

Music and Mental Health

ISYE 412 Course Project

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Agenda



- I. Introduction and Motivation
- II. Dataset Details
- III. Objectives
- IV. Results and Discussion
- V. Dashboard
- VI. Summary and Conclusions





Introduction and Motivation



Music and Mental Health

- **Motivation:**
 - Over 1 in 8 people globally live with a mental disorder (WHO, 2019).
 - In the U.S., 1 in 5 adults experience mental illness each year (NAMI, 2023).
- **The Role of Music:**
 - Music is widely used as a **coping mechanism** and a tool for **emotional regulation**.
- **Why This Project:**
 - Explore the relationship between music preferences, habits, and mental health trends.
 - Use data analytics to uncover patterns that could inform music therapy



Datasets



Dataset 1: Music & Mental Health Survey Results (Kaggle)

- Describes behavior in response to music therapy as a soothing mechanism for mental health disorders.
- Contains responses from 600+ individuals covering **mental health status, music preferences, listening frequency**, and more.

Dataset 2: Global Music Streaming Trends & Listener Insights (Kaggle)

- Provides music streaming trends in terms of most listened to genres and minutes streamed per day for listeners across multiple platforms, demographics, and countries.
- This dataset was used to measure how the amount of **time listening to music** might correlate with the mental health status of different populations.



Datasets (Continued)



Dataset 3: Global Trends in Mental Health Disorder (Kaggle)

- Describes information from various countries about the prevalence of mental health disorders including schizophrenia, bipolar disorder, anxiety disorders, and depression disorders.
- This dataset was used to assess the **relationship between streaming rates and mental health globally**.



Objective



Question 1: Do music genre preferences differ across age groups? Do mental health trends differ across age groups?

Question 2: Does music have a greater self-reported therapeutic impact on certain mental health conditions than others? For instance, is it more effective in alleviating symptoms of depression, anxiety, insomnia, or OCD?

Question 3: Is there a relationship between the amount of time spent listening to music and mental well-being?

Question 4: How does the associated BPM to a person's top music genre affect the prevalence of certain mental conditions?

Question 5: Do countries with higher streaming rates exhibit lower or higher rates of anxiety, depression, or other mental health conditions?

Question 1:

Do music genre preferences differ across age groups? Do mental health trends differ across age groups?

Approach

Dataset Used

[Music & Mental Health Survey Results](#)

Calculated Fields

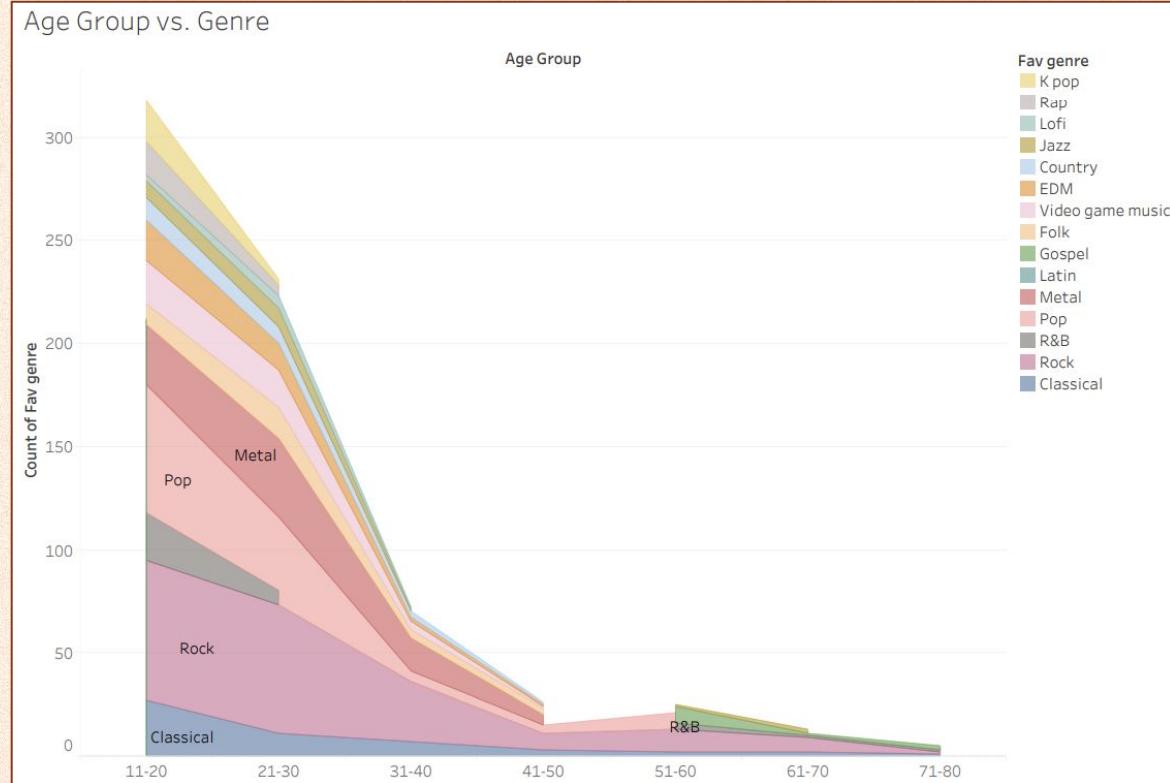
- **Most Prevalent Condition**
 - Each respondent reported their symptoms of Anxiety, Depression, Insomnia, and OCD
 - Created a calculated field called Most Prevalent Condition based on the respondent's condition with the highest ranking
- **Age Group**
 - Created a calculated field grouping ages in ranges of ten years

