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DSC680
Project 2, Milestone 3

Music and Mental Health

Introduction. This paper is an analysis of the role music plays in mental health. The topics that will be discussed are the main problem and history; an explanation of the data as well as the methods and analysis; and the conclusions and assumptions made regarding the data. I'll move onto the limitations and challenges presented by the data set as well as potential future uses, recommendations, and an implementation plan. Finally any ethical concerns will be addressed.

Business Problem. Music therapy has proven to be an effective treatment for mental health disorders such as anxiety and depression, but is there a way we can improve patient outcomes by identifying specific music genres according to patient age and/or disorder? If we can refine how music is handled during therapy, patients may be able to experience relief faster. When designing a treatment plan, some things therapist needs to know:

- How does favorite genre affect a person's mood?
- Is there a relationship between mental health disorders the type of music?
- Are there benefits for a patient to listen outside of their favorite genre?

Background/History. Almost 20% of adults in the United States have experience with a mental health condition, and almost 5% of adults deal with what is considered to be a serious mental health condition (Dvorak et al., 2021). Mental health disorders may affect anyone and usually result from a combination of social, biological, cultural, and psychological factors. Music therapy has shown to positively impact those who experience depression and anxiety disorders.

Data Explanation. This dataset was collected via a form on Google by Catherine Rasgaitis. Survey respondents provided basic information regarding their:

- Background – their musical background (if any) and their listening habits
- Musical genres – how often they listened to sixteen various types of music
    - Available options are:
        - Never
        - Rarely
        - Sometimes
        - Very frequently
- Mental health – they ranked how often they experience up to five designated

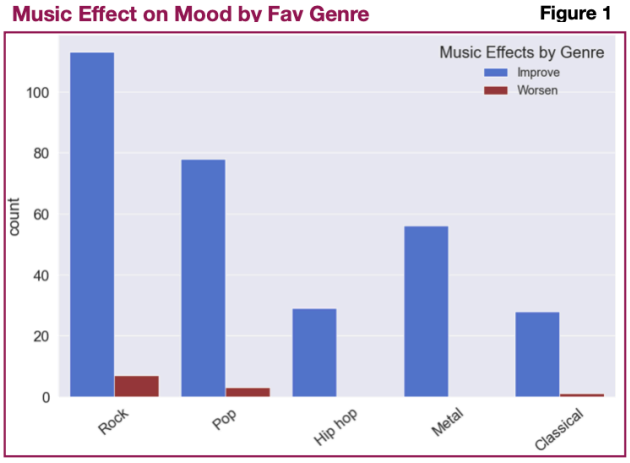
mental health conditions on a scale of 0 – 10:
  - 0 = not experiencing the disorder at all
  - 10 = experiencing the disorder constantly or in the extreme
- Additional columns include the person's age, streaming service of choice, and the effect listening to music has on their mental health disorder.

Methods & Analysis. Work on the dataset began with an overview of the shape and general statistics. The patient ages ranged between 10 and 89, with a mean of 25.2 years. Mean scores for each of the disorders are as follows:

- Anxiety - 5.8
- Depression - 4.8
- Insomnia - 3.7
- OCD - 2.6

Unneeded columns were removed and then distributions of various datapoints were explored. Outliers were removed so that the dataset was better distributed across the data fields.

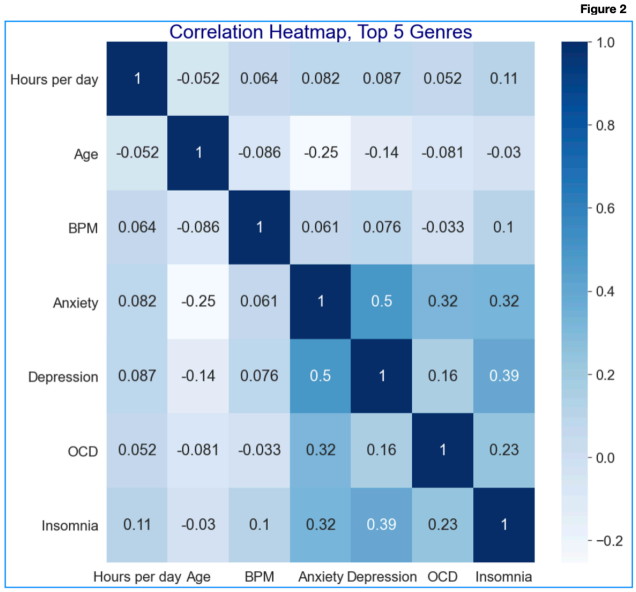
Figure 1



The data was further refined down to the top five music genres so that relationships were easier to recognize. Some of the relationships explored were: music effect on mood by genre (fig. 1), listening time by disorders, age and disorders, and listening time compared to high and low disorder scores. Finally correlations were examined and predictions were made regarding music genres and therapy.

