How Does Music Affect the Brain?

- How does music affect the brain?
- My project studies heart rate and stress levels of teenagers as they listen to music.

- I found that my participants became much more tranquil while listening to music.
- They calmed down and were far more at ease than they had been.

- I used a smart watch to record heart rate as the participants listened to music and found the average of each person's heart rate with each song.
- I took note of how each participant was feeling before, during, and after each song- using their own words.

- I concluded that music, no matter the genre or intensity, may affect stress levels positively, almost every time.
- My conclusion was the root of research, other studies found, and my own project and general experience.

Introduction

Background Research

- Music affects nearly every part of the brain. This includes the amygdala and hippocampus, activating emotional responses through memory; the limbic system, activating pleasure and reward; and the motor system, making it easy to move to the beat.

Already found studies

- According to neuroscientist Kiminobu Sugaya and violinist Ayako Yonetani, music impacts brain function and human behavior by reducing stress, symptoms of depression, and even physical pain. They also have found that it may improve cognitive and motor skills and the brain's ability to produce neurons. Sugaya and Yonetani also focus on the brains of those affected by neurodegenerative diseases such as Alzheimer's and Parkinson's disease.

How does music affect the brain?

- My prediction is that I will find positive changes in heart rate and stress level, no matter the genre. Music, even if it isn't your favorite song, can take your mind off stressful situations or thoughts. It can wildly increase mental and physical health. What I am very curious about, though, is how different genres affect different people. Everyone has a different taste in music, but I wonder how much of that is influence from peers, or maybe how much is changed from a certain memory having to do with that specific song.

Procedure and Materials

Procedure

- I will record the heart rates and stress levels of children in high school. The participants include my friends/peers. Participants will be asked to listen to a curated playlist using headphones whilst wearing a smart watch. I will ask and write down the participants' emotions before, during, and after listening.

Materials

- Source of music/phone
- Headphones
- Smart watch to interpret heart rate, stress levels, etc.

Participant 1 - "Raw Blue" by Whirr

- Average heart rate ***before*** the song: 80 BPM
- Average heart rate ***during*** the song: 70 BPM
- Average heart rate ***after*** the song: 78 BPM
- Notes: before listening, participant 1 reported feeling curious, engaged in the project, but slightly ill. While listening, they said they felt extremely focused on the music, calm, and said, "it took my mind off of things." After listening, they reported feeling more at ease, giddy/excited, but resumed feeling ill.

Participant 2 - "Raw Blue" by Whirr

- Average heart rate ***before*** the song: 87 BPM
- Average heart rate ***during*** the song: 83 BPM
- Average heart rate ***after*** the song: 85 BPM
- Notes: before listening, participant 2 was feeling slightly sad about something, but at peace and, mostly, bored. During the song, participant 2 reported a feeling of nervousness and said they felt unfocused on the world outside of the music. Afterward, they were feeling neutral, bored again, but longing for the feeling they felt while listening.

Participant 1 - "One More Hour" by Tame Impala

- Average heart rate ***before*** the song: 71 BPM
- Average heart rate ***during*** the song: 66 BPM
- Average heart rate ***after*** the song: 69 BPM
- Notes: Before this song, participant 1 felt neutral, excited to listen to the song, but tired. During, they felt very involved/connected in the music. This, interestingly, included a deep, yet unwanted feeling of nostalgia. After the song was over, participant 2 felt more feelings of tranquility, and a sadness that the song was over.

Participant 2 - "One More Hour" by Tame Impala

- Average heart rate ***before*** the song: 86 BPM
- Average heart rate ***during*** the song: 75 BPM
- Average heart rate ***after*** the song: 79 BPM
- Notes: participant 2 reported feeling anxious before this song, as well as other somewhat negative emotions. They felt as if they couldn't focus and their mind was darting around different negative situations. During, they reported their attention being driven away from those thoughts and brought into a much happier realm. In the end, the song comforted them and changed their outlook to a much more confident one.

Interpretation and Explanation

- Variables that may have presented limitation might include gender, lack of musical diversity, how each participant was feeling that day, etc.
- In summary, the consensus seemed to be that music makes people calmer, more at ease and just happier in general. This project also may show that this can be the case even if the music is heavier or more intense, as the songs I used are both quite intense at times.

Significance

- This project and research is important because learning about the human brain and what affects it can help us find beneficial ways to positively manipulate the brain and regulate emotion using neuroscience. Music is widely used by humanity and has been since the beginning of time. This project is also a good way to prove that just because a song may sound aggressive or bad to you, does not always mean that it will decrease emotional or physical health. Just because you have a different music taste than somebody does not mean that they are less than you in any way. This also brings me to say that everybody should find their own taste and opinion in music, because the only time anyone's music taste is lame is when it is not their own.

References

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- https://magazine.hms.harvard.edu/articles/how-music-resonates-brain