

# Introduction

**Attention Deficit Hyperactivity Disorder (ADHD):** A mental disorder in which the user has **difficulty paying attention** and has excessive amounts of hyperactivity and **impulsive behavior in periods of time** (Adult Attention-Deficit/Hyperactivity Disorder (ADHD) - Symptoms and Causes, 2023).

**Brainwaves:**

- Combinations of electrical signals sent by neurons in the brain (Editorial, 2016).
  - **Theta waves:**
- Contain frequencies of **3hz to 8hz**, and are known to reduce anxiety, stress, and mental fatigue.
  - **Beta waves:**
- Have frequencies of **12 hz to 27 hz**, and are responsible for improved concentration, alertness, logic, reasoning, and critical thinking.

**Previous studies:**

- Have tried to manipulate theta, beta, and gamma brainwaves (Ingendoh et al., 2023).
- Flawed Testing Strategies

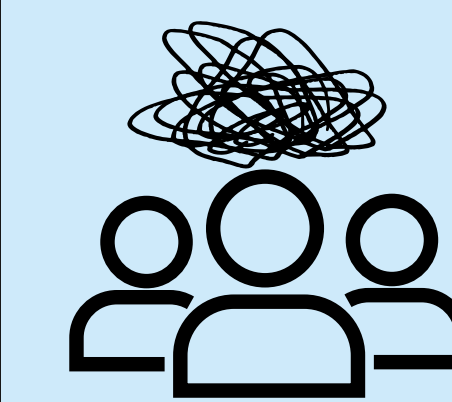


ADHD Patients have trouble concentrating in classes. One significant sign of the mental disorder is an imbalance of theta and beta brain waves in the prefrontal cortex of the brain.

Each genre of music has a specific waveform, which is a measure of frequency. Classical Music is projected to help increase concentration. There are 4 major genre of music: Pop, Hip-Hop, EDM, and Rock.

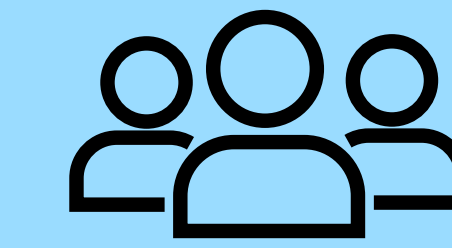


Binaural beats is a method of neurofeedback to change brain waves in the brain that uses frequencies to do so.



ADHD Patients have trouble concentrating in classes

Test which genre of music, through its use of binaural beats, helps increase beta waves



Students can listen to this genre of music to improve their concentration in classes while doing schoolwork

# Effectiveness of Music Frequencies on Mitigating the Symptoms of Attention Deficit Hyperactivity Disorder

By Heidi Rodriguez

## Purpose:

With the analysis of binaural beats in neurofeedback, in different genres of music, which genre is more effective in mitigating the symptoms of ADHD patients?

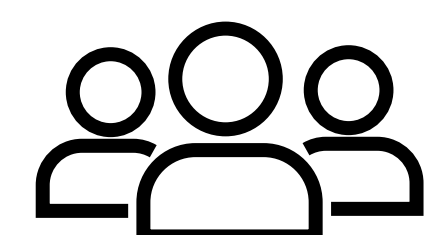
## Hypothesis:

The genre of music that is hypothesized in decreasing the symptoms of ADHD patients in classical music.

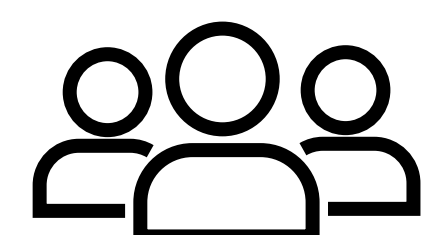
# Classical Music induces concentration in patients of ADHD:

## Contribution to Field

- The average adult spends about **\$14,000** on medication and other impacts. At a social level, the price to pay for having the disorder costs **\$122.8 billion**. (McKenna, n.d.)
- By using music as a way to mitigate symptoms, the intention is that a cost-effective solution is found.
- Due to the fact that binaural beats have been done solely with **focused frequencies**, using music to do this induces more of a **progression** in terms of how **binaural beats** can be applied and its **impact on everyday life**.

