Art as a Stress Reduction Tool

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Abstract

Research has found that participating in an artistic activity can reduce clinical and nonclinical levels of stress. Unfortunately, many schools have chosen to cut art programs due to financial restraints and policy changes. By taking away opportunities for students to learn about art and participate in the creation of art using different mediums, students could be losing the chance to develop healthy coping mechanisms to deal with every day stress. This study looked at the effect that completing nine coloring assignments over the course of three weeks, compared to a control group who viewed videos, had on non-clinical levels of reported stress in 55 students who attended a small liberal arts college in Southeastern Ohio.
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In the past decade, drastic changes in federal and state spending have negatively impacted the amount of money allocated to public schools in the United States. This budgetary cut in addition to new federally mandated standards and laws were introduced at the beginning of this century, and these changes forced schools to reevaluate the academic programs they offered (Peterson et al., 2016; Sabol, 2013). For many public schools, the choice was to reduce the size of their art departments and limit the number of art courses offered (Sabol, 2013). With the diminished opportunity to participate in art courses, students are losing out on opportunities to be creative which could prevent them from learning healthy stress management skills.

Results from an extensive study of 349 public schools found that from 2001 to 2008, the amount of time student’s spent participating in art courses was reduced by 16%. However, there was an increase in other programs. For instance, students spent 45% more of their time reading in the classroom (McMurrer, 2008). Today, public schools place an emphasis on careers in the STEM fields (science, technology, engineering and math), which is explained by the increased time that students spend on these courses in addition to the increased monetary funding that to these educational programs receive (Urbanski, 2012).

Shrinking art programs offered to students in the classroom could have a negative long-term effect. When an individual participates in creative activities they experience positive increases in their emotions. This can enhance their sense of psychological well-being (Wilkinson & Chilton, 2013). Research found that having high levels of psychological well-being can be a protective factor against the development of psychopathology (Weiss et al., 2016). Stress is a major factor that can negatively impact one’s psychological well-being (Nurius et al., 2015).
Stress

Lazarus defined stress as a continuum of emotional arousal that constantly fluctuates due to internal and external factors. This process has been described as a transactional approach, and begins with one appraising a situation. If an individual perceives a situation as a threat, but doesn’t feel that they have the skills or ability to cope with that threat, they experience negative physiological sensations which they label as stress (Lazarus, 1966). Levels of stress range in severity based on situational and individual differences, which means that reactions to one situation can be wide ranging between two people (Lusky, 2008).

Experiencing extreme or chronic stress can lead to serious physiological and emotional illnesses. Physiologically, stress activates the hypothalamic-pituitary-adrenal axis (HPA). When activated, the HPA sends a message to the sympathetic nervous system (SNS) which increase one’s heart rate and triggers the adrenal glands to release hormones. Stress also activates the ACTH which releases cortisol, a hormone associated with the experience of stress (Akoury, 2014). In large amounts, these hormones can have negative consequences.

The physiological impact of stress goes beyond the release of hormones. For instance people who experienced stress were more likely to contract communicable diseases because stress suppresses the immune system (Schneiderman et al., 2005). Stress has been linked to the worsening of heart conditions, and has even led to lethal cardiac arrhythmia in people of all ages (Schneiderman et al., 2005; “Type A Behavior”, 2008). The development of psychopathology could be another consequence of stress. Anxiety and depression are disorders that can develop or worsen during extended or extreme times of stress. Mood disorders and post-traumatic stress disorder were common diagnosis associated with people who experienced trauma or chronic stress (Schneiderman et al., 2005).
**Gender and Stress**

An international survey conducted for the World Health Organization (WHO) by Currie et al. (2008) found that there were overall differences in the levels of stress reported between males and females in European and North American countries. This survey concluded that 15 year-old females reported the highest levels of stress compared to their peers, often due to school related burdens. Females aged 11 to 15 were more likely to report psychosomatic symptoms related to stress, such as headaches and sleep issues, versus males in this age group (Currie, 2008). Another study found that males were more likely to experience higher levels of stress than females from situational events, like fights with teachers or their parents (Murberg & Bru, 2004). Both studies indicated that females became more stressed by internalized beliefs and males became more stressed by external events.

While there were some clear differences in the causes of stress for males and females, there were some similarities such as the progression and worsening of stress as males and females entered puberty. Both genders had an increase in stress levels if they had poor relationships with their peers, lived in a negative environment, or experienced pressure within school. External factors, like positive peer relationships and supportive families, could help adolescents cope with the high levels of stress they often experienced (Currie et al., 2008). Since student populations are the most monitored and supervised population, tools to cope with and manage stress levels could easily be taught in school systems to help prevent the negative physiological symptoms associated with stress.

**Student Populations and Stress**

Experiencing chronic or extreme stress at an early age can have lifelong consequences because stress can permanently alter the neurological structure and chemical functioning of the
brain. A study by Klein et al., (2013) provided an overview of research that outlined the potential psychological consequences caused by extreme stress in childhood due to severe neglect, and the immediate and long term effects it had on children. These children demonstrated emotional and behavioral problems if they didn’t receive intervention. Many were diagnosed with disorders such as post-traumatic stress disorder, oppositional defiant disorder, attachment disorders, or attention deficit disorder (Klein, Gorter, Rosenbaum, 2013). Other common symptoms seen in children who experienced extreme stress in early childhood were the inability to produce appropriate emotional reactions to situations, difficulty with concentration, and difficulty forming appropriate relationships with others (Thompson, 2014).

