as to the best medium for mandala coloring. A few studies (Schrade, Tronsky, & Kaiser, 2011; Van Der Vennet & Serice, 2012) give choices of markers, crayons, pastels, and colored pencils to offer participants options to the coloring tool they like the best. Due to finances and availability, colored pencils were the only coloring tool available to the participants in this study. We chose Crayola colored pencils ordered from www.Amazon.com because they were within our budget and easily accessible. Colored pencils are also less messy than other coloring mediums. Each participant received a pack of 12 colored pencils containing red, red-orange, orange, yellow, yellow-green, green, sky blue, blue, purple, black, brown, and

white. Additionally, we provided each participant with a pencil sharpener. Next, we discuss the data collection procedures.

Data Collection Procedures

We organized all dates and details of the study with the company's Wellness Program Coordinator via email and phone calls. We set dates over the course of three weeks in January 2017 and into February 2017. Prior to the initial data collection session, we met with the Wellness Program Coordinator to do a rehearsal of the data collection process on site. Before the first coloring intervention, we created packets containing all forms, mandala or coloring sheets, and colored pencils. We assigned a random number from 1 to 500 via Fast Random Number Generator, a free iPhone application, to each packet. With the exception of the consent form, the random number kept all information confidential throughout the entire study. Additionally, we secured any documents with the participants' random number on it in our lockbox, with one researcher storing the lockbox and another researcher storing the key to the lockbox.

We collected data on site at the company on three separate occasions: Monday, January 23rd, 2017; Monday, January 30th, 2017; and Friday, February 10th, 2017. On Monday, January 23rd, 2017, all registered participants met in a conference room at 12:00 PM. As participants arrived, we sent every other participant downstairs to a different conference room to separate the participants into the mandala coloring group and control group.

The mandala group stayed in the upstairs conference room while the control group relocated to the basement conference room. Once participants arrived at their designated room, they randomly sat down at a table containing a packet. Two researchers instructed the mandala group and the remaining two researchers instructed the control group. In the separate rooms, we read from the written script (Appendix H) and allowed sufficient time for participants to ask any

questions. All original 19 (ten in the experimental group, nine in the control group) willing participants signed the consent form and proceeded to data collection.

Next, the participants in each group filled out the short intake form regarding demographics, medication use, and their coloring experience. Once participants completed the forms, they turned in their consent and intake forms to a researcher located behind a partition in the room. Here, one researcher privately measured each participant's blood pressure and pulse with the Omron BP785 blood pressure machine and the participant rated their current stress level on Rollison's (2016) Perceived Stress Meter (Appendix E). The second researcher recorded the SBP, HR, and SL on the participant's log form (Appendix I) for the corresponding date and session.

We kept the consent form (Appendix C), intake form (Appendix D), and participant log form (Appendix I) after the initial session in the lock box. The participants kept their packet containing 15 coloring pages (Appendices F and G), a pack of 12 colored pencils, a tracking calendar (Appendix J), and an educational handout (Appendix K). The education handout provided information regarding healthy blood pressure and pulse ranges, and signs and symptoms of stress and anxiety. We explained the packet was for their use for the duration of the study and requested participants not share the contents of their packets with others and keep it in a safe, secure space.

After we collected all pre-vital signs and perceived stress levels from participants, they took a coloring sheet from their packet and colored it for ten minutes, timed with the researcher's cell phone stopwatch. After coloring for ten minutes, participants returned the colored sheet to their packet and individually returned to the private space where the same researcher measured

the participant's SBP, HR, and SL. The second researcher logged the participants' BP, HR, and SL on the participant log form (Appendix I).

For three weeks after the initial coloring session, we instructed participants to color a sheet from their provided package, daily, while at work, for ten minutes. Participants logged their coloring sessions on the provided January and February 2017 calendars. We collected the calendars for data analysis upon completion of the study.

On Monday (January 30, 2017) of the second week and Friday (February 10, 2017) of the third week, we returned to host another ten-minute coloring session. We measured the participants' SBP, HR and SL pre-and post-coloring sessions. The study concluded after data collection on February 10th, 2017. Participants kept their remaining coloring sheets, colored pencils, and pencil sharpener. Of the 19 participants, four from the mandala coloring group and one from the control coloring group were excluded from data analysis because they did not complete the third coloring session.

After completion of all data collection on February 10, 2017, the 14 participants who attended all three sessions participated in a drawing to win one of four $50 Amazon gift cards. We wrote the eligible participants' coded numbers on a piece of paper, placed in a hat, and drew four numbers of the participants who won the gift cards. All participants received a thank you card and cookie to show our appreciation for their participation. In the next section, we discuss the data analysis procedures used.

Data Analysis Procedures

This section explains the statistical analyses used to interpret the data collected. We input the SBP, HR, and SL measurements, both pre- and post- coloring, of the 14 participants who completed all three coloring sessions, into an SPSS database (IBM SPSS Statistics 24). To

ensure rigor, two researchers in the group, who did not initially enter the data, checked for accuracy and verified the data entered into the SPSS software. We analyzed the data of the participants who completed the study (n = 14) and utilized a repeated-measures analysis of variance (RMANOVA).

We analyzed the change scores of SBP, HR, and SL pre- and post- coloring session and compared intervention one (T1) and three (T3) within both groups. The between-subjects factor of "group" indicates whether there are any differences between the experimental and control groups. The within-subjects analysis reveals whether there are differences in the change scores of the SBP, HR, and SL after coloring sessions, regardless of the group. The interaction reveals whether the group assignment (mandala or coloring sheet) influenced the change in perceived stress, blood pressure, and pulse after 15 days of coloring. The next section outlines actions taken to ensure the protection of human subjects throughout the entire research study.

Protection of Human Subjects

We acknowledged ethical considerations to protect the human subjects participating in this study. Potential risks for our participants include abnormal vital sign values, coercion of participants, and potential invasion of privacy. Before recruiting participants and data collection, we obtained approval from the St. Catherine University Institutional Review Board (IRB). We also received written permission from the CEO of the company to go onsite and conduct the research project. Once an individual volunteered to participate in the study, they signed the informed consent form (Appendix C) outlining the risks and benefits. The informed consent form (Appendix C) clearly stated participants could choose to leave the study at any time for any reason.

One potential risk of this study was abnormal vital sign values and the medical conditions they may represent. No participants exhibited abnormal vital sign results. However, we provided educational handouts (Appendix K) to participants with medical information on normal and abnormal blood pressure and pulse readings and when to seek medical attention. We also gave participants information about work stress and directed them to their employee assistance program as a precautionary measure for possible psychological distress related to questions on the intake form.

Another conceivable risk for our project was coercion since participants had a chance to win a $50 Amazon.com gift card for participating. Coercion is the act of pressuring individuals to partake in a particular research study (Robinson-Baily, 2014). Potential research participants received the relevant information, through the informed consent (Appendix C), and made an educated decision on whether to take part in our study. Those interested in participating in the study signed the consent form, with no consequences to those not wishing to volunteer.

