A Thesis

entitled

The Effects of Mindful Coloring on State Mindfulness, Anxiety, and Stress

by

Heather Rae Schultz

Submitted to the Graduate Faculty as partial fulfillment of the requirements for the

Master of Arts Degree in Clinical Psychology

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December 2017

An Abstract of

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Adult coloring books have recently surged in popularity, with five of Amazon's top fifteen bestsellers being adult coloring books at the end of 2015 (Ingram, 2015). Using intricate patterns, geometric shapes, and abstract designs, adult coloring books are sold not only as creative and artistic outlets, but are marketed as a "mindful exercise" and a way to eliminate stress and decrease anxiety (Farrarons, 2015). Despite their current popularity, knowledge regarding the purported benefits of adult coloring books largely stems from personal accounts and little is known regarding the efficacy of coloring as a "mindfulness exercise." Literature points to the use of structured coloring, opposed to free coloring, as being beneficial in reducing anxiety and increasing psychological health and well-being (Curry & Kasser, 2005). The present study evaluated the effects of coloring activities (structured and unstructured) versus a mind wandering control task on state mindfulness, state anxiety, and stress levels in a randomized controlled study. It was hypothesized that structured coloring, as opposed to unstructured coloring or mind wandering, would demonstrate a significantly greater increase in state mindfulness and a significantly greater decrease in both state anxiety and stress levels. Contrary to

predictions, mixed results were found between individual measures of state mindfulness and state anxiety. However, results did reveal a significant increase in state mindfulness from pretest to posttest for both structured coloring and unstructured coloring on the State Mindful Attention Awareness Scale (MAAS) and a significant decrease in state anxiety as measured by the State Trait Anxiety Inventory (STAI) State form for both structured and unstructured coloring. Crucially, although the state MAAS and Toronto Mindfulness Scale (TMS) are both purported to measure state mindfulness, unexpected significant negative correlations were observed between the measures. With regard to changes in state anxiety and stress as measured by the Depression, Anxiety, and Stress Scale (DASS 21), a significant decrease in both anxiety and stress from pretest to posttest was observed for all three groups, with no significant difference between the structured coloring, unstructured coloring, and mind wandering groups. The results, limitations, and implications for future research on mindfulness and coloring are discussed.

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List of Abbreviations

ACT.....Acceptance and Commitment Therapy

BAI.....Beck Anxiety Inventory
BDI.....Beck Depression Inventory

DASS 21 .....Depression, Anxiety, and Stress Scale 21
DBT.....Dialectic Behavior Therapy

MAAS .....Mindful Attention Awareness Scale
MBAT .....Mindfulness-Based Arts Therapy
MBCT .....Mindfulness-Based Cognitive Therapy
MBSR .....Mindfulness-Based Stress Reduction

STAI.....State-Trait Anxiety Inventory

The Effects of Mindful Coloring on State Mindfulness, Anxiety, and Stress

Chapter One

Project Summary

Adult coloring books have now become bestsellers, and are captivating 'readers' with titles such as "The Mindfulness Coloring Book," "Color Me Calm," and "Dream Catcher: Finding Peace." Adult coloring books incorporate the concept of children's coloring books and mandalas; they use intricate designs, geometric shapes, and continual patterns that create elaborate outlines to be colored and filled in. Mandalas are symmetrical circular figures that stem from spiritual Hindu and Buddhist practices that can exist in any modality, and have been used as an aid in meditative and therapeutic practices for self-awareness and self-expression (Henderson, Rosen, & Mascaro, 2007). Adult coloring books are marketed as a "mindful exercise" and a way to eliminate stress, decrease anxiety, and induce a sense of calm and serenity (Farrarons, 2015). Knowledge regarding the purported psychological benefits of adult coloring books largely comes from personal accounts, news stories, and other media references. Little is known as to the efficacy of coloring books when they are deliberately used as an intentional "mindfulness exercise," however, literature points to the use of structured coloring as being beneficial in reducing anxiety and increasing psychological health and well-being (Curry & Kasser, 2005).

Chapter Two

Project Overview and Empirical Literature to Date on Mindfulness and Coloring

Mindfulness has become increasingly popular in psychology and medicine, particularly with its therapeutic introduction in Mindfulness-Based Stress Reduction

(MBSR), and integration in Dialectic Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), and Mindfulness-Based Cognitive Therapy (MBCT) (Kang & Whittingham, 2010). Mindfulness is defined as, "a means of paying attention in a particular way; on purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 1994, p. 4). It is a conscious direction of awareness toward oneself (physically, mentally, and emotionally) at that precise moment in time, while being in emotionally nonreactive state (Kabat-Zinn, 2012). Mindfulness is operationalized to consist of two main components: 1) self-regulation of attention and, 2) orientation to experience (Bishop et al., 2004). Self-regulation of attention involves focusing attention to the present moment, and noticing any subtle changes in thoughts, feelings, and sensations that are occurring. It involves sustained attention on the current experience, switching attention (redirecting the mind away from ruminative thoughts to the present moment), and inhibition of elaborative processes. The second component, orientation to experience, is characterized by curiosity, openness, and acceptance. It involves maintaining an attitude of curiosity to the present moment, acceptance of any thoughts or sensations that occur without judgment, and being open to the process without a preset agenda.

Mindfulness exists in both a state and trait form. State mindfulness refers to altered sensory experiences, and altered cognitive experiences that are only present during and shortly after engagement in a purposely chosen mindfulness activity; attention is being focused, and there exists a nonjudgmental and open stance to the experience (Lau et al., 2006). Trait mindfulness refers to longer-term changes in mindfulness. These changes persist after the mindfulness experience has ended and are incorporated into the individual's disposition and daily life (Kiken, Garland, Bluth, Palsson, & Gaylord, 2015).

Practicing mindfulness leads to heightened state mindfulness, with enduring cumulative increases in overall trait mindfulness (Kiken et al., 2015). Without intervention, trait mindfulness tends to be stable over an individual's lifetime. Opportunities for repeated practice through participation in mindfulness-based treatments, such as MBSR and MBCT, cultivate greater state mindfulness, and over time increase trait mindfulness. In addition, the deeper states of mindfulness an individual is able to achieve, there exists a greater tendency for the individual to incorporate mindfulness into their daily life (Kiken et al., 2015).

As previously stated, teaching mindfulness has become an integral component to many therapeutic practices. Mindfulness was first brought to the forefront of psychotherapy with MBSR. In its original form, MBSR is a structured 8-week group program where participants practice mindfulness daily, discuss stress and coping, and complete out of class assignments to reinforce material and concepts learned in class (Baer, 2003; Kabat-Zinn, 2012; Kang & Whittingham, 2010). Mindfulness activities include meditation, breathing exercises, yoga, and body scans, and incorporates mindful activities into everyday tasks such as eating, walking, and standing. The goal of MBSR is to have individuals integrate mindfulness into their everyday life as a way to become more fully aware of their affect and cognitions in the context of daily living, to practice coping with stress and anxiety, and to enhance emotional processing. MBSR has been shown to be effective for both clinical and nonclinical populations, with beneficial effects in stress and anxiety reduction, relaxation, and overall quality of life and well-being (Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004). Other forms of psychotherapy that use mindfulness includes MBCT, DBT, and ACT.

One popular variant, MBCT, combines mindfulness with Cognitive Behavioral Therapy (CBT) and focuses on preventing relapse of depression by disrupting negative thought processes and rumination, and by contrast, centers the client's attention on present moment experiences (Kang & Whittingham, 2010). DBT focuses on the acceptance component of mindfulness by teaching clients to accept the present moment, themselves, and the past, while concurrently working towards changing their behaviors and environments, whereas ACT concentrates on the nonjudgmental aspects of mindfulness by encouraging clients to experience thoughts and emotions as they are when they arise, without attempting to judge, change, or avoid them (Baer, 2003; Kang & Whittingham, 2010).

