

Utilizing Meditation Audio in Warrior Mind Training Treat Traumatized Firefighters

Mengqi Zou

Beijing No. 101 High School, Beijing, China

Abstract. Meditation is a psychological concept that has become a hot topic recently in the field of neuroscience. Based on many fundamental and crucial experiments or research, people discovered that meditation, however, is a stress buster that helps people to alleviate the symptoms of anxiety disorders spectrums with its scientific mechanisms that are studied. When it comes to firefighters frequently exposed to traumatic fire scenes and at risk of being traumatized, chances are high that meditation will be a pragmatic way of improving their resistance when exposed to the trauma without any side effects caused by its medication. This paper examines the effectiveness of meditation in alleviating PTSD or traumatized symptoms for firefighters with the use of two psychological scales, analyzing and categorizing each result in the statistic. By listening to the meditation audio, the symptoms of insomnia and anxiety have been assuaged, shown by the post-intervention group with $p=0.099<0.1$, $\chi^2 = 4.63$ in insomnia-scale measurement, as well as $p=0.079<0.1$, $\chi^2 = 3.086$ in traumatized-scale measurement, embodying the effectiveness of meditation in alleviating traumatized symptoms and insomnia severity as prediction (P was set at 0.1).

Keywords: Meditation; Traumatize; Firefighter; Insomnia; Warrior Mind Training.

1. Introduction

Posttraumatic stress disorder (PTSD), the development of recognizable symptoms after exposure to one or more traumatic experiences, is characterized by a predominance of emotional, behavioral, and fear-based reexperience symptoms, symbolized by anhedonia or dysphoric mood states and negative thoughts. [1]

Every year, 6% of the population, or around 6 out of every 100 individuals, will have PTSD at some point in their life. [2] Firefighters, who experienced multiple traumatic events, have a greater risk of developing PTSD at a heightened rate.[3] According to studies, anything between 7% and 37% of firefighters matches the requirements for a current PTSD diagnosis. [4]

As a crucial job in saving people's lives, firefighters' mental issues need increased awareness and effective treatment. Treatment such as exposure therapy functions effectively by targeting the acquired behaviors in avoidance that individuals adopt in reaction to circumstances, ideas, and memories that are seen as frightening or anxiety-inducing.[5] Nonetheless, exposure therapy has the highest dropout rate of any PTSD therapy that has been well researched so far, and it has also been linked to increased levels of violence, suicidal thoughts, and depression in certain veterans.[6] The ineffectiveness of half of the people's absent response to therapy and uncomfortable feelings while undergoing treatment stresses the importance of considering a new option for treating PTSD.[7]

The practice of meditation may be characterized as a collection of methods designed to promote increased alertness and concentration. [8] Its primary goal is to reduce reactivity to one's unpleasant thoughts and sensations, which, while disturbing and upsetting and stealing one's attention from time to time, are invariably transient.[9] For thousands of years, contemplative practice and self-regulation have benefited greatly from the practice of meditation. Following the end of World War II, an increased interest in meditation and Eastern philosophy began to take root. [10] The Warrior Mind Training program – based on mind-focusing techniques – was created for veterans to stay focused during combat and to reintegrate themselves into society once combat has ended. [11] This training technique reduces trauma reactions — fluctuated mood states or insomnia caused by physical reasons or experienced mental nightmares — and is used at seaside Camp Lejeune, 100 miles inland at the Army's Fort Bragg, and at many facilities in California.[12] [13] Warriors may fortify their brains by fusing these potent mind-focusing techniques with the therapeutic benefits of music. [14] Enhancing

resilience and mindfulness skills, warriors, and further prevention will guarantee those veterans like firefighters are less affected by trauma.

With firefighters younger and fewer experiences being more likely to experience PTSD since they experience more types of disasters, professional training may help reduce the likelihood of developing PTSD. [15] This research, in this case, focuses on the younger firefighters with less working experience to determine whether meditation functions well in alleviating their traumatized symptoms by improving their sleeping conditions.

2. Methods

2.1 Participants

Participants were firefighters from two classes of Beijing Economic and Technological Development Zone Fire Rescue Detachment. The selection criteria included: 1) At least 15 numbers of Active-Duty firefighters, 2) At the age between 20-30 years old on average, 3) Males, 4) Many times of working experience (20-30 times) on average.

2.2 Materials

2.2.1 Testing Assessment

In this research, the researcher used the Athens Insomnia Scale (AIS) and PTSD Checklist for DSM-5 (PCL-5) to measure before and after the meditation was performed.