To determine the long term effects of stress in a population of elementary school children, a two year longitudinal study was conducted by Morales and Guerra (2006). They examined the role that stressful experiences within the student’s school, family, and neighborhood had on their school achievement, levels of depression, and levels of displayed aggression. The sample consisted of 1,745 elementary students, aged 6-11, who lived in urban areas. Children who experienced extreme stress on the initial sample, determined through self-reports by the children and interviews with the teacher, were more likely to be depressed two years later. In addition to experiencing depression, these students’ grades were worse than their peers and many demonstrated aggressive behaviors. While there were no significant differences found between the sources of stress, the researchers determined that the chronic accumulation of one specific external stressor had the greatest impact on a child’s long-term health (Morales & Guerra, 2006). This research suggested that stress at a young age could have long-term consequences on academic success in addition to behavioral, social, and emotional consequences.
Laftman, Almquist, and Ostberg (2013) conducted interviews with 49 eighth grade students who attended a school in Stockholm, Sweden to identify any common factors that evoked stress. Three major themes of school-performance stress were identified through this research. The first stress theme identified was seen in students with high personal aspirations and long term goals. The second influence on stress came from external expectations; specifically, students with parents or teachers who had high expectations for the student. The third stress theme that emerged was the high performing context, which described students who were competitive, proud of their school’s high performance culture, and were often stressed when others around them were stressed. The high performing context was a common theme reported by females in this study (Laftman, Almquist, & Ostberg, 2013). This research supports previously reported findings that individual and environmental cues create uniquely different reactions to stressful situations for every individual.

School was found to be a major source of stress in an older, young adult population of students. Lin and Yusoff (2013) researched the different aspects of school that elicited the most stress on a population of 19 year old students from six different high schools in Malaka, Malaysia during an examination week. Participants completed a questionnaire which had them rank a twelve item list from the most stress inducing items to the least stress inducing items. Student’s reported that the fear of not getting into a university, school examinations, the expectation to know too much, and getting poor grades on courses as the top four sources of stress. Of the 382 participants in this research, 47.6% responses revealed high levels of psychological distress (Lin & Yusoff, 2013). This research was conducted during a stress evoking time period, examinations, so further research should be conducted at different time
periods and on different student populations to determine if these stress provoking situations will consistently be found.

Looking at a population of college students, Peer et al. (2015) interviewed 20 students, aged 18-24 years, who attended a public university in the Midwest. This qualitative research asked participants three questions to identify the different consequences of stress that affected them as students, and to determine if these young adults felt they had the skills to cope with the stressful experiences they encountered. Analyzing their responses, the researchers identified four common sources of stress these young adults experienced: personal relationships, family relationships, finances, and school. Fortunately, 60% of these college students felt that they were able to manage their stress levels and reported healthy coping mechanisms when they experienced stress, like exercising or socializing with friends when stressed. Conversely, 40% of the participants reported that they were unable to cope with stressful situations. Many of these participants reported being constantly worried, which they believed predisposed them to even higher levels of stress. When participants were unable to manage their stress, they reported a variety of physical and mental health effects such as sleeping issues, stomach pains, appetite changes, depressed mood, and concentration difficulties (Peer, Hillman, & Hoet, 2015). In order to prevent the development of serious psychological disorders that chronic stress can cause people, stress management techniques should be taught to people and the school system could be the perfect environment to provide these preventative tools at an early age.

**Art as a Tool for Stress Reduction**

Art as a therapeutic tool has been used successfully to treat a variety of symptoms associated with mental illness, especially for those who suffer from anxiety disorders, a group of disorder that are often worsened by stress (Slayton et. al, 2010). Reynolds, Nabors, and Quinlan
(2000) conducted a meta-analysis of 17 articles published on MEDLINE and PsycINFO before 2000. The research evaluated in this analysis included experiments with wide ranging age groups, experiments that included males and females, experiments with participants diagnosed with various physical and mental disorders, and experiments that included inpatient and outpatient research. Three different research designs were assessed in this meta-analysis, and eight experiments found significant effects which supported the positive effects of art therapy (Reynolds, Nabors, & Quinlan, 2000). Slayton et al. (2010) conducted a meta-analysis which looked at research conducted between 1999 and 2007 to determine how the field of art therapy had positively progressed since Reynolds et al. (2000) meta-analysis. Using the same research parameters as Reynolds et al., (2000), Slayton et al. (2010) found 35 studies that there was a clear growth in the number of experimental trials that utilized random assignment. However, researchers for this review believed that more research should be conducted to provide better data that could statistically support the benefit of art therapy (Slayton et al., 2010). These two meta-analyses helped validate art as a therapeutic tool that could be used to help children, adults, or families suffering from a number of different disorders.

There are a variety of art mediums that have been used in therapy. Specifically focusing on art mediums utilized for stress reduction, there are artistic tasks and mediums that fall into the performing and visual arts which have been utilized to reduce stress in clinical and non-clinical populations. Drawing and painting was found to help reduce internalizing problems, like anxiety, which are often worsened by stress (Bazargan & Pakdaman, 2016). Participation in other art mediums, like clay modeling or collage making, reduced anxiety states in college students even after one thirty minute assignment (Sandmire et al., 2012). As stated previously, the inability to cope with stressful situations can worsen the physiological and psychological
symptoms associated with many disorders. For this reason, it is especially important for clinical populations to find healthy stress management techniques that work for them (Connor-Smith & Compas, 2002). The success of varying art mediums to help people suffering from mental illnesses would allow people with different interests and abilities to participate in a stress reducing artistic activities.