Mindfulness Interventions

In a broader contextualization, "mindfulness in contemporary psychology has been adopted as an approach for increasing awareness and responding skillfully to mental processes that contribute to emotional stress and maladaptive behavior" (Bishop et al., 2004, p. 230). Mindfulness teaches the client to view thoughts as transient mental events, as opposed to accurate concrete reflections of the self and reality, and to approach thoughts and feelings from a wider, decentered perspective. Adopting a mindful perspective does not encourage avoidance of negative thoughts and emotions, but alters the initial impact and subsequent responding. Mindfulness inhibits rumination and judgment and teaches the individual to 'just be' with the experiences for what they are in the present moment. Mindfulness in clinical settings seeks to increase insight into automatic patterns and habitual responding of the client, and how these habitual response patterns both inform and maintain emotional and cognitive distress. Clients with anxiety

or depression can change response patterns enabling greater cognitive flexibility, decreased reactivity (both mentally and affectively), and enhance emotion regulation, resulting in improved anxiety and mood symptoms (Hofmann, Sawyer, Witt, & Oh, 2010). The ability to alter habitual response patterns promotes self-observation and insight, and reduces the vulnerability of affect and cognitions becoming overwhelming, all-consuming, and even becoming debilitating in nature. Mindfulness has the ability to be a powerful tool in optimizing well-being.

The integration of mindfulness in other therapeutic modalities is beginning to emerge with the incorporation of mindfulness in art therapy, known as Mindfulness-Based Arts Therapy (Monti et al., 2013), although the literature on its efficacy and exact nature of practice is scarce. MBAT incorporates therapeutic art making with mindfulness exercises, based on MBSR programming (Monti et al., 2013). In MBAT, the mindfulness component is utilized first, for individuals to anchor themselves in the present moment, and gain awareness of any thoughts or sensations that arise. The art therapy component is expressive in nature, allowing individuals to communicate any cognitions or emotions that arose during the mindfulness experience. Parallel to MBSR, the goal of MBAT is for individuals to incorporate mindfulness skills and techniques into their everyday lives. MBAT has been shown to improve quality of life and psychosocial stress for cancer patients (Monti et al., 2013; Peterson, 2015).

Studies Exploring the Nature and Parameters of the Coloring Task to Promote Mindfulness

It is important to note that mindfulness studies often lack true control groups; instead many studies use within subjects pre- and post-comparisons to determine whether

there are any significant changes associated with the mindfulness intervention or manipulation, or more commonly, use wait-list controls or treatment-as-usual groups (Ospina et al., 2007; Reb & Atkins, 2015). Other studies report using active or passive control groups (Ospina et al., 2007; Reb & Atkins, 2015). Active control groups include relaxation training, exercise or physical activity (such as yoga, swimming, running, tai chi, etc.), educational activities on health, nutrition, or wellness, or even reading (Ospina et al., 2007). Studies with passive control groups incorporate mind-wandering exercises or mental silence (Reb & Atkins, 2015).

As noted earlier, most of the currently available information and extant literature regarding the use of coloring books in the adult population as a way to promote greater mindfulness has come from popular culture and media references, claiming their efficacy as a mindful activity, and as a means to reduce stress and anxiety. However, carefully controlled research investigating the effects of coloring on mindfulness has been scarce. Research investigating the psychological effects of engaging in an art activity, specifically coloring, has been shown to be advantageous in reducing anxiety (a positive consequence exhibited by individuals who engage in mindfulness activities) (Carsley, Heath, & Fajnerova, 2015; Curry & Kasser, 2005; Sadmire, Gorham, Rankin, & Grimm, 2012; Van Der Vennet & Serice, 2012). Participating in either a structured (e.g., coloring a mandala) or unstructured (e.g., free-form coloring or drawing) art-making activity, was found to be associated with reduced test anxiety in school children (Carsley et al., 2015) and reduced state anxiety in college students (Sandmire et al., 2012) compared to non-art activity control groups. Curry and Kasser (2005) and Van Der Vennet and Serice (2012) demonstrated that a structured coloring activity using mandalas and plaid patterns

opposed to free coloring were more efficacious in reducing anxiety. Curry and Kasser (2005) proposed that coloring mandalas and geometric designs may be similar to meditation, requiring focused attention and deep concentration, and posit that coloring the mandala or geometric design provides structure and direction that is not available with free-form coloring. This deep engagement promoted the individual to disengage from any inner chaos and negative thoughts and emotions that were currently present. Intricate designs also produce structure and direction, which according to Greenberg and Harris (2012) are necessary for a task to be considered mindful.

Research investigating the psychophysiological indices of art making has also been shown to be advantageous in reducing stress levels (another positive consequence exhibited by individuals who engage in mindfulness activities). A study by Kamal, Ray and Muniz (2016) demonstrated that cortisol levels (a stress hormone) significantly decreased when individuals engaged in a visual art making activity (e.g., collage, model clay, and coloring). Cortisol levels were measured by taking pre- and post-salvia samples, as salivary cortisol is a noninvasive biomarker and proxy measure for the experience of stress in humans. Further, there were no significant differences of change in cortisol levels based on prior art making experiences or choice of art medium. Several themes from participants' narrative responses to the art making activity emerged including: feeling relaxed, feeling pleasure/enjoyment, learning something new about one's self, feeling free from constraints, experiencing an evolving process of change in art making from initial struggle to later resolution, and having a desire to make art in the future.

Although the aforementioned studies do not specifically investigate whether coloring is a sufficient mechanism that promotes mindfulness, they demonstrate the

benefits of coloring in stress and anxiety reduction, and hypothesize as to why a structured coloring activity may be considered a mindfulness promoting activity.

Chapter Three

Purpose of the Present Study

The goal of the present study was to expand upon existing research regarding mindfulness and mindfulness-based activities, by having participants engage in either a structured coloring activity, an unstructured coloring activity, or a non-mindful control activity, to assess the effects of structured coloring activities on state mindfulness, anxiety, and stress levels. Participants completed the *Toronto Mindfulness Scale* (TMS) (Lau et al., 2006), and *State Mindful Attention Awareness Scale (MAAS)* (Brown & Ryan, 2003) to measure pre- and post- state mindfulness, the *Depression, Anxiety, and Stress Scale* (DASS 21) to measure pre- and post- anxiety and stress levels (Lovibond & Lovibond, 1995), and the *State-Trait Anxiety Inventory* (STAI) (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) as another means to assess pre- and post- anxiety.

Hypotheses

The current study investigated five hypotheses by comparing outcomes across the three experimental groups. First, it was hypothesized that participants who engaged in a structured coloring activity would have significantly greater increases in state mindfulness, as measured by the state MAAS and the TMS, than participants who engaged in either an unstructured coloring task or non-mindful control activity. No significant difference in state mindfulness were expected between participants in the unstructured coloring group and the control condition.

The second hypothesis, based on findings by Curry and Kasser (2005) and Van Der Vennet and Serice (2012), was that participants in the structured coloring group would experience significantly greater decreases in anxiety, as measured by the STAI and anxiety subscale of the DASS 21, compared to participants in the unstructured coloring group or the control condition. Third, it was hypothesized that there would be a significantly greater reduction in anxiety for participants in the unstructured coloring group compared to those in the control group. The fourth and fifth hypotheses predicted that participants in the structured coloring group would experience a significantly greater decrease in stress, as measured by the DASS 21, compared to participants in either the unstructured coloring group or the control condition, and that participants in the unstructured coloring group would have significantly greater reductions in stress levels than participants in the non-mindful control group.

Chapter 4

Method

The goal of the current study was to determine the effects of a structured coloring activity through the use of pre-printed line drawings of mandalas that could be colored in, versus an unstructured free-coloring activity and a mindless wandering control activity, on state mindfulness, state anxiety, and stress levels.