The next potential risk was an invasion of privacy of the subjects. We took steps to maintain the confidentiality of the data collected from participants. Confidentiality is keeping all identifying information protected to make sure participants' involvement, and personal information is not made public (Hicks, 2014). Ensuring confidentiality allows the researcher to form a trusting relationship with the participating individuals (Hicks, 2014). We obtained self-reported personal and demographic information from the participants during the study (vital signs, current medication use, and perceived stress levels). We thoroughly explained all of their information (intake form responses, vital sign readings, and stress level ratings) remained confidential, including from their employer or other participants. We stored the completed forms

in a lockbox with no information shared outside of our research group and our advisor. We will destroy all identifiable data on May 17, 2018.

We worked with an insurance company in the Midwestern United States, which employs a family member of one of the researchers, who did not participate in the research study. We chose this corporation strictly out of convenience due to time constraints. Creswell (2013) defined vested interested as having a personal interest in the outcomes of the study. We have no vested interest in this company.

Creswell (2013) recommends researchers respect the study site and the participants. As guests at the company, we made every effort to minimize disruptions in the workplace. We clearly laid out the plans for our study to the company so the individuals knew what to expect. Next, we detail how we ensured reliability, validity, and rigor throughout the research study process.

Reliability, Validity, and Rigor

We took numerous steps to ensure the reliability, validity, and rigor of the design of our study, collection, and data analysis. As a part of this project, we wrote our lenses chapter informing the reader how our theoretical, personal, and professional perspectives shape our biases. Throughout this process, we worked primarily as a group, allowing for both questioning and receptive attitudes. At times, we worked as individuals when researching articles and writing assigned sections of the paper, but we brought all ideas back to the group for final input before making decisions. Once a decision was final, we did not change it to minimize the threat to the validity of the project. For example, we considered using cortisol as a variable, but as a team, we determined the time allotment, cost, and availability of supplies for testing cortisol was not a conceivable endeavor. Additionally, we discussed and agreed that cortisol testing might be too

invasive to some participants and we strived to keep the participants as comfortable as possible.

To ensure all data collection procedures ran smoothly, with no inconvenience to the participants, we thoroughly role-played and practiced the entire data collection procedure before the first official data collection session. We practiced reading the script (Appendix H) to an audience, taking blood pressures and pulse rates, and obtaining perceived stress levels. We verified that the flow of the data collection process was smooth and orderly, taking no more than one hour. By practicing the data collection procedure beforehand, we appeared professional and prepared. Additionally, we prepared answers for potential questions from participants. We did not anticipate all questions or concerns beforehand but the thoughtful consideration is important because it demonstrates rigor.

We took steps to maintain rigor, however, there were unanticipated occurrences during the data collection process. The participants were unclear of the directions we sent in our email regarding the correct forms to turn in at the first coloring session. The email provided instructions regarding the first coloring session and a copy of the informed consent (Appendix C) and the intake form (Appendix D). Some participants printed and completed the forms before the first coloring session while others did not. The additional forms created some confusion for us based on our preconceived notion. We originally planned for participants to have copies of the forms for reference, and fill out the hard copies we brought to the first session. We did not let this slow down the data collection process and exchanged our blank forms with the pre-filled forms. Additionally, we did not initially consider including pencil sharpeners in the participants' packets. We subsequently bought pencil sharpeners for the participants for coloring sessions two and three.

Next, we encountered a design flaw related to taking the participants' blood pressures. In the mandala coloring group, we used the arm the participant preferred at the first session. We continued to use the same arm throughout the rest of the data collection. In the coloring worksheet group, we used the left arm to take blood pressures throughout all three sessions, unless contraindicated. In the rare instance when the machine failed to read the blood pressure, the participant switched arms and we tested the other arm to obtain the reading. The inconsistency of the arm used between groups is significant because it may impact results.

Lastly, we showed reliability, validity and rigor through our data analysis and interpretation. As mentioned, two researchers who did not initially enter the data into the SPSS software double-checked for accuracy of all data before we analyzed it. Reading statistic books and consulting with experts helped us determine the best statistical data analysis. These steps demonstrate rigor in our data analysis and interpretation. Lastly, we address the limitations and strengths of the study.

Limitations and Strengths

There are some design limitations to conducting a quasi-experimental research study with quantitative data. The standard settings for quasi-experimental studies include the laboratory or field (Bentz & Shapiro, 1998). These studies look at a small sample of participants and attempt to generalize the information learned to the external world. For example, in our study, we have a small sample of corporate workers from the Midwestern United States. We assume the results of this sample are generalizable to all corporate employees. This generalization may be futile because it does not take into consideration "their inability to account for extreme complex and subtle features of individual behavior which can sometimes not be reduced to numbers" (Bentz & Shapiro, 1998, p. 123). Condensing individuals to numbers is a limitation of quasi-

experimental studies (Bentz & Shapiro, 1998). By grouping individuals into one generalizable category, researchers view them as collective results instead of individual results (Bentz & Shapiro, 1998). Time and resources made this limitation difficult to mitigate.

Additionally, the researcher can be a limitation to the study. A researcher's own paradigm, bias, and influence can affect a study's design, method, data, and results. We minimized this limitation by including a lenses chapter in our project. Also, if a researcher is knowledgeable of which participants are in the control and research group, it can inadvertently influence the results (Bentz & Shapiro, 1998). We remained objective observers and limited interactions with participants beyond obtaining data.

Unknowingly tweaking the design or data of the study can "sometimes fail to achieve what they were designed to achieve" (Trafimow, 2014, p. 18). The data and statistical results can be polished up by eliminating outlier data that skews the study results (Trafimow, 2014). However, our study did not have any outlier variables, so we did not eliminate any data. Also, to minimize limitations of this study, we checked for normality and linearity of our data, verifying the data was appropriate to analyze.

There are further limitations to our particular research study. The small sample size makes it difficult to obtain statistically significant data (Bentz & Shapiro, 1998). However, our limited resources only allowed for a small sample size. Another limitation of our study is the potential bias of participants with previous coloring experience. It is possible participants with coloring experience wanted to participate in the study based on their emotional investment in coloring. Another potential limitation is the use of blood pressure or pulse medications. It is possible that participant's blood pressure and pulse are more stable if they take these medications. The coloring sessions may affect their measurements differently than someone who

does not take these medications. These potential limitations impact the study and data in ways we cannot predict.

One strength of our study is the addition of objective stress measurements, because the use of subjective stress measurements can vary greatly. One participant may rate his/her stress level low while the same amount of stress another participant may rate as severe. The addition of stress measurements through blood pressure and pulse adds objectivity, reliability, and validity to the project.

Our study was not a blind study so the participants were aware of our interest in learning if coloring can reduce stress in employees. One strength of the study is participants did not know we were particularly interested in mandala coloring as a means to reduce stress in corporate employees. It is unknown whether participants knowing our study was measuring stress levels affected the participants' vital signs and perceived stress levels. Next, we present the results of our study.

Results

The purpose of this chapter is to report the results of this quantitative, quasi-experimental pilot study. We begin with a description of the participants and relevant demographic data. Next, we present the quantitative results.

