

Reducing Stress Among College Students: Mindfulness Meditation Versus Adult Coloring

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ABSTRACT

College students report a wide variety of stressors including academic difficulties, uncertainty about future career plans, conflict with roommates, family pressure, and financial worries (Aselton, 2012). It is important to research not only stress reduction interventions for college students, but also effective ways to disseminate these programs to students, especially given how busy students are. The purpose of this study was to compare a brief 2-week peer-delivered mindfulness meditation intervention with an adult coloring intervention and a control condition that received general stress reduction tips. Participants were randomly assigned to an experimental condition (mindfulness meditation or adult-coloring) or the control condition (general stress reduction tips). Participants' levels of stress, psychological distress, anxiety, and mindfulness were measured via pre-and post-treatment assessments (online self-report surveys). All interactions with participants were conducted remotely, through Zoom and email. Participants were 74 General Psychology students who enrolled via Sona Systems, a participant pool management system, as part of their class participation. Results found that all interventions were equally beneficial in reducing stress and psychological distress among college students. Both control and mindfulness conditions showed significant decreases in anxiety compared to the adult coloring condition. Contrary to expectations, the control condition showed significant increases in mindfulness compared to the adult coloring and mindfulness conditions. Mindfulness meditation, adult coloring, and psychoeducation all show the potential to be effective in helping college students manage their stress.

1 INTRODUCTION

Stress in college students is widespread and problematic. College students report a wide variety of stressors including academic difficulties, uncertainty about future career plans, conflict with roommates, family pressure, and financial worries (Aselton, 2012). Approximately 30% of college students report that stress has adverse consequences on their academic performance (American College Health Association, 2017). Furthermore, academic stress in college students can have negative effects on their physical health (Hughes, 2005). Therefore, it is important to research not only stress reduction interventions for college students, but also effective ways to disseminate these programs to students.

Previous research has found that mindfulness-based interventions are effective in addressing a variety of mental health concerns, including stress (Bamber & Schneider, 2016). Mindfulness involves bringing our attention and awareness to the present moment in a nonjudgmental manner (Kabat-Zinn, 1990). For example, mindful walking involves purposefully noticing the sights, sounds, smells, and physical sensations experienced in the present moment while slowly walking (as opposed to getting lost in thoughts). In addition, a person can non-judgmentally observe with acceptance as they

experience difficult emotions and sensations such as stress or anxiety. Formal mindfulness meditation exercises help individuals to train their minds to be in the present moment with an attitude of self-compassion, as opposed to getting caught up in difficult thoughts and emotions or labeling themselves as bad or defective. Mindfulness meditation exercises vary but may include focusing on the breath, walking with awareness, noticing internal events (i.e., thoughts, emotions, and sensations) with acceptance, and bringing attention to the external events (e.g., sights or sounds) around them (Kabat-Zinn, 1990).

According to a review article by Bamber & Schneider (2016), most published studies of mindfulness-based interventions targeting college students found significant reductions in stress and anxiety at post-treatment. However, across these studies with college students, there was a wide variety in the methods used to deliver the interventions (Bamber & Schneider, 2016). A traditional and commonly structured protocol is that of Mindfulness-Based Stress Reduction (MBSR) which involves 26 hours of formal instruction over an 8-week period (Kabat-Zinn, 2003). However, a comprehensive program such as this may not be logistically feasible for many college students who may feel they have limited time as they attempt to balance their academic, work, and personal responsibilities.

Some research has found preliminary support for a brief 4-week mindfulness meditation program with weekly sessions with college students (Shearer et al., 2016; Dark-Freudeman, Jones, & Terry, 2021). For example, Shearer et al. (2016) found that a 4-week mindfulness meditation program significantly reduced anxiety and improved stress response in college students compared to an active control group that interacted with a dog during a group study break. Dark-Freudeman, Jones, & Terry (2021) found that a 4-week mindfulness-based intervention significantly reduced stress in college students compared to an active control condition that involved adult coloring. However, it is possible that even a month-long time commitment may be viewed as too intensive by many college students. The question then becomes, could an even briefer mindfulness meditation program help college students manage their stress levels?