Participants

Participants (N = 215) were undergraduate students enrolled in introductory psychology courses who earned course credit for their participation in the study. Participants were randomly assigned to either the structured coloring condition (n = 69), unstructured coloring condition (n = 73), or the mindless wandering control condition (n

= 73). In each of the three conditions, there was missing or incomplete data on one or more of the outcome measures for some of the participants (n = 50). For the current study, only participants with complete and whole data were retained and used in the data analyses. The final sample included a total of 165 participants across the three conditions, with 52 participants in the structured coloring condition, 54 participants in the unstructured coloring condition, and 59 participants in the mindless wandering condition. The following demographic information pertains only to those participants retained in the final data set. Of 165 participants, 123 (74%) identified as female, 39 (24%) identified as male, and 3 (2%) participants chose not to disclose. The overall mean age of participants was 19.27 years.

Measures

State Mindful Attention Awareness Scale (MAAS) (Brown & Ryan, 2003). The state MAAS is a 5 item self-report scale designed to measure state mindfulness (Brown & Ryan, 2003). The core concepts of state mindfulness assessed by the MAAS are the short-term or current expression of openness or receptiveness, and present moment attention, awareness, and observation of what is currently taking place within and to an individual. Items are assessed on a 0 to 6 scale ranging from 0 (*not at all)* to 6 (*very much*). The state MAAS draws items from the trait form of the MAAS, a more commonly used measure of mindfulness (Brown & Ryan, 2003). A total score is calculated by reverse scoring all items and then computing an overall mean. Higher scores are indicative of greater levels of state mindfulness. The state MAAS has excellent psychometric properties with an internal consistency of $\alpha = 0.92$ (Brown & Ryan). State MAAS scores have been shown to be related to psychological well-being outcomes, such

as positive affectivity, self-esteem, and life satisfaction, and lower levels of neuroticism, depression, self-consciousness, angry hostility, and impulsiveness (Brown & Ryan, 2003). Studies of convergent and discriminant validity have shown the state MAAS to be inversely related to the Beck Depression Inventory (BDI), $r = -0.41$, $p < 0.0001$ and the STAI, $r = -0.40$, $p < 0.0001$ (Brown & Ryan, 2003) (see Appendix A).

The Toronto Mindfulness Scale (Lau et al., 2006). The TMS is a 13 item self-report questionnaire that measures state mindfulness (Lau et al., 2006). State mindfulness is conceptualized on two dimensions: *curiosity* (an attitude of awareness and openness to the present moment) and *decentering* (awareness of experience in a wider perspective without rumination on one's own thoughts and feelings). Items are measured on a 5-point scale ranging from 0 (*not at all*) to 4 (*very much*). Sample items include, "I was curious about my reactions to things," and "I was aware of my thoughts and feelings without overidentifying with them." The TMS has an internal consistency of $\alpha = 0.95$ and item-total correlation of $r = 0.53$. The curiosity factor and decentering factor have coefficient alphas of 0.88 and 0.84, respectively. Scores on the TMS are summed, with a higher score indicating greater mindfulness. Scores for each factor of curiosity and decentering can also be calculated (see Appendix B).

The TMS demonstrates good construct validity, correlating with other scales assessing facets of mindfulness (Lau et al., 2006). Both subscales of curiosity and decentering were positively and significantly correlated with measures of absorption, awareness of surroundings, reflective self-awareness, and psychological mindedness, with correlations ranging from $r = 0.16$ to $r = 0.42$. Curiosity was also significantly correlated with internal state awareness ($r = 0.41$) and self-consciousness ($r = 0.31$), and

decentering was significantly associated with openness to experience ($r = 0.23$). The correlations were significant, yet modest, indicative of the discriminant validity of the TMS relative to other related constructs. Convergent validity between state and trait mindfulness measures showed a non-significant relationship, indicating that state and trait mindfulness are in fact separate constructs (Thompson, & Waltz, 2007).

Depression, Anxiety and Stress Scale (DASS 21) (Lovibond & Lovibond, 1995). The DASS 21 is a 21 item measure assessing symptoms associated with depression, anxiety, and stress (Lovibond & Lovibond, 1995). Items are rated on a 4-point scale ranging from 0 (*never*) to 3 (*almost always)*. Internal consistency for each of the subscales in non-clinical samples of adults ranges from $\alpha = 0.88$ to $\alpha = 0.91$ for depression, $\alpha = 0.80$ to $\alpha = 0.82$ for anxiety, and $\alpha = 0.84$ to $\alpha = 0.90$ for stress (Henry & Crawford, 2005; Sinclair et al., 2012). A study assessing the concurrent validity of the DASS 21 in a sample combining clinical patients and community volunteers found the depression, anxiety, and stress subscales had correlations of $r = 0.79$, $r = 0.85$, and $r = 0.68$, with the Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), and the State-Trait Anxiety Inventory Trait Subscale, respectively (Antony, Bieling, Cox, Enns, & Swinson, 1998). Item scores on the DASS 21 are summed and multiplied by 2 for each of the subscales, with higher scores suggesting greater severity. Categorical labels can be applied to the numerical scores for clinical purposes and include normal, mild, moderate, severe, and extremely severe. Although the entire measure was administered, only the anxiety and stress subscales were considered during the data analysis (see Appendix C).

State-Trait Anxiety Inventory (STAI) Form Y (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The STAI is a 40-item self-report questionnaire that measures

state and trait anxiety in adult populations (Spielberger et al., 1983). The first 20 items pertain to state anxiety and the remaining 20 items relate to trait anxiety. For the purpose of this study, only the items pertaining to state anxiety were used. State anxiety assesses 'right now' or 'present moment' feelings such as fear, nervousness, and discomfort, and is rated on a 4-point scale from 1 (*not at all*) to 4 (*very much so*). Scores range from 20-80 with higher scores suggestive of greater anxiety levels (see Appendix D). The STAI is a psychometrically sound instrument with high internal consistencies ranging from 0.86 to 0.95 (Spielberger et al., 1983) and test-retest reliabilities of STAI trait of $r = 0.88$ (Barnes, Harp, D & Jung, 2002). Convergent validity of the STAI with other measures of anxiety and stress ranges from weak to moderately strong with correlations ranging from 0.16 to 0.64 for the STAI state subscale and 0.34 to 0.68 for the STAI trait subscale (McDowell, 2006). The strongest correlations were between both the STAI trait and state subscales and the BAI, and the STAI trait subscale and the DASS 21 (McDowell, 2006).

Procedure

Participants were randomly assigned to one of the three experimental conditions, structured coloring, unstructured coloring, or the mindless wandering control condition and completed the MAAS, TMS, DASS 21, and STAI state version pre- and post-experimental manipulation to assess for changes in state mindfulness, state anxiety, and stress levels. Each session included only one of the experimental conditions. Participants were instructed to put away electronic devices and to complete the assigned activity individually and quietly, focusing solely on their own work. These instructions parallel those used in previous studies investigating the effects of mindful coloring on anxiety (Carsley et al., 2015; Curry & Kasser, 2005; Sandmire et al., 2012). Participants were

told that it was not necessary to complete the activity within the time frame, but just to focus on the task at hand. Informing participants that completing the coloring activity was not the fundamental goal is congruent with other coloring task paradigms (Carsley et al., 2015). The instructions used in this study were designed to be informative without influencing participants as to the potential positive or negative effects of coloring on the constructs of health and well-being. (See Appendices E, F, and G for instructions for each of the three conditions.)