Description of the Participants

Our study included 14 employees from a corporate insurance company in the Midwestern United States. In total, we analyzed the data of 14 participants. Twelve participants were female, one participant identified as 'other' gender, and one participant did not answer the gender identity question. We asked participants to indicate their age by selecting from a range of ages: 18 to 24 years; 25 to 34 years; 35 to 44 years; 45 to 54 years; 55 to 64 years; 65 to 74 years; and 75 or older. No participants selected 18 to 24 years or 65 to 74 years. The mean age group was 45-54 years old.

We did not ask the race or ethnicity of the participants. Participants work between 38-50 hours per week, with a mean of 40.2 hours. Two participants reported taking blood pressure medications, one participant takes medications to control pulse rate, and five participants reported taking anxiety medication. Three participants indicated they previously used coloring as a stress reliever and two of those participants reported coloring is helpful with stress reduction (see Table 1).

Lastly, over the course of the 19-day study, the minimum number of days that participants colored for at least ten minutes at a time were four and the maximum was 19, with a mean of 10.79 days colored and mode of 15 days colored.

Table 1: Demographic Details of Participants

		Experimental group (n = 6)	Control group (n = 8)
		Frequency	Frequency
Gender			
	Male	-	-
	Female	6	6
	Other	-	2
Age			
	35 - 44	1	2
	45 – 54	4	3
	55 – 64	1	3
Hours Worked (per week)			
	< 40	-	1
	40	5	7
	> 40	1	-
Blood Pressure medications used	Yes	1	1
	No	5	7
Heart rate medication used	Yes	-	1
	No	6	7
Anxiety medication used			
	Yes	3	2
	No	3	6
Previously tried coloring for stress reduction	Yes	2	1
	No	4	7
Coloring helpful for stress reduction	Yes	1	1
	No	1	1
	Don’t know	1	4
	N/A	3	2
Days colored			
	0 – 5	-	3
	6 – 10	2	2
	11 - 15	3	3
	> 15	1	-

Hypothesis findings. Our original hypothesis, coloring mandalas reduces employees' stress levels, as demonstrated by a decrease in the change scores from intervention one (T1) to intervention three (T3) of SBP, HR, and SL is unsupported as evident by the analysis of F(df)=x, p=y. Therefore, we accept the null hypothesis, showing no statistically significant difference in the stress levels of participants who color mandalas or coloring worksheets.

RMANOVA Results

We ran a repeated-measures analysis of variance (RMANOVA) utilizing the change scores of the means for systolic blood pressure (SBP), pulse rate (HR), and perceived stress levels (SL) pre-and post-intervention of coloring intervention one (T1) and three (T3). The RMANOVA determines statistical significance between coloring either a mandala (experimental group) or a coloring worksheet (control group) and the reduction of objective and subjective stress levels. A p-value significance level, set by SPSS in advance, is $p \leq 0.05$. We ran separate RMANOVA tests for each coloring intervention group and analyzed the change scores for SBP, HR, and SL of each group pre-and post-intervention for T1 and T3.

Systolic blood pressure. The sphericity assumed results of the RMANOVA for the mandala coloring groups SBP, $F(2) = 0.132$, $p = 0.878$, indicates no statistical significance between coloring mandalas versus the control group and reducing objective stress levels (SBP). In comparison, we ran the same RMANOVA for the control group, where $F(2) = 0.513$, $p = 0.614$, indicating no statistically significant results for coloring worksheets in reducing SBP. Finally, we ran a comparison RMANOVA of the two groups, in which $F(1) = 0.007$, $p = 0.936$, which also does not indicate statistically significant results between the two coloring group.

Pulse. We also ran an RMANOVA comparing the mean changes of the pulse for each group. The mandala coloring group results are as follows: $F(2) = 0.073$, $p = 0.930$, indicating

no statistical significance between coloring mandalas and reducing pulse. The control group pulse results are as follows: $F(2) = 0.945$, $p = 0.42$; the results illustrate no statistically significant data for coloring worksheets and reducing pulse. The comparison RMANOVA between the two groups are as follows: $F(1) = 2.808$, $p = 0.120$, indicating no statistically significant for reducing pulse.

Perceived stress levels. Lastly, we analyzed the changes in SL between the mandala coloring group and the control group using an RMANOVA. The mandala group results are $F(2) = 0.455$, $p = 0.647$, which indicates no statistically significant data for coloring mandalas versus a control group and reducing SL. The comparison data for the control group's SL results are $F(2) = 0.263$, $p = 0.774$, which shows no statistically significant changes between the T1 and T3. Finally, we ran an RMANOVA comparing the mandala and control groups with the following results: $F(1) = 0.586$, $p = 0.459$, a result that does not indicate statistically significant data for reducing SL. In the next chapter, we discuss these results in greater detail.

Discussion

The purpose of this chapter is to interpret our research findings. First, we discuss our unanticipated discoveries. Then, we discuss implications for future research and holistic health within workplace wellness programs (WWPs). Lastly, we provide a conclusion of the entire project.

Unanticipated Discoveries

The results of the data analysis reveal unanticipated discoveries through no statistically significant decreases in any of our three variables. Our hypothesis, coloring mandalas reduces employees' stress levels, as demonstrated by a decrease in the change scores from intervention one (T1) to intervention three (T3) of systolic blood pressure (SBP), pulse rate (HR) and perceived stress levels (SL), is unsupported. Due to the limitations of our study, such as the small sample size, limited time, and our inexperience with research, it is possible these factors impacted our results.

Previous studies based on different populations, such as college students, cancer and pediatric patients, and individuals who suffer from post-traumatic stress disorder (PTSD), anxiety, stress, and depression, show a positive correlation between mandala coloring and stress reduction (Babouchkina & Robbins, 2015; Clarkson, 2010; Henderson et al., 2007; Stinley et al., 2015; Van Der Vennet & Serice, 2012). The framework for these studies offered us a roadmap to organize our study. At the time of this study, there is no literature exploring mandala coloring as a stress reduction technique for corporate employees. Next, we discuss implications of our research findings.

Implications

The results of this pilot study provide no statistically significant data but provide a starting point for future researchers. First, we discuss implications for future research, and secondly, describe implications for holistic health within WWPs.

Implications for future research. Based on our pilot study findings, future researchers can replicate this study utilizing our suggestions. First, we recommend recruiting a larger sample size. The larger sample size allows for the probability of a truly random sample, supporting the validity of the study (Creswell, 2013).

Next, we advise conducting the study over a longer time period, making the study more longitudinal in nature. A three-week time period is a short time in determining the impact of mandala coloring on SBP, HR, and SL. Of note, the number of day's participants colored on their own varied greatly. The days ranged from a minimum of four days of coloring to coloring all 19 days of the study. This variance of days colored can influence objective and subjective stress measurements. Although we required participants to track their days colored, we did not analyze this particular data, because it did not directly answer our research question, which is an avenue for future research.