Cleaning Data

- Cleaning responses such as 'N/A' and 'n/a'
- Removing Unnecessary Columns

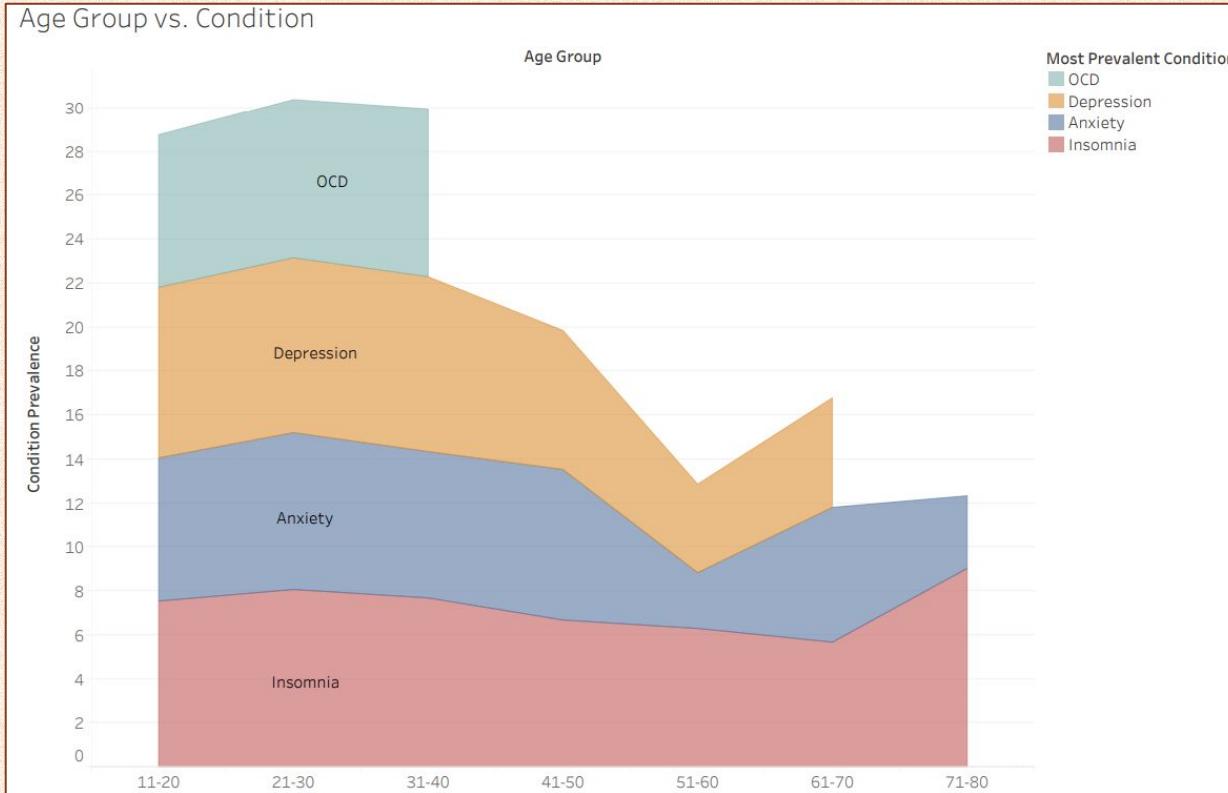


Results - Age Group and Genre



Question 1: Do music genre preferences differ across age groups?

Results - Age Group and Mental Health



Question 1: Do mental health trends differ across age groups?



Results - Age Group and Mental Health

Takeaways - Favorite Genre

- The survey more **robustly surveys younger age groups**
- Individuals ages 50+ typically listen to pop, R&B, Gospel, Classical, and Rap
- Individuals under 50 listen to a wider variety of genres including K-pop, rap, country, metal, and folk.
- The younger the age group, the more genres that are represented

Takeaways - Mental Health

- Younger generations have an equal number of ODC, Depression, Anxiety, and Insomnia as the most prevalent condition.
- No individuals older than 30 reported OCD as their most prevalent condition
- Decrease in the number of people experiencing mental health symptoms between 50 and 60.
- A gradual **increase in mental health symptoms after retirement age.**

Question 1: Do music genre preferences differ across age groups? Do mental health trends differ across age groups?

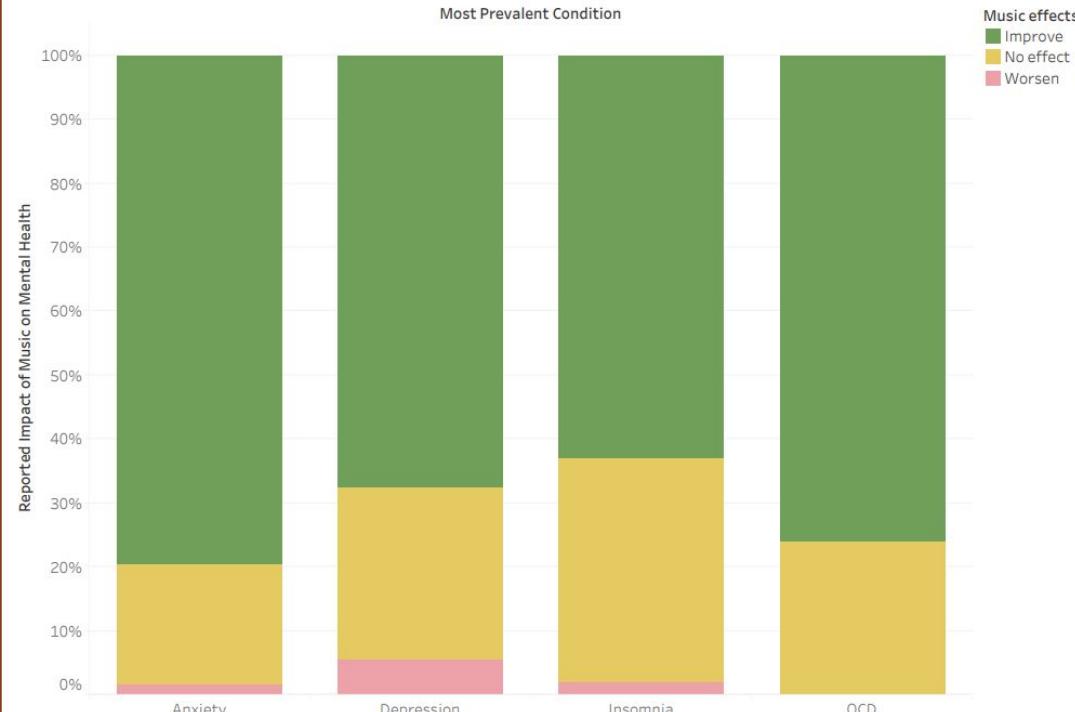
Question 2:

Does music have a greater self-reported therapeutic impact on certain mental health conditions than others?

For instance, is it more effective in alleviating symptoms of depression, anxiety, insomnia, or OCD?