Focusing on the visual arts as a therapeutic tool, Bazargan and Pakdaman (2016) researched the effect that participating in six art assignments had on a population of 60 Iranian females that were 14 to 18 years old. Participants completed the Achenbach System of Empirically Bases Assessment (ASEBA) which determined any social, emotional, or behavioral problems. Participants reported their interest and involvement in art tasks because their research found that general interest and ability influenced art therapy outcomes. Thirty females were identified as having externalizing problems and thirty females were identified as having internalizing problems and these groups were then split into the experimental or control group. Participants met six times with their experimental groups and spent 45-60 minutes painting. Each meeting had a topic that participants were supposed to focus on while creating their artwork. Following the six session’s participants completed the ASEBA once more, and the results showed positive score changes which indicated decreased anxiety and stress in the experimental group of females with internalizing problems like depression and anxiety. However, no significant results were found for those in the experimental condition with females who presented externalizing problems (Bazargan & Pakdaman, 2016). These findings indicate that participation in just a few art tasks can be used as a tool to help manage and reduce internalizing symptoms, like anxiety or depression.
Art is a tool that nonclinical populations could use to manage every day stress. Research by Abbott, Shanahan, and Neufeld (2013) conducted on a group of 52 college students from Canada who experienced a stress inducing situation, and then colored for 12 minutes, experienced a reduction in their stress levels. This research had four experimental conditions, two active conditions (participants physically participated in a task) and two passive conditions (participants viewed a task). All participants completed a color-word interference test and the mental arithmetic task, which are validated tests that induce stress. Participants also completed two self-report measurements which assessed their stress levels. The active artistic condition was provided with coloring utensils (markers, crayons, pencils, or pastels) and a blank piece of paper. After viewing three posters (which were images of artwork by Claude Monet, Allan Stephenson, and Christian Zacho), they were told to let the images inspire them and they had 12 minutes to color. The passive artistic condition viewed the same three posters as the active art group for 30 seconds, and were then given 4 minutes for each image to rank 45 adjectives that described the image. The active non-artistic group was given 12 minutes to work on a puzzle (participants had the option of three U.S. state maps). The passive non-artistic group viewed pictures of the maps for 30 seconds each (same as those offered in the active non-artistic task), and were then given 4 minutes to rate the distance of 30 countries to the state image. Participants in both artistic conditions experienced significantly more decreases in stress compared to the non-artistic groups, and the active artistic group showed the largest decrease in stress following their participation in the research (Abbot, Shanahan, & Neufeld, 2013). The physical act coloring, even if it was not a master piece, was found to reduce stress for these participants.
The majority of research previously presented, and generally conducted in this field, used self-report measurements to evaluate changing levels of stress. However, technology can help researchers assess neurological changes in the brain related to stress after people participate in artistic activities. Utilizing magnetic imaging, Bolwerk et al. (2014) looked at the neurological differences of 28 retired adults over a ten week period who participated in different activities. Half of the adults spent an hour each week observing art in a museum and the other half spent an hour each week creating art (drawing and painting). Following the research, participants were placed into an fMRI machine while their stress resistance was monitored. The researchers found that the group who had physically created artwork over the ten weeks demonstrated higher functional connectivity in their frontal lobe which increased participant’s psychological resilience at the conclusion of the experiment. Changes in psychological resilience were measured by the German version of the Resilience Scale, which measured psychosocial resistance to stress. Having higher psychological resilience helped people effectively manage their stress, which can increase their psychological well-being (Bolwerk et al., 2014). This study demonstrated how art could be used as a stress management tool because it can physically change a human’s response to stressful situations in a positive way.

With all the different art mediums available for people to participate in, research has begun to investigate if there are specific art mediums that are more effective at reducing stress for a student population. Pizarro (2004) looked at the effectiveness of creative writing tasks versus artistic drawing tasks in stress reduction on a population of 45 college students over the course of two sessions (one hour each). Participants were placed into a stress art group (draw stressful experience), stress write group (write about stressful event), or a control group (draw a still life). Participants in the writing group reported higher levels of stress reduction compared to
the two other groups. However, the stress art group and control art group reported more satisfaction throughout the experiment and were less likely to drop out of the research compared to the write stress group (Pizarro, 2004). If more longitudinal studies were conducted that expanded longer than two hours, than the art medium would be found to be just as effective at stress reduction as the writing task for stress reduction.

Strictly researching the visual arts, Curl (2008) conducted a follow up study utilizing similar methodology as Pizarro (2004), but utilized drawing and collage making mediums rather than a writing task. There were 40 participants, and they were told to depict a highly stressful event or a positive event (with the medium they were assigned too) that happened in the last two weeks. There was no difference in stress reduction levels between the drawing group and the collage making group, but those in the positive focused creation groups were found to have the greatest reported stress reduction (Curl, 2008). This research supports the positive effects that art can have on stress reduction, but was not able to identify if there was a particular medium that was more effective. This research also highlights the influence that one’s cognitive state could have when completing an artistic task.

The research findings of Curl (2008) and Pizarro (2004) indicated that the type of art medium and cognitive focus while completing an artistic task influenced the levels of stress reduction (Curl, 2008; Pizarro, 2004). Research focused on the combination of positive psychology and art therapy found that if an artistic task was too difficult for someone, or unenjoyable, than the therapeutic aspect of art could be hindered. Additionally, the environment in which art therapy is conducted can affect the creative flow of an individual. Minor environmental cues, like lighting or sounds, could affect the beneficial consequences from participation in an artistic task (Wilkinson & Chilton, 2013). To prevent increases in stress when
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utilizing art as a coping tool, an individual’s personal interest and general artistic skill level should be evaluated and it should be conducted in a controlled environment. By evaluating individual differences in interest and skill level, inconsistencies in stress reduction could be identified.

