



Digital relaxation training and its effects on work stress and well-being

A randomized controlled trial of the Synctuition
relaxation program and wellness outcomes for office
workers.



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Key findings

Digital relaxation training can decrease stress amongst other wellness factors in office workers.

The randomized controlled trial (RCT) of digital relaxation training analyzed positive outcomes for office workers. Participants used Synctuition, a commercially available relaxation app and website. Synctuition improved stress levels, sleep quality, and resilience. Synctuition provided greater improvement across these outcomes after 8 weeks of use, and continued improving towards the final 16 weeks of use. There were also small-to-moderate improvements in global well-being and cognitive skills. Participants who used Synctuition more regularly benefited the most and reported additional benefits including more motivation, mindful awareness, and self-confidence.

Background

Stress can affect all aspects of life, including a person's emotions, behaviors, thinking ability, and physical health. For example, stress overload can cause physical symptoms such as headaches, fatigue, and poor sleep. In the long term, stress can cause or exacerbate serious health conditions including cardiovascular disease, gastrointestinal problems, obesity, and diseases of the reproductive system. Furthermore, chronic stress increases the risk of developing mental health problems, including depression and anxiety disorder.

Several studies and surveys show that job-related stress is the major source of poor mental health for adults and it has escalated progressively in recent years (Thorsteinsson, 2014 and Bhui et al., 2016). According to a survey by the American Institute of Stress, 65% of interviewees said that workplace stress had caused difficulties, and more than 10% described these as having major effects on their lives. Health and Safety and Executive (HSE) reported that 602,000 workers in the UK suffered from work-related stress, depression, or anxiety (new or long-lasting) in 2018/19. In addition, 12.8 million working days were lost to these three factors.

Relaxation techniques have received widespread attention for their ability to help with stress management and overall well-being (Krusche et al., 2012 and Kemper, 2017). Relaxation is a process that decreases the negative symptoms of stress. There are several relaxation techniques including acupuncture, mindfulness, meditation, visualization, and deep breathing. While studies have demonstrated a positive relationship between relaxation techniques and well-being, they have focused on traditionally delivered stress reduction therapies. Although effective, traditionally delivered therapies can be inaccessible for a significant proportion of the population due to high costs, lack of time, and location.

In recent years, digital training mediums, such as smartphone-based relaxation apps have sought to offer alternatives for stress relief. Digital mediums have become an attractive alternative due to factors such as lower costs, accessibility, and entertaining activities. A recent meta-analysis of digital training mediums demonstrated beneficial impacts on stress, anxiety, depression, and overall well-being (Spijkerman, 2016 and Ma et al., 2018).

Synctuition, a mobile application and website, incorporates audio-guided imagery, mindfulness techniques, and binaural beats into 25-minute relaxation sessions intending to reduce stress, improve sleep quality, and overall well-being of the user. The purpose of the RCT is to assess whether completing 80 sessions of Synctuition can improve several wellness factors such as stress, sleep quality, resilience, well-being, and cognitive skills in employees. If proven effective, this application could be used more widely to promote wellness at the workplace.

The Randomized Controlled Trial (RCT)

The study participants were employees at two Estonian-based companies that each had over 300 employees. Company A was an IT company and company B was a financial solutions company. The opportunity to participate in a research trial to reduce stress and improve wellness was publicized at both companies in a company e-newsletter. Interested employees completed an online eligibility survey. Eligibility criteria included (a) being 21 to 50 years of age, (b) being fluent in English, (c) owning an Android, iPhone smartphone, or computer, (d) having no clinical diagnoses of depression, heart disease, hypertension, or cancer because treatment for these diseases could have influenced the study's outcomes, and (e) having no previous experience with Synctuition. In total, 217 volunteers from the general population

expressed interest in participating. 68 participants withdrew after being randomized and before the beginning of any assessments. Of the 149 participants that began the intervention, 54 withdrew before completing the intervention, resulting in a final size of 95 (61 females and 34 males).

Participants were provided with a Synctuition gift card code, which gave them access to the program for the duration of the RCT along with instructions on how to redeem their code and install the app. The program consisted of 80 relaxation sessions lasting approximately 25 minutes each. Participants were asked to listen to one session per day after work. For each session, participants were instructed to sit comfortably and were led through pre-recorded relaxation audios. The sessions were to be listened once per day, for 16 weeks, to positively impact stress, sleep quality, resilience, well-being, and cognitive skills.