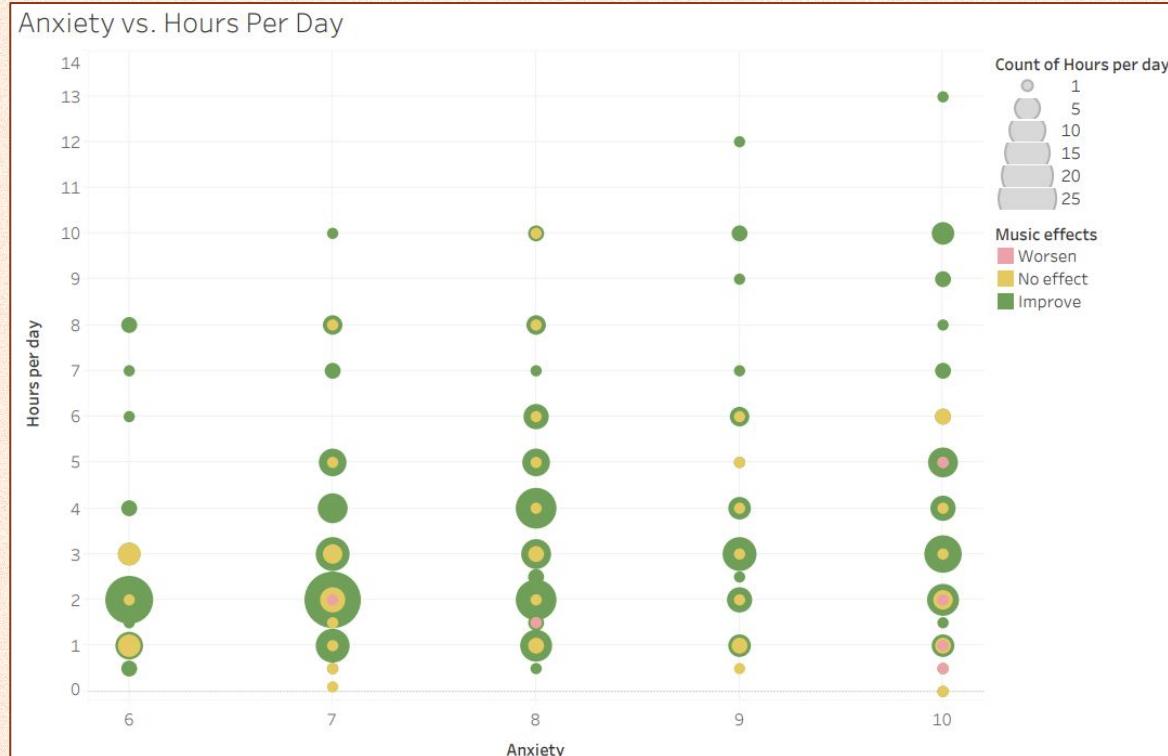
Results - Therapeutic Impact

Therapeutic Impact



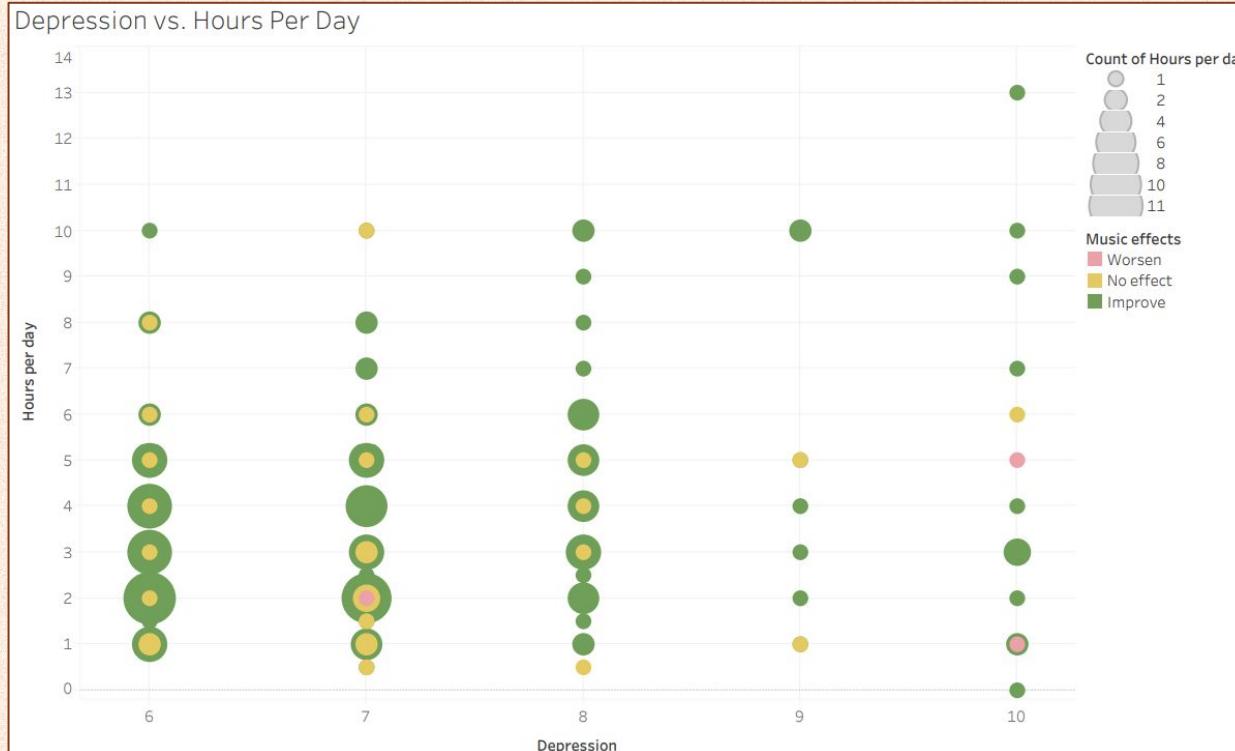
Question 2: Does music have a greater self-reported therapeutic impact on certain mental health conditions than others? For instance, is it more effective in alleviating symptoms of depression, anxiety, insomnia, or OCD?

Results - Therapeutic Impact and Hours



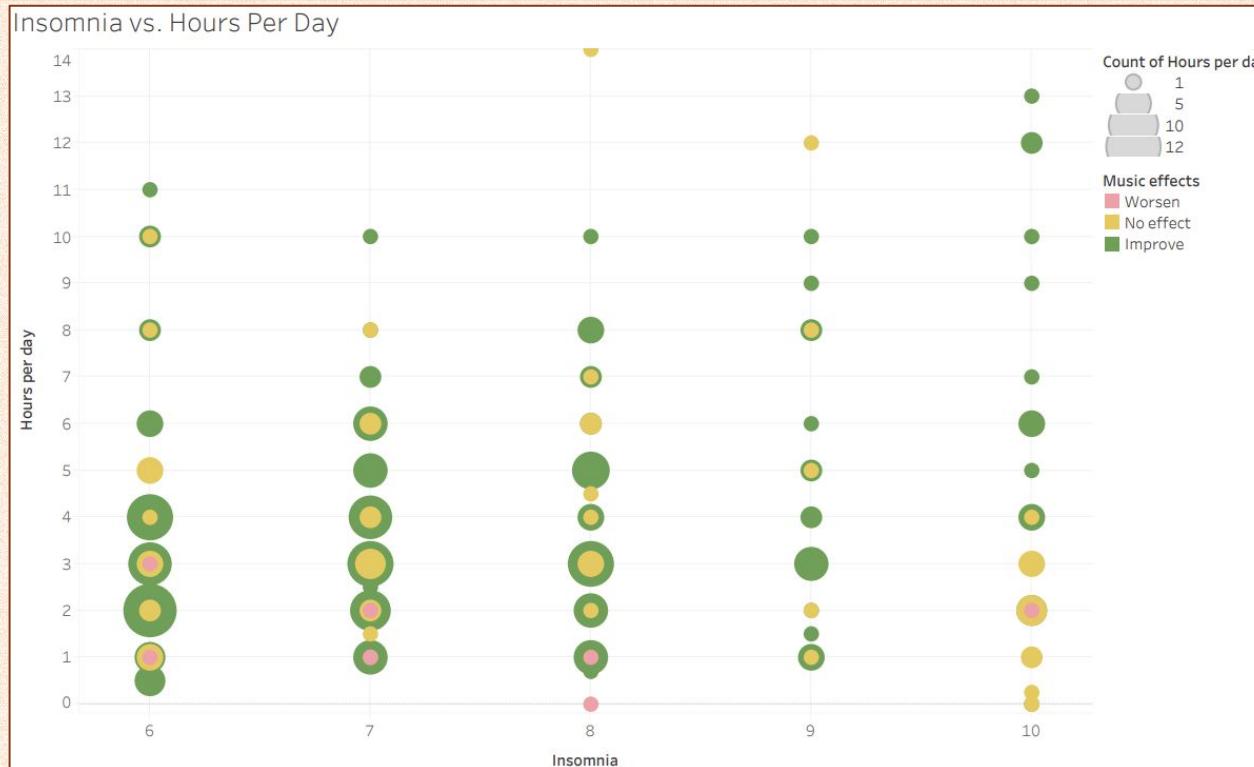
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Results - Therapeutic Impact and Hours



