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# EFFECTS OF LISTENING TO MUSIC ON MENTAL HEALTH

Our project was inspired by a study on mental health and genres of music found on Kaggle.com. We attempted to answer the following questions using cleaned data and various chart plots. How does listening to music influence mental health outcomes, and what factors determine whether the effects are improved, worsened, or have no effect? How does the number of hours spent listening to music daily affect mental health? Does age influence the mental health impact of listening to diverse music genres?

We started by downloading our dataset from Kaggle.com. Then, we cleaned the data of duplicates and dropped null values which took us down to 616 unique data rows based on the composer column. We renamed the columns so that they were more code friendly. Limitations to the dataset include bias from uneven amount of subjects in the age groups. Also, only four mental health conditions were analyzed: anxiety, depression, insomnia, and OCD.

We approached the question "How does the number of hours spent listening to music daily affect mental health?", by using a correlation chart and concluded that while correlation does not imply causation, there are slight positive correlations from listening to specific genres more frequently. Increased hours of listening to music might coincide with improved mental health scores. Also, when there are negative correlations on the map, the increased frequency of music may be associated with depression and anxiety.
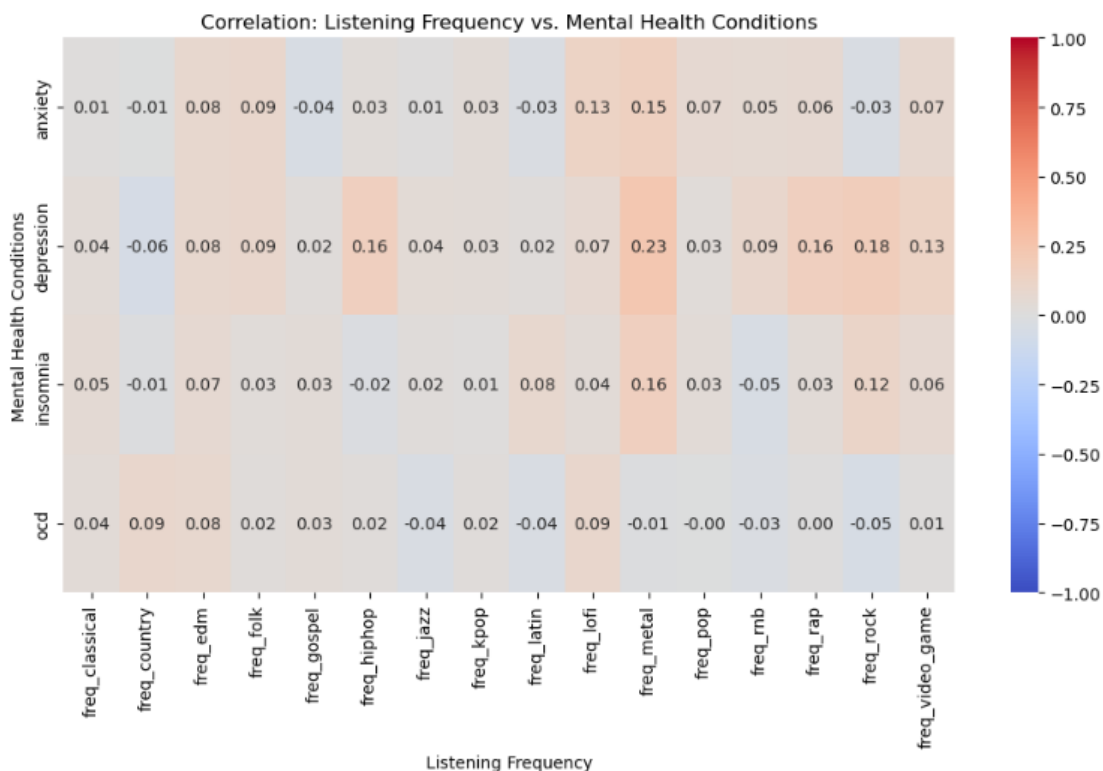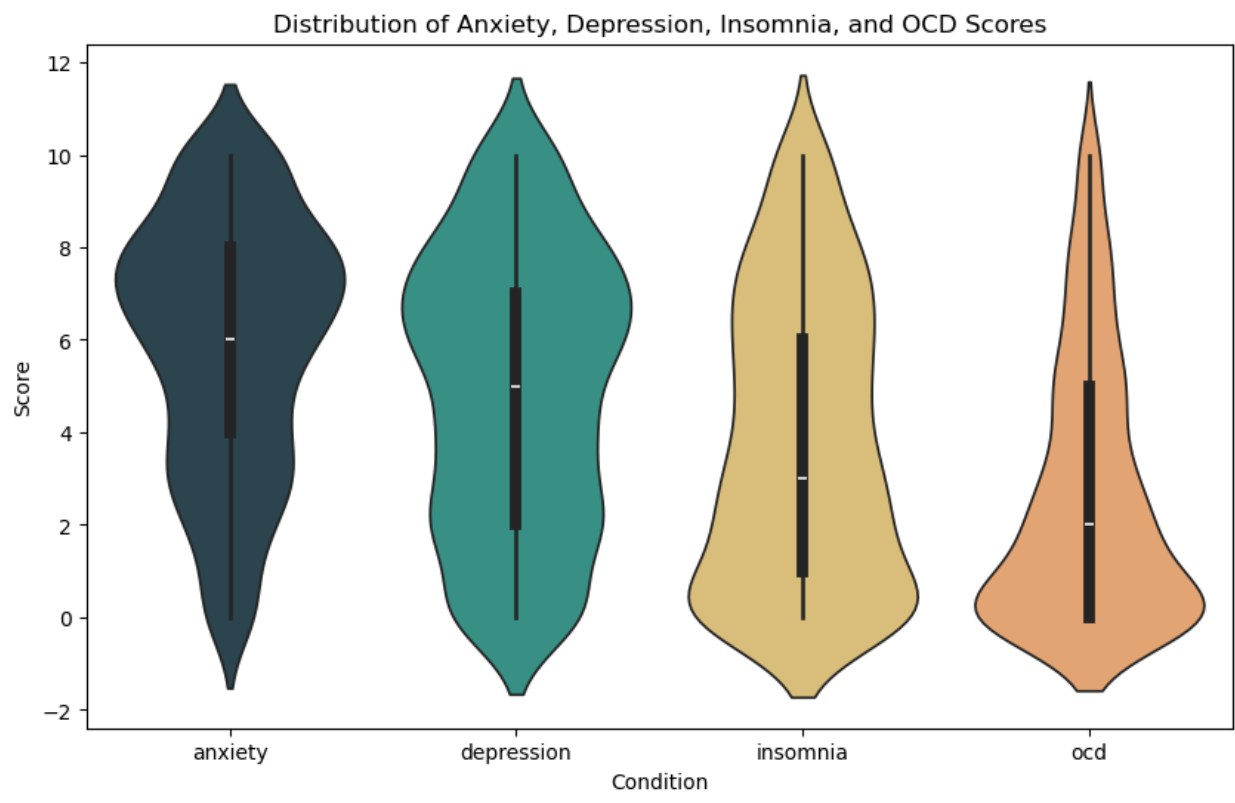
Using a T-test we concluded that there is a significant difference between age and music listening time. The data was grouped by age and hours per day. If the age was less than 25 then they were grouped as young while greater than or equal to 25 were considered older.