The current research study explored the efficacy of a brief 2-week peer-delivered mindfulness meditation program to reduce stress in college students, with minimal initial instruction and low time requirements for practice. The study design was a randomized controlled trial that compared the brief mindfulness meditation program with an adult-coloring intervention and a psychoeducation control condition. Overall, there are few published research studies on the psychological effects of adult coloring books, but preliminary research suggests it may have at least short-term benefits for reducing stress (Ashdown et al., 2018), anxiety (Duong, Stargell, & Mauk, 2018; Khademi et al., 2021), or depression (Flett et al., 2017). Although it is possible for one to practice mindfulness during an art activity if instructed to do so (e.g., nonjudgmentally noticing

any emotions that are evoked), past research suggests that many individuals may not naturally practice mindfulness when engaged in adult coloring (Ashdown et al., 2018; Flett et al., 2017) but rather engage in the activity in a “mindless” manner (Mantzios & Giannou, 2018). Adult coloring can thus be compared to watching television, reading a book, or playing a game (i.e., distraction), which can help “get the mind off” of one’s unwanted emotional experience (counter to mindfulness, which encourages awareness and acceptance of present-moment emotions).

All interventions in our study were delivered remotely due to the COVID-19 pandemic. Participants attended a single hour-long videoconferencing session where they completed baseline measures and received an intervention based on their condition (mindfulness, adult coloring, or psychoeducation). Participants were then sent periodic emails over the course of two weeks with instructions to practice their assigned activities. After two weeks, participants completed post-treatment measures of stress, psychological distress, anxiety, and mindfulness. We hypothesized that mindfulness meditation would produce the greatest psychological benefits, and that psychoeducation (control condition) would have the least positive effects.

2 METHOD

Participants

Seventy-seven undergraduate participants completed the study. However, one participant was removed from the analysis for not completing the post-treatment survey, and two participants were removed due to the researcher sending the incorrect intervention email. This left 74 participants in the final analysis. Participants had a mean age of 19.3 ($SD = 2.2$) ranging from 18 to 35 years old. Most of the participants (80%) were female. Seventy-six percent were White, 10% were African American, 5% were Multiracial, 5% identified as Other, 3% were Native American, and 1% were Asian. In terms of ethnicity, 19% identified as Hispanic. Participants were recruited via Sona Systems, an online software that allows individuals to sign-up for research studies. All students 18 years and older and enrolled in a General Psychology class at The University of Tampa were eligible to sign up for the study. Participants completed the study as part of their research requirement for their course.

Measures

The Demographics Questionnaire is a 7-item self-report questionnaire that asks about age, gender, race, ethnicity, student year, and past history of mental health treatment.

The Perceived Stress Scale (PSS Cohen, Kamarck, & Mermelstein, 1983) is a 10-item questionnaire that measures the degree to which participants have perceived life situations as stressful. Each item is rated on a 5-point scale (1 = Almost Never to 4 = Very Often). Examples of items include “How often have you felt nervous and stressed?” and “How often have you felt that things were going your way?” The language in this measure was changed to ask about the past week instead of the past month.

The Kessler Psychological Distress Scale (K10 Kessler et al., 2003) is a 10-item questionnaire that measures psychological distress levels based on questions about anxiety and depressive

symptoms. Each item is rated on a 5-point scale (1 = None of the time to 5 = All of the time). Examples of items include “About how often did you feel tired out for no good reason?” and “About how often did you feel restless or fidgety?” The language in this measure was changed to ask about the past week instead of the past four weeks.

The Beck Anxiety Inventory (BAI Steer & Beck, 1997) is a 21-item self-report survey that assesses the intensity of physical and cognitive anxiety symptoms. Each item is rated on a 4-point scale (0 = Not at all to 3 = Severely—it bothered me a lot). Examples of items include “Feeling hot” and “Fear of losing control.” The language in this measure was changed to ask about the past week instead of the past month.