Although most studies showing reduction in stress with the use of mandalas are based on an acute intervention (Stinley et al., 2015; Van Der Vennet & Serice, 2012), it is important to know if mandala coloring can reduce stress over time. Reducing chronic stress helps decrease physiological and psychological issues (Ganster & Rosen, 2013; Rodgers & Micozzi, 2011; & Sapolsky, 2004). It is unknown what amount of time is necessary to see a reduction in stress from coloring mandalas. Stinley et al. (2015) and Van Der Vennet & Serice (2012) saw

reductions in stress utilizing mandalas during only one intervention, while Clarkson (2010) initiated a study involving mandalas over the course of three years.

Another implication for future research is the consideration of the intervention time. Sandmire et al. (2015) observes reductions in stress in college students after a 30-minute art-making intervention, while Stinley et al. (2015) demonstrates decreased stress levels in pediatric patients coloring mandalas for only five-minutes. With these studies in mind, we chose ten minutes for the allotted coloring sessions in consideration of the participants' busy work schedules. In the future we recommend future researchers carry out the study over a longitudinal time period, leaving the time up to those conducting the research.

Other areas not taken into consideration during the design of our study include the selected time to collect data. Our participants work an average of 40.42 hours a week (See Table 1) and utilize the lunch hour for meetings or other personal tasks and obligations, resulting in some participants missing one or two coloring sessions. Participants expressed the need for more flexible time to complete the coloring sessions, but due to time restraints, there was no room for flexibility. With this in mind, the feasibility of corporate employees setting aside time to color mandalas at work is potentially unlikely, and perhaps why there is limited research on this topic. We recommend future researchers look at creative ways in designing studies, such as having corporate employees color at home away from the work environment.

Additionally, it is important for researchers to consider the multiple factors influencing blood pressure on a regular basis. In clinical practice, blood pressure measurements taken on both arms often results in different readings. When obtaining a person's blood pressure on both arms, Fallon (2015) suggests using the arm with the higher blood pressure reading for all future measurements. If the systolic readings in each arm have a 20 mmHg or greater difference, or

diastolic readings have a ten mmHg or more, this is a possible indication of underlying cardiovascular issues and something we did not consider in our testing (Fallon, 2015). Also, a person's blood pressure varies throughout the day, lowering during rest and sleep, and increasing with activity. Some factors that result in fluctuating blood pressures include: "emotion, exercise, smoking, alcohol, temperature, respiration, digestion, bladder distension, and pain" (Fallon, 2015; Wedgbury and Valler-Jones, 2008). To keep our study simple and noninvasive, we did not ask the participants details regarding any of these factors. We asked participants about their use of blood pressure, pulse rate, and anxiety medication. However, we did not ask about medication frequency and adherence, and it is unknown how this affected the results.

Lastly, we are novice researchers with limited funding and resources, affecting the design of our study. In the future, researchers with access to grant money and more time may discover significant results such as the addition of cortisol levels to measure stress. Salivary cortisol tests are another way of measuring if the body is in a state of stress. Cortisol is an important measurement because it is a stress hormone, and when levels remain elevated over a chronic period of time health problems may arise (Sapolsky, 2004). Researchers can also collect qualitative data such as reflective journaling from the participants, providing the researcher's subjective data through the participants lived experience with coloring (Creswell, 2013). Next, we discuss implications for holistic health within WWPs.

Implications for holistic health within workplace wellness programs. With the rise of work hours and stress levels, it is imperative employees manage their stress levels to maintain a balanced mind, body, and spirit. According to Sapolsky (2004), a long-term imbalance of the mind, body, and spirit leads to disease. Coloring mandalas or other coloring worksheets is a cost-effective, easy, and calming form of art modalities (AMs) and can be completed at work, home,

school, or in the community (Babouchkina & Robbins, 2015; Clarkson, 2010; Henderson et al., 2007; Stinley et al., 2015; Van Der Vennet & Serice, 2012). At the same time, Baicker et al. (2010) propose medical costs fall by about $3.27 for every dollar spent on WWPs. Even though we did not find statistically significant results showing coloring mandalas reduces stress levels via SBP, HR, and SL compared to a control group, there are small improvements in SBP, HR, and SL in some participants after coloring. Burkhardt and Keegan (2013); Engebretson (2013), and Pizzorno et al. (2011) believe all people have the ability to be well, but many lack tools to maintain optimal wellness. For example, WWPs lack holistic modalities to provide to employees. So by adding a modality such as mandala coloring to their programs, WWPs address the components of mind, body, and spirit.

Barret (2015) states coloring is already a popular trend in the United States and many stores sell adult coloring books. It is no doubt the general population is jumping on the adult coloring book bandwagon, with the belief that coloring promotes a relaxed and at-ease state of mind, in return reducing stress (Barrett, 2015). After a thorough review of the literature, we are the first to explore using coloring as a means to reduce stress within a WWP. Current WWPs emphasize physical health of employees, often neglecting the mind, body, and spirit (Barringer & Orbuch, 2013; Carlson, 2014; & Jarman et al., 2015). More research is needed to support the inclusion of holistic modalities, like mandala coloring, within WWPs, as evidence that it reduces employee stress, in return improving overall well-being.

Conclusion

As evident by the increased amount of stress reported by employees (Centers for Disease Control and Prevention, 2014; DeVries III; 2010, Lee & Ashforth, 1996; Nixon et al., 2011), there is a need for holistic stress reduction options within WWPs to improve mental, emotional,

and physical well-being (Barringer & Orbuch, 2013; Jarman et al., 2015; Machen et al., 2010; Walsh, 2015). We examined the use of mandala coloring as a stress reduction technique in a WWP by going onsite to a corporate insurance company. We researched the effects coloring mandalas has on reducing employees' stress levels. Within our post-positivist paradigm, we measured participants' SBP, HR, and SL on three separate occasions. After three weeks of coloring and data collection, we ran an RMANOVA based on the change scores of T1 and T3.

Our hypothesis, that coloring mandalas reduces stress levels in corporate employees, shown by a reduction in the change score of SBP, HR, and SL from T1 to T3, was rejected. We accept the null hypothesis and the lack of current research with this population at the time of this study implies the need for future research. Several similar studies looking at mandala coloring for stress reduction in different populations show positive results (Babouchkina & Robbins, 2015; Clarkson, 2010; Henderson et al., 2007; Stinley et al., 2015; Van Der Vennet & Serice, 2012) and indicate perhaps a different approach would shed more light on the subject.

As researchers, we recognize the need for pilot studies to pave the way for future researchers and encourage those who wish to use our study as a stepping-stone for their projects. We contribute to the body of research by finding holistic ways in reducing stress in corporate employees through our pilot study.

