

MUSIC AND MENTAL HEALTH RELATIONSHIP

PRATEEK GOEL

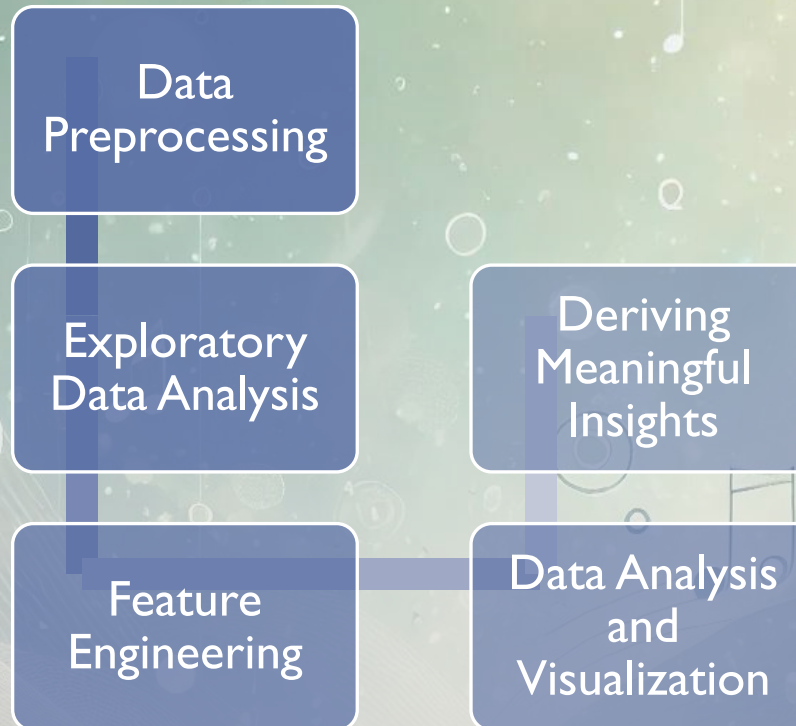
MTECH DATA SCIENCE

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MOTIVATION

- Music therapy (MT) is increasingly recognized as a powerful tool to support mental health, helping reduce stress, improve mood, and enhance overall well-being.
- Music has been scientifically proven to trigger the release of “happy” hormones like oxytocin, providing a natural boost to emotional health.
- The MxMH dataset aims to uncover meaningful patterns between music preferences and self-reported mental health, offering valuable insights for personalized MT approaches.
- By analyzing these patterns, researchers can optimize the effectiveness of MT, potentially leading to more targeted, evidence-based treatments.

BLOCK DIAGRAM



PSEUDO CODE VIEW

- Imported required libraries
- Read data from .csv file and return the loaded data as a DataFrame
- Cleaning the data - drop rows with missing essential values, Map frequency values to numeric codes, Fill missing BPM values with median
- Plotting different data visualizations and giving meaningful insights on data as per the user input

CODE SNIPPETS

Loading the dataset

```
# Load the dataset
def load_data():
    df = pd.read_csv("mxmh_survey_results.csv")
    return df
```

