



Does Breathing Meditation Reduces Stress Levels for Students Between Late Teenage and Early Adulthood

Yumeng Chu^(✉)

Department of Art and Science, Queen's University, Kingston K7L 3N6, Canada
19yc81@queensu.ca

Abstract. There is a high prevalence of stress among young adults in their late teens and early twenties. Most of them are high school students or post-secondary students. Therefore, this issue sparked our interest in examining the effectiveness of a new type of stress reduction method that has become popular recently—formal meditation. In our experimental design, 60 participants were randomly assigned to two groups, who all agreed to participate. The first group of participants was asked to answer a standardized stress level survey before and after they listened to the meditation. The second group of participants was asked to answer the standardized stress level survey before and after “12 min of free time”, the second group of participants was asked to continue doing things in their daily routine as usual during this 12 min-period. The intervention meditation used in our experiment is breath meditation, which focuses mainly on guiding people’s attention to their breathing. This meditation video appeared to reduce stress levels in an overall positive manner. Therefore, we believe that this self-help intervention can provide people with stress complaints with easy access to information and assistance.

Keywords: Breathing meditation · stress management · adolescent · emerging adulthood

1 Introduction

It is important to recognize that psychological stress is not always going to negatively affect one’s health. Dhabhar explains how short-term stress serves an adaptive purpose during a fight or flight as a physiological stress response. A moderate amount of short-term stress may also help us improve our alertness, performance, and memory. Despite the fact that short-term stress can be beneficial by preparing the organism to deal with challenges, long-term stress is generally considered harmful [1]. Stress can have a negative impact on one’s health when it persists over a long period of time [2]. Psychological stress triggers a variety of physiological responses affecting the nervous system, the endocrine system, the cardiovascular system, and the immune system, as well as causing mental health problems [3, 4].

Stress is highly prevalent among students in their late teenage and early adulthood due to the rapid development of society and the nature of how their brains function

during this age [5]. The majority of them are high school students or post-secondary students who are facing both personal growth pressure and academic pressure. Many of them are also in the stage of emerging adulthood and face challenges like identity exploration, instability, and feeling incompletely adult [6]. According to a 2017 survey, college-aged adults reported higher levels of stress than older generations and often did not have adequate coping mechanisms to overcome that stress [7]. Young people are often reluctant to seek professional help services because it is not cost-effective and very time-consuming [8]. Therefore, young people often seek unhealthy and risky ways of reducing stress like staying late and scrolling on social media, or even extreme alcohol use or drug use [9]. Thus, there is a critical need to encourage them to use a more healthy and effective way of stress release.

Meditation has a long history. According to Psychology Today, archaeologists have dated meditation to as early as 5,000 BCE. Recent years have seen meditation gain popularity as a method of relieving stress. Due to the fact that meditation is still in its developing stage and is a relatively new method of regulating emotions for most people today, more research is required in this field in order to improve its function and make it more widely applicable [10].

2 Goal and Hypothesis

Meditation has become popular in recent years. Much research has been done by scholars in this field. For example, in Michael Girodo's experiment, he and his colleagues found that meditation is effective in treating anxiety neurosis [11]. However, it is still necessary to question the effectiveness of meditation in stress releasing on a daily stress level. The four of us in our research group are all in our transition stage from adolescence to full adulthood. Through our observations of the stress our peers face and from our personal experiment, we became interested in researching whether meditation can reduce the stress that people our age usually face, like academic pressure and identity crisis [12]. We were particularly interested in breath meditation for stress release because it's a form of "entry-level" meditation that anyone can do. Therefore, we first raised awareness of the question: "Does breathing meditation really reduce stress levels between late teenage and early adulthood?" Therefore, the goal of our study is to evaluate the effectiveness of this breathing meditation intervention on students' stress perception. Moreover, we hope that the information gathered from our research will support students with a coping mechanism to navigate their academic and life stressors. In our research study, we hypothesized that breath meditation reduces stress levels among late teenage, while the null hypothesis is that breath meditation does not reduce stress levels between late teenage and young adulthood.