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Appendices

Appendix A

Recruitment Post

Subject: Coloring research opportunity
Hello employees of [redacted]!
You are receiving this email because your company's CEO has granted approval to allow you to voluntarily partake in a graduate student research project involving coloring.
In previous studies, researchers have shown that coloring may reduce stress in various populations, such as college students, children, and individuals with PTSD (Post Traumatic Stress Disorder).
We know that that the demands of the workplace are increasing and as a result, some of you might be experiencing additional stress.
There are studies indicating the harmful effects stress can have on one's health, so we want to take this opportunity to determine if coloring can reduce stress in corporate employees.
Participants who complete this study will be entered into a drawing for a chance to win one of four $50 Amazon gift cards, you must be present to win. If you think this sounds like something of interest to you, here's what would be expected of you:

1. Meet with the student researchers on January 23rd, 2017 at 12:00 PM for approximately 1 hour. During this hour you will have your blood pressure and pulse taken and recorded, and you will be asked to rate your current stress level on a meter of 0 to 10. You will then quietly color for 15 minutes, followed by a repeat measurement of your blood pressure, pulse and current stress level.
2. Participants will be asked to quietly color (supplies provided) on their own daily while at work for 10 minutes.
3. Over a course of 3 weeks, the student researchers will return again in week 2 (January 30th, 2017) and in week 3 (February 10th, 2017) to repeat the same blood pressure, pulse, perceived stress meter, and 15-minute coloring intervention.
4. The total time commitment for this study, over a course of 3 weeks, will be up to 6 hours.

If you are interested in participating in this coloring research study, please send an email to coloringresearch@gmail.com by January 19th, 2017. A more detailed follow-up email with times and locations will be sent on January 20th, 2017.
Additional questions can also be sent to coloringresearch@gmail.com.
Thank you so much for considering to participate in our research study.
Sincerely,
Kelly Asplin, Olivia Augustin, Jenna Burckhard, and Katie Jacobson

Appendix B

Participant detail email

Subject: Coloring research opportunity

The study will begin on January 23, 2017 and continue for three weeks, the last day being February 10, 2017. The following steps go into detail of what you can expect:

1. Meet with the student researchers on January 23, 2017 for approximately 1 hour. During this hour you will:
    1. Come to the assigned room and listen to the written script detailing the purpose of the study and what is expected of your participation.
    2. Ask any questions you may have regarding the study and confirm understanding of the study. If you decide not to participate in the study, you can leave at this time.
    3. Read and sign the informed consent form agreeing to participate in the study.
    4. Fill out a short intake form regarding demographics, medication use, and your experience with coloring.
    5. Next, you will be assigned a random number (1-500) and sorted into a room, with each person going into the opposite room of the person before them.
    6. Once in the designated room, you will bring your signed informed consent and intake form to a researcher in a private space.
    7. In this private space, a researcher will measure your blood pressure and pulse with the Omron BP785 blood pressure machine and you will rate your current stress level based on a 0-10 Perceived Stress Meter.
    8. The researcher will record your results (this information will not have your name tied to it and will be kept secure in a lockbox) and give you a manila envelope containing coloring sheets, colored pencils, a January and February 2017 calendar, and educational handouts for you to take with you into the coloring room.
    9. In your designated room, when directed to do so, you will quietly color the coloring sheet with the provided colored pencils for 15 minutes.
    10. After the 15 minutes of coloring is complete, you will return to the same private space to have your blood pressure, pulse, and perceived stress levels measured a second time by the same researcher. Keep your manila envelope with the provided coloring sheets and colored pencils with you.
    11. At this time you will be free to return to work.
1. Following the initial session, participants will be asked to quietly color (supplies provided) on their own daily while at work for 10 minutes.
2. Over a course of 3 weeks, the student researchers will return again in week 2 (January 30, 2017) and in week 3 (February10, 2017) to repeat the same blood pressure, pulse, perceived stress meter, and coloring intervention.
3. The total time commitment for this study, over a course of 3 weeks, will be up to 6 hours.

On the last day, February 10, 2017, participants who complete this study will be entered into a drawing for a chance to win one of four $50 Amazon gift cards. You must be present to win. We look forward to seeing you! Please don't hesitate to email with any questions. All emails will be answered as quickly as possible. Once again we thank you for your interest in participating in this research study.

Sincerely,

Kelly Asplin, Olivia Augustin, Jenna Burckhard, and Katie Jacobson

Appendix C

Informed Consent

Code: _____

ST CATHERINE UNIVERSITY

Informed Consent for a Research Study

Study Title: The Effects of Coloring on Reducing Stress in Corporate Employees: An Empirical Research Study

Researcher(s): Kelly Asplin, BSN, RN, OCN; Olivia Augustin, BS Kinesiology, ACSM-HFS; Jenna Burckhard, BSN, RN, HNB-BC; & Katie Jacobson, BSN, RN, HNB-BC

You are invited to participate in a research study. This study is called "The Effects of Coloring on Reducing Stress in Corporate Employees: An Empirical Research Study." The study is being done by students in the Master of Arts in Holistic Health Studies at St. Catherine University in St. Paul, MN. The faculty advisor for this study is Dr. Carol Geisler, with Graduate Studies Master of Arts in Holistic Health Studies, at St. Catherine University.

The purpose of this study is to find out if coloring can reduce stress levels in corporate employees. Up to 500 people could participate in this research. Below, you will find answers to the most commonly asked questions about participating in a research study. Please read this entire document and ask questions you have before you agree to be in the study.

Why have I been asked to be in this study?

You are an employee of Western National Insurance Group.

If I decide to participate, what will I be asked to do?

If you agree to be in this study, you will be asked to do these things:

1. On day 1 of the study, you will show up to the assigned room and listen to the written script detailing the purpose of the study and what is expected of your participation.
2. Ask any questions you may have regarding the study and confirm understanding of study.
3. Read and sign the informed consent form agreeing to participate in the study.
4. Fill out a short intake form regarding demographics, medication use, and your experience with coloring.
5. Once the forms are filled out, you will be assigned a random number from 1 to 500, and you will be sorted into one of two rooms, with every person going into the opposite room of the person before them.
6. Based on the room you are sorted into, you will bring your signed informed consent and intake form to a researcher in a private space.
7. In this private space, a researcher will measure your blood pressure and pulse with the Omron BP785 blood pressure machine and you will rate your current stress level based on a 0-10 Perceived Stress Meter.
8. The researcher will record your results onto a log sheet (that will not have your name tied to it and will be kept secure in a lockbox) and give you a manila envelope containing coloring sheets, colored pencils, a tracking calendar, and a participant educational handout, for your use.

9. In your designated room, when directed to do so, you will select and quietly color the provided coloring sheet with the provided colored pencils for 15 minutes.

10. After the 15 minutes of coloring is complete, you will return to the same private space and researcher as before to have your blood pressure, pulse, and perceived stress levels taken a second time. Keep your manila envelope with the provided sheets and colored pencils with you.

11. At this time you will be free to return to work. Then, for 3 weeks (January 9-27, 2017) after the initial coloring session and testing, you will be instructed to color the provided coloring sheets with the color pencils daily, while at work, for 10 minutes. You will record the days you colored at work on the provided January 2017 calendar and this will be turned into the researchers at the end of the study (January 27, 2017). Please do not share the contents of your manila envelope to anyone.