Experimental Groups

Structured Coloring. Participants assigned to the structured coloring activity received a printed, blank (uncolored) mandala on a piece of 8.5 X 11 inch paper (Appendix H) and a set of colored markers. All participants received the same mandala to ensure consistency and mitigate contamination due to differences in the mandalas themselves. Participants were given verbal and written instructions to color the mandala for a duration of 20 minutes (see appendix E).

Unstructured Coloring. Participants assigned to the unstructured coloring activity received a blank piece of paper (8.5 X 11 inches) and the same set of markers as participants in the structured coloring task. Participants were given verbal and written instructions to freely color the blank piece of paper for a duration of 20 minutes (see appendix F).

Mindless Wandering. Participants in the control group were instructed to engage in an unfocused attention or 'mindless wandering' activity for 20 minutes. For this task, participants received verbal and written instructions to let their mind freely wander, to not focus on anything in particular, and to just allow their thoughts to come and go (see

appendix G). Mindless wandering control groups have been used in previous research investigating mechanisms of mindfulness (Arch & Craske, 2006; Kiken & Shook, 2011).

Didactic Presentation. Experiential engagement by both the facilitator of the mindfulness exercise and participants is a primary feature of MBSR (Woods, 2009). As such, the facilitator for each of the experimental groups engaged in the coloring or control activity in order to model the behaviors and provide a contextual framework for participants. Engagement by the facilitator not only provided a contextual framework for the participants, but helped to create a safe and exploratory environment for the participants to embody the exercise.

Chapter Five

Results

The goal of the current study was to investigate the effects of coloring, structured versus unstructured coloring, against a mind wandering control condition on the psychological constructs of state mindfulness, state anxiety, and stress. To assess for changes in state mindfulness, state anxiety, and stress following the experimental manipulation, a 2 (time: pre and post) x 3 (group: structured coloring, unstructured coloring, mindless wandering) repeated measures ANOVA was conducted for each of the outcome variables of interest, with group as the between-subjects factor and time as the within-subjects factor. In all analyses considering variable outcome scores, specific subscales from the following measures were utilized: the curiosity subscale from the TMS, the decentering subscale from the TMS, the anxiety subscale from the DASS 21, the state form from the STAI, and the stress subscale from the DASS 21. Significant

ANOVAS were followed by planned pairwise comparison of group means (using *t*-tests with Bonferroni corrections, and evaluation of effect sizes using Cohen's *d*.

Preliminary Analyses

Exploratory descriptive analyses were conducted to assess means and standard deviations both pre- and post- experimental manipulation for each of the variables of interest across the three groups (see Table 1).

Table 1. *Group Means (SD) at Pre- and Post-test*

Measure	*Structured Coloring Group M (SD)*		*Unstructured Coloring Group M (SD)*		*Mindless Wandering Control Group M (SD)*	
	n = 52		n = 54		n = 59	
	Pre	Post	Pre	Post	Pre	Post
State MAAS	3.26 (1.39)	3.95 (1.48)	3.39 (1.44)	3.92 (1.38)	3.12 (1.18)	2.91 (1.38)
TMS Curiosity	12.15 (6.24)	13.48 (6.05)	8.81 (6.03)	10.93 (7.11)	11.36 (5.80)	13.75 (5.86)
TMS Decentering	12.04 (4.16)	14.21 (6.13)	9.91 (4.76)	12.51 (6.23)	12.31 (4.76)	15.25 (5.37)
DASS 21 Anxiety	8.31 (6.67)	3.81 (6.45)	7.44 (6.90)	3.56 (5.91)	7.49 (7.14)	4.98 (5.59)
STAI State	36.54 (11.13)	30.62 (10.58)	38.57 (12.05)	34.70 (13.88)	37.03 (10.60)	35.29 (11.58)
DASS 21 Stress	10.00 (7.10)	5.69 (7.12)	11.04 (7.36)	7.33 (8.98)	12.20 (8.24)	9.05 (6.92)

Pearson correlation coefficients were examined to assess for construct validity across measures and/or respective subscales purported to assess the same psychological construct (see Table 2). Correlational analyses yielded several expected results. As expected, a significant positive correlation was observed between TMS Curiosity and

TMS Decentering, the two subscales that comprise the TMS, $r = 0.570$, $n = 165$, $p < 0.01$. A significant positive correlation was observed between anxiety as measured by the DASS 21 and STAI State, $r = 0.561$, $n = 165$, $p < 0.01$. Stress, as measured by the DASS 21, was also positively significantly correlated with anxiety on both the DASS 21, $r = 0.587$, $n = 165$, $p < 0.01$, and the STAI State, $r = 0.647$, $n = 165$, $p < 0.01$. Significant negative correlations were observed between state mindfulness as measured by the state MAAS, and anxiety as measured by the DASS Anxiety subscale, $r = -0.384$, $n = 165$, $p < 0.01$, and STAI State subscale $r = -0.401$, $n = 165$, $p < 0.01$, indicating that mindfulness and anxiety are inversely related to one another, and align with the expectation that as mindfulness increases, anxiety decreases. A significant negative correlation was also observed between state mindfulness as measured by the state MAAS and stress $r = -0.446$, $n = 165$, $p < 0.01$, demonstrating the inverse relationship between mindfulness and stress, which again aligns with the expectation that as mindfulness increases, stress decreases.

Correlational analyses also revealed several unexpected results. Although the state MAAS and TMS are both purported to measure state mindfulness, significant negative correlations were observed. Specifically, the state MAAS was significantly negatively correlated with TMS Curiosity, $r = -0.193$, $n = 165$, $p < 0.05$, and TMS Decentering, $r = -0.213$, $n = 165$, $p < 0.01$. In contrast to significant negative correlations occurring between measures of stress and anxiety and state mindfulness as measured by the state MAAS mentioned above, there were significant positive correlations between stress as measured by the DASS 21 with both TMS Curiosity, $r = 0.204$, $n = 165$, $p < 0.01$, and

TMS Decentering, $r = 0.179$, $n = 165$, $p < 0.05$, which do not align with the expectation that as mindfulness increases, stress decreases.

Table 2. *Pearson correlation coefficients across measures and/or measure subscales*

Measure	*State MAAS*	*TMS Curiosity*	*TMS Decentering*	*DASS 21 Anxiety*	*STAI State*	*DASS 21 Stress*
State MAAS	--	-.193*	-0.213**	-0.384**	-0.401**	-0.446*
TMS Curiosity	-.193*	--	.570**	.112	.052	.204**
TMS Decentering	-.213**	.570**	--	.052	-.003	0.179*
DASS 21 Anxiety	-.384**	.112	.052	--	.561**	.587**
STAI State	-.401**	.052	-0.003	.561**	--	.647**
DASS 21 Stress	-.446**	.204**	0.179*	.587**	.647**	--

**p< 0.05, **p<0.01*

Pre Group Differences. One-way between-group ANOVAs were conducted to assess for any pre-existing differences in state mindfulness, state anxiety, and stress between participants randomly assigned to the structured coloring, unstructured coloring, and mindless wandering control group. One-way ANOVAs permit the same between group comparisons as *t*-test, but maintain acceptable Type 1 error rate without the inflation that would occur with multiple t-tests (Howell, 2002). One-way ANOVAs were completed by

entering each subscale or total score, when appropriate, at pre-experimental manipulation as dependent variables, and the condition (structured coloring, unstructured coloring, and mindless wandering) as the factor. The assumption of homogeneity of variance was not violated for any of the pre-group differences. Therefore, results are reported with equal variances assumed. Results revealed that the structured coloring, unstructured coloring, and mindless wandering groups did not significantly differ on any variable at pretest with the exception of the TMS for both the curiosity and decentering subscales (see Table 3). The three conditions differed significantly on TMS Curiosity $F(2, 162) = 4.511$, $p < 0.05$, partial $\eta^2 = 0.053$, at pretest, with the unstructured coloring condition ($M = 8.81$, SD = 6.03) having mean scores significantly lower than the structured coloring group ($M =$ 12.15, SD = 6.24) $t = 0.802$, $p < 0.01$, and the mindless wandering control condition ($M =$ 11.36, SD = 5.80) $t = -2.85$, $p < 0.05$. There were no significant differences between the structured coloring group and mindless wandering condition on the TMS Curiosity $t =$ 0.698, p = 0.487 at pretest. The three conditions were also significantly different on TMS Decentering $F(2, 162) = 4.519$, $p < 0.05$, partial $\eta^2 = 0.053$, at pretest, again with the unstructured coloring group ($M = 9.91$, SD = 4.76) having significantly lower scores than the structured coloring group ($M = 12.04$, SD = 4.16) $t = 2.449$, $p < 0.05$, and the mindless wandering control group ($M = 12.31$, SD = 4.76) $t = -2.675$, $p < 0.01$. There were no significant differences at pretest between the structured coloring group and mindless wandering group on the TMS Decentering $t = -0.312$, $p = 0.755$ at pretest. The three groups did not significantly differ on any other variable at pretest (see table 3).