3 Methods

3.1 Participants

We have also collected some demographics in our survey. In the experimental group, there were 8 female participants and 20 male participants, and there were 25 university students and 3 high school students. While in the control group, there were 9 male

participants and 19 female participants, and there were 13 university students and 15 high school students. The age mean of the experimental group is about 19.96 years old (Median = 20), and the age mean of the control group is about 19.42 years old (Median = 20).

3.2 Experimental Design

During the first week of the semester following summer break, which is often associated with increased stress and anxiety among high school students and college students, we conducted an online 12-min breath meditation intervention. We sent the QR-code of the Self-Rating Anxiety Scale for the participants to complete before and after the intervention. We also held several Zoom meetings playing the meditation video at different times of the day. The participants each chose one meeting to attend. In this study, 56 participants were randomly selected from our WeChat friend lists who have Chinese as a first language, and who are 16 or older. The 56 participants were randomly assigned to two groups. Participants in the experimental group of 28 were asked to complete a standardized stress level survey before and after listening to the breath meditation practice. The control group of 28 participants were asked to answer the standardized stress level survey two times for a duration of 12 min, and the participants were asked to continue doing things in their daily routine during this 12 min-period. Overall, in our experiment, we manipulated the independent variable, which was the breath meditation practice, and we measured the changes in the stress levels, which was the dependent variable.

3.3 Anxiety Assessment

Participants in this study completed a self-administered standardized stress level survey, specifically the Self-Rating Anxiety Scale (SAS) was used [13]. The SAS focuses on the most common general symptoms of anxiety disorders; anxiety is typically caused by coping with stress. Since Zung created an English and a Chinese version of SAS, all the participants in this experiment completed the Chinese version of SAS [13]. In total, there are 20 questions, 15 of which increase in score value with anxiety level and 5 of which decrease in score value with anxiety questions. When the total score is calculated, the higher the score was, the more severe the stress level was. There are example statements like “I feel more nervous and anxious than usual”, “I feel afraid for no reason at all” and “I get upset easily or feel panic” [13].

3.4 Breath Meditation Intervention

This is a 12-min guided formal meditation video recording; a screenshot of the meditation video is shown in Fig. 1. This meditation video focuses mainly on guiding people’s attention to their breathing, which is to feel the natural rhythm of inhaling and exhaling.



Fig. 1. A screenshot of the breath meditation video [Owner-draw]. Note. A screenshot of the breath meditation video, “Talk to your inner self, slow down your life, anxiety relief meditation, 12 min long.”

4 Results

We calculated the differences in the participant’s stress levels before and after the intervention for the experimental group, and the differences in the participant’s stress levels before and after the 12 min of free time. We calculate the mean and the standard error of the stress level differences (before and after the intervention or the control time) in both the experimental group and the control group. The Mean = -1.857, SE = 0.416 for the experimental group, and Mean = 0.92, SE = 0,174 for the control group are indicated in Fig. 2 The boxplot below indicates that the median for the differences in stress levels for all 56 participants is 0, and the maximum and minimum difference in stress level (before and after the intervention or the control time) is 6 and -6 respectively. The boxplot indicates that most of the participants showed a decrease in their stress levels after the meditation intervention or the 12 min of free time (see Fig. 3).

First, we used the Shapiro-Wilk normality test to test whether our collected data is normally distributed. This results in $P = .13$, ns, therefore, our data is normally distributed. Secondly, because our data collected is continuous data and is normally distributed, we used a t-test for further calculation. We imported our data into R studio and use an unpaired t-test as our design includes both an experimental group and a control group. We resulted in $T = 4.3924$, and $p = .000$, the absolute value of the t score is greater than the critical value of .975, and $p < .001$. Therefore, we reject the null hypothesis, indicating that breath meditation reduces stress levels for students between late teenage and early adulthood.