12. Additionally, the Monday of the second week (January 16th, 2017) and the Friday of the third week (January 27th, 2017), the researchers will return to host another 15-minute coloring session including measuring the blood pressure, pulse, and perceived stress level before and after the coloring sessions. The January 27th, 2017 coloring session will conclude the study. You will be asked if you would like to provide one of your coloring sheets, with no identifiable information, to be included in the final paper. You can keep the remaining coloring sheets and colored pencils.

13. After completion of the third coloring session (January 27th, 2017) and measurements, you will write your name on a piece of paper to be entered into a drawing to win one of the four $50 Amazon gift cards. The winning names will be drawn out of a hat and you must be present to win. The piece of paper will be shredded after the drawing. You will also turn in your January 2017 calendar that you used to track your independent coloring sessions.

What if I decide I don't want to be in this study?

Participation in this study is completely voluntary. If you decide you do not want to participate in this study, please feel free to say so, and do not sign this form. If you decide to participate in this study, but later change your mind and want to withdraw, simply notify any one of us and you will be removed immediately. Once you have completed the final coloring session, we will not be able to remove your data from the study. Your decision of whether or not to participate will have no impact on your relationship with St. Catherine University, nor with any of the students or faculty involved in the research.

What are the risks (dangers or harms) to me if I am in this study?

Potential psychological distress related to personal intake form questions and potentially learning of an undiagnosed medical condition, if this occurs we encourage you to speak with your health care provider. An educational sheet about blood pressure, pulse, and signs/symptoms of work-related stress will be provided to all participants for your reference. All answers to the intake forms will remain confidential and only accessed by the researchers, their advisor and kept securely in a lockbox.

What are the benefits (good things) that may happen if I am in this study?

There are no direct benefits to participating in this study.

Will I receive any compensation for participating in this study?

You will write your name on a piece of paper to be entered into a drawing to win one of the four $50 Amazon gift cards. The winning names will be drawn out of a hat and you must be present to win. The piece of paper will be shredded after the drawing. Participants will also be able to keep the coloring supplies used for the study.

What will you do with the information you get from me and how will you protect my privacy?

The information that you provide in this study will be transcribed on to spreadsheets. Participants' names or initials will not be used; a randomly assigned number (1-500) will be used instead. We will keep the consent form and intake form in a lockbox with one researcher keeping the box and another researcher keeping the key. The blood pressure/pulse measurements as well as the perceived stress meter results will be kept on a spreadsheet within a password protected file on a password protected computer. Only the researchers, along with the research advisor, will have access to the records while we work on this project. We will finish analyzing the data by May 17, 2018. We will then destroy all original reports and identifying information that can be linked back to you.

Any information that you provide will be kept confidential, which means that you will not be identified or identifiable in any written reports or publications. If it becomes useful to disclose any of your information, we will seek your permission and tell you the persons or agencies to whom the information will be given to, the nature of the information to be furnished, and the purpose of the disclosure; you will have the right to grant or deny permission for this to happen. If you do not grant permission, the information will remain confidential and will not be released.

Are there possible changes to the study once it gets started?

If during course of this research study, we learn about new findings that might influence your willingness to continue participating in the study, we will inform you of these findings.

How can I get more information?

If you have any questions, you can ask them before you sign this form. You can also feel free to contact the researchers at coloringresearch@gmail.com. If you have any additional questions later, and would like to talk to the faculty advisor, please contact: Dr. Carol Geisler at ccgeisler@stkate.edu. If you have other questions or concerns regarding the study and would like to talk to someone other than the researcher(s), you may also contact Dr. John Schmitt, Chair of the St. Catherine University Institutional Review Board, at (651) 690-7739 or jsschmitt@stkate.edu.

You may keep a copy of this form for your records.

Statement of Consent:

I consent to participate in the study.

My signature indicates that I have read this information and my questions have been answered. I also know that even after signing this form, I may withdraw from the study by informing the researcher(s).

_____

Signature of Participant Date

_____

Signature of Researcher Date

Appendix D

Intake Form

Code: _____

Thank you for completing our intake form. Your feedback is important.

1. Please state which gender you most closely identify with?

2. What is your age?

   18 to 24
   25 to 34
   35 to 44
   45 to 54
   55 to 64
   65 to 74
   75 or older