Current Study

Previous research has primarily focused on the effectiveness of various art mediums in relation to stress reduction. Additionally, most literature on this subject has focused on clinical populations. The purpose of this study was to research if active participation in art is more effective than participation in a passive activity for a nonclinical population.

The current study looked at the effectiveness of art as a tool for stress reduction compared to a control group who viewed video clips. It was hypothesized that participants in the experimental condition would report greater stress reduction than the control condition after completing nine assignments over three weeks. Participants who reported the greatest interest in art prior to the experiment were predicted to have the greatest level of stress reduction after the three weeks.

Method

Participants

A total of 55 college students at a small liberal arts college in Ohio participated in this research. Participants were recruited through a participant pool, a campus wide email, and with flyers posted in all academic buildings on campus. The only requirement for this research was that the participant had access to their school email for three weeks in order to complete all nine assignments. Participants in psychology courses received up to two hours of research credit for
class, and all participants who completed the research were entered into a raffle drawing for a $50 Visa gift card.

A total of 28 participants were randomly assigned into the experimental condition and 27 participants were randomly assigned into control condition. There were 19 males and 36 females, and the age of participants ranged from 17 to 36 ($M = 20.31, SD = 20.31$) (Table 1.) Three participant’s data could not be included in the final analysis because they failed to complete all nine assignments. The educational background of participants was diverse, with over 20 different majors and minors listed.

Materials

Informed Consent

Participants were provided with an informed consent, which the researcher collected after participants reviewed and signed (see Appendix A).

Demographic Survey

Participants completed a demographic survey that asked about their gender, age, grade level, and number of art classes they’d currently or previously taken (high school and college). Participants also indicated their overall enjoyment on art tasks and how much time they spent on art tasks each week. Participants indicated their interest in art as not at all, not very much, neutral, somewhat, and very much which the researcher coded on a 0-4 scale with 0 being not at all and 4 being very much (see Appendix B).

Perceived Stress Scale (PSS)

The Perceive Stress Scale (PSS) developed by Cohen et al. (1983) is a 10 item self-report questionnaire that assesses an individual’s level of stress over the previous month (see Appendix C). Respondents answered each question on a 4 point scale, 0 points if they’ve never
experienced the statement and 4 points if they experienced the statement very often. Reverse scoring was used on the four positive statements, and participants could earn a maximum total of 40 points. Scores around 13 demonstrated typical levels of stress experienced by the average population. Scores around 20 were associated with people who experienced high levels of stress, and individuals who scored more than 20 points on the PSS scale experienced severe levels of stress. This scale was tested on three separate sample groups, and was found to have a high internal consistency. Cohen’s PSS scores were also correlated with other stress measurements (Cohen et al., 1983).

This scale was used twice, as a pre-test and post-test measurement, to determine if there were any changes in participant’s levels of stress.

**Amended Perceived Stress Scale (APSS)**

The researcher created an amended version of the Perceived Stress Scale (Cohen, 1983,) which asked the same questions as the Perceived Stress Scale but in relation to the participant’s level of stress during the past 24 hours (see Appendix D).

**Debrief Statement**

Following completion of the experiment, participants were emailed this statement, which informed them that they had completed the research as well as an explanation on why the research was conducted. Information about community resources which participants could utilize if they experienced high levels of stress were included (Appendix H).

**Coloring Supplies**

Nine images from the public domain that ranged in theme, detail, and shape were used in this research. These images were black and white, and were selected because they provided white spaces for participants to color in. Male and female graduate students pre-screened the
images in an attempt to make them gender neutral (see Appendix E). These images were used in the experimental condition, and participants in this condition colored all nine of the same images in the same order. Participants were able to keep their colored images after each assignment.

An eight pack of standard Crayola crayons was used in this research. Colors included in this pack were black, blue, brown, green, orange, red, violet, and yellow.

**TED Talk Videos**

Nine TED Talk videos found on the public domain were used in this research. All the videos ranged in informational themes, focusing on design, technology, and entertainment. Each video used in this research was around ten minutes. The shortest video was nine minutes and twenty-four seconds and the longest video was ten minutes and fifty-eight seconds (see Appendix F). These nine videos were viewed by the control group in the same order.

**Procedure**

All participants completed an informed consent, a brief demographic questionnaire, and provided the researcher with their email and phone number. Participants received a unique identification code to use for each assignment to protect their identity when results were analyzed. Each participant was randomly assigned into the experimental or control condition, and every participant completed the Perceived Stress Scale (Cohen, 1983).

Participants in the experimental condition were provided with an eight pack of Crayola crayons, which they used to complete the nine assignments over the course of three weeks. For each assignment, participants received an email with a different image to color for ten minutes and a survey to complete afterwards (Appendix G). The surveys asked participants if they colored for more than ten minutes, if they enjoyed the assignment, and then provided them with the 10 item Amended Perceived Stress Scale created by the researcher which asked them about
their stress levels in relation to certain scenarios during the last 24 hours. Upon completion of each assignment, participants had to text an image of their colored image to the researcher to prove that the assignment had been completed. Each assignment took approximately 15 minutes, unless the participant chose to color for a longer period.