The AIS is capable of categorizing insomnia severity as follows: absence of insomnia (0–5), mild insomnia (6–9), moderate insomnia (10–15), and severe insomnia (16–24) [16]; In the PCL-5, the scores for the items within each cluster, and each item scored as 2 = "Moderately" or higher can be treated as an endorsed symptom in the provisional diagnosis of PTSD by applying the DSM-5 diagnostic criteria, which calls for at least: 1 B item (questions 1–5), 1 C item (questions 6–7), 2 D items (questions 8–14), and 2 E items (questions 15-20). [17]

In both questionnaires, their ages and numbers of entering fireplaces are also included as questions.

2.2.2 Technical Equipment

Wen Juan Xing, a website for designing the questionnaire, includes two measurement scales sent to the two classes of firefighters before and after. [18] The data in the questionnaire can also be exported in excel for further statically analysis.

Zen Warrior, a piece of Asian meditation music for Tai Chi yoga practice and oriental songs for martial arts training, [19] is used as the Warrior Training Audio, listened to by those firefighters for seven nights and 15 minutes before sleeping as an intervention.

2.2.3 Procedure

At the beginning of the before-after study, two classes of active-duty firefighters (18-22) who will be randomly picked were involved in the research process. And the hypothesis of Warrior Mind Training is displayed that it can alleviate the firefighter's traumatized symptoms, as well as their insomnia severity.

Before the intervention, firefighters, having undergone the same training and life experience, will be asked to finish both PCL-5 (with 21 of them) and AIS scales (with 22 of them), and the results of both scales will be measured and recorded. Their ages and numbers of fires entered will also be mentioned in both questionnaires. Consequently, the researcher will sum up the numbers on the scales and categorize those results into different levels of insomnia and kind of traumatized symptoms.

During the intervention, two classes of firefighters will be required to listen to the Zen Warrior's audio for seven nights for 15 minutes before sleeping. Every activity they experience during the day is controlled as same as before the intervention.

After the intervention, the 18 firefighters (four of whom did not attend in the later measurement due to going out for business) in the same classes will be asked to complete the same questionnaire

again. Subsequently, the researcher calculates the sum of the number of each sample in each scale, categorizing them into a specific level of sleeping condition and traumatized level (E.g., the firefighter whose sum of the answer in AIS is 4 is concluded as the absence of insomnia; the firefighter who chooses 3 in questions 6 or 7 have the traumatized symptoms).

After finishing the data collection and analysis process, the researcher then undergoes statistical analysis.