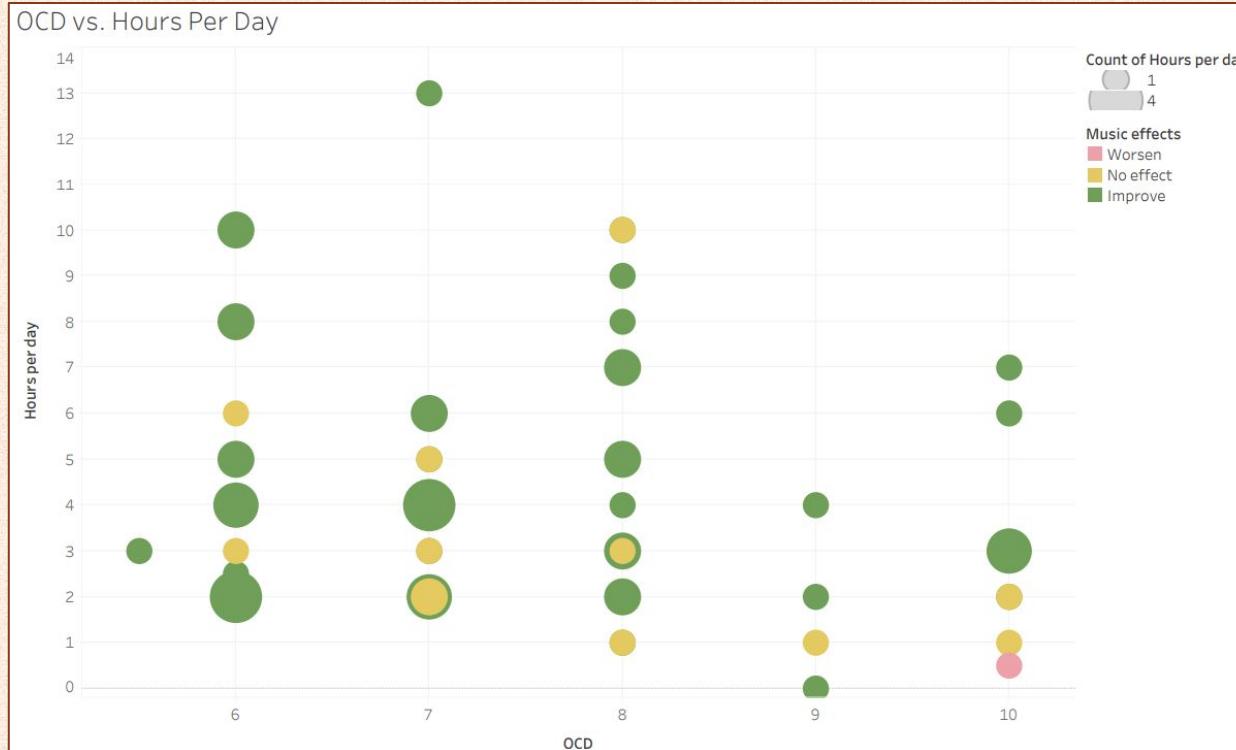
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Results - Therapeutic Impact and Hours



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Results - Therapeutic Impact and Hours



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Results - Therapeutic Impact and Hours

Takeaways - Therapeutic Impact

- The majority of respondents report that **music has a positive impact on mental health.**
- Music has the **greatest positive therapeutic impact on anxiety.**
- We want to explore whether listening time has a relationship on mental health score.



Question 2: Does music have a greater self-reported therapeutic impact on certain mental health conditions than others? For instance, is it more effective in alleviating symptoms of depression, anxiety, insomnia, or OCD?

Question 3:

Is there a relationship between the amount of time spent listening
to music and mental well-being?

Approach

Metrics visualized :

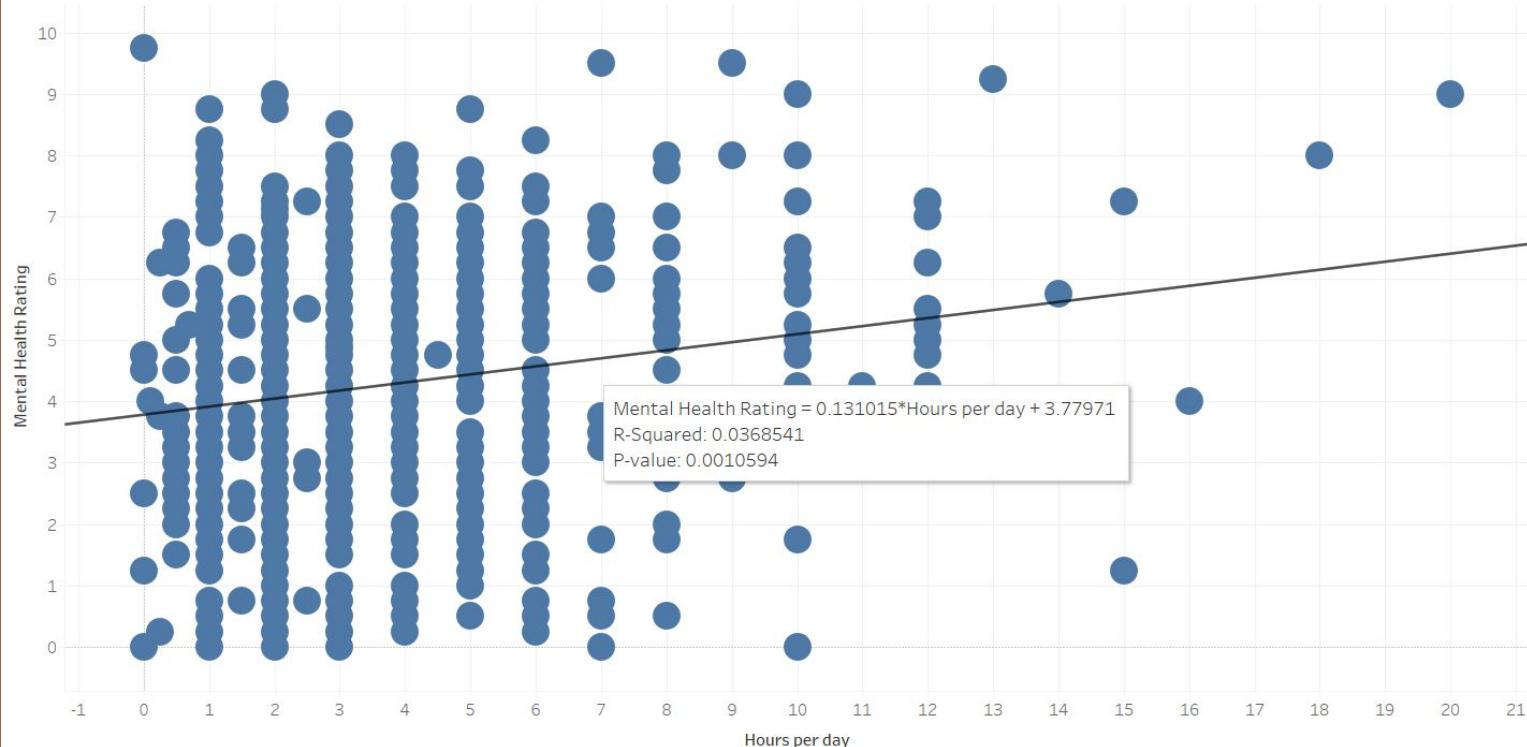
- **Listening time** - listening hours per day vs. self reported mental health score 1-10 (the **average mental health score** across disorders).

Analyzed trends:

- **Scatter plot to understand** time and wellbeing correlation

Results - Time Listening

Listening time vs Mental Well-Being Score



Question 3: Is there a relationship between the amount of time spend listening to music and mental well-being?



Results - Time Listening



Takeaways

Yes, **there is some relationship** between music listening time and mental well-being, but:

1. At an alpha level of **0.05**, the p-value (~0.001) indicates a **statistically significant** relationship between time spent listening to music and mental well-being.
2. The correlation is **slightly positive** (slope ≈ 0.131).
3. However, the **R-squared value (~0.036)** is low, suggesting that **listening time alone explains very little** of the variability in mental health scores.



Conclusion: **While time spent listening to music is statistically significant, it is not a strong predictor by itself** — other factors likely contribute more heavily to mental well-being.

Question 4:

How does the associated BPM to a person's top music genre affect the prevalence of certain mental conditions?

Approach

Calculated Fields

- Most Prevalent Condition: highest score per data point.

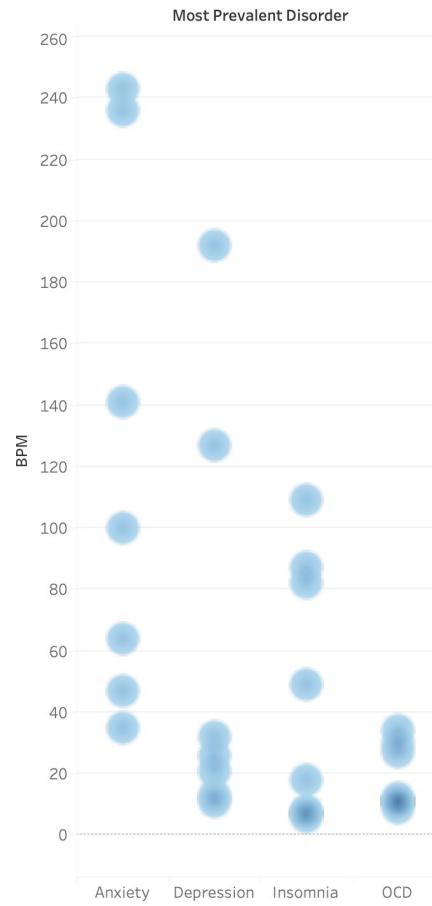
Exclusion of Outliers

- Any values > 245 BPM were excluded.

