

The impact of music and meditation on anxiety symptoms in students

By Ryan Qi

Author Biography

Ryan Qi is a dedicated high school student with a strong interest in both medicine and music. From a very young age, Ryan has demonstrated a deep passion for understanding the natural world through study and observation. As a budding musician, Ryan seeks to thoroughly explore and unearth the potential therapeutic effects of musical pieces. As a student, Ryan strives to balance academic studies with extracurricular research and plans to continue this at the university level. When Ryan is not studying, you can find him at the piano bench, glued to a book, volunteering, or spending time with friends or family.

Abstract

Due to the ubiquitous nature of anxiety conditions and comorbidities and their detrimental damages, there has been increasing interest in anxiety research and treatment development. Here, current literature on anxiety and therapies are combined to form an overview of the available scientific knowledge. There is currently a substantial amount of information on anxiety disorders, such as the general cause, types, and typical therapies. There is also a wealth of knowledge on anxiety comorbidities. However, gaps in the literature exist regarding comorbidity complexities and alternative, nontraditional therapies, namely music- and meditation-based ones. The available research on both meditation and musical interventions is reviewed in this paper, including the background knowledge and current implementations. An original case study by the author involving the investigation of high school students' anxiety levels during both music-containing and music-free guided meditations is presented as well. The case study's design, procedure, results, and limitations are also discussed. This research confirms the need for continued research on anxiety complications and supports directing funding to a wider selection of resources.

Keywords: anxiety, stress, music, meditation, mindfulness, therapy, alternative therapy, literature review, case study

Introduction

Anxiety is a common response to stressors (National Institute of Mental Health [NIMH], 2024). Experiencing anxiety is normal, and people worry for many reasons. It becomes problematic and complicated when the anxiety persists, especially if there are no stressors present. Eventually, the anxiety can prevent one from being able to function properly, interfering with simple decisions and daily tasks. This is known as an anxiety disorder.

Epidemiology of anxiety

Anxiety disorders are extremely pervasive, existing as the most frequently occurring disorder in the EU (Harney et al., 2022). In the US, approximately 18%-20% of adults (40 million people) experience it at any point in time (Harney et al., 2022; Goldstein-Piekarski et al., 2016). There are many types of anxiety disorders, including but not limited to: Generalized Anxiety Disorder (GAD), Panic Disorder (PD), and Social Anxiety Disorder (SAD) (NIMH, 2024). Anxiety disorders all share similar symptoms, such as fear, worrying, physical discomfort (sweating, rapid heartbeat, shallow breathing, etc.), and avoiding the stressors.

Even though anxiety disorders persist, there are therapies and remedies in place to combat the symptoms (NIMH, 2024). Two common ways to treat anxiety are psychotherapy and medication. Examples of psychotherapy include Cognitive Behavioral Therapy (CBT) and Acceptance and Commitment Therapy (ACT), which aim to address unhealthy thinking and behavior that may contribute to anxiety. Examples of medication treatment include antidepressants, anti-anxiety medicine, and beta-blockers, which each target specific symptoms. Alternative treatments include the use of nontraditional methods such as exercise, reading, meditation, and music (Christensen, 2023).

Demographics

In a study of U.S. adults during the COVID-19 pandemic, it was found that people who were at the greatest risk for poor mental health, including feelings of anxiety and depression, were

young adults and the nonbinary population (Ettman et al., 2023). In addition, the elderly, females, and the unemployed are also generally at risk for poor mental health (Ettman et al., 2023). The EU's policies on mental health identified several vulnerable groups: people in dangerous occupations, young people, people with drug-use disorders, and people with mental health problems (Council of the European Union, 2025).

Anxiety comorbidities

Anxiety disorders can be comorbid; in fact, it is not uncommon that they are comorbid with other anxiety disorders or mental health disorders (Goldstein-Piekarski et al., 2016). A major and common example of anxiety disorder comorbidity is depression and anxiety, which has harmful effects on population health and the economy (Ettman et al., 2023). Another example of anxiety comorbidity is PTSD with social phobia, which was found to be the most comorbid with PTSD, of all the anxiety disorders studied (Qassem et al., 2020). In a study about anxiety comorbidities, it was found that anxiety comorbidities are extremely complicated in that having one disorder can be highly comorbid with another but not conversely (Goldstein-Piekarski et al., 2016). Because anxiety disorder comorbidity follows a difficult and inconsistent diagnosis method, and current scientific knowledge in this field is lacking, further research is needed to study this topic.

Significance

It is evident that anxiety is a significant concern. In addition to the individual symptoms and the complications of comorbidities, as well as the high prevalence of it, the effects of anxiety disorders must be considered at the national and international levels (The Lancet Global Health, 2020; Harney et al., 2022). Anxiety and depression alone cost the global economy one trillion US dollars annually through lost productivity. Unfortunately, government budgeting for mental health in the US and abroad is very low (on average 2%). In addition, only about 20% of diagnosed people who seek help receive proper intervention. This data suggests the necessity for more proper diagnosis and evidence-based therapies. It is crucial to investigate anxiety disorders

as well as effective treatments, so we can address both the individual and large-scale impacts of anxiety. Mental health research in the European Union is being directed to collecting data about mental health, finding treatments, supporting research for young people, and supporting research on working conditions on mental health (Council of the European Union, 2025).

Alternative therapies

Meditation

Meditation has been practiced for millions of years, taking on many forms from yoga to religious rituals (Gao et al., 2023).

Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) are two Mindfulness-Based Intervention (MBI) programs that incorporate meditation in shared and distinct methods (UMass Memorial Medical Center, 2025). MBSR was created for the general population and mainly focuses on recognizing and accepting all types of emotions, whereas MBCT was developed to treat depression by allowing individuals to recognize and respond to depressive symptoms. In MBSR, mindfulness meditation is used to treat a variety of physical and psychological disorders and symptoms. In a literature review, it was indicative that MBSR could improve the prognosis of chronic and clinical diseases (Niazi et al., 2011). In a study by Williams et al., they concluded that MBCT can significantly increase the time between depression relapses, which means that MBCT is effective at managing depressive symptoms (2008). MBIs have been proven to be effective compared to non-evidence-based therapies and have been moderately to strongly indicated to be effective at dealing with anxiety and depression (Hoffman et al., 2017).

Music

Studies have found that people listen to music for three main underlying reasons: to gain self-awareness, to manage emotions, and to connect with others (Schäfer et al., 2013). Music listening is an inexpensive alternative therapy for reducing

anxiety and is also easy to incorporate, does not require a medical professional, and can be self-administered. Some studies have suggested that it is effective at reducing anxiety (Hernandez-Ruiz, 2022; Harney et al., 2022). In addition, doctors at Johns Hopkins Medicine recommend listening to music for many reasons, such as reducing anxiety and engaging the brain (Johns Hopkins Medicine, 2025). They know this because they can see certain areas of the brain light up through fMRI scans.

Music and meditation for anxiety - Case study

Combining music and meditation

Studies combining music and meditation are sparse (Worthey, 2023). In one study on brain waves based on stress-reduction techniques, both music and meditation caused individuals to generate alpha waves, which indicates a reduction of stressful feelings (Stokan et al., 2022). Another study's findings suggested that either music meditation or mindfulness meditation could be used to decrease anxiety levels (Lothes II et al., 2022). A recent paper's findings strongly suggest that music paired with mindfulness practices can alleviate anxiety (Worthey, 2023).

Case study design

This case study was conducted as a single-subject experiment. Thirty people participated in my study, with the male-to-female ratio being approximately two to one. The subjects were part of a school physical education (PE) class together, so they were participating through convenience sampling. There was a voluntary questionnaire, to which about one-third (11) people responded.

The meditative experience consisted of guided yoga nidra with background music and Headspace guided meditations from the programs: Basics I, Basics II, and Basics III, which did not have background music. Yoga nidra is a meditative technique in which the individual lays down and attempts to enter a state of deep, conscious awareness. The specific background music in this

case study is best described as slow, ambient music. The yoga nidra and Headspace meditations were practiced weekly in a one to two ratio, with the overall ratio being one to three (due to missed school days). Every day during this school period, the instructor plays the guided meditation clip in a gymnasium, lights off with natural sunlight, while the subjects listen quietly until the meditation session is over.

Google Forms was used in the making of the questionnaire. The questionnaire addresses whether the subjects felt a decrease in anxiety, if they noticed the music in some of the meditation, and provided space for general feedback on the questionnaire and the experience overall. No personal information was collected to ensure confidentiality, but the form was limited to one response per email address to prevent duplicates.

Case study results

To the statement “the meditation that we've been doing in PE class has been effective at reducing anxiety”, 54.5% (6) individuals agree or strongly agree, 18.2% (2) feel neutral, and the rest (3) disagree. Based on a qualitative analysis of short answer responses to a question that asked respondents to explain their answer, respondents agreed or strongly agreed mainly because the meditation has been calming, and people who answered otherwise had similar answers in that it's difficult to focus and they're thinking of other things.

Case study limitations

The sample size of the case study is rather low, and there could potentially be bias from the convenience sampling and volunteer bias (for the questionnaire). In addition, not all meditation sessions had background music, so the results for music from this study may not be significant. This study's respondents are high school students, so the results cannot be generalized to the general population. The results of this case study are thus inconclusive.

Ethical considerations

This research was conducted following the Institutional Review Board (IRB) guidelines regarding the research on human subjects. The research was conducted on a part of a physical education curriculum, in which all participants included in the study could voluntarily contribute to this research by responding to the Google Form. No personal information was collected from participants who chose to contribute, including, but not limited to, name, gender, and contact information.

Conclusion

Anxiety is common, and so are the related disorders, but several different therapies can ease the symptoms. Anxiety disorders can be difficult to diagnose, as the comorbidities are complicated. Anxiety has significant effects on both individual health as well as national and global economy. The two main types of therapies for anxiety disorders are medication and psychotherapy. Meditation and music, two types of alternative therapies, were found to be effective in combating anxiety. Each therapy has its additional individual benefits, such as music listening having high adherence rates and MBCT resulting in less frequent depressive relapses. When meditation and music are combined, it leads to reduced anxiety levels, which is supported by several papers as well as the case study. Anxiety is an important topic of study because of the prevalence of anxiety disorders, its major individual and global effects, and the need for appealing, evidence-based therapies. In light of this, governments should direct funds to research in anxiety and implement cost-effective solutions, such as meditation and music therapies.

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Footnotes

The recording of the yoga nidra meditation can be found here:

<https://www.youtube.com/watch?v=7H0FKzeuVVs>

A PDF of the questionnaire can be found here: Meditation and Mental Health Survey - Google Forms.pdf

<https://drive.google.com/file/d/1qlxXh217dBArLDRNIrxd7wj2tDBN6cEb/view?usp=sharing>

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