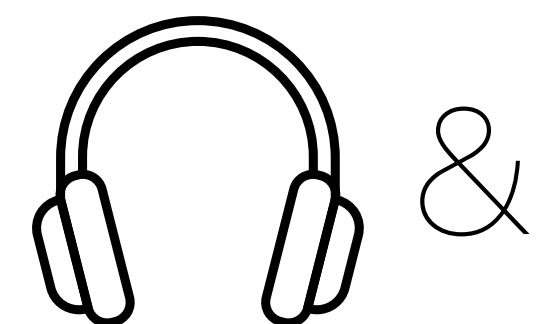


**Control: Subjects without ADHD**

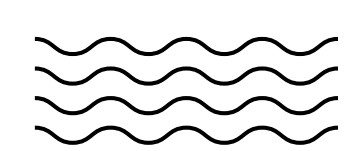
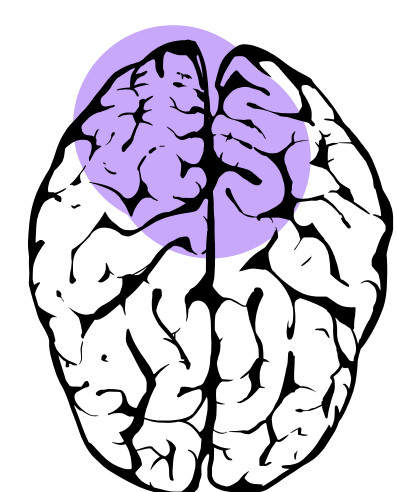