Table 3. *One-way ANOVA comparing structured coloring (n = 52), unstructured coloring (n = 54), and mindless wandering (n = 59) groups at pretest on state mindfulness, state anxiety, and stress variables.*

Measure	*Structured Coloring Group M (SD)*	*Unstructured Coloring Group M (SD)*	*Mindless Wandering Group M (SD)*	*MS*	*F*	*p*	*ηp2*
State MAAS	3.26 (1.39)	3.39 (1.43)	3.12 (1.18)	1.086 1.782	0.609	0.545	0.007
TMS Curiosity	12.15 (6.24)	8.81 (6.03)	11.36 (5.80)	163.130 36.163	4.511	0.012*	0.053
TMS Decentering	12.04 (4.16)	9.91 (4.76)	12.31 (4.76)	94.807 20.981	4.519	0.012*	0.053
DASS21 Anxiety	8.31 (6.67)	7.44 (6.90)	7.49 (7.14)	12.555 47.822	0.263	0.769	0.003
STAI State	36.54 (11.13)	38.57 (12.05)	37.03 (10.60)	134.407	1.538	0.218	0.019
DASS 21 Stress	10.00 (7.10)	11.04 (7.36)	12.20 (8.24)	67.421 57.849	1.165	0.314	0.014

Main Analyses

State Mindfulness. The first hypothesis was that participants who engaged in a structured coloring activity would have significantly greater increases in state mindfulness, as measured by the state MAAS and TMS, than participants who engaged in either the unstructured coloring activity or the mindless wandering control task. No significant difference in state mindfulness were expected between participants in the

unstructured coloring group and control condition. The results of the repeated measures ANOVA for state mindfulness as measured by the state MAAS revealed a significant main effect of time, $F(1,162) = 7.811$, $p < 0.01$, partial $\eta^2 = 0.046$, and a significant group by time interaction effect $F(2,162) = 5.380$, $p < 0.01$, partial $\eta^2 = 0.062$. Pairwise comparisons revealed a significant pretest to posttest difference between participants in the structured coloring condition and mindless wandering control condition, $p < 0.05$ and participants in the unstructured coloring condition and mindless wandering control condition, $p < 0.05$. Follow-up analyses revealed a significant increase in state mindfulness from pretest to posttest for both structured coloring, $t = -3.063$, $p < 0.01$, $d = 0.48$, and unstructured coloring, $t = -2.479$, $p < 0.05$, $d = 0.38$, and a nonsignificant decrease in state mindfulness for mind wandering, $t = 1.083$, $p = 0.283$ as measured by the state MAAS (see Table 4) (see Figure 1).

Table 4. *Follow-up t-tests from pre- to post-test for state MAAS.*

Condition	*Pre M (SD)*	*Post M (SD)*	*t*	*p*	*Cohen's d*
Structured Coloring	3.26 (1.39)	3.95 (1.48)	-3.063	0.003*	0.48
Unstructured Coloring	3.39 (1.43)	3.92 (1.38)	-2.479	0.016*	0.38
Mind Wandering	3.12 (1.18)	2.91 (1.38)	1.083	0.283	N/A

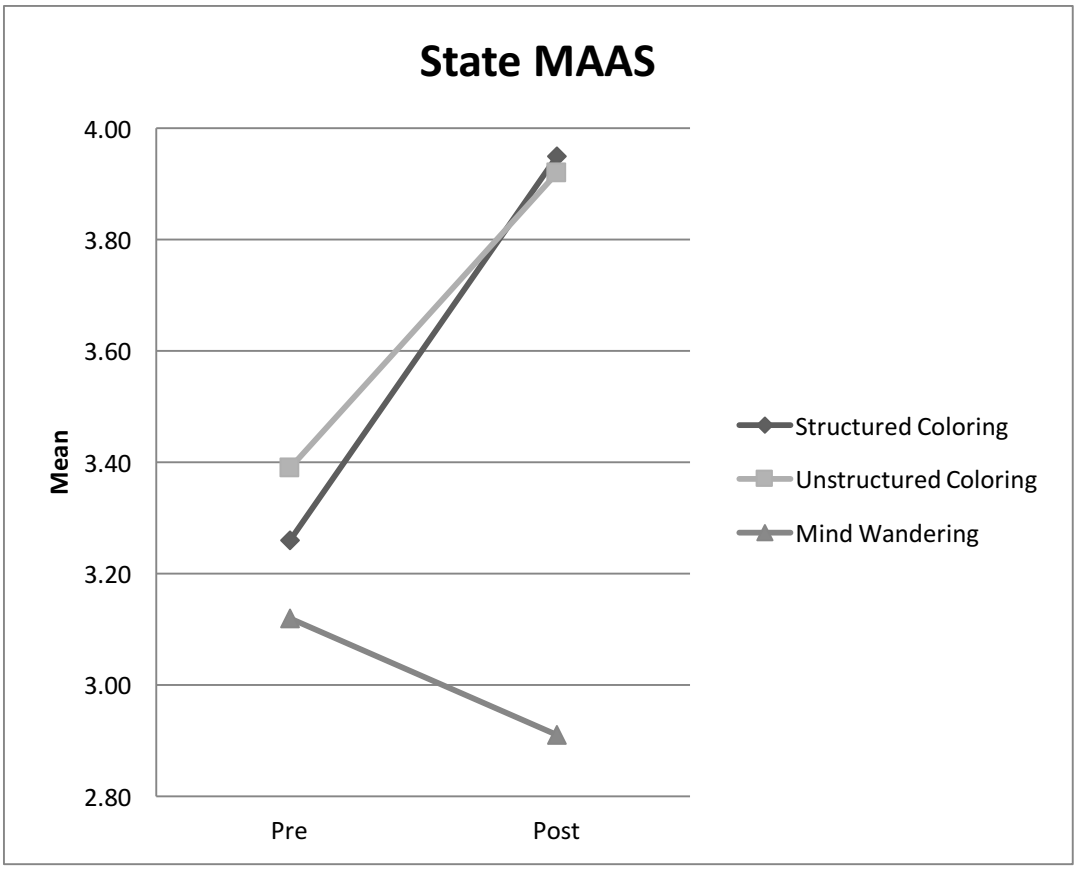

Figure 1. *Pre- and post- mean state MAAS scores for structured coloring, unstructured coloring, and mind wandering groups.*