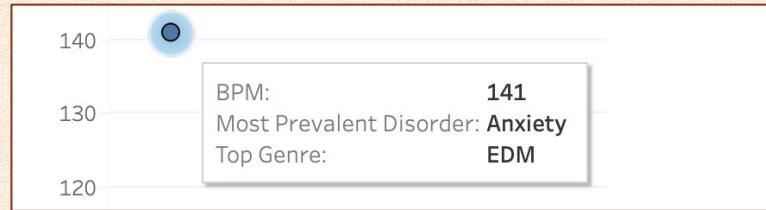
Classification of BPM Levels

- High → BPM > 130
- Medium → $100 \leq \text{BPM} \leq 130$
- Low → BPM < 100

BPM vs. Most Prevalent Disorder



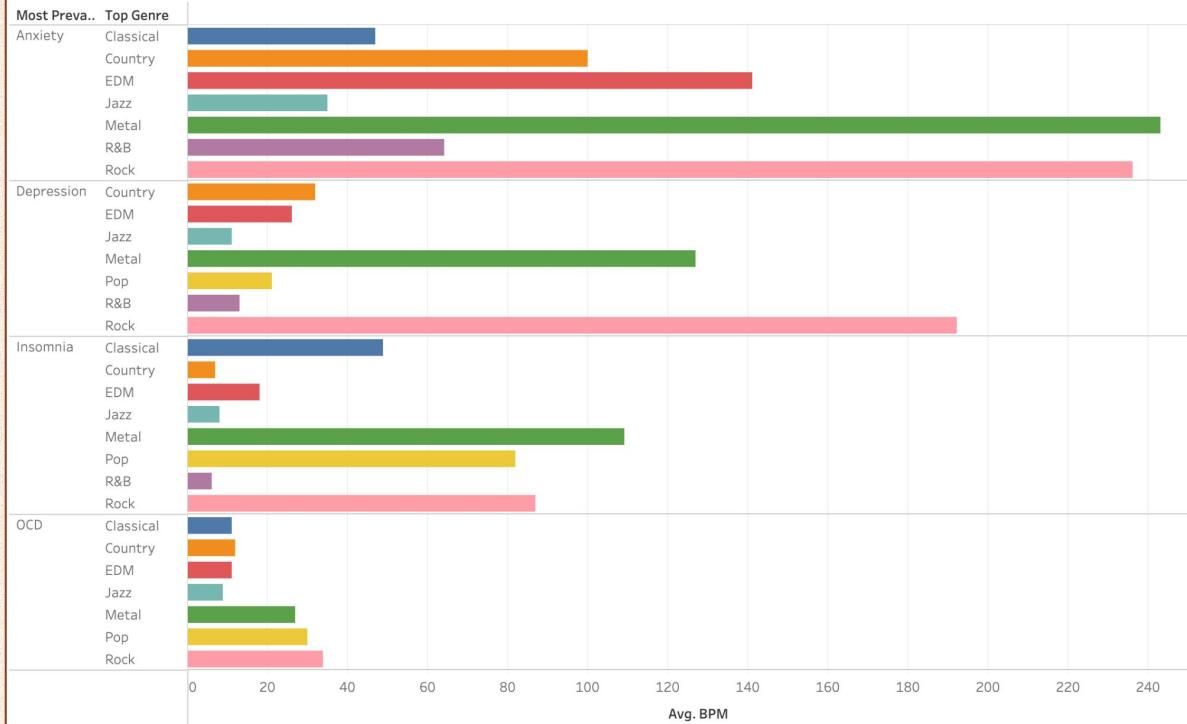
Results - BPM



Question 4: How does the associated BPM to a person's top music genre affect the prevalence of certain mental conditions?

Results - BPM

Average BPM per Genre for every Disorder



Question 4: How does the associated BPM to a person's top music genre affect the prevalence of certain mental conditions?



Results - BPM

Simple Linear Regression

```
Residual standard error: 65.02 on 26 degrees of freedom  
Multiple R-squared:  0.3775,    Adjusted R-squared:  0.3057  
F-statistic: 5.256 on 3 and 26 DF,  p-value: 0.005722
```

Takeaway

A person's reported most prevalent disorder **significantly affects** the type of music they decide to listen to.

- Those with Depression, Insomnia, or OCD tend to have **lower BPM values** compared to those with Anxiety.

Question 5:

Do countries with higher streaming rates exhibit lower or higher rates of anxiety, depression, or other mental health conditions?



Approach - Mental Health & Music Trends

Datasets Used:

[Global Trends in Mental Health Disorder](#), [Global Music Streaming Trends & Listener Insights](#)

Cleaning “Global Trends in Mental Health Disorder” data:

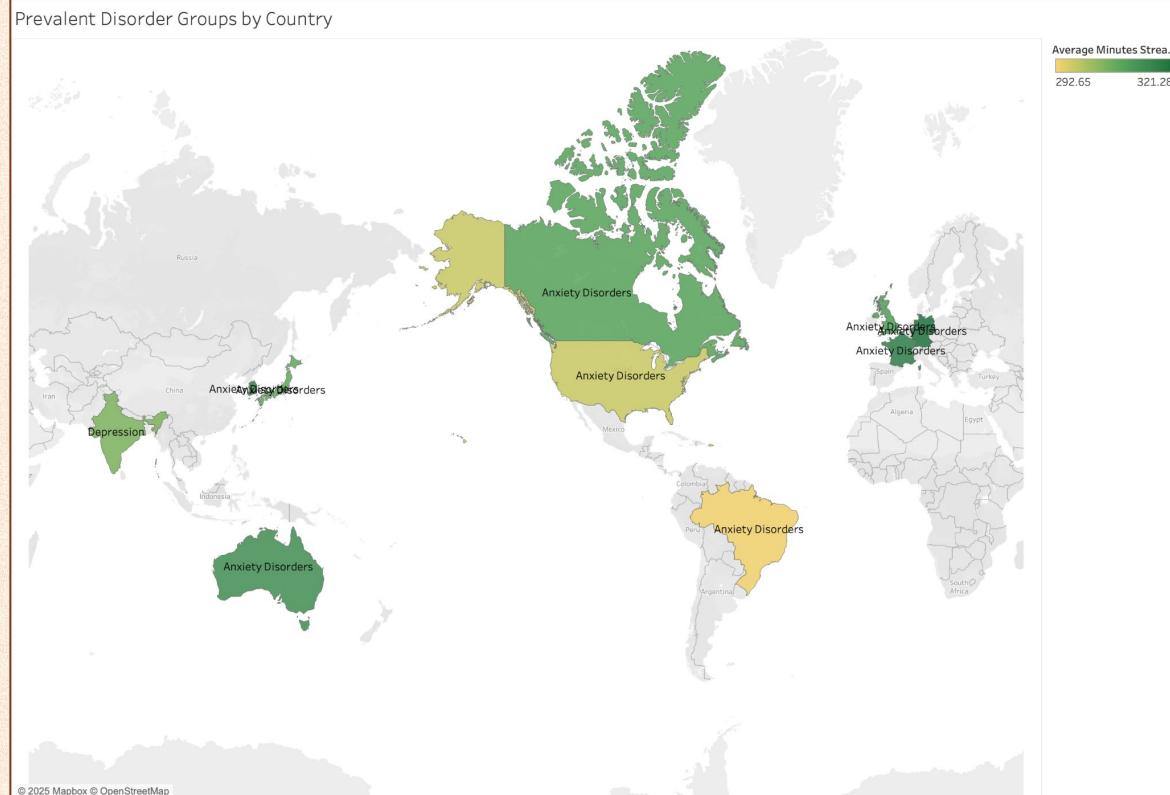
- Renamed countries to match the names of the countries in the other dataset
- Grouped by **Country** and averaged **Minutes Streamed Per Day**