The Mindful Attention Awareness Scale (MAAS Brown & Ryan, 2003) is a 15-item questionnaire that assesses the frequency of mindful states. Each item is rated on a 6-point scale (1 = Almost Always to 6 = Almost Never). Examples of items include “I find it difficult to stay focused on what’s happening in the present” and “I rush through activities without being really attentive to them.” The language in this measure was changed to ask about the past week.

The Satisfaction Survey is a post-treatment questionnaire that asks participants to rate the effectiveness of the intervention in reducing and coping with stress, and if they would recommend the intervention to a friend. Additional questions asked how often participants practiced their assigned exercises. Those in the control condition were asked to rate the helpfulness of each psychoeducation tip that they received. Those in the adult coloring condition were asked how often they completed a coloring activity online versus by hand.

Procedures

Each participant signed an online consent form and was randomly assigned to one of two experimental groups (mindfulness meditation or adult coloring) or to the control group (psychoeducation). Researchers randomly assigned participants by drawing a slip of paper. All participants signed up for an initial 60-minute group Zoom intervention session with two undergraduate research assistants. Groups contained anywhere from one to five research participants at a time. First, the research assistants gave a general overview of the research study and explained that the purpose of the study was to examine stress levels in college students. Participants then completed pre-treatment measures on Qualtrics.

Participants were then taught specific stress coping techniques. Participants in the mindfulness intervention were taught two mindfulness exercises. First, they used their five senses to observe the room they were physically in. Second, they practiced a 5-minute breathing meditation. Meanwhile, participants in the adult coloring intervention virtually colored both a simple and complex mandala design using an online website. Participants in the control condition were given two general stress reduction tips to create a schedule in order to prioritize activities and to make the effort to socially connect with other people.

At the end of this Zoom session, participants were given instructions for the next two weeks. Participants in the experimental conditions were asked to practice their exercises at least five minutes per day. Participants in the control condition were told that it was their choice whether to incorporate any of the tips into their daily lives. All participants were then sent periodical emails (5 total)

containing additional information and/or tips during the next two weeks. Participants in the mindfulness condition were sent emails that contained an array of mindfulness exercises (e.g., links to audio files and YouTube videos). Participants in the adult coloring condition received a variety of adult coloring exercises that ranged from simple to complex mandala designs. Some exercises included pictures for them to color online with their mouse and/or pictures to print out and then color by hand. Participants in the control condition received general stress reduction tips. Examples of these tips were journaling, yoga, and eating healthier. At the two-week mark, participants completed online post-treatment measures on Qualtrics.

3 RESULTS

Mixed ANOVAs were conducted to determine if there were any significant differences in the dependent variables between conditions from pre- to post-treatment. Results found a significant reduction in perceived stress for all the conditions combined (main effect), $F(1,71) = 19.67, p < .001$. However, there was no significant difference in stress level reductions between the conditions (no interaction), $F(2,71) = 1.08, p = .346$. Likewise, results demonstrated an overall significant main effect for pre-to-post reduction of psychological stress, $F(1,71) = 10.73, p = .002$, but no significant differences in effectiveness between the conditions from pre- to post-treatment, $F(2,71) = 0.85, p = .432$.

A significant interaction between time and condition was found for anxiety levels, $F(2,71) = 3.17, p = .048$. Post-hoc tests determined that there was no significant difference between the control versus mindfulness conditions ($p = .810$), but there was a significant difference between the mindfulness versus adult coloring condition ($p = .010$) and the control versus adult coloring condition ($p = .027$). The control and mindfulness interventions significantly reduced anxiety levels, but the coloring condition did not.

A significant interaction was also found between time and condition for mindfulness levels, $F(2,71) = 3.76, p = .028$. Post-hoc tests demonstrated that there was a significant difference between the control versus mindfulness conditions ($p = .021$), and between the control versus coloring conditions ($p = .019$), but not for the coloring versus the mindfulness conditions ($p = .50$). The control intervention led to a significant increase in mindfulness levels, but the coloring and the mindfulness interventions did not.

When participants were asked to rate the effectiveness of the intervention in reducing their stress levels, there were no significant differences amongst the conditions, $F(2,71) = 1.00, p = .372$. Likewise, when participants were asked to rate the effectiveness of the intervention in helping them cope with stress, there were no significant differences amongst the conditions, $F(2,71) = 1.46, p = .239$.