We created a pie chart that displayed streaming services by popularity among the subjects in the dataset. Spotify is the most popular while YouTube Music and those that do not use a streaming service came in second. Other streaming services and Apple Music were tied for third place. Pandora was used by a small portion of the subjects and was the smallest portion of the pie chart. Spotify, being the most popular streaming service, provides a slightly skewed perspective because more subjects from other platforms are not represented as much.
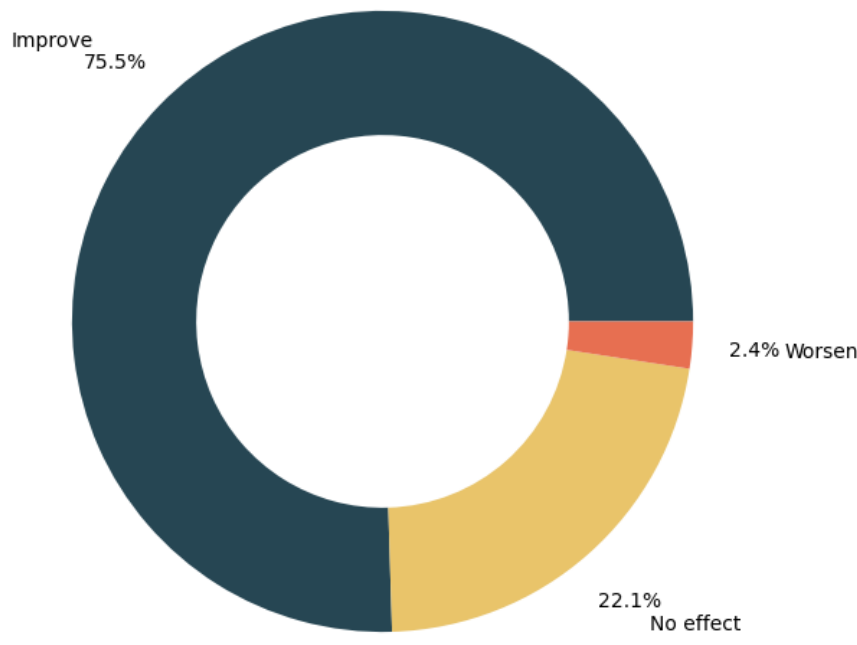
Streaming services by popularity
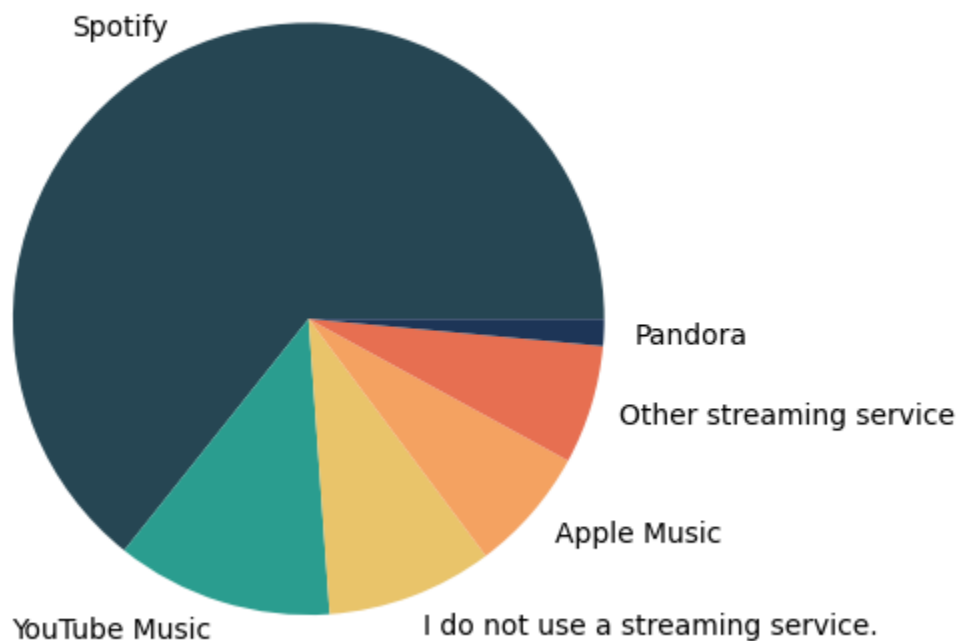
The question "How does listening to music influence mental health outcomes, and what factors determine whether the effects are improved, worsened, or have no effect?", was answered with a scatter, violin, and a donut chart. In generating a violin chart that depicted the distribution of mental health issues of anxiety, depression, OCD, and Insomnia among the subjects in the dataset. It showed that anxiety and depression had max distribution points between 6 and 8 of the subjects, while insomnia and OCD were between 0 and 2 across mental health conditions. We concluded from that that more subjects had anxiety and depression versus OCD and insomnia. Depression had the greater and more even distribution, thus we can conclude that most of the subjects reported depression more than the other mental health conditions.