The intervention focused on the first 4 levels of the Synctuition program, including “Level 1: Discovering your path”; “Level 2: Journey of Life”; “Level 3: Inner Voice”; and “Level 4: My Inner World”. Each level consists of 20 audio recordings of a duration of 25 minutes. Participants were asked to complete the sessions in sequential order set by the program and to complete each component before starting the next one (e.g. audio number 1 must be completed before starting audio number 2. And Level 1 must be completed before starting Level 2). Once the participant completed a level, they were automatically sent five end-of-session questionnaires to measure their progress. Selected participants were also contacted via Skype to provide comments on the overall experience.

The following data were collected for the study, with informed consent from each participant:

- Usage data collected directly from the online relaxation resource provider.
- Five sets of online survey data (see ‘measures’ below) plus comments.
- Interview data collected via Skype calls with selected participants.
- Measures

The following measures were used in this study:

- Stress: the Perceived Stress Scale test (ten items, aggregated in analysis to form one score per response to measure the degree to which situations in a person's life are perceived as stressful).
- Sleep quality: Pittsburgh Sleep Quality Index test (nineteen individual items and seven components that produce one global score to assess sleep quality over a one-month time interval).
- Resilience: the Brief Resilience Scale test by Smith et al. (six items, averaged in analysis to form one score per response to measure the ability to cope with difficulties).
- Well-being: the Living Well Assessment test (fourteen items, aggregated in analysis to form one score per response to measure the state of being content and healthy).
- Cognitive skills: the Stanford–Binet Intelligence Scale test (fifty items to measure five factors of cognitive ability including knowledge, quantitative reasoning, visual-spatial processing, working memory, and fluid reasoning).

The measures were collected for the study at the following time points:

Data	Baseline	4 weeks	8 weeks	12 weeks	16 weeks
Stress	✓	✓	✓	✓	✓
Sleep quality	✓	✓	✓	✓	✓
Resilience	✓		✓		✓
Well-being	✓		✓		✓
Cognitive skills	✓		✓		✓

Analysis

Third party researchers analyzed the quantitative survey and usage data using several regression analyses appropriate to the nature of the data. The researchers analyzed the quantitative data gathered from the survey open-text comments and skype interviews using framework analyses to identify emerging themes.

Main results

Results showed that listening to relaxation sessions via smartphone app multiple times for 16 weeks can positively impact stress, sleep quality, resilience, well-being, and cognitive skills in a sample of working adults. We also found a positive correlation between the number of sessions listened to and improvements in our outcomes, with participants who completed the greatest number of sessions experiencing the greatest wellness benefits. However, it should be noted that we found small-to-moderate effects of the intervention on global well-being and cognitive skills.

The table below offers a more detailed overview on the hypothesis established before the intervention and the final outcomes:

Hypothesis	Results
Synctuition's digital relaxation sessions will reduce stress associated with work pressure.	<p>Synctuition is effective at reducing stress associated with work pressure.</p> <p>Stress scores improved as early as 4 weeks of starting the intervention, with 54% of the group sample (n = 51) reporting less stress. The number remained consistent at 8 weeks and increased significantly at 12 weeks with 62% (n = 59) of participants reporting less stress. This number further increased, reaching 70% (n = 67) at 16 weeks.</p>
Synctuition's digital relaxation sessions will improve perceived sleep quality.	<p>Synctuition is effective at reducing poor sleep associated with stress.</p> <p>Perceived sleep quality scores improved as early as 4 weeks of starting the intervention, with 29% of the group sample (n = 28) reporting better sleep. The figure increased significantly at 8 weeks, 39% (n = 37). It continued to increase exponentially at 12 and 16 weeks, with scores of 48% (n = 46) and 58% (n = 55) respectively.</p>