3. About how many hours per week do you work?

4. Are you currently taking medications to control your blood pressure?

   Yes
   No

5. Are you currently taking medications to control your pulse (heart rate)?

   Yes
   No

5. Are you currently taking medications for anxiety?

   Yes
   No

6. Have you ever tried coloring to reduce stress?

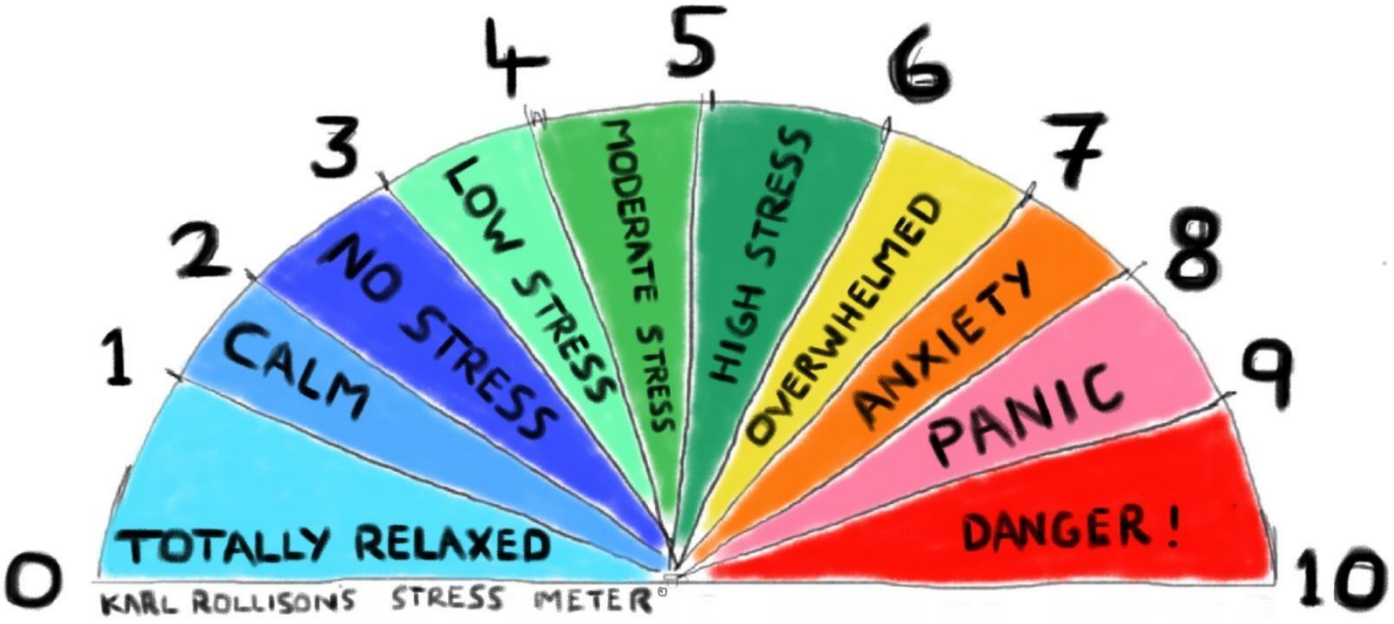
   Yes
   No

8. If you have tried coloring to reduce stress, was it helpful?

   Yes
   No
   Don't know

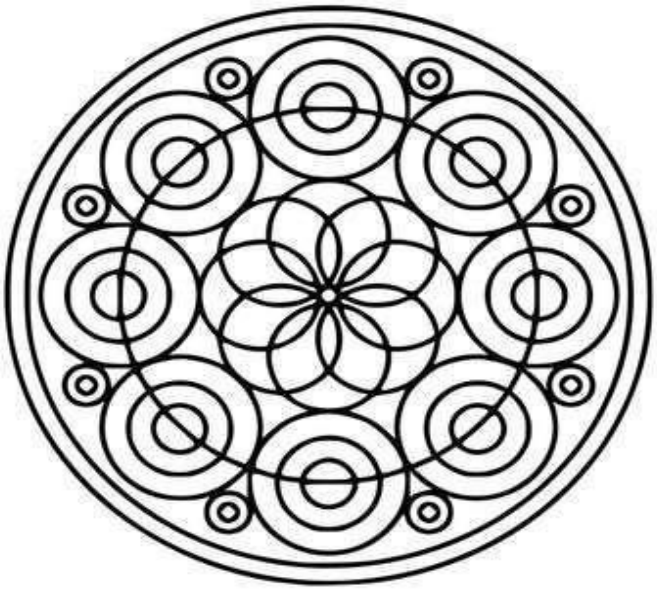
Appendix E

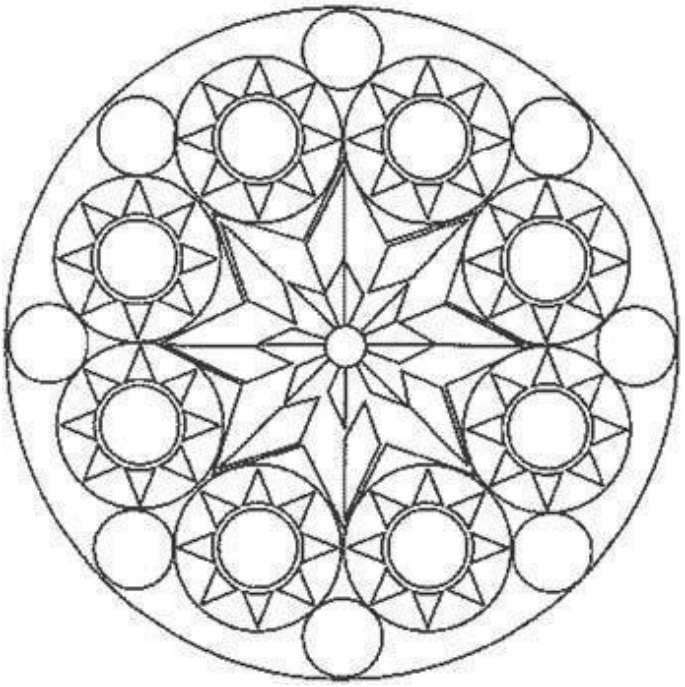
Perceived Stress Meter

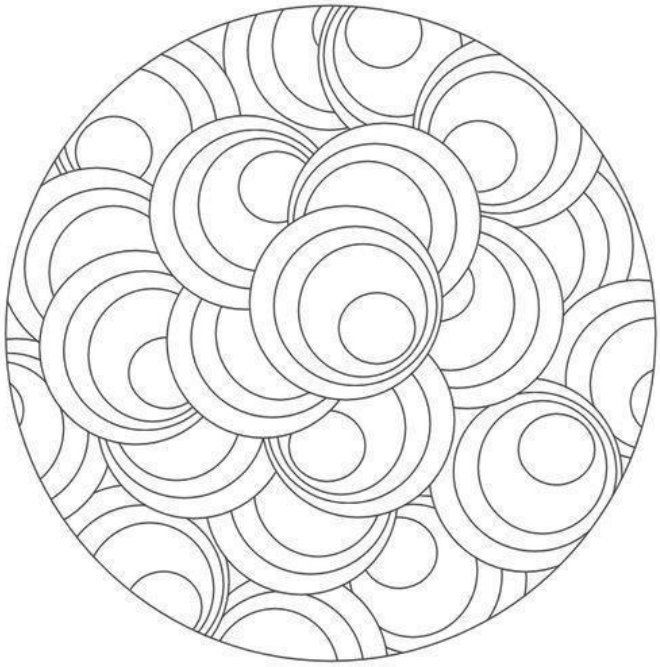


Appendix F

Mandalas

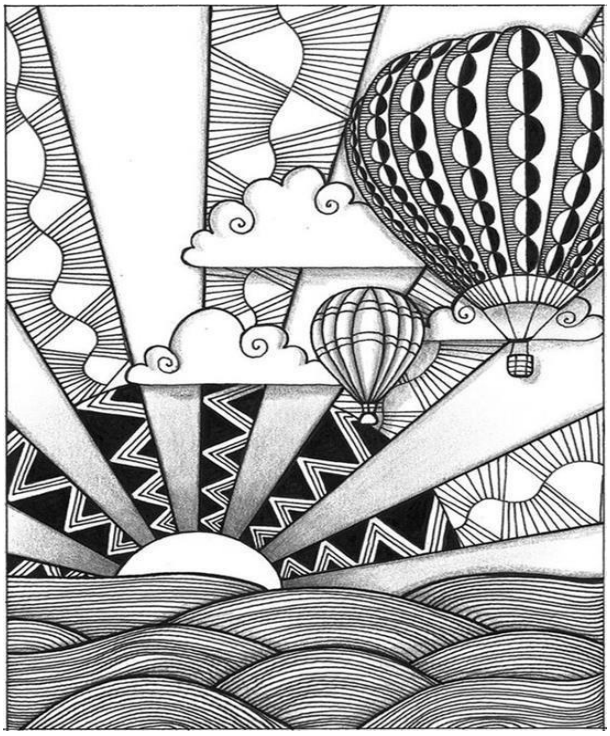






Appendix G

Coloring Sheets



Appendix H

Script

Good morning/afternoon, thank you for joining us today.
My name is _____ and these are my classmates, _____, _____ and _____, and we are currently enrolled in the Master of Arts in Holistic Health Studies graduate program at St. Catherine University in St. Paul, MN. Today we are here to collect data for our research project. The purpose of this empirical research study is to describe the effects coloring has on physiological and subjective stress levels in corporate employees.

Before we begin, we want you to know that all data will remain confidential and not be shared with anyone outside the research team and our advisor. Your employer will not have any access to any of your information.