**Experimental: Subjects with ADHD**

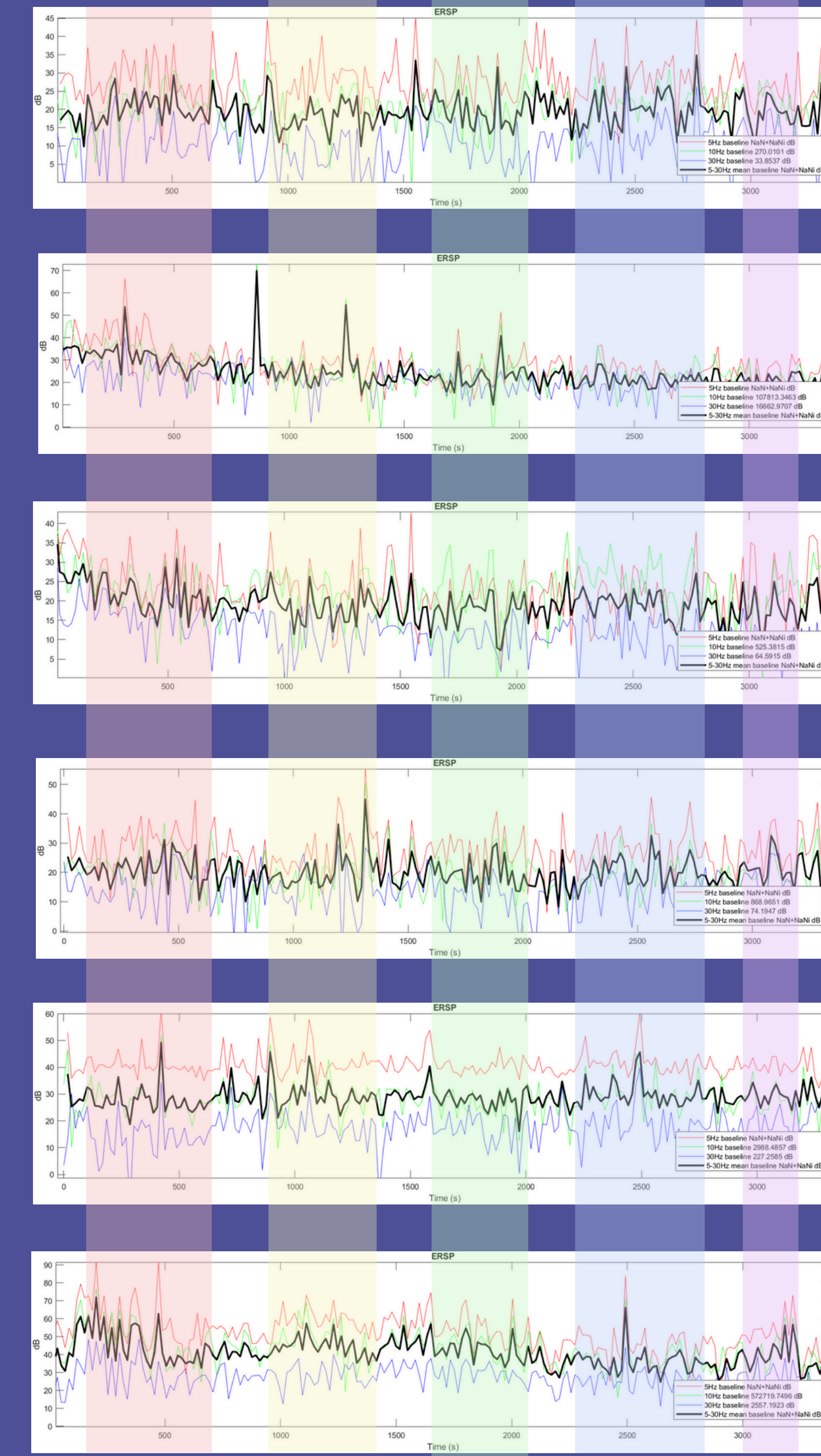
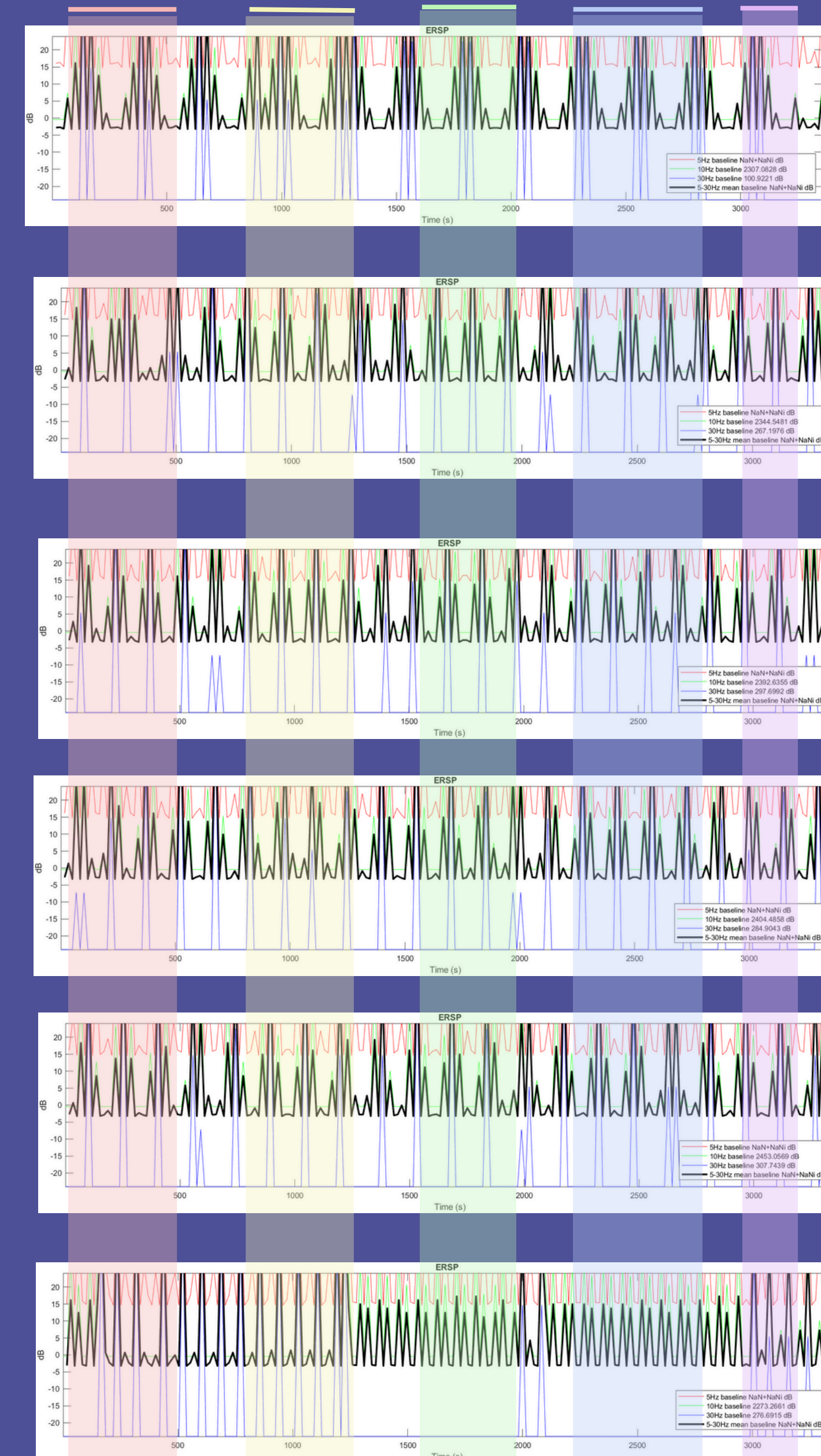
Listen to different genres of music



Complete a questionnaire



Compare the impacts of the different genres of music in mitigating theta and beta brain waves in the Prefrontal Cortex in order to reduce ADHD symptoms



## Discussion

- Classical music as well as EDM produce a significant decrease in theta waves
- Produce signs of using Binaural Beats
- More research has to be done in order to determine the influence that lyrics play into the brain waves projected in the brain while listening to music
- Can lead to cost effective methods of mitigating ADHD symptoms
- Advances in music therapy