Synctuition's digital relaxation sessions will improve resilience.	<p>Synctuition is effective at improving resilience.</p> <p>Participants' resilience scores showed improvement at 8 weeks of the intervention, with 27% (n = 26) reporting higher resilience. The number increased to 43% (n = 41) at 16 weeks of the intervention.</p>
Synctuition's digital relaxation sessions will improve global well-being.	<p>In comparison to the previous measures, Synctuition contributed towards a small improvement in perceived levels of global well-being.</p> <p>Participants' resilience scores showed a slight improvement at 8 weeks of the intervention, with 22% (n = 21) reporting higher resilience. The number increased to 28% (n = 27) at 16 weeks of the intervention.</p>
Synctuition's digital relaxation sessions will improve cognitive skills (knowledge, quantitative reasoning, visual-spatial processing, working memory, and fluid reasoning).	<p>In comparison to the previous measures, Synctuition contributed towards a small improvement in cognitive skills.</p> <p>Participants' cognitive skills scores showed improvement at 8 weeks of the intervention, with 16% (n = 15) reporting higher resilience. The number increased slightly to 19% (n = 18) at 16 weeks of the intervention.</p>

Feedback from participants

The survey findings suggest that using digital relaxation resources has a positive impact on office employees. Participants were interviewed via skype to gain a better understanding of why this positive change occurred. Participants reported feeling more relaxed while learning new techniques to use during stressful situations.

Developing the habit of listening to the program regularly to improve wellness is one of Synctuition's core messages. To convey this message, developers invited the participants to think about relaxation sessions and the mind as the equivalent to physical exercise and the body. The more you exercise your mind with Synctuition, the faster you will experience wellness benefits. Most of the participants assimilated this message and found it useful.

"In general, I feel good at my job. But there is always stress and negativity that we don't always notice. I liked the idea of listening to the app to destress and build mental resilience, but it was very difficult to incorporate it to my routine at the beginning. I didn't have too much free time and when I did, I would forget about doing the sessions. But then, with time, it was easier to be more consistent and listen to the audios every day. And this way, it was possible to notice a positive difference."

(Synctuition user)

"For me, the main issue is to separate work from personal life. Many times I carry the stress from work to my home and it's impossible to fully enjoy my free time. The program was a really good experience. It didn't eliminate stress for me, but rather it showed me useful ways to cope with it and not let myself be consumed by it. It's like you have to make the commitment to achieve that mental balance you want."

(Synctuition user)

Participants who engaged the most with Synctuition reported additional benefits such as:

- Increased motivation
- Increased mindful awareness
- Improved self-confidence

Limitations and future research

The present study had a number of limitations. First, the modest sample size of 95 participants in total might have limited the results. Further studies should attempt to replicate and expand upon our results with larger study cohorts to gain a full

understanding of who is most likely to benefit from digital relaxation programs.

Second, the decision to focus on a brief intervention period prevents further investigation of how long the reported effects change in the long-term. Thus, it remains unknown whether participants continued using the program, and which are the effects of the intervention or continued use of the program over 16 weeks of use. Tracking participants for longer would allow researchers to determine whether there are specific psychological or demographic factors influencing individuals and making them engage more with the program. And whether any additional benefits result from long term use.

Third, it cannot be ignored that digital relaxation sessions to reduce work stress can place the responsibility to reduce stress on the individual employee instead of emphasizing organization-level changes that might be implemented to improve wellness at the workplace. Future interventions should incorporate changes in organization factors and individual capacity for relaxation and stress management.

Conclusion

This intervention demonstrates that relaxation can be effectively delivered to a healthy working population via a self-guided, digital program. It suggests that relaxation with Synctuition is effective at reducing work-related stress, improving sleep quality, and improving resilience. It is also effective, to a lesser extent, at improving global well-being and cognitive skills. The findings are consistent with other studies that demonstrate the effectiveness of relaxation techniques delivered outside the traditional, in person, format.

The intervention also responded to the question of how much relaxation is needed to reduce stress and see improvements in other aspects of wellness. We found that the number of relaxation sessions was indeed associated with the outcomes. Specifically, there were more benefits of the intervention across the 5 measures for participants who completed more than 20 relaxation sessions within the 16 weeks.

Finally, these results may have implications for reducing the impact of stress-related absenteeism and stress-related illness on the economy and public health respectively, especially taking into consideration the accessibility and low cost of digital mental health programs. However, further research is needed to support these conclusions.

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