Cleaning “Global Music Streaming Trends...” data:

- Filtered out countries not included in the other dataset and filtered year to 2008 - 2017
- Grouped by **Country**
- Joined all data by **Country** to create aggregated dataset for analysis

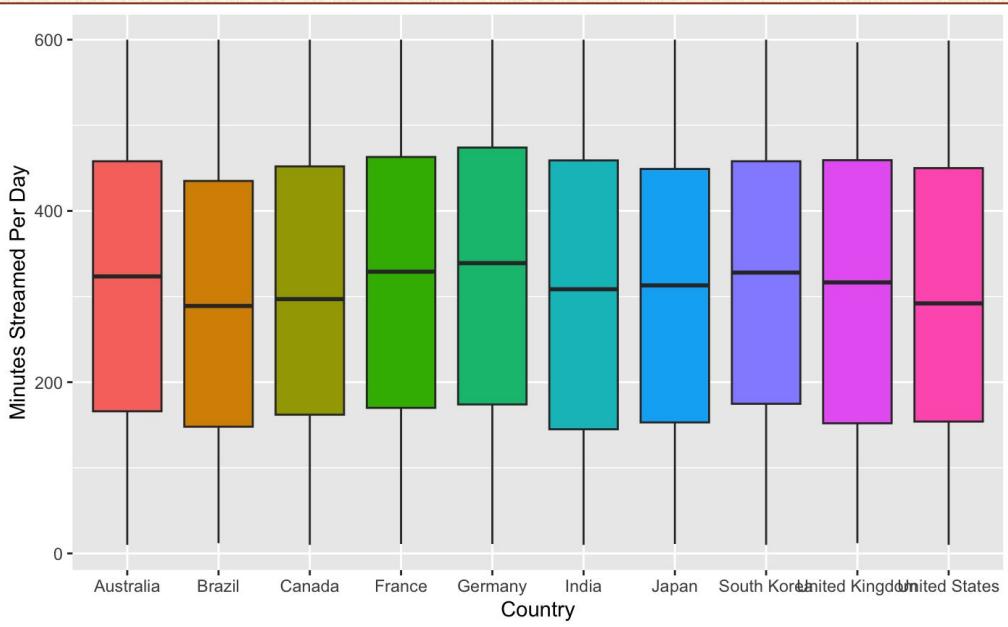
Calculated field: **Most Prevalent Disorder**

Results - Mental Health & Music Trends



Question 5: Do countries with higher streaming rates exhibit lower or higher rates of anxiety, depression, or other mental health conditions?

Results - Mental Health & Music Trends



Null Hypothesis:

No difference in average minutes streamed per day between countries.

Alternative Hypothesis:

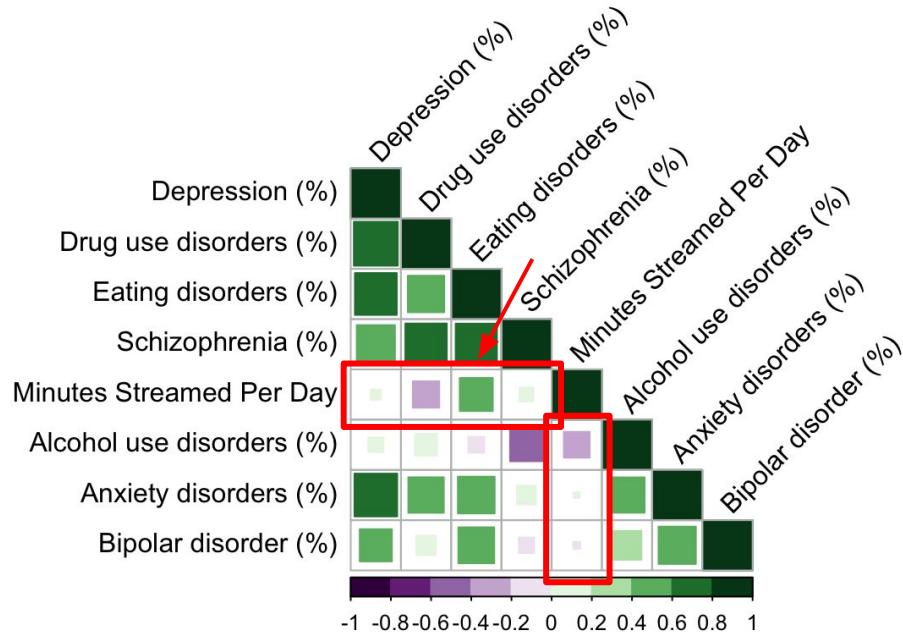
There is a difference in the average minutes streamed per day between countries.

Analysis of Variance Table

	Response: Minutes Streamed Per Day			
	Df	Sum Sq	Mean Sq	F value
Country	9	1763684	195965	6.6366
Residuals	23500	693903396	29528	1.557e-09 ***

Question 5: Do countries with higher streaming rates exhibit lower or higher rates of anxiety, depression, or other mental health conditions?