The TMS is broken down into two subscales, Curiosity and Decentering. Results of the repeated measures ANOVA for both TMS Curiosity and TMS Decentering did not corroborate the mindfulness findings as measured by the State MASS. For TMS Curiosity, there was a significant main effect for time, $F(1, 162) = 18.240$, $p < 0.001$, partial $\eta^2 = 0.101$, but a non-significant group by time interaction effect $F(2, 162) = 0.484$, $p = 0.617$, partial $\eta^2 = 0.006$. Follow-up analyses revealed a nonsignificant increase in state mindfulness as measured by TMS Curiosity from pretest to posttest for structured coloring, $t = -1.787$, $p = 0.08$, $d = 0.22$. There was significant increase in state mindfulness from pretest to posttest for unstructured coloring, $t = -2.320$, $p = 0.024$, $d =$

0.22, and mindless wandering, $t = -3.407$, $p < 0.001$, $d = 0.41$, as measured by TMS Curiosity. Similarly, for TMS Decentering, there was a significant main effect for time, $F(1, 162) = 35.066$, $p < 0.001$, partial $\eta^2 = 0.178$, and a nonsignificant group by time interaction effect, $F(2, 162) = 0.267$, $p = 0.766$, partial $\eta^2 = 0.003$. Follow-up analyses revealed a significant increase in state mindfulness from pretest to posttest as measured by TMS Decentering with small to medium effect sizes for structured coloring, $t = -2.704$, $p = 0.009$, $d = 0.41$, unstructured coloring, $t = -3.091$, $p = 0.003$, $d = 0.47$, and mindless wandering, $t = -4.794$, $p < 0.001$, $d = 0.60$.

State Anxiety. It was hypothesized that participants who engaged in the structured coloring activity would experience significantly greater decreases in state anxiety, as measured by the STAI and DASS 21, than participants who engaged in the unstructured coloring activity or mindless wandering control group. Further, it was hypothesized that there would be a significantly greater reduction in anxiety for participants in the unstructured coloring group than participants in the control group. The results of the repeated measures ANOVA for state anxiety as measured by the STAI State form, revealed a significant main effect of time $F(1, 162) = 26.324$, $p < 0.001$, partial $\eta^2 = 0.140$, and a nonsignificant group by time interaction, $F(2, 162) = 2.613$, $p = 0.076$, partial $\eta^2 = 0.031$. Follow-up analyses revealed a significant decrease in state anxiety as measured by the STAI State form from pretest to posttest with small to medium effect sizes for both structured coloring, $t = 4.443$, $p < 0.001$, $d = 0.545$, and unstructured coloring, $t = 3.292$, $p = 0.002$, $d = 0.30$. There was not a significant decrease in state anxiety as measured by the STAI State form for participants in the mindless wandering group, $t = 1.285$, $p = 0.204$, $d = 0.16$ from pretest to posttest (see Figure 2).

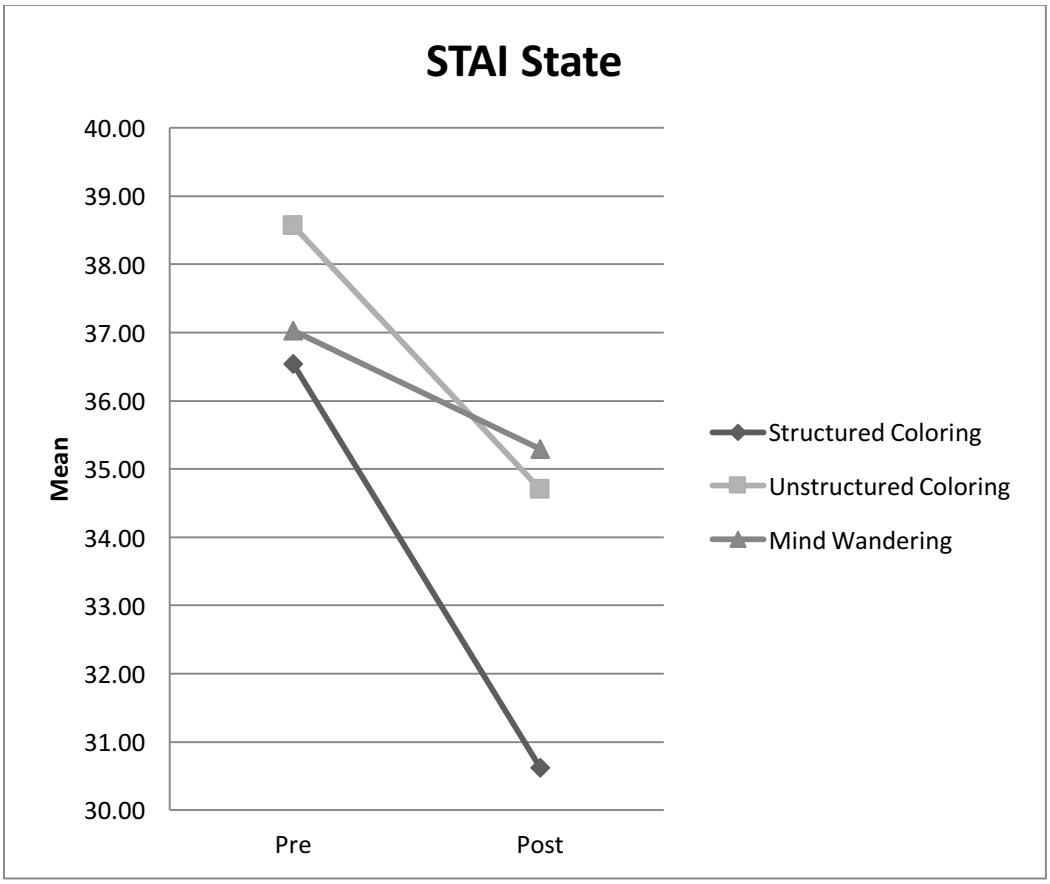

Figure 2. *Pre- and post- mean STAI state scores for structured coloring, unstructured coloring, and mind wandering groups.*

The results of the repeated measures ANOVA for state anxiety as measured by the DASS 21 Anxiety subscale, however, revealed only a significant main effect of time $F(1, 162) = 56.013$, $p < 0.001$, partial $\eta^2 = 0.257$, and a nonsignificant group by time interaction, $F(2, 162) = 1.508$, $p = 0.224$, partial $\eta^2 = 0.018$. Follow-up analyses revealed a significant decrease in anxiety as measures by the DASS 21 Anxiety subscale with small to medium effect size across for structured coloring, $t = 4.700$, $p < 0.001$, $d = 0.69$, unstructured coloring, $t = 5.702$, $p < 0.001$, $d = 0.60$, and mindless wandering, $t = 4.225$, $p = 0.005$, $d = 0.39$ from pretest to posttest.

Stress. Lastly, it was hypothesized that participants who engaged in the structured coloring activity would experience a significantly greater decrease in stress, as measured by the DASS 21, than participants who engaged in the unstructured coloring activity or mindless wandering control task, and participants in the unstructured coloring group would have significantly greater reductions in stress levels than participants in the mindless wandering control group. With respect to stress, there was a significant main effect of time $F(1, 162) = 41.946$, $p < 0.001$, partial $\eta^2 = 0.206$, and a nonsignificant group by time interaction, $F(2, 162) = 0.340$, $p = 0.713$, partial $\eta^2 = 0.004$. Follow-up analyses revealed a significant decrease in stress from pretest to posttest with small to medium effect sizes for structured coloring, $t = 4.283$, $p < 0.001$, $d = 0.61$, unstructured coloring, $t = 3.951$, $p < 0.001$, $d = 0.46$, and mindless wandering, $t = 3.073$, $p = 0.003$, $d = 0.41$.

Chapter Six

Discussion

The purpose of the present study was to determine the effects of a structured coloring activity, using mandalas, versus an unstructured free-coloring activity and a mindless wandering control activity on state mindfulness, state anxiety, and stress levels. The effects of coloring versus mind wandering on state mindfulness led to somewhat mixed results. Contrary to the initial prediction, participants who either colored a mandala or who engaged in a free coloring activity both had significant increases in state mindfulness, whereas participants who engaged in the mind wandering task had nonsignificant decreases in state mindfulness - when state mindfulness was measured by the state MAAS. This finding, however, was not corroborated when state mindfulness

was measured by the TMS. Regardless of activity, state mindfulness measured by the TMS as a function of curiosity and decentering increased for participants who either colored a mandala, freely colored, or just sat quietly and allowed their thoughts to come and go.