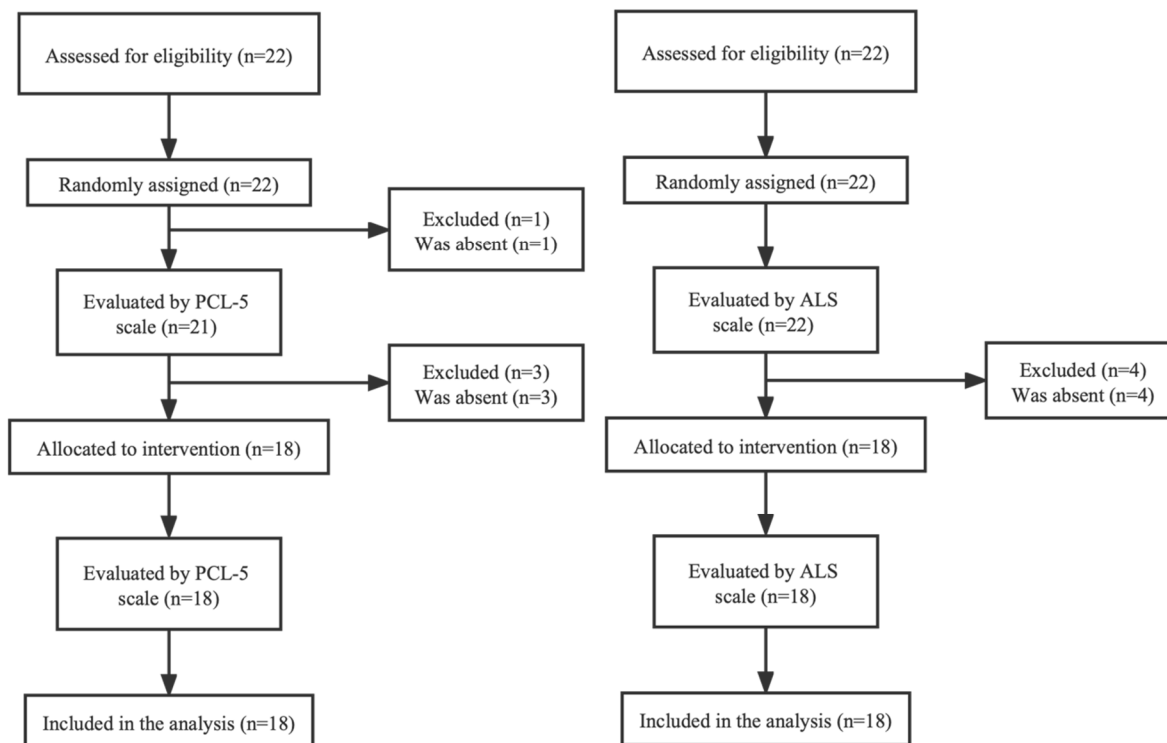


Figure 1. Procedure of experiment (PCL-5 on the left, ALS on the right)

2.2.4 Statistic Analysis

Baseline characteristics will be compared before and after the intervention in the same groups of firefighters using the Chi-square test, used to compare observed results with expected results. P was set at 0.1 for each outcome by using SPSSAU.

3. Results

3.1 Selected Sample

3.2 Outcome

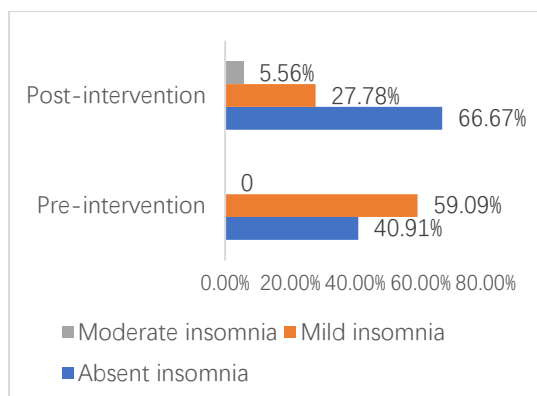


Figure 2. ALS measurement

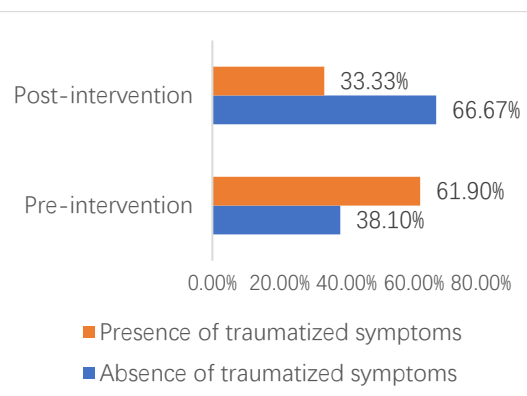


Figure 3. PCL-5 measurement

18-22 active firefighters at the age of 24.55 on average, having 27.6 to 28.5 times of working experience, were investigated to complete two scales of measurement before or after the intervention.

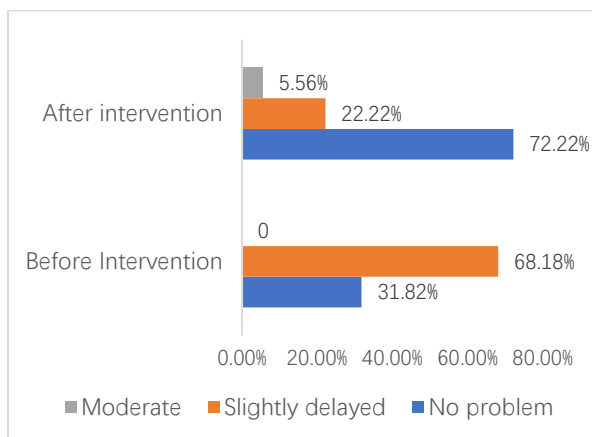


Figure 4. Sleep Induction (time it takes you to fall asleep after turning-off the lights)

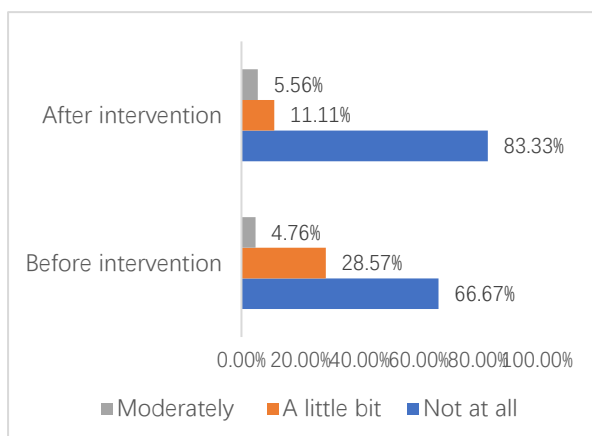


Figure 5. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?