Analysis & Conclusions. As can be seen in figure 2, there is a positive correlation between anxiety and depression. We can take this to mean that one may trigger the other, or if a genre/listening time provides relief for one disorder, the other may experience the same benefit. Additional positive correlations also exist between Anxiety/OCD and Depression/ Insomnia; however these aren't as strong.

Figure 2



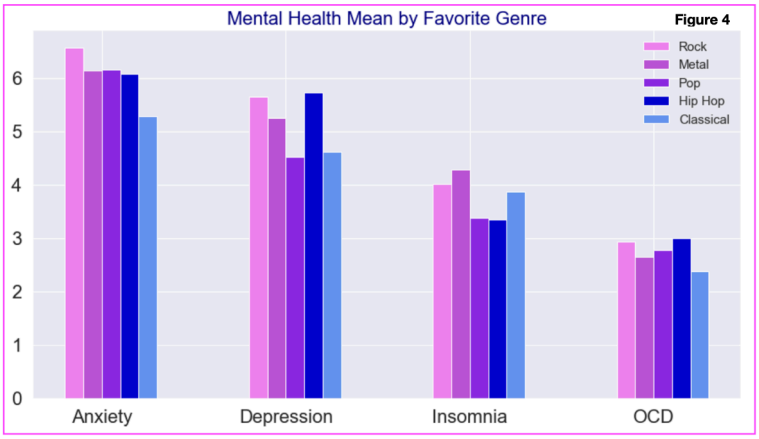
Interestingly, the overall mental health disorder

mean scores for those with musical experience ranked higher than the mean scores of the general population:

Comparison of Composer and Musician Mental Health Means

Composer Mental Health Means		Musician Mental Health Means	
Anxiety	6.108696	Anxiety	6.247059
Depression	5.260870	Depression	5.038235
Insomnia	4.478261	Insomnia	3.726471
OCD	2.750000	OCD	2.791176

This indicates that these individuals may see benefits by increasing their listening time or focusing on their preferred genre.



As shown in figure 4, we are able to see which genres of music are preferred by those with each specific disorder. This information could help us in deciding which genre of music to focus on during the patient's music therapy sessions. For example, those with anxiety would most likely see benefit from listening to rock or metal music. Patients with OCD may see more benefit from listening to hip-hop or rock.

By separating the disorders by age group, the data shows us how mental health needs may change with age. Through about age 50, anxiety and depression have a higher score within every age groups. After 50 this can vary. As shown in figure 5, insomnia starts becoming more pronounced as the person's age increases. By knowing how age affects mental health, we have a better idea how to begin designing the music therapy program for the patient.

The final conclusion of all this work is that we can examine the patient's mental health disorder, their favorite genre, and their age to design an effective music therapy

program. We are even able to predict how beneficial it would be for the person to listen to genres outside of their favorite genre.

Assumptions. The largest assumption made in working with this data is that the respondents do actually have the indicated mental health disorder. Because the dataset was gathered from individuals self identifying with a disorder, it is not necessarily backed with a psychiatric diagnosis.

Limitations/Challenges. There were no great challenges or limitations with this dataset, aside from it being smaller than I would have liked. There were only only 736 respondents. However, this was large enough that I think we are still able to make conclusions from the data.

Future Uses/Additional Applications. The results of this research could be applied in a clinical setting for patients were music therapy has been deemed an appropriate treatment. When a therapist considers the patient's diagnosis, age, and favorite genre, they will be able to use that information to design an effective program.

Recommendations. I would recommend the study to be expanded so that more data points could be collected. The same trends observed in this smaller dataset may be strengthened when more information is collected, or additional valuable trends may begin to emerge. Alternatively this type of study could benefit by using actual patient data. It would not require any patient PII data so I don't think privacy would be an issue. This would allow us to examine the results of those who have a verified mental health diagnoses.

Implementation Plan. The results of this research would be implemented in a clinical setting by therapists as part of the patient treatment plan.

Ethical Assessment. As with any therapeutic process, the main ethical concern is that the patient is receiving appropriate care for their needs. I don't have any ethical concerns with the dataset itself or how it was collected; however, if this research is applied in a clinical setting and the patient is not experiencing improvement, then the treatment plan needs to be adjusted, or even stopped. The patient's needs must come first.

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