The effects of coloring versus mind wandering on anxiety were also contradictory to initial predictions. When measured by the STAI, significant decreases in anxiety were reported by participants only in the structured and unstructured coloring activity, whereas participants who engaged in the mind wandering activity had nonsignificant marginal decreases in anxiety. However, when measured by the DASS 21, significant decreases in anxiety were reported by all participants, regardless of whether they engaged in either the structured coloring, unstructured coloring, or mind wandering task. These results contradict previous findings of structured versus unstructured coloring activities after an anxiety induction (Curry & Kasser, 2005; Van Der Vennet & Serice, 2012), in which it was found that participants had significant decreases in anxiety when coloring in a mandala or structured plaid design compared to participants who freely colored. Although Curry and Kasser (2005) proposed that coloring a mandala has a meditative-like quality that provides direction and structure that is not inherent with free form coloring and accounts for the differences in anxiety reduction, this pattern of results was not found with the current study. Possible explanations are addressed in the limitation section. Lastly, significant reductions in stress were experienced across all three activities, regardless of whether participants colored a mandala, freely colored, or allowed their mind to wander, which were again contrary to original predictions.

The findings from the present study suggest implications concerning the effectiveness of structured coloring (and adult coloring books) on mindfulness, stress and anxiety. Adult coloring books are marketed using phrases including "mindfulness," "calm," and "stress relieving." Prior work by Curry and Kasser (2005) and Van Der Vennet and Serice (2012) would support the notion that adult coloring books provide a quality of structure and direction that specifically works to induce attention and awareness leading to a reduction in anxiety and a possible an increase in mindfulness. Results of the present study, however, do not support these findings and raise questions as to the efficaciousness of adult coloring books. One possible explanation to the findings noted above and contradictions to previous research, is the idea of the power behind allowing individuals the time and space to "not worry;" where they are able to sit in a quiet space, with similar others, and engage in an activity that has minimal negative consequences or future ramifications. The results of the current study strongly suggest that the increases in state mindfulness, and decreases in stress and anxiety may not be attributable to the specific activity itself (e.g., coloring versus mind wandering), and more about the cultivation of a type of environment that encourages individuals to take a pause from their everyday lives including daily hassles and struggles, and gives them the permission to do so.

Limitations and Suggestions for Future Research

Several important limitations of the present study should be addressed by future research. The first major limitation of the study was the poor, and in fact, inverse relationship between the TMS and state MAAS. Although both measures are purported to measure state mindfulness, current findings indicated otherwise, with both subscales of

the TMS being significantly negatively related to the state MAAS. This unexpected finding was further substantiated by the small, but significant positive correlations between the curiosity and decentering subscales of the TMS and the measures of stress and anxiety, which contradicts the expected relationship that as mindfulness increases, stress and anxiety decreases. This result was not found between the state MAAS and measures of stress and anxiety, which were negatively correlated, and aligns with the expectation that as mindfulness increases, stress and anxiety decreases, and lends credence to using the state MAAS as a better measure of state mindfulness. The discrepancy between the TMS and state MAAS also helps to explain the mixed results found between participants in the mind wandering group when their state mindfulness was measured with the TMS opposed to the state MAAS. This raises questions regarding the construct validity of the TMS, despite studies supporting its psychometric properties (Lau et al., 2006). Future research should focus on evaluating the construct validity of the TMS as a measure of state mindfulness, as well as the convergent validity between the TMS and other measures of state mindfulness, including the state MAAS.

Discrepancies in findings between the TMS and state MAAS may also stem from differences in how items between the two measures are phrased, and subsequently interpreted. Research findings have demonstrated that Western mindfulness training, as opposed to Eastern mindfulness practice, may change how individuals relate to concepts embedded within mindfulness such as “attention” or “awareness,” and are subject to different interpretations (Rau & Williams, 2016). Measures that use a word or phrase that is subject to interpretation beyond the lay interpretation, may have different connotations and inadvertently render different results based on varying levels of exposure to

mindfulness practice and experiences (Rau & Williams, 2016). Results of one study found that the ambiguity used to describe mindfulness, including experiencing, noticing, and judging, led to unstable interpretations of questionnaire items (Rau & Williams, 2016). The mixed, and even antithetical, results of the current study suggest that closer inspection of item phrases and ambiguity of words on the TMS and state MAAS is warranted.

A second limitation of the current study lies in the wording of instructions in the mindless wandering activity group, which may have been more "mindful inducing" than anticipated. Although the intention was to have participants focus on and potentially perseverate or ruminate on their thoughts from the past or future, as opposed to being "fully present" in the current moment, the instructions told participants to "… just allow your thoughts to come and go without trying to focus on anything specifically," which is analogous to thought defusion techniques often used in many mindfulness based therapy approaches such as ACT (Harris, 2009). Replication of the present study with minor adjustments to the instructional phrases used for participants in the mind wandering condition may produce different results with participants in mind wandering conditions having significant decreases in state mindfulness.

Another potential limitation of the mind wandering group comes from the relatively new distinction between intentional versus unintentional mind wandering (Seli, Risko, & Smilek, 2016), and the associated consequences when mind wandering is used as a control activity. Mind wandering was originally conceptualized as "a situation in which executive control shifts away from a primary task to the processing of personal goals. Mind-wandering shares certain similarities with standard views of controlled

processing, however, there is an important difference. Controlled processing is generally associated with the intentional pursuit of a goal. Mind-wandering, however, often occurs without intention … or even awareness that one's mind has drifted" (Seli et al., 2016). Drawing from this definition, many researchers instinctively assume that mind wandering is an unintentional task. Seli et al., (2016) propose, however, that mind wandering can either be unintentional, the uncontrolled process that happens spontaneously and seemingly without our awareness, or intentionally, such as when being instructed to do so. As such, intentional mind wandering seems to be associated with awareness, a key component of mindfulness, whereas unintentional mind wandering is not associated with the same sense of awareness. If in fact mind wandering is associated with both intention and awareness, it may be more mindful and less mindless than initially conceived, and may serve as a potential explanation for the increases in state mindfulness and decrease in stress and anxiety witnessed in participants in the mind wandering control group. Future research investigating intentionality and awareness of mind wandering is needed.

Relatedly, the mind wandering instructions in the present study were relatively vague. Participants had the flexibility to focus on thoughts related to the present moment, or that were more past or future oriented. Seli et al., (2016) have also proposed that intentional mind wandering may be associated with either future-oriented thinking, with associated benefits in self-reflection and autobiographical planning, or positive thinking because it requires willful engagement. The results of the present study showed that participants who engaged in the mind wandering task had decreases in both stress and anxiety. One of the key features of anxiety disorders is unwarranted fear and anxiety about the anticipation of future events (American Psychiatric Association, 2013),

therefore, if intentional mind wandering does lead to future-oriented thinking, it may be that participants were focused on more positive than negative thoughts, explaining the decreases in stress and anxiety in the present results. Future research investigating the content of intentional thoughts in mind wandering tasks is needed before any firm conclusions can be drawn.