The result of the equation model indicates the acceptable linkage between meditation’s effectiveness to alleviating insomnia and traumatized symptoms. (In scale of AIS, number of samples in pre-intervention = 22, number of samples in post-intervention = 18, $\chi^2 = 4.63$, $p = 0.099 < 0.1$; in scale of PCL-5, number of samples in pre-intervention = 21, number of samples in post-intervention = 18, $\chi^2 = 3.086$, $p = 0.079 < 0.1$)

According to Figure 2, the level of insomnia before intervention is shown in the left column, in which the mild insomnia level is 59.09%, whereas the absence of insomnia only takes 40.91%. After the intervention of listening to mediation audio, the mild insomnia level was 27.78%, the moderate insomnia level in 5.56%, and the percentage of having insomnia was 33.3%. The symptom of insomnia in percent decreases after listening to the meditation audio for seven nights based on the data. According to Figure 3, the symptom of traumatized reaction takes 61.9% before the intervention. The absent-symptom type solely takes 38.1%; after the intervention, the percentage of absent-traumatized reaction types increases to 66.67%, whereas the type of traumatized symptoms diminishes to 33.3%. The percentage of traumatized-symptom types decreases due to exposure to meditation audio during the intervention for seven nights. Specifically, when focusing on particular questions before and after the intervention, the ALS scale, which measures the sleeping condition of people, discovered an increasing percentage of people chose the "No problem" option (from 31.82% to 72.22%), meaning a significant improvement in sleeping condition. Moreover, the "Slightly delayed" option's percentage, representing mild insomnia, decreases obviously (reduces from 68.18% to 22.22%) despite the occurrence of an extremely increasing percentage of moderate insomnia. The

PCL-5 scale also demonstrated the increase in the absence of traumatized reactions, shown by the "Not at all" option from 66.67% to 83.33%; the percentage of "A little bit" also decreases, representing decreasing of traumatized symptoms in proportion, regardless the increase in extreme or moderate traumatized symptoms.

4. Discussion

Measuring firefighters' behaviors before or after intervention on the ALS and PCL-5 scales, the researcher finds the effectiveness of meditation audio in alleviating insomnia and traumatized symptoms. Furthermore, the positive impact of meditation even alters each symptom of insomnia or being traumatized included in both scales' questions per se.

Meditation has the capacity to improve people's sleeping conditions by diminishing insomnia and sleep disturbance. The previous study focuses on evaluating the effectiveness of mindfulness meditation, a mind-body medicine intervention, in improving sleep quality in adults with mild sleep disorders. [20] In the short term, formalized meditation-based therapies may help older persons with their sleep issues, and this impact seems to transfer over into a reduction in sleep-related daytime impairment that has consequences on the quality of life. [21] Moreover, in the evaluation of the efficacy of mindfulness meditation for treating chronic insomnia, the researchers discovered adults with persistent insomnia might benefit from mindfulness meditation as a therapy option, which might replace more conventional insomnia medications. [22]

Meditation also plays an indispensable role in mitigating traumatized symptoms. As a time-based symptom, instead of longer-conditioned PTSD, [23] a quintessential anxiety disorder, [24] being traumatized can be alleviated by taking simple meditation. The previous study, which is an open-label, a randomized clinical trial, looked at the benefits of meditation on anxiety, to which PTSD attributes, fatigue, and quality of life in women following breast cancer radiation therapy. [25] The findings corroborated that meditation is useful in reducing anxiety levels in breast cancer patients. [26] The fatigue level of the control group increased, whereas the fatigue level of the test group who received meditation therapy dropped, indicating that meditation is helpful in reducing fatigue. Aside from that, despite the lack of a direct measurement of exhaustion, a study found that meditation has a good effect on energy and physical function. [27]

Customarily, when being traumatized, the amygdala undergoes dysregulation, and dysfunction contributes to the traumatized symptoms. In this way, amygdala down-regulation could enhance clinical efficacy. [28] By taking meditation, through decreased amygdala activation, the training may enhance emotional responsiveness. [29]

During the intervention process, the method of the Warrior Mind Training program was used for those active firefighters who experienced traumatized symptoms and insomnia in a large proportion (59.09% of insomnia in Figure 2 and 61.90% of presence of traumatized reaction in Figure 3). Listening to the meditation audio of Zen Warrior audio for seven nights before sleeping, the participants' sleeping conditions and severity of traumatized symptoms were analyzed with two scales (ALS and PCL-5) before and after. When listening to the audio, the participants focused on their breath, emptying their minds, and therefore their sleeping condition improved. This can show the positive effects of the intervention type, as well as the effectiveness of undergoing meditation, which supports theoretical perspectives that meditation has the effect of reducing insomnia levels.