Participants in the control condition received nine emails over the three week experiment. Each email contained nine different TED Talk videos which were approximately ten minutes long and a survey. After viewing the TED Talk, participants completed the online survey which asked a brief question relevant to the video they viewed to ensure that participant watched the video, asked if the participant enjoyed the video, and had them complete an Amended Perceived Stress Scale created by the researcher which asked the participant about their stress level in relation to certain scenarios during the last 24 hours. It took approximately 15 minutes to complete this entire assignment.

Over the next three weeks, participants completed the remaining eight assignments. The researcher emailed the assignment to the participant’s student email accounts every Monday, Wednesday, and Friday by 10:00AM. Assignments took approximately fifteen minutes and had to be completed by 11:00PM. The researcher sent reminder texts at 5:00PM and 10:00PM to each participant who hadn’t completed the assignment due that day. The final assignment was completed the same way, except the Perceived Stress Scale by Cohen (1983) was also included at the end of the survey. Participants were emailed a debrief statement upon successful completion of the nine assignments, which explained why the research was conducted and mental health resources available if participants experienced uncomfortable levels of stress.

To receive the full two hours of credit and be entered into the raffle drawing for a $50 VISA gift card, each participant had to complete all nine assignments. If participants chose to
withdraw from the experiment, they received class credit equal to the time they had completed the research.

**Results**

In order to assess overall reduction in stress across both conditions, a repeated measure t-test revealed that the level of stress participants in both conditions reported on their initial Perceived Stress Scale (Cohen, 1983) ($M = 18.38, SD = 5.69$) (*Figure 1*) were significantly higher than the scores following the experiment ($M = 16.51, SD = 6.83$), $t(54) = 2.19, p = .03$ (*Figure 2*). A repeated measure analysis of variance found that that there were no significant changes on the nine Amended Perceived Stress Scales reported by the experimental condition, $F(8, 200)= 1.19, p = .31$ and the control condition, $F(8, 200) = 1.05, p = .40$ over the three weeks.

An independent sample t-test found that participants initial Perceived Stress Scale scores from the experimental condition ($M = 18.25, SD = 5.73$) were not significantly different than participants scores in the control condition ($M = 18.52, SD = 5.75$), $t(53) = -.17, p = .86$. The Perceived Stress Scale scores reported at the end of the experiment for the experimental condition ($M = 15.82, SD = 6.61$) were not significantly different than the control condition ($M = 17.22, SD = 7.11$), $t(53) = -.76, p = .45$. A between subjects t-test analyzed the difference between the initial Perceived Stress Scale and post Perceived Stress Scale scores, or participants change difference scores, and showed that the experimental condition ($M = 2.43, SD = 6.51$) scores were not significantly different than the control condition ($M = 1.30, SD = 6.25$), $t(53) = .66, p = .51$.

An analysis of covariance was run to determine if there were any unique factors that influenced the final Perceived Stress Scale (Cohen, 1983) scores. Participants reported level of
art enjoyment at the beginning of the research showed that participants in the experimental condition ($M = 2.79$, $SD = .96$) were not significantly different than the control condition ($M = 3.04$, $SD = .81$), and they did not have a significant impact on the final Perceived Stress Scale scores, $F(3,51) = .41, p = .75$. Females initial Perceived Stress scores ($M = 18.67$, $SD = 5.82$) were not significantly different than males initial Perceived Stress Scale scores ($M = 17.84$, $SD = 5.54$), $t(53) = .51, p = .61$. Similarly, females final PSS scores ($M = 16.75$, $SD = 6.78$) were not significantly different than males ($M = 16.05$, $SD = 7.10$), $t(53) = .36, p = .72$. Finally, an analysis of covariance found that participants gender did not significantly impact the initial Perceived Stress Scale scores, $F(1,52) = .06, p = .81$ or the final Perceived Stress Scale scores, $F(1,52) = .65, p = .43$.

**Discussion**

This research was conducted to see if participating in nine coloring tasks over a three week time period had the ability to reduce stress. School aged children and young adults experience high levels of stress, and participating in art has been found to help with the reduction and management of stress. However, a decrease in the amount of time students spend learning different art techniques and participating in art courses at school has been seen over the last century. With the diminishing opportunities for students to participate in art, adolescents and young adults could be losing out on the opportunity to learn a skill that could help them manage their stress levels. It was predicted that participants in the experimental art condition of this research would show significant decreases in stress compared to the control condition who viewed nine videos over three weeks.

This research found an overall reduction in the level of reported stress by all participants. Participant’s experimental condition, gender, and overall reported enjoyment in art did not have
a significant impact on their initial Perceived Stress Scale scores. Additionally, there were no significant changes in stress scores on the nine Amended Perceived Stress scales. These scales asked participants questions about their stress levels in the last 24 hours, but always in the same question progression, which could have affected the validity of these results due to practice effect. It was hypothesized that participants in the experimental coloring condition would experience significantly more stress reduction than the control video watching condition, however the results found the hypothesis to be null.

Participants were asked to report their enjoyment in art because research by Bazargan & Pakdaman found that participants overall ability and interest in an art influenced the effectiveness of art as a therapeutic technique (Bazargan & Pakdaman, 2016). This research might have shown similar findings in regards to the influence of artistic ability on the effectiveness of art as a stress reduction had the researcher been able to analyze the number of courses each participant had taken. However, this data was not analyzed because the reported number of courses in high school and college could not be averaged equally. Courses completed in high school were often scored as one credit, whereas course completed in college were scored between one to four credits or students just listed the class with no credit association.