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Distribution of Anxiety, Depression, Insomnia, and OCD Scores

Effects of Music on Mental Health

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The donut chart showed the effects of music on mental health; whether they improved, worsened, or had no effect. The overall report showed that most subjects had improvement in their mental health with music. A small amount worsened and a little less than a quarter of the subjects experienced no effects. Based on the donut chart we can conclude that there is a general improvement in mental health when listening to music.

We created a scatter chart that showed the average age versus score by mental health conditions. The overall trend in the scatter plot was that between the ages of 20 and 30 there were more reported mental health conditions. The conditions that were common among the average 20- to 30-year-olds were insomnia and depression. We can conclude that the average 20 to 30-year-old has some form of depression and/or insomnia.
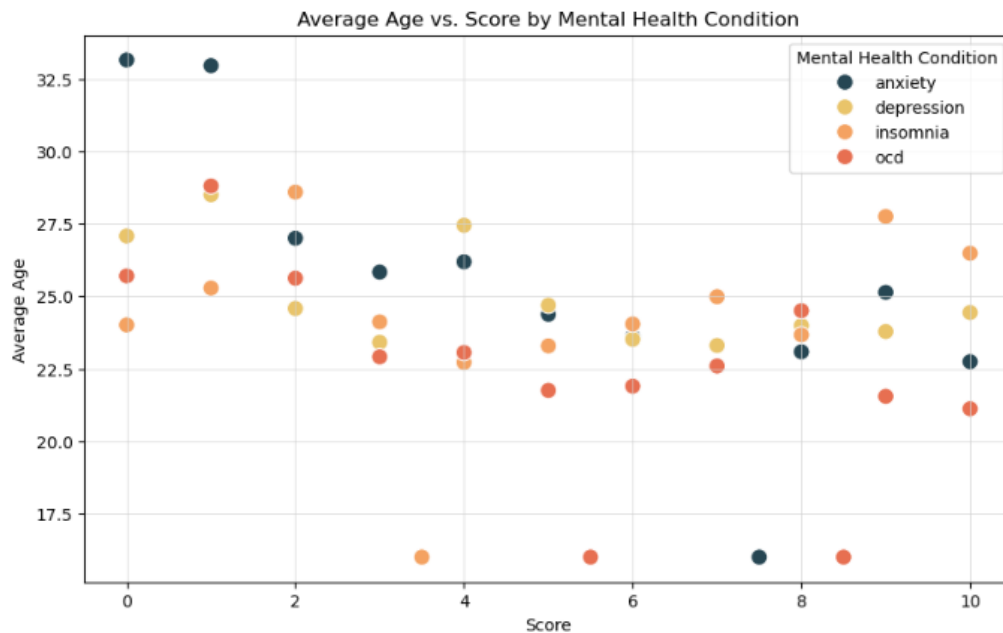

In answering the question "Does age influence the mental health impact of listening to diverse music genres?", we concluded that mental health is improved by listening to diverse music genres and because the average subject is between the ages of 20 and 30 years old it could be a positive influence.

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Does listening to a single genre impact mental health differently than listening to various genres? To answer this question, we created a box plot comparing the frequency of listening and favorite genres. The most popular of the genres were pop and rock. Both fell between sometimes and very frequently in listening. We can conclude by the box plot that the average subject in the dataset listened to pop and rock more so than any genre. Based on the other charts such as the donut chart where mental health was reported as improved overall by listening to music it could be said that the subjects that listened to pop or rock experience improved mental health. Gospel music was found to have an outlier for very frequently, but the majority of the plot was between never and sometimes. It was the only genre that had a low listening frequency. Meanwhile, both hip hop and classical had the majority fall between sometimes and rarely with outliers at never and very frequently. The rest of the genres fell between never and rarely.