In addition, the results of the one-question PCL-5 scale asking about the feeling of stressful events' reexperience shown in Figure 5 also support the theoretical perspective that undergoing meditation positively influences alleviating traumatized symptoms.

4.1 Limitation

In spite of the promising finding in this study which discovered the effectiveness of meditation in assuaging insomnia and traumatized symptoms of firefighters, several limitations must be noted. Firstly, the limited sample size reduces the visibility of the result. Without testing the firefighters

from the whole Fire Department, the researcher merely conducted experiments among two classes of firefighters at young ages. Additionally, there are more variables that should be taken into consideration: ages and times of being a firefighter. These factors can also be influential in determining the level of firefighters' severity of insomnia and traumatized reactions. Finally, the time of undergoing meditation and listening to the Zen Warrior audio should be prolonged from seven nights to two months for better accuracy. In the future study, the researcher should include a larger sample size above 200 firefighters of different ages and different working backgrounds, testing the factors like ages or working times related to the symptoms of insomnia and being traumatized by listening to the meditation audio for two months.

References

- [1] DSM-5: Diagnostic and Statistical Manual of Mental Disorders, 5th Edition. Generic Tyzek, 2022.
- [2] "PTSD: National Center for PTSD." U.S. Department of Veterans Affairs, www.ptsd.va.gov/understand/common/common_adults.asp. Accessed 4 Sept. 2022.
- [3] Jones, Laura K., and Jenny L. Cureton. "Trauma Redefined in the DSM-5: Rationale and Implications for Counseling Practice." *The Professional Counselor*, vol. 4, no. 3, July 2014, pp. 257–71. <https://doi.org/10.15241/lkj.4.3.257>.
- [4] Boffa, Joseph W et al. "Posttraumatic Stress Disorder Symptoms and Suicide Risk in Male Firefighters: The Mediating Role of Anxiety Sensitivity." *The Journal of nervous and mental disease* vol. 206,3 (2018): 179-186. doi:10.1097/NMD.0000000000000779.
- [5] Kumpula, Mandy J et al. "Peritraumatic dissociation and experiential avoidance as prospective predictors of posttraumatic stress symptoms." *Journal of abnormal psychology* vol. 120,3 (2011): 617-27. doi: 10.1037/a0023927.
- [6] Morris, David. "Trauma Post Trauma." *Slate Magazine*, 21 July 2015, slate.com/technology/2015/07/prolonged-exposure-therapy-for-ptsd-the-vas-treatment-has-dangerous-side-effects.html.
- [7] Lang, Ariel J., et al. "The Theoretical and Empirical Basis for Meditation as an Intervention for PTSD." *Behavior Modification*, vol. 36, no. 6, 2012, pp. 759–86. Crossref, <https://doi.org/10.1177/0145445512441200>.
- [8] West, Michael. "Meditation." *The British Journal of Psychiatry*, vol. 135, no. 5, Jan. 2018, pp. 457–67. <https://doi.org/10.1192/bjp.135.5.457>.
- [9] "How Meditation Impacts Your Mind and Body." *Verywell Mind*, 22 July 2022, www.verywellmind.com/what-is-meditation-2795927.
- [10] Burke, Adam. "Prevalence and Patterns of Use of Mantra, Mindfulness and Spiritual Meditation Among Adults in the United States." *BMC Complementary and Alternative Medicine*, vol. 17, 316 (2017), June 2017, <https://doi.org/10.1186/s12906-017-1827-8>.
- [11] Ccollins. "Warrior Mind Training – 'Mindfulness' Meditation | Veterans Families United." *Veterans Families United*, veteransfamiliesunited.org/warrior-mind-training. Accessed 4 Sept. 2022.
- [12] Department Of Health and Human Services, U.S. A Treatment Improvement Protocol - Trauma-Informed Care in Behavioral Health Services - Tip 57. lulu.com, 2016.
- [13] The Associated Press. "'Warrior Mind Training' Helps Troops Stay Calm." *NBC News*, 8 Oct. 2008, www.nbcnews.com/health/health-news/warrior-mind-training-helps-troops-stay-calm-flna1c9458404.
- [14] Ccollins. "Warrior Mind Training --'Mindfulness' Meditation | Veterans Families United." *Veterans Families United*, veteransfamiliesunited.org/warrior-mind-training. Accessed 4 Sept. 2022.
- [15] Psarros, Constantin et al. "Personality characteristics and individual factors associated with PTSD in firefighters one month after extended wildfires." *Nordic journal of psychiatry* vol. 72,1 (2018): 17-23. doi: 10.1080/08039488.2017.1368703.
- [16] Okajima, Isa et al. "Evaluation of Severity Levels of the Athens Insomnia Scale Based on the Criterion of Insomnia Severity Index." *International journal of environmental research and public health* vol. 17,23 8789. 26 Nov. 2020, doi:10.3390/ijerph17238789.