A potential reason for why the researcher’s hypothesis wasn’t supported could be explained by the time frame that the data was collected. This research was conducted at the end of a Spring Semester, during examination period, and the beginning of Fall Semester. The varying time frames that data was collected could have affected the stress levels reported by participants, because examination period is usually a stressful and academically challenging time period for individuals whereas the beginning of a semester is traditionally easy with few academic constraints. Future research could analyze similar data in separate categories based off
the time the participants completed data (beginning versus end of semester. A second factor that could have influenced the unsupported hypothesis is the fact that the research was conducted over a three week time period, which is a short time frame. The majority of research found in the public domain was conducted on clinical populations who participated in art over an extended amount of time (Reynolds et al., 2000; Slayton et al., 2010). While there were experiments that found positive results after participation in one art assignment in clinical and non-clinical populations, the experiments that were conducted over a longer period of time found more significant results in their research which supported the efficacy of art at reducing stress (Curl, 2008; Pizarro, 2004; Bazargan & Pakdaman, 2016; Bolwerk et al., 2014). The researchers hypothesis might have been supported had the research been conducted over a longer period of time.

Cohen’s (1983) research on the Perceived Stress Scale found that a score around 13 reflected an individual who was experiencing average levels of stress and scores more than 20 often meant that an individual was experiencing extreme levels of stress (Cohen, 1983). Overall, participants in this research reported higher levels of stress on both the initial (Table 2.) and post (Table 3.) Perceived Stress Scale compared to national findings on a L. Harris Poll (Cohen & Williamson, 1988) (Table 4.). One explanation for the difference in scores reported in this research compared to the L. Harris Poll could be because they used a national population of 2,387 participants whereas this research included only 55 participants who were attending a small liberal arts school in the Midwest (Spacapan & Oskamp, 1988). To better depict the results of this research in reference to Cohen’s findings of normative stress levels, the researcher grouped the Perceived Stress Scale scores into four categories; low stress levels (0-10), average stress levels (11-15), high stress levels (16-20), and extreme stress levels (20 and above) (Figure
Another explanation for these scores being higher than a national average could be because college students experience higher levels of stress than non-collegiate populations. For example, research on a collegiate population found that 60% of students reported high levels of stress and 40% were felt they were unable to manage their stress levels (Peer, Hillman & Hoet, 2015). This research did not analyze if students felt they were able to manage their stress, but future research could include questions that would allow for qualitative analysis.

While gender was not found in this research to significantly affect the Perceived Stress Scores, results showed that the mean scores of women were higher than men on the initial and final Perceived Stress Scale score. These results reflect international findings that women generally experience, or at least report, higher levels of stress than men. Women are more likely to be diagnosed with depressive and anxiety disorders compared to men, and these disorders are often worsened by stress (“Gender and Mental Health”, 2002). These results are mirrored in adolescents, as the World Health Organization has found that 15 year old female girls experience extremely high levels of stress in comparison to their peers (Currie et al., 2008).

Many adolescents and young adults experience stress during their school years, and research has shown that school can be a source of stress for many students (Morales & Guerra, 2006). Specifically looking at a population of college students, research found that 60% of students experienced stress and that 40% of these students felt that they didn’t have the ability or skills to manage their stress. Many of these severely stressed students reported negative physiological and psychological consequences that are associated with stress (Peer, Hillman, & Hoet, 2015). Stress management skills, like participating in art, could be learned early in life so that when adolescents enter into their teenage years they are prepared to deal with external and internal stressors (Currie et al., eds., 2008).
While this research didn’t find art to be more effective at reducing stress compared to viewing TED Talk videos, results showed that there were overall significant decreases in stress. Perhaps participating in art and viewing videos can help reduce stress, just in different ways. Television, or viewing video clips, could be used as a distraction method. By watching videos, one is able to momentarily distract themselves from their current feelings, and depending on what is being watched it can lead to a reduction in negative feelings (Zillmann, 1991). Research by Bryant and Zillmann (1985) found that people experiencing stress chose television shows that were exciting (Bryant & Zillmann, 1985). These findings support the Mood Management theory because an exciting film can distract people from their current mood (Anderson et al., 1996).

Perhaps participants in the control condition experienced momentary decreases in stress, but they did not experience the long-term stress decreases which many participants in previous art research often report. For instance, participation in art has long term positive neurological changes that could help one cope with and manage stressful situations (Bolwerk et al., 2014; Bazargan & Pakdaman, 2016). However, the researcher was unable to find any research which supported the long term benefits of watching television.

Research by Ulrich, Simons, and Miles (2003) found that patients who waited in a doctor’s office for thirty minutes prior to donating blood reported lower levels of stress when the television was not turned on compared to groups who viewed television during this waiting period. This research used the Zuckerman Inventory of Personal Reactions (ZIPERS; Zuckerman, 1997) assessment and patients’ blood pressure prior to donating blood as a stress measurement (Ulrich, Simons, & Miles, 2003). This research indicates that during stressful situations television could increase stress, but various research has indicated that art can lead to stress reduction during stress inducing situations. This research did not incorporate a stressful
stimulation prior to each assignment, but if it had the experimental group might have indicated greater decreases in stress compared to the control condition.

There were a few limitations to this research that could explain why the main hypothesis was not supported. Since this research took place over a three week period, only the first assignment was conducted in a controlled and consistent environment. Participants completed the other eight assignments in a location of their choosing. Research has shown that a comfortable environment leads to higher levels of stress reduction, so if participants completed their assignments in uncomfortable locations it could have negatively influenced their levels of reported stress (Wilkinson & Chilton, 2013). While no participant reported that they didn’t like art, the fact that participants did not self-select into groups but were randomly assigned into the experimental or control condition could have influenced the results as well. If participants had chosen what condition they were in based on what task they were interested in, it could have affected their stress levels (Bazargan & Pakdaman, 2016). Additionally, this research consisted of a small population of students from the same college in a Midwestern town. Perhaps if there was a larger more diverse population there could have decreased the error margin (Deziel, 2017).