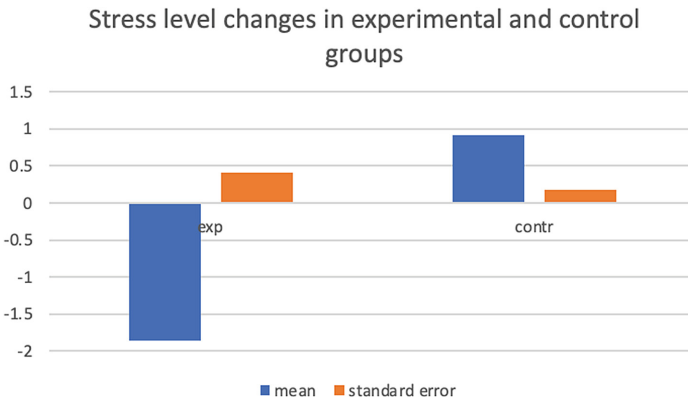


Fig. 2. Stress level changes in experimental and control group [Owner-draw]. Note. The mean and the standard error of the stress level differences in the experimental group and the control group.

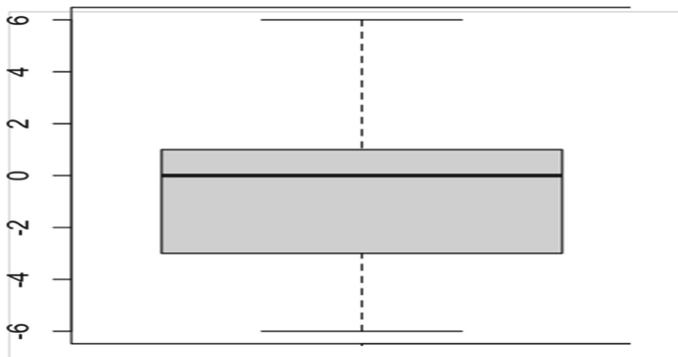


Fig. 3. Boxplot of the stress level differences for both the experimental group and the control group [Owner-draw]. Note. The boxplot indicates the stress level differences for both experimental group and control group.

5 Conclusion

The objective of our project was to examine the effectiveness of breathing meditation in reducing stress levels for students between late teenage and early adulthood. In view of the high level of stress among college students and high school students, the purpose of this project was to assist students in this age range in developing positive coping mechanisms in order to deal with their academic and life stressors. These mindfulness skills may allow students to reduce their anxiety and stress, resulting in improved academic performance, reduced burnout, and increased empathy toward their patients in the long run.

5.1 Limitations

As compared to previous studies in this field, our study is more cost effective and time efficient because all processing takes place online within a short period of time. However, our study does have many limitations. Firstly, our study has a small sample size, and since all of our samples speak Chinese as their first language, our findings can only be applied to Chinese students. More samples could be collected in order to generalize students from other cultural backgrounds or a broader population. Secondly, our meditation intervention was short in duration as participants were only required to practice meditation once. Therefore, long-term effects were not examined in this study, so we cannot determine whether the effects were permanent. Thirdly, because of our small sample size and short intervention duration, the results of the change in stress levels are more likely to be affected by participants' personal factors such as special events, diet, and sleep quality. Moreover, as we are not able to form a lab setting for our participants, it is hard for us to control outside factors. This also means that what participants in the control group did during those 12-min could also affect the results of the change in their stress levels. Finally, our study was also limited by potential self-reported outcomes which may have led to reporting bias by participants due to the subjective nature of surveys. This is due to the fact that self-report measures are susceptible to method variations or social desire effects. Moreover, since the participants answered the same set of questions before and after the intervention, and the duration between before and after the intervention was relatively short, the results from the second survey may be heavily influenced by the results of their previous survey, or by participant expectations.