In order to complete this project, we will be sorting you into two rooms, with each person going into the opposite room of the person prior to them. Once you have entered the assigned room, your blood pressure, pulse and perceived stress score will be taken and recorded. After all the participants in each group have gathered, we will ask you to select a coloring sheet from the envelope, and quietly color for the next 15 minutes. Once time is up, we ask that you please report to the same researcher to have your blood pressure, pulse and perceived stress meter recorded again.

After we finish today, we ask that you take your manila envelope which contains colored pencils, BP/Pulse/stress meter forms, coloring pages and a January and February 2017 calendar with you. Between our meeting times, please take ten minutes each work day to quietly color, and mark the day you color on the calendar. We will meet twice more over the next three weeks, and we will repeat the steps of checking your blood pressure, pulse, and perceived stress levels before and after a 15-minute coloring session. At our last meeting, your name will be entered into a drawing to win one of four $50 Amazon gift cards. You must be present to win.

Are there any questions at this point?

~time for questions~

Great questions! Now we'd also like to ask you to say a quick summary of what we'll be doing during this study.

~time for summaries ~

At this time, we'd like to invite anyone who is not interested in participating in this study to leave, we appreciate you taking the time to listen. Prior to today you should have received a copy of the informed consent form which contains a brief description of the study and an intake form. At this time please take a few minutes to read and sign the informed consent form.

Once the informed consent form is complete, please complete the intake form. After you have filled out the forms, please come to the front where we will assign you a random number for anonymity and then direct you to the researcher who will be collecting the forms so we can begin the study. Thank you for being a part of our study!

Appendix I

Participant Log Form

Code: _____
Researcher's Name: _____

Date: _____

Pre-coloring	Post-coloring
BP: _____	BP: _____
Pulse: _____	Pulse: _____
Stress scale: _____	Stress scale: _____

Date: _____

Pre-coloring	Post-coloring
BP: _____	BP: _____
Pulse: _____	Pulse: _____
Stress scale: _____	Stress scale: _____

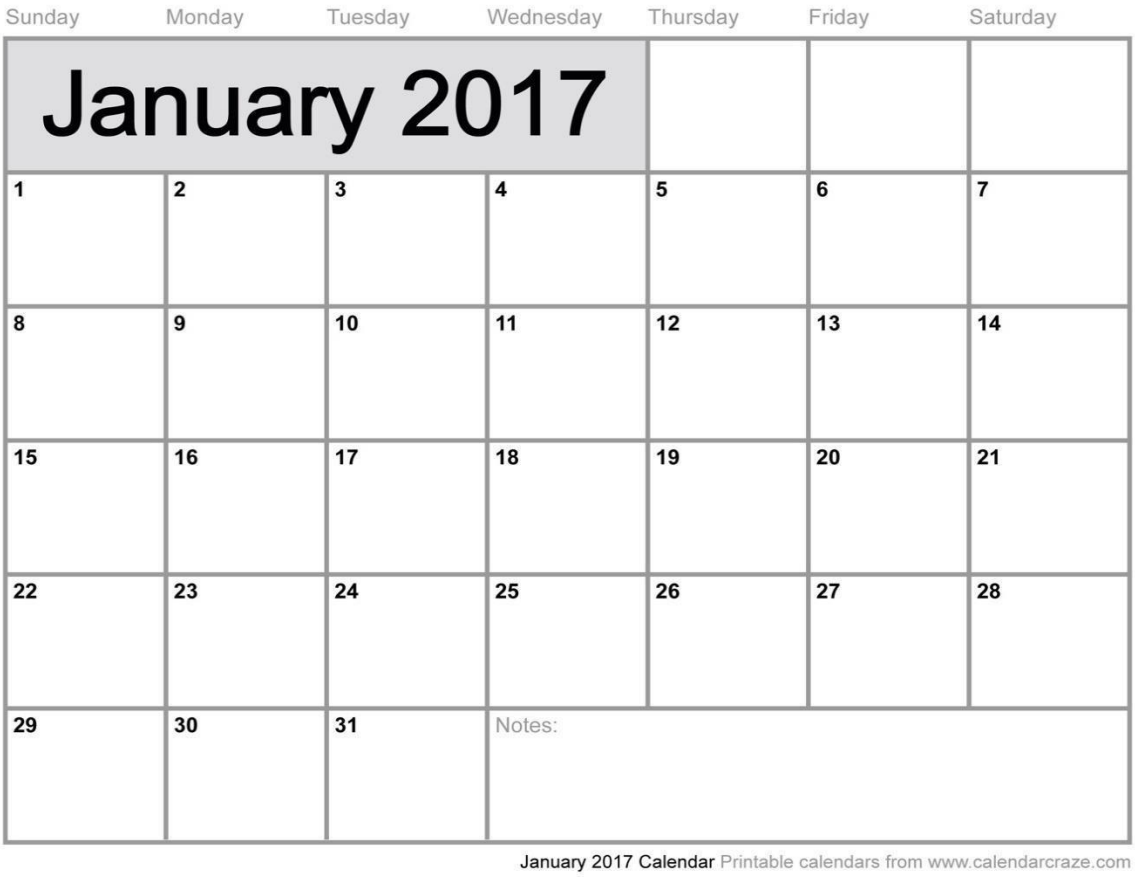
Date: _____

Pre-coloring	Post-coloring
BP: _____	BP: _____
Pulse: _____	Pulse: _____
Stress scale: _____	Stress scale: _____

Appendix J

Tracking Calendar

Code: _____



Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
January 2017						
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	Notes:			

Please color in the days during the week you spent at least ten minutes using the provided coloring sheets while at work.

Appendix K

Participant Education Handouts

Participant Educational Information

Signs of Work-Related Stress

Work-Related Stress can present as either physical, psychological or a combination of the two.

Common Signs/Symptoms can include but are not limited to:

- Fatigue
- Muscle Tension
- Headaches
- Stomach problems such as diarrhea
- Insomnia
- Anxiety
- Feelings of inadequacy or of being overwhelmed
- Trouble concentrating
- Depression

(www.stress.org)

If you feel you are experiencing any of these signs/symptoms and need further help managing them, please contact your Employee Assistance Program.

Blood Pressure Readings

	Systolic (Top Number)	Diastolic (Bottom Number)
Normal Blood Pressure	<120	<80
Prehypertension	120-139	80-89
Hypertension (High Blood Pressure)	140-159 (and anything above)	90-99 (and anything above)
Hypotension (Low Blood Pressure)	<90	<60

(Burke & Lemone, 2008)

*These readings are based on individuals with no underlying health conditions. If chronic health issues exist blood pressure parameters may be different and should be discussed with your healthcare provider.

**As stated in the informed consent participants are encouraged to follow up with their healthcare provider if abnormal results are found.

Pulse (how fast your heart is beating)

Normal Pulse	60-100 beats per minute
Tachycardia (Fast Pulse)	>100 beats per minute
Bradycardia (Slow pulse)	<60 beats per minute

(Burke & Lemone, 2008)

*These readings are based on individuals with no underlying health conditions. If chronic health issues exist blood pressure/pulse parameters may be different and should be discussed with your healthcare provider.

**As stated in the informed consent participants are encouraged to follow up with their healthcare provider if abnormal results are found.