The final limitations addressed here are the generalizability of the results and the use of self-report measures in the current study. The sample of participants in the present study consisted of undergraduate students, similar in age and education level, which does not provide a representative sample of the population in general, or its applicability to unique samples of individual such as in mental health and forensic settings, its applicability across the lifespan, and experienced versus novice meditators. Coloring activities present a multitude of avenues for changing mindfulness, stress, and anxiety levels. For example, mindful coloring may open the door to other mindfulness activities such as meditation, and help to cultivate increases in both state and trait mindfulness levels. With regard to anxiety and stress, structured coloring activities, such as adult coloring books, may provide longer-term benefits for individuals with anxiety disorders, and be useful in reducing other stress-related problems. The current study also relied on self-report measures of mindfulness, anxiety, and stress, which are subject to various flaws and response biases. It would be useful to include psychophysiological indices and neurological correlates to assess for changes in mindfulness, stress, and anxiety levels before, during, and after the coloring and mind wandering tasks. Expanding the current research to other settings and incorporating measurements beyond self-report is highly recommended.

Conclusion

In conclusion, present findings attempted to demonstrate the effects of a structured coloring activity versus an unstructured coloring activity and mind wandering activity on state mindfulness, state anxiety, and stress levels. Although present findings were mixed, this study sheds light onto the potential benefits that art making activities can afford, and the necessity for future research to be conducted using unique populations, incorporating physiological and neurological correlates as biomarkers, and investigating the differences between intentional versus unintentional mind wandering. Mindful art activities are just one of many potential means of increasing mindfulness and improving overall psychological health and well-being that requires continued research and practice.

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Appendix A
State Mindful Attention Awareness Scale

Instructions: Using the 0-6 scale shown, please indicate to what degree were you having each experience described below over the past activity. Please answer according to what really reflected your experience rather than what you think your experience should have been.

	Not at All			Some What			Very Much
1. I was finding it difficult to stay focused on what was happening.	0	1	2	3	4	5	6
2. I was doing something without paying attention.	0	1	2	3	4	5	6
3. I was preoccupied with the future or the past.	0	1	2	3	4	5	6
4. I was doing something automatically, without being aware of what I was doing.	0	1	2	3	4	5	6
5. I was rushing through something without being really attentive to it.	0	1	2	3	4	5	6

Appendix B

Toronto Mindfulness Scale

Instructions: We are interested in what you just experienced. Below is a list of things that people sometimes experience. Please read each statement. Next to each statement are 5 choices: "not at all," "a little," "moderately," "quite a bit," and "very much." Please indicate the extent to which you agree with each statement. In other words, how well does the statement describe what you just experienced, just now?	**Not at All**	**A Little**	**Mode rately**	**Quite a Bit**	**Very Much**
1. I experienced myself as separate from my changing thoughts and feelings.	0	1	2	3	4
2. I was more concerned with being open to my experiences than controlling or changing them	0	1	2	3	4
3. I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings, or sensations.	0	1	2	3	4
4. I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the ways things 'really' are.	0	1	2	3	4
5. I was curious to see what my mind was up to from moment to moment.	0	1	2	3	4
6. I was curious about each of the thoughts and feelings I was having	0	1	2	3	4
7. I was receptive to observing unpleasant thoughts and feelings without interfering with them.	0	1	2	3	4
8. I was more invested in just watching my experiences as they arose, than in figuring out what they could mean.	0	1	2	3	4
9. I approached each experience by trying to accept it, no matter whether it was pleasant or unpleasant.	0	1	2	3	4
10. I remained curious about the nature of each experience as it arose.	0	1	2	3	4
11. I was aware of my thoughts and feelings without overidentifying with them.	0	1	2	3	4
12. I was curious about my reactions to things.	0	1	2	3	4
13. I was curious about what I might learn about myself by just taking notice of what my attention gets drawn to.	0	1	2	3	4

Appendix C

Depression, Anxiety, and Stress Scale (DASS 21)

Instructions

Please read each statement and circle a number 0, 1, 2, or 3 which indicates how much the statement applied to you over the previous experience. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 – Did not apply to me at all – NEVER

1 – Applied to me some degree, or some of the time – SOMETIMES

2 – Applied to me a considerable degree, or a good part of the time – OFTEN

3 – Applied to me very much, or most of the time – ALMOST ALWAYS

	N	S	O	AA
1. I found it hard to wind down	0	1	2	3
2. I was aware of dryness of my mouth	0	1	2	3
3. I couldn't seem to experience any positive feeling at all	0	1	2	3
4. I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5. I found it difficult to work up the initiative to do things	0	1	2	3
6. I tended to over-react to situations	0	1	2	3
7. I experiences trembling (e.g. in the hands)	0	1	2	3
8. I felt that I was using a lot of nervous energy	0	1	2	3
9. I was worried about situation in which I might panic and make a fool of myself	0	1	2	3
10. I felt that I had nothing to look forward to	0	1	2	3
11. I found myself getting agitated	0	1	2	3
12. I found it difficult to relax	0	1	2	3
13. I felt down-hearted and blue	0	1	2	3
14. I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15. I felt I was close to panic	0	1	2	3
16. I was unable to become enthusiastic about anything	0	1	2	3
17. I felt I wasn't worth much as a person	0	1	2	3
18. I felt I was rather touchy	0	1	2	3
19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	0	1	2	3
20. I felt scared without any good reason	0	1	2	3
21. I felt that life was meaningless	0	1	2	3

Appendix D

State-Trait Anxiety Inventory

SELF-EVALUATION QUESTIONNAIRES
Form 1

Please provide the following information:

Age _____ Gender_____ Date_____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *feel right now*, that is, at *this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm ……	1	2	3	4
2. I feel secure ……	1	2	3	4
3. I am tense ……	1	2	3	4
4. I feel stained ……	1	2	3	4
5. I feel at ease ……	1	2	3	4
6. I feel upset ……	1	2	3	4
7. I am presently worrying over possible misfortunes ……	1	2	3	4
8. I feel satisfied ……..	1	2	3	4
9. I feel frightened ……	1	2	3	4
10. I feel comfortable ……..	1	2	3	4
11. I feel self-confident……	1	2	3	4
12. I feel nervous ……	1	2	3	4
13. I am jittery ……	1	2	3	4
14. I feel indecisive ……	1	2	3	4
15. I am relaxed……..	1	2	3	4
16. I feel content …….	1	2	3	4
17. I am worried ……	1	2	3	4
18. I feel confused ……..	1	2	3	4
19. I feel steady ……..	1	2	3	4
20. I feel pleasant ……	1	2	3	4

Appendix E

Instructions

Structured Coloring Activity Group
"For the next 20 minutes, you will complete a coloring activity. The following page contains a pre-drawn geometric pattern, called a mandala, which will be used for the coloring exercise. You may choose to color in the design however you wish.

During this time, please settle into a comfortable position, put away all distractions, turn off cellphones, and remain quiet. The goal of this activity is not to necessarily finish coloring the mandala, but to just engage in the activity in front of you. If you notice your attention wanders off, simply bring your mind back to the activity in front of you.

You may now turn to the next page and begin."

Appendix F

Instructions

Unstructured Coloring Activity Group
"For the next 20 minutes, you will complete a coloring activity. The following page contains a blank white piece of paper, allowing you the option to choose what you wish to color for this activity.

During this time, please settle into a comfortable position, put away all distractions, turn off cellphones, and remain quiet. The goal of this activity is not to necessarily finish coloring or drawing anything, but to just engage in the activity in front of you. If you notice your attention wanders off, simply bring your mind back to the activity in front of you.

You may now turn to the next page and begin."

Appendix G

Instructions

Mindless Wandering Activity Group
"For the next 20 minutes, sit comfortably and allow your mind to freely wander. During this activity simply think about whatever comes to mind. Let your mind wander freely without trying to focus on anything in particular.

During this time, please settle into a comfortable position, put away all distractions, turn off cellphones, and remain quiet. During this activity, please keep your eyes open and direct your attention to your thoughts. It is important to remember that the goal of this activity is to just allow your thoughts to come and go without trying to focus on anything specifically."

You may now begin."

Appendix H

Mandala