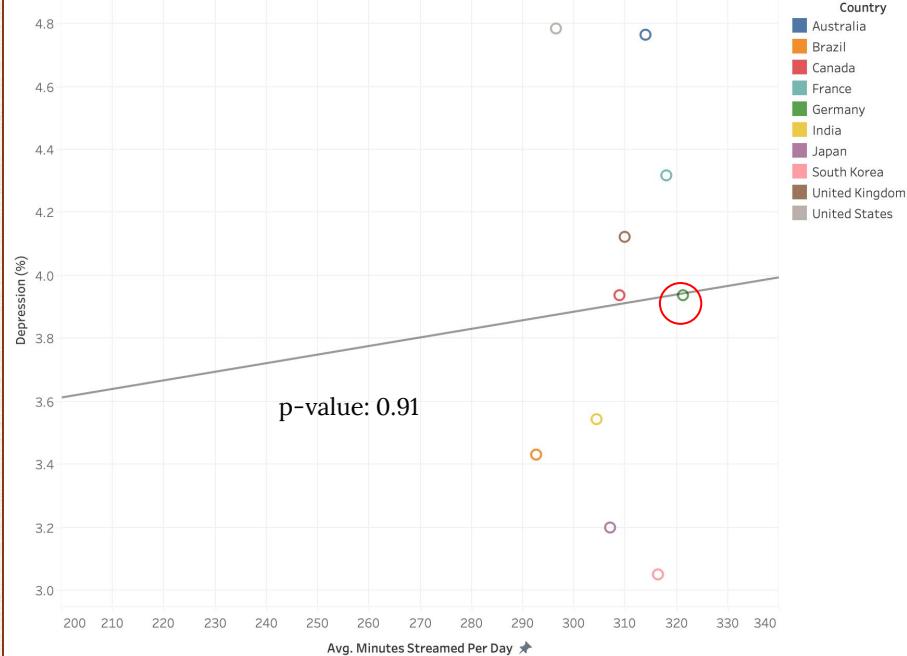
Results - Mental Health & Music Trends



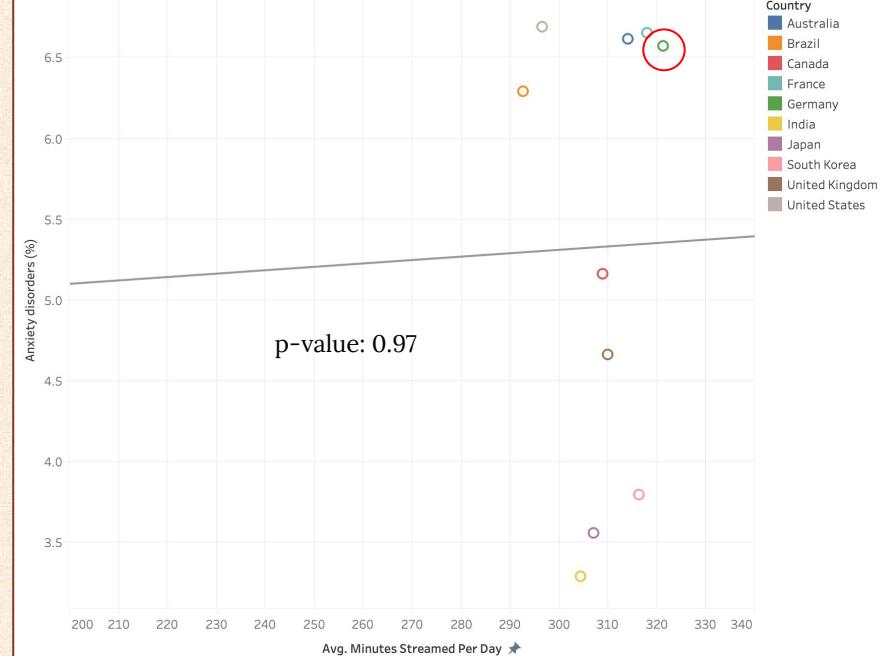
Question 5: Do countries with higher streaming rates exhibit lower or higher rates of anxiety, depression, or other mental health conditions?

Results - Mental Health & Music Trends

Depression



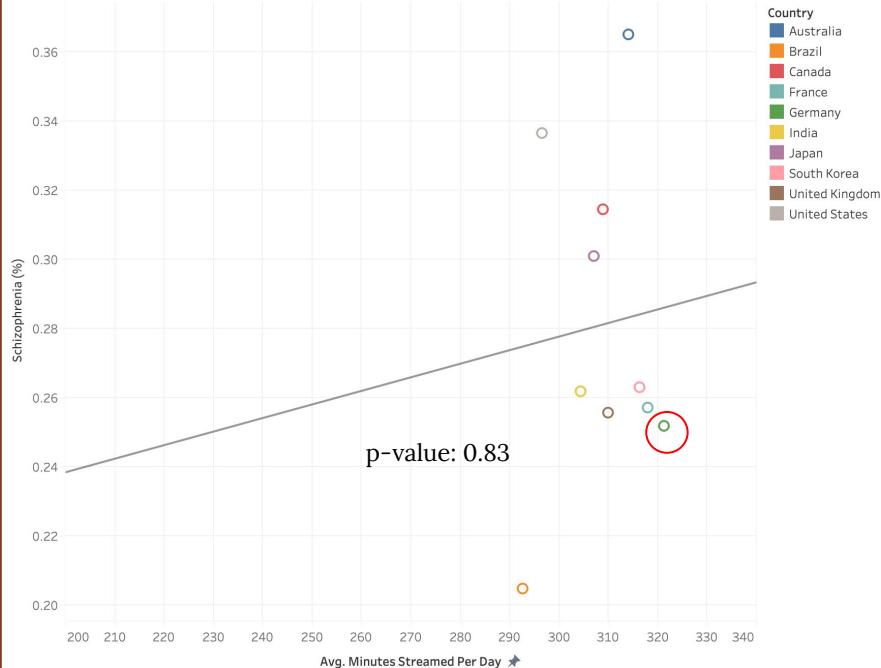
Anxiety



Question 5: Do countries with higher streaming rates exhibit lower or higher rates of anxiety, depression, or other mental health conditions?

Results - Mental Health & Music Trends

Schizophrenia



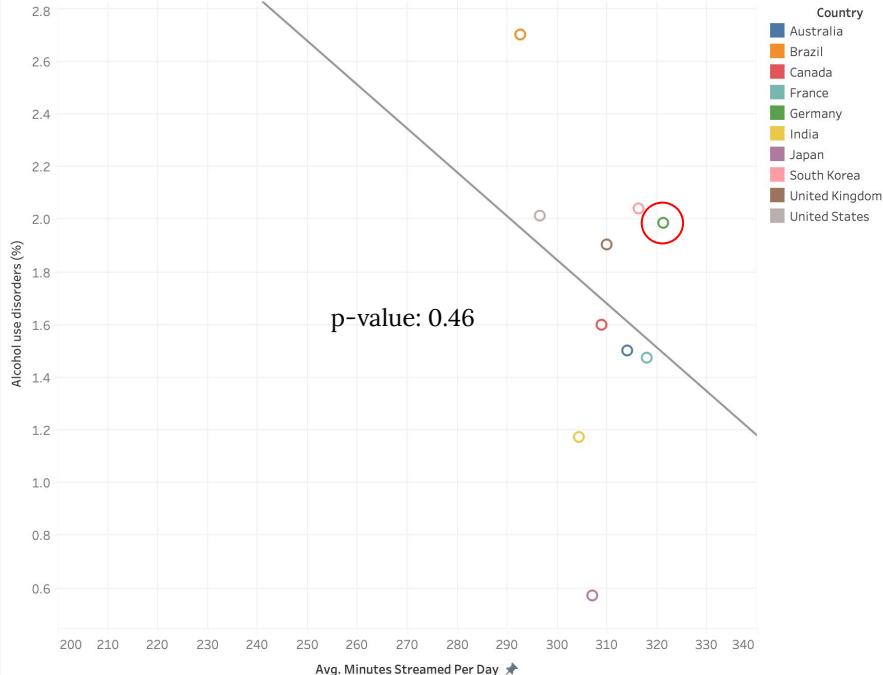
Eating Disorders



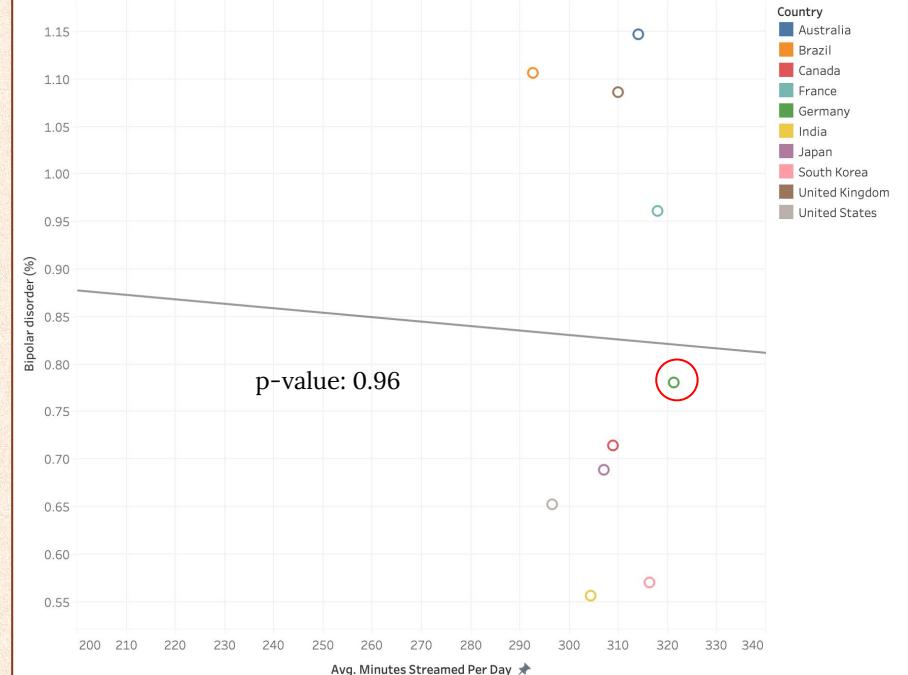
Question 5: Do countries with higher streaming rates exhibit lower or higher rates of anxiety, depression, or other mental health conditions?