The one stress measurement tool used in this research, a self-report measurement report, could have affected the final results. Participants could have inaccurately reported their stress levels on the measurement because of practice effect. By completing the same survey nine times over the three weeks, participants could have been more focused on answering consistently rather than accurately. Or, participants could have become bored with completing the same survey each week and not accurately answered the questions (“Practice Effect & Carry Over”, 2017). Future research that utilizes a self-measurement tool repeatedly could randomize the
order the questions are in to counteract practice effect. Additionally, future research could include different stress measurement tools, like a physiological stress measurement tools.

The field of art therapy continues to grow each year, but there is a need for more experimental studies to be conducted on nonclinical populations (Reynolds, Nabors, & Quinlan, 2000; Slayton, S.C., D’Archer J., & Kaplan, F., 2010). A large amount of research on art therapy has been conducted on clinical populations, but if more non-clinical populations were used in research than positive results could lead to art being used a preventative tool within the school systems for normative populations. Art practices that reduce stress could easily be incorporated into school curriculum, and these academic courses could help prevent the development of serious disorders worsened by stress because students will have access to tools that help them manage and reduce their stress (Stuckey & Nobel, 2010).
References


Analysis of Randomized Controlled Trials. Plos ONE, 11(6), 1-16.

doi:10.1371/journal.pone.0158092


Appendix A:

The Effect of Art on Stress Reduction

Informed Consent

The human subjects committee at Marietta College has approved this research. You must be at least 18 years old and an undergraduate student at Marietta College to participate. This experiment will take place over three weeks, during which time you will have to complete short weekly tasks and will need access to a computer. When you sign this form you are giving your consent to participate in this research. All personal information gathered during this experiment will be coded with an identification number and remain confidential. Only the researcher will have access to this information.

Printed Name ___________________________ Signature ___________________________

Date ___________________________

Due to the longitudinal nature of this research please provide your cell phone number and email where notifications can be sent to remind you of continued participation.

Cell Phone ___________________________ Email ___________________________

There is are no risks involved in this experiment. You are able to withdraw at any time that you feel uncomfortable. Students participating in this research for class credit can receive up to two credits, but if they chose to withdraw they will receive credit equivalent to the amount of time they participated. All participants who complete the experiment will be entered into a drawing to win a $50 gift card to Walmart.

If you have any questions email the researcher Bri Scott at bas010@marietta.edu or text at 513-262-2697 or contact the advisor for this research Dr. May ryan.may@marietta.edu.

If you would like to receive information about the results of this experiment via email circle yes or no.

Yes

No

If you have any questions or concerns about your rights as a research subject contact Dr. Ryan May, Marietta College Human Subjects Committee Chairperson, at ryan.may@marietta.edu or 740-376-4952.
Appendix B:

Demographic Survey

Indicate your choice by checking or writing the most appropriate answer.

☐ Female  ☐ Male

Age:

Major:

Minor:

Have you taken an art class at Marietta College or another collegiate institution?

☐ Yes  ☐ No

If yes, how many course credits you have taken:

Have you ever taken an art class in high school?

☐ Yes  ☐ No

If yes, how many course credits you have taken:

What is your overall enjoyment of participating in artistic activities?

☐ Not at all  ☐ Not very much  ☐ Neutral  ☐ Somewhat  ☐ Very much

Approximately how much time do you engage in artistic activities weekly?

☐ No time  ☐ Thirty minutes  ☐ An hour or less

☐ Two hours  ☐ Three hours  ☐ More than four hours
Appendix C:

**PSS**

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way.

1. In the last month, how often have you been upset because of something that happened unexpectedly?
   
   ___0=never  ___1=almost  ___2=sometimes  ___3=fairly  ___4=very
   never       often       often       often       often

2. In the last month, how often have you felt that you were unable to control the important things in your life?
   
   ___0=never  ___1=almost  ___2=sometimes  ___3=fairly  ___4=very
   never       often       often       often       often

3. In the last month, how often have you felt nervous and "stressed"?
   
   ___0=never  ___1=almost  ___2=sometimes  ___3=fairly  ___4=very
   never       often       often       often       often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?
   
   ___0=never  ___1=almost  ___2=sometimes  ___3=fairly  ___4=very
   never       often       often       often       often

5. In the last month, how often have you felt that things were going your way?
   
   ___0=never  ___1=almost  ___2=sometimes  ___3=fairly  ___4=very
   never       often       often       often       often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?
   
   ___0=never  ___1=almost  ___2=sometimes  ___3=fairly  ___4=very
   never       often       often       often       often

7. In the last month, how often have you been able to control irritations in your life?
   
   ___0=never  ___1=almost  ___2=sometimes  ___3=fairly  ___4=very
   never       often       often       often       often

8. In the last month, how often have you felt that you were on top of things?
   
   ___0=never  ___1=almost  ___2=sometimes  ___3=fairly  ___4=very
   never       often       often       often       often

9. In the last month, how often have you been angered because of things that were outside of your control?
   
   ___0=never  ___1=almost  ___2=sometimes  ___3=fairly  ___4=very
   never       often       often       often       often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
    
    ___0=never  ___1=almost  ___2=sometimes  ___3=fairly  ___4=very
    never       often       often       often       often
Appendix D:

Amended PSS

The questions in this scale ask you about your feelings and thoughts during the past 24 hours. In each case, please indicate how often you felt or thought a certain way by selecting the appropriate circle.