Participants reported a variety in the number of days they spent practicing exercises during the two-week intervention period. The percentage of participants who practiced exercises on 7 or more days was 54% for the mindfulness condition, 70% for the adult coloring condition, and 43% for the control condition. There was also a variety in the number of hours spent practicing exercises during the two-week period. The percentage of participants who spent over an hour total practicing exercises was 38% for the mindfulness condition, 50% for the adult coloring condition, and 54% for the

control condition. The majority of participants in the adult coloring condition (60%) reported that they did all their coloring exercises online, as opposed to also printing out pages to color by hand. The most helpful psychoeducation tips, as rated by the control group, were to improve sleeping habits, listen to music, stay active, and create a schedule.

4 DISCUSSION

The current study investigated the effectiveness of three alternative interventions for reducing stress among college students. Previous research has found that mindfulness-based interventions are effective in addressing a variety of mental health concerns, including stress (Bamber & Schneider, 2016). Therefore, we hypothesized that mindfulness meditation would produce the greatest effects on stress, psychological distress, anxiety, and mindfulness, and that the psychoeducation tips (control condition) would have the least positive effects. Our results did not support our hypotheses. First, all three interventions were equally effective in reducing stress and psychological distress in college students. Secondly, both the control and the mindfulness interventions led to a significant decrease in anxiety levels compared to the adult-coloring intervention. Third, participants in the control condition had a significant increase in mindfulness levels compared to the mindfulness and adult-coloring intervention.

It should be noted that our control condition was an “active control” whereby participants received general stress reduction tips that do have the potential to be helpful in reducing stress and anxiety. It is therefore not surprising that positive outcomes were observed in the control group. There are several possible reasons for why the control intervention led to the greatest increase in mindfulness levels. Perhaps the psychoeducation tips led to participants becoming more informally mindful in their daily activities. In addition, due to our study being conducted remotely, participants in the mindfulness condition did not have regular guidance in practicing mindfulness. This lack of guidance could perhaps explain why those in the mindfulness condition did not experience an increase in mindfulness levels. As for the adult coloring intervention, past research suggests that many individuals may not naturally practice mindfulness when engaged in adult coloring (Ashdown et al., 2018; Flett et al., 2017), but rather engage in the activity in a “mindless” manner. This past finding is consistent with our results that participants in the adult coloring intervention did not have a significant increase in mindfulness levels.

There are also possible explanations for why participants in both the control and mindfulness conditions had a significant decrease in anxiety levels compared to the adult-coloring intervention. Many participants in the adult-coloring intervention stated that they viewed their intervention as a “school assignment,” “distraction,” or a “short-term coping mechanism.” Furthermore, participants may have experienced frustration with the user interface when attempting online coloring activities on various websites. Some participants may also have preferred to hand-color pictures on paper instead of using websites. These possibilities could contribute to why those in the adult-coloring intervention did not experience a significant decrease in anxiety symptoms.

A strength of our study is that it utilized random assignment and had an experimental design, which increases our ability to

make causal claims. Another strength is that this study delivered all interventions remotely to make them accessible to students during the COVID-19 pandemic. However, our study lacked consistency in environment. We asked participants to engage in their assigned interventions in a quiet environment, however, we were not able to ensure that students did so. Other limitations of our study were small sample size and limited external validity because our participants included only General Psychology students at the University of Tampa. It would be important to explore the effects of these interventions with a greater variety of college students.

Future research could replicate this study with a face-to-face format, rather than an online format, and the duration of the interventions could be lengthened. Furthermore, future research could replicate this research study with a greater number of participants and with a variety of backgrounds. It would be interesting to compare how individuals of different ethnicities or genders respond differentially to the various treatments. Moreover, a future study could provide more ongoing guidance for those in the mindfulness intervention. In conclusion, our study found that alternative interventions such as mindfulness meditation and adult coloring, as well as psychoeducation tips, could benefit college students in reducing their levels of stress. It is important for researchers to continue to explore alternative methods and formats of helping college students with psychological distress.

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