Results - Mental Health & Music Trends

Alcohol Use

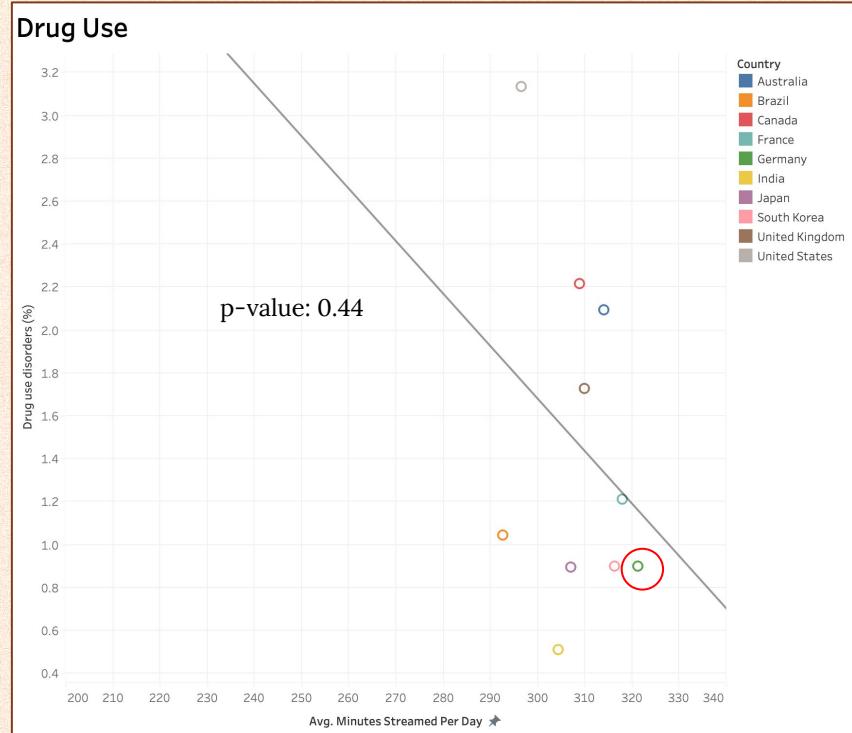


Bipolar



Question 5: Do countries with higher streaming rates exhibit lower or higher rates of anxiety, depression, or other mental health conditions?

Results - Mental Health & Music Trends



Question 5: Do countries with higher streaming rates exhibit lower or higher rates of anxiety, depression, or other mental health conditions?



Results - Mental Health & Music Trends

Key Takeaways:

There **is** a significant difference in **Average Minutes Streamed Per Day** between countries.

Multiple countries with **higher Average Minutes Streamed Per Day** tended to be **higher** in prevalence of the mental health disorder measures.

Overall weak correlation between **Minutes Streamed Per Day** and mental health prevalence measures

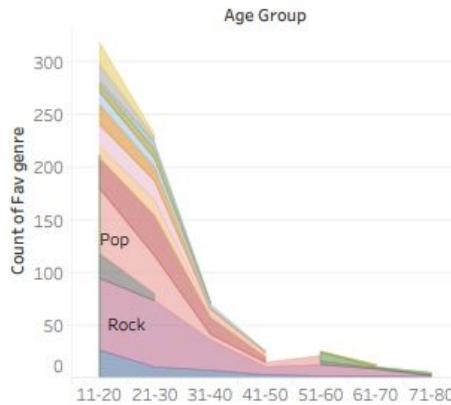
- Why? Confounding factors?

Factors for consideration:

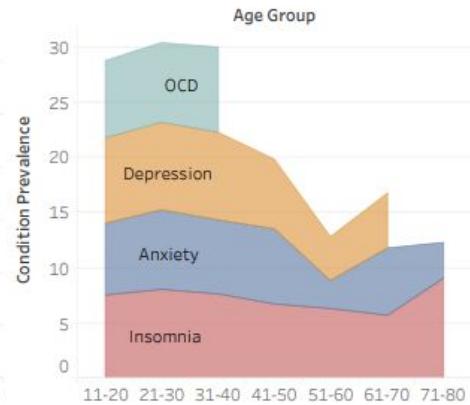
- Rates of reporting & definitions of mental disorders
- Cultural impacts
- Streaming platform availability
- Lifestyle differences

Music and Mental Health

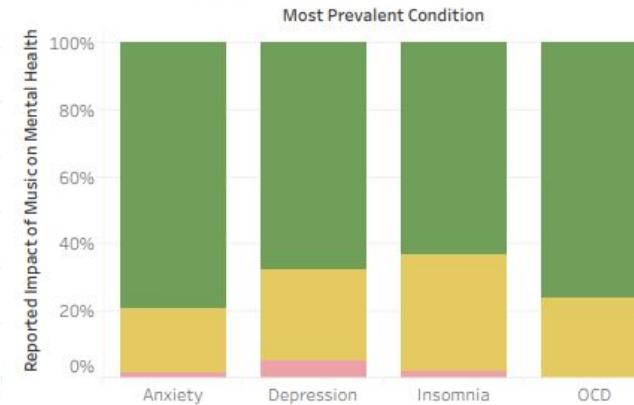
Age Group vs. Genre



Age Group vs. Condition



Therapeutic Impact



Fav genre

- Kpop
- Rap
- Lofi
- Jazz
- Country
- EDM
- Folk
- Gospel
- Latin
- Metal
- Pop
- R&B
- Rock
- Classical

Most Prevalent Con...

- OCD
- Depression
- Anxiety
- Insomnia

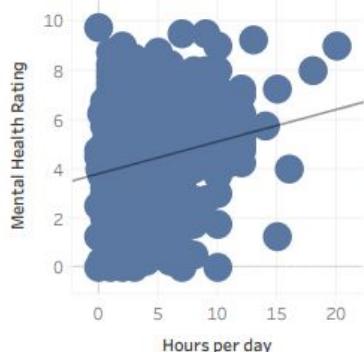
Music effects

- Improve
- No effect
- Worsen

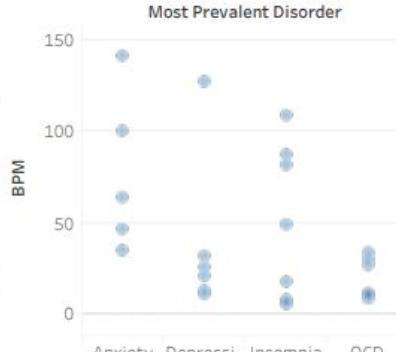
Average Minutes St...

292.65 321.28

Listening time vs Mental Well-Being Score



BPM vs. Most Prevalent Disorder



Prevalent Disorder Groups by Country





Summary and Comments



Music is a non-invasive, accessible mental wellness tool

Recommendations:

1. Mental health professionals should consider using music-based interventions.
2. Encourage individuals to incorporate music into self-care routines.
3. Therapists or individuals could create Low-BPM playlists for OCD and Insomnia.
4. Musicians and streaming platforms should continue to collaborate to tag therapeutic tracks (e.g. “calm,” “focus,” “sleep aid”).
5. Experts should explore further research regarding mental health improvements tied to genres or BPM ranges. Additionally, we should explore cultural and genre-specific therapeutic effects.



Thank you!



Any Questions?