- [17] VA.gov | Veterans Affairs. www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp. Accessed 15 Sept. 2022.
- [18] “Wen Juan Xing.” <https://www.wjx.cn>, www.wjx.cn. Accessed 19 Sept. 2022.
- [19] Zen Warrior - Asian Meditation Music for Tai Chi Yoga Practice, Oriental Songs for Martial Arts Training. Aqua Purha, 6 Jan. 2017, www.youtube.com/playlist?list=OLAK5uy_lLjcfV2k2hDzOQDLttjaZ31zBs5Ejlqpw.
- [20] Black, David S et al. “Mindfulness meditation and improvement in sleep quality and daytime impairment among older adults with sleep disturbances: a randomized clinical trial.” *JAMA internal medicine* vol. 175,4 (2015): 494-501. doi:10.1001/jamainternmed.2014.8081.
- [21] Black, David S et al. “Mindfulness meditation and improvement in sleep quality and daytime impairment among older adults with sleep disturbances: a randomized clinical trial.” *JAMA internal medicine* vol. 175,4 (2015): 494-501. doi:10.1001/jamainternmed.2014.8081.
- [22] Ong, Jason C et al. “A randomized controlled trial of mindfulness meditation for chronic insomnia.” *Sleep* vol. 37,9 1553-63. 1 Sep. 2014, doi:10.5665/sleep.4010.
- [23] How to Prevent Trauma from Becoming PTSD. 19 Sept. 2017, adaa.org/learn-from-us/from-the-experts/blog-posts/consumer/how-prevent-trauma-becoming-ptsd.
- [24] Zoellner, Lori A., et al. “PTSD Not an anxiety disorder? DSM Committee Proposal Turns Back the Hands of Time.” *Depression and Anxiety*, vol. 28, no. 10, Wiley, Oct. 2011, pp. 853–56. <https://doi.org/10.1002/da.20899>.
- [25] Kim, Hwa Jung, et al. “Effects of Meditation on Anxiety, Depression, Fatigue, and Quality of Life of Women Undergoing Radiation Therapy for Breast Cancer.” *Complementary Therapies in Medicine*, vol. 21, no. 4, Aug. 2013, pp. 379–87. <https://doi.org/10.1016/j.ctim.2013.06.005>.
- [26] Hofmann, Stefan G et al. “The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review.” *Journal of consulting and clinical psychology* vol. 78,2 (2010): 169-83. doi: 10.1037/a0018555.
- [27] Zhang, Jia-Yuan, et al. “Randomized Controlled Trial of Mindfulness-based Stress Reduction (MBSR) on Posttraumatic Growth of Chinese Breast Cancer Survivors.” *Psychology, Health & Medicine*, vol. 22, no. 1, Informa UK Limited, Feb. 2016, pp. 94–109. <https://doi.org/10.1080/13548506.2016.1146405>.
- [28] Fruchtman-Steinbok, Tom et al. “Amygdala electrical-finger-print (AmygEFP) Neuro Feedback guided by individually-tailored Trauma script for post-traumatic stress disorder: Proof-of-concept.” *Neuro Image. Clinical* vol. 32 (2021): 102859. doi: 10.1016/j.nicl.2021.102859.
- [29] Kral, Tammi R A et al. “Impact of short- and long-term mindfulness meditation training on amygdala reactivity to emotional stimuli.” *NeuroImage* vol. 181 (2018): 301-313. doi: 10.1016/j.neuroimage.2018.07.013.