Data Preprocessing

```
# Data Preprocessing/Cleaning
def clean_data(df):
    # Drop rows with missing values in essential columns
    essential_cols = ['Age', 'Primary streaming service', 'While working',
                     'Instrumentalist', 'Composer', 'Foreign languages', 'Music effects']
    df = df.dropna(subset=essential_cols)

    # Fill missing values for BPM column with median
    df['BPM'] = df['BPM'].fillna(df['BPM'].median())

    # Remove unrealistic values in Age and Hours per day
    df = df[(df['Age'] >= 10) & (df['Age'] <= 100)]
    df = df[(df['Hours per day'] >= 0) & (df['Hours per day'] <= 24)]

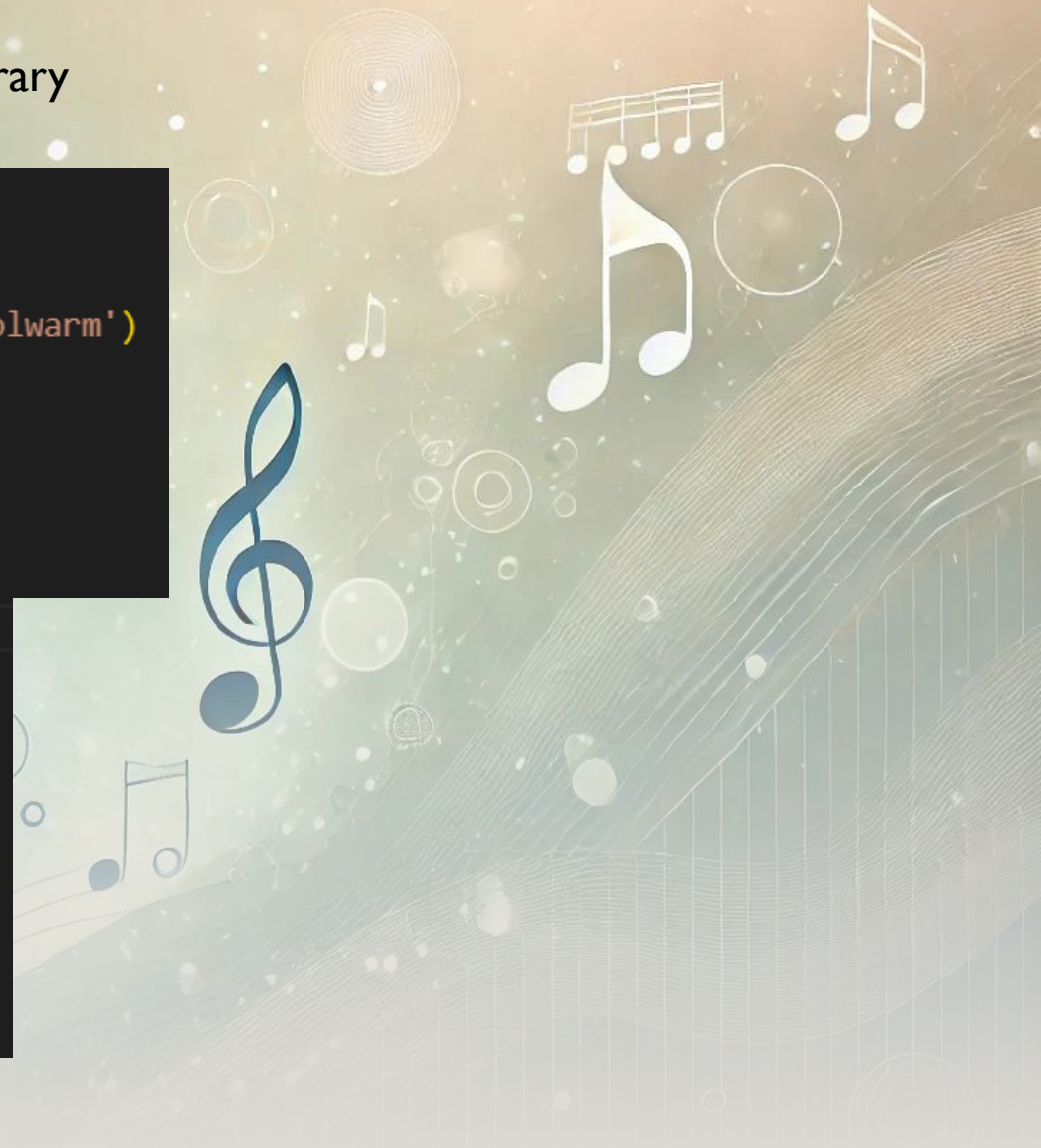
    # Standardize categorical data to lowercase and strip whitespace
    categorical_cols = ['Primary streaming service', 'Fav genre', 'Music effects', 'Foreign languages']
    df[categorical_cols] = df[categorical_cols].apply(lambda x: x.str.lower().str.strip())

    # Map frequency columns to numerical values
    freq_mapping = {'Never': 0, 'Rarely': 1, 'Sometimes': 2, 'Very frequently': 3}
    genre_cols = [col for col in df.columns if col.startswith('Frequency')]
    df[genre_cols] = df[genre_cols].replace(freq_mapping)
```

Creating Heatmap and Boxplot using Seaborn library