Comparison of Favorite Genres and Listening Frequency
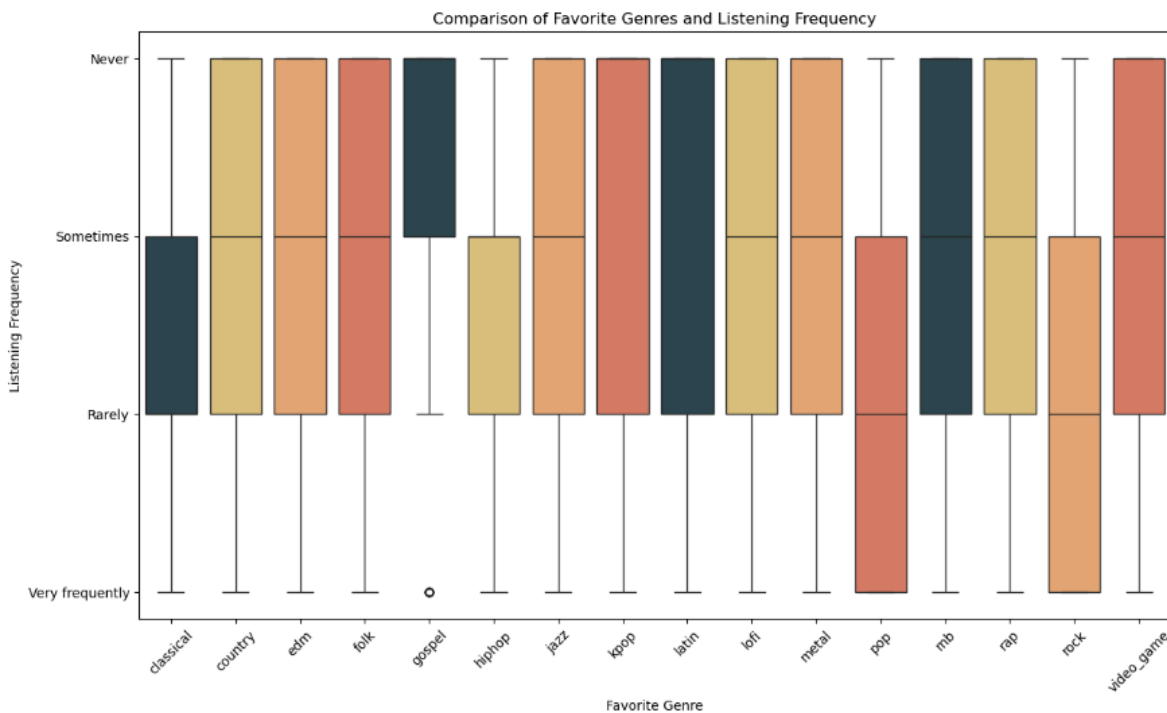
Also, we did a correlation chart for listening frequency versus mental health condition. It could be concluded that certain genres have more subjects with mental health conditions that listen frequently. It was found that most pop listeners had very low averages for mental health conditions. Whereas rock listeners were at a higher level for depression and insomnia averages. The highest correlation was for metal music at .23 for depression with rock at .18. It can also be said that more metal music listeners have depression.