1. During the last 24 hours, how often have you been upset because of something that happened unexpectedly?
   _____0=never _____1=almost never _____2=sometimes _____3=fairly often _____4=very often

2. During the last 24 hours, how often have you felt that you were unable to control the important things in your life?
   _____0=never _____1=almost never _____2=sometimes _____3=fairly often _____4=very often

3. During the last 24 hours, how often have you felt nervous and "stressed"?
   _____0=never _____1=almost never _____2=sometimes _____3=fairly often _____4=very often

4. During the last 24 hours, how often have you felt confident about your ability to handle your personal problems?
   _____0=never _____1=almost never _____2=sometimes _____3=fairly often _____4=very often

5. During the last 24 hours, how often have you felt that things were going your way?
   _____0=never _____1=almost never _____2=sometimes _____3=fairly often _____4=very often

6. During the last 24 hours, how often have you found that you could not cope with all the things that you had to do?
   _____0=never _____1=almost never _____2=sometimes _____3=fairly often _____4=very often

7. During the last 24 hours, how often have you been able to control irritations in your life?
   _____0=never _____1=almost never _____2=sometimes _____3=fairly often _____4=very often

8. During the last 24 hours, how often have you felt that you were on top of things?
   _____0=never _____1=almost never _____2=sometimes _____3=fairly often _____4=very often

9. During the last 24 hours, how often have you been angered because of things that were outside of your control?
   _____0=never _____1=almost never _____2=sometimes _____3=fairly often _____4=very often

10. During the last 24 hours, how often have you felt difficulties were piling up so high that you could not overcome them?
    _____0=never _____1=almost never _____2=sometimes _____3=fairly often _____4=very often
During the last 24 hours, how much time have you spent coloring outside of this experiment?

___0=no time  ___1=20 minutes or less  ___2=20-40 minutes  ___3=40-60 minutes  ___4=more than 60 minutes
Appendix E:

All pages were found on the public domain.
Appendix F:

Assignment 1:
https://www.ted.com/talks/joshua_klein_on_the_intelligence_of_crows/transcript?language=en#t-513000

Questions: What animal does the speaker think can be trained to do productive activities? Did you enjoy this video?

Assignment 2:
https://www.ted.com/talks/thomas_peschak_dive_into_an_ocean_photographer_s_world

Questions: What is this video about? Did you enjoy this video?

Assignment 3:
https://www.ted.com/talks/pardis_sabeti_how_we_ll_fight_the_next Deadly_virus

Questions: What virus did the speaker talk about? Did you enjoy this video?

Assignment 4:
https://www.ted.com/talks/andy_puddicombe_all_it_takes_is_10_mindful_minutes?language=en

Questions: What profession did the speaker become when he was overwhelmed by life? Did you enjoy this video?

Assignment 5:

Questions: What was the detector called that the speaker talked about? Did you enjoy this video?

Assignment 6: https://www.ted.com/talks/oscar_schwartz_can_a_computer_write_poetry

Questions: Can computers write poetry? Did you enjoy this video?

Assignment 7:
https://www.ted.com/talks/regina_hartley_why_the_best_hire_might_not_have_the_perfect_resume

Questions: What were the two types of candidates described by the speaker? Did you enjoy this video?

Assignment 8:

https://www.ted.com/talks/alix.generous.how_i.learned_to_communicate_my_inner_life_with_.aspergers

Questions: What disorder did this speaker have? Did you enjoy this video?


Questions: What were the houses made out of? Did you enjoy this video?
Appendix G:

Participant ###,
To complete assignment 2, you must color the attached image for ten minutes and then send a picture via text message to the researcher.

After you complete the coloring assignment, complete the survey attached to this link. https://survey.co1.qualtrics.com/SE/?SID=SV_8kT5r4xLd9XBqbH

You have until 11pm to complete this assignment. The researcher will send reminder texts at 5pm and 10pm.

Bri Scott
Researcher for Coping with Stress
513-262-2697
Appendix H:

Thank you for participating in this research. Your name has been placed into a raffle drawing and class credit will be given to those in preapproved classes.

This research was conducted to look at the effect that art had on stress reduction. You should be able to find the results from this study posted on OhioLink by August 2016. If you experience extreme stress in the future, the Michael J. Harding Center for Health and Wellness has counselors available to all students and community members. The center is open 9 am to 5 pm Monday through Friday during the academic year. They accept walk-ins or you can call ahead and make an appointment at 740-376-4477.

Thank you for your participation. If you have any follow-up questions regarding your participation or the research you can contact the researcher Bri Scott at bas010@marietta.edu
Figure 1. Initial Perceived Stress Scale scores by experimental condition.
Figure 2. Post Perceived Stress Scale scores by experimental condition.
Figure 3. Initial Perceived Stress Scale grouping of scores based off Cohen’s findings of normative scores.
Figure 4. Post Perceived Stress Scale grouping of scores based off Cohen’s findings of normative stress scores.
Table 1. Participant demographics

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<tr>
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<td>SD</td>
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Table 2. Frequencies of initial Perceived Stress Scale scores grouped by experimental condition.

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Table 3. Frequencies of final Perceived Stress Scale scores grouped by experimental condition.

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Table 4.

Table 4. L Harris Poll descriptive scaled of national survey from 2,387 respondents on the Perceived Stress Scale (Cohen & Williamson, 1988).

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