5.2 Future Directions

Based on the findings of the study, self-help interventions such as meditation are capable of reducing stress on a substation level. Meditation is also a really suitable intervention for students particularly, students usually feel stressed periodically depending on which academic period they are in, and they often feel it's too much for them to seek professional help, so a self-help intervention may be a better choice for them. Moreover, self-help intervention like meditation is easy to access and cost-effective, as we are able to find professional guided meditation online for free nowadays. Despite the fact that this kind of occasional meditation practice provides a sense of instant relaxation, previous studies indicate that the more significant effectiveness emerges only after long-term meditation practice on a regular basis [11]. Regular practice of meditation will result in a calm physiological state that will have long-term benefits for the health and activity of people's brains [11]. Due to the limited amount of time, we were not able to let our participants practice a long-term meditation intervention, but future studies may be designed with a longer intervention duration. The participants will do the meditation practice once a day regularly for two weeks. Research has also shown that it is better to meditate a little regularly than to meditate intensely but irregularly. Once a day is an excellent rhythm if you are interested in reaping the real benefits of mindfulness-style meditation [10].

References

1. Dhabhar, Firdaus S. "Effects of Stress on Immune Function: The Good, the Bad, and the Beautiful." *Immunologic Research* 58, no. 2–3 (2014): 193–210. <https://doi.org/10.1007/s12026-014-8517-0>.
2. Pascoe, M. C., Hetrick, S. E., & Parker, A. G. (2020). The impact of stress on students in secondary school and higher education. *International Journal of Adolescence and Youth*, 25(1), 104–112.
3. Steptoe, Andrew, Mark Hamer, and Yoichi Chida. "The Effects of Acute Psychological Stress on Circulating Inflammatory Factors in Humans: A Review and Meta-Analysis." *Brain, Behavior, and Immunity* 21, no. 7 (2007): 901–12. <https://doi.org/10.1016/j.bbi.2007.03.011>.
4. Barnes, V. A., Bauza, L. B., & Treiber, F. A. (2003). Impact of stress reduction on negative school behavior in adolescents. *Health and Quality of Life Outcomes*, 1(1), 1–7.
5. Keshavan, M. S., Giedd, J., Lau, J. Y., Lewis, D. A., & Paus, T. (2014). Changes in the adolescent brain and the pathophysiology of psychotic disorders. *The Lancet Psychiatry*, 1(7), 549–558.
6. Gill, G., Nayak, A. U., Wilkins, J., Hankey, J., Raffeeq, P., Varughese, G. I., & Varadhan, L. (2014). Challenges of emerging adulthood-transition from paediatric to adult diabetes. *World journal of diabetes*, 5(5), 630.
7. "Stress in America 2007." *PsycTESTS Dataset*, 2007. <https://doi.org/10.1037/t55062-000>.
8. Gulliver, Amelia, Kathleen M. Griffiths, and Helen Christensen. "Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review." *BMC psychiatry* 10, no. 1 (2010): 1–9.
9. McCreary, Donald R., and Stanley W. Sadava. "Stress, Drinking, and the Adverse Consequences of Drinking in Two Samples of Young Adults." *Psychology of Addictive Behaviors* 12, no. 4 (1998): 247–61. <https://doi.org/10.1037/0893-164x.12.4.247>.
10. Ross, Ashley. "Meditation History: Religious Practice to Mainstream Trend." *Time*. Time, March 9, 2016. <https://time.com/4246928/meditation-history-buddhism/>.
11. Girodo, Michael. "Yoga Meditation and Flooding in the Treatment of Anxiety Neurosis." *Journal of Behavior Therapy and Experimental Psychiatry* 5, no. 2 (1974): 157–60. [https://doi.org/10.1016/0005-7916\(74\)90104-9](https://doi.org/10.1016/0005-7916(74)90104-9).
12. Roux, C. (2011). Forensic science—A teenager in identity crisis?.
13. Zung, William W.K. "A Rating Instrument for Anxiety Disorders." *Psychosomatics* 12, no. 6 (1971): 371–79. [https://doi.org/10.1016/s0033-3182\(71\)71479-0](https://doi.org/10.1016/s0033-3182(71)71479-0).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