Correlation: Listening Frequency vs. Mental Health Conditions
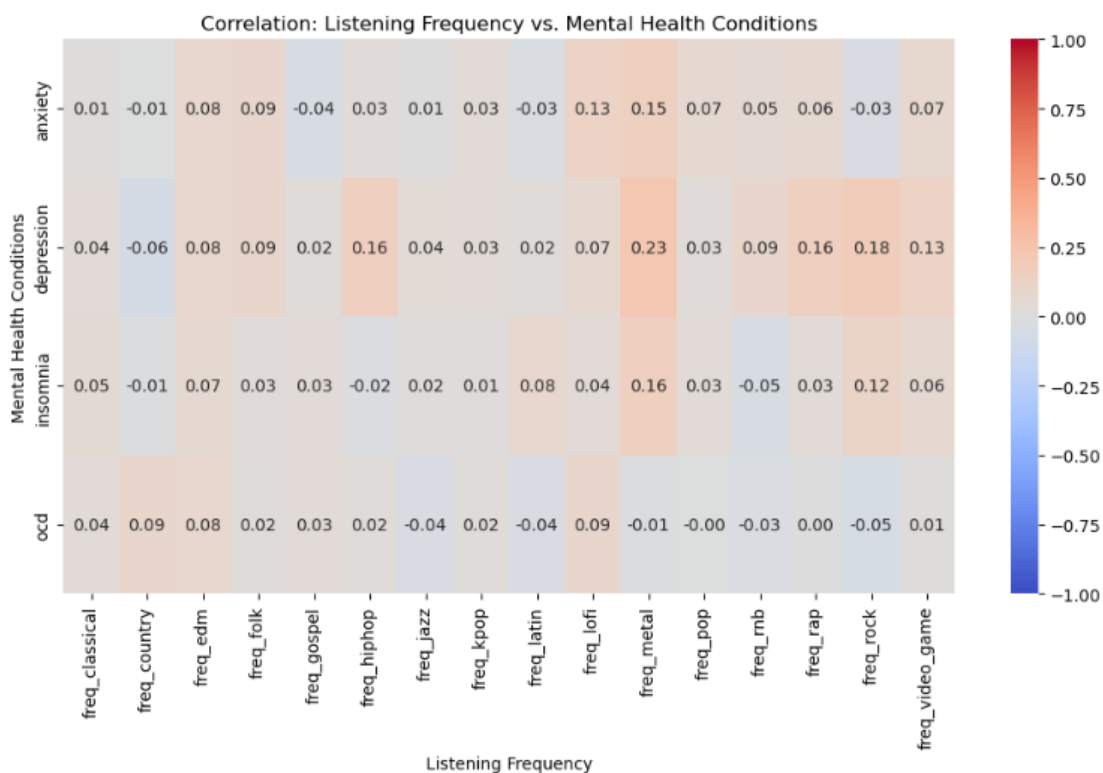
We also did a linear regression analysis of depression to frequency of listening to rock music. The linear regression was not the best for the dataset. The frequency of listening to rock was questioned on the following scale: 0 'Never listened', 1 'Rarely listened', 2 'Sometimes listened', and 3 'Very frequently listened'. As can be seen here in the plot, the data is scattered. This was true when we tested this for multiple other genres, including pop, lo_fi, and classical. Although the line of regression shows positive, we got an r squared value of 0.035, which makes sense when looking at the distance of the data points from the line of regression. We can conclude from this there is no direct correlation between rock and depression, since the data variability is so spread out.

Linear Regression: Depression vs Frequency of Rock
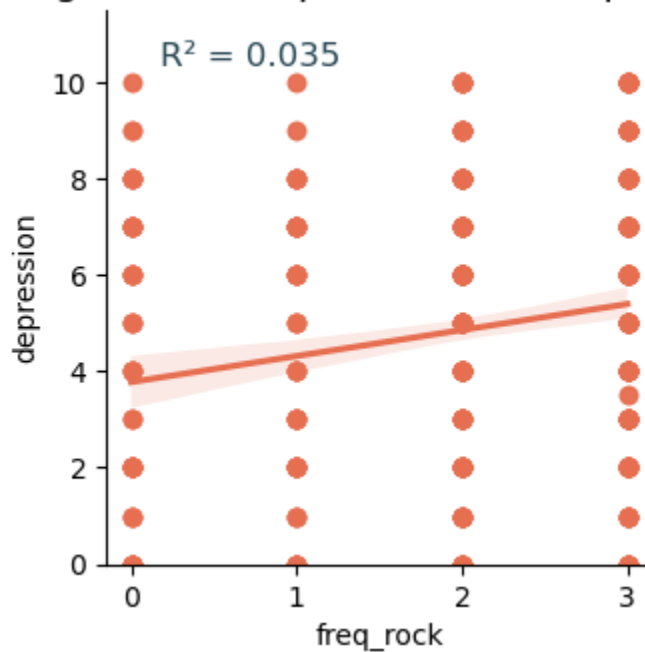
We can conclude that music has a positive effect on mental health as most subjects reported improvement in their conditions after listening, based on our analysis of the dataset in the attempts to answer the questions: How does listening to music influence mental health outcomes, and what factors determine whether the effects are improved, worsened, or have no effect? How does the number of hours spent listening to music daily affect mental health? Does age influence the mental health impact of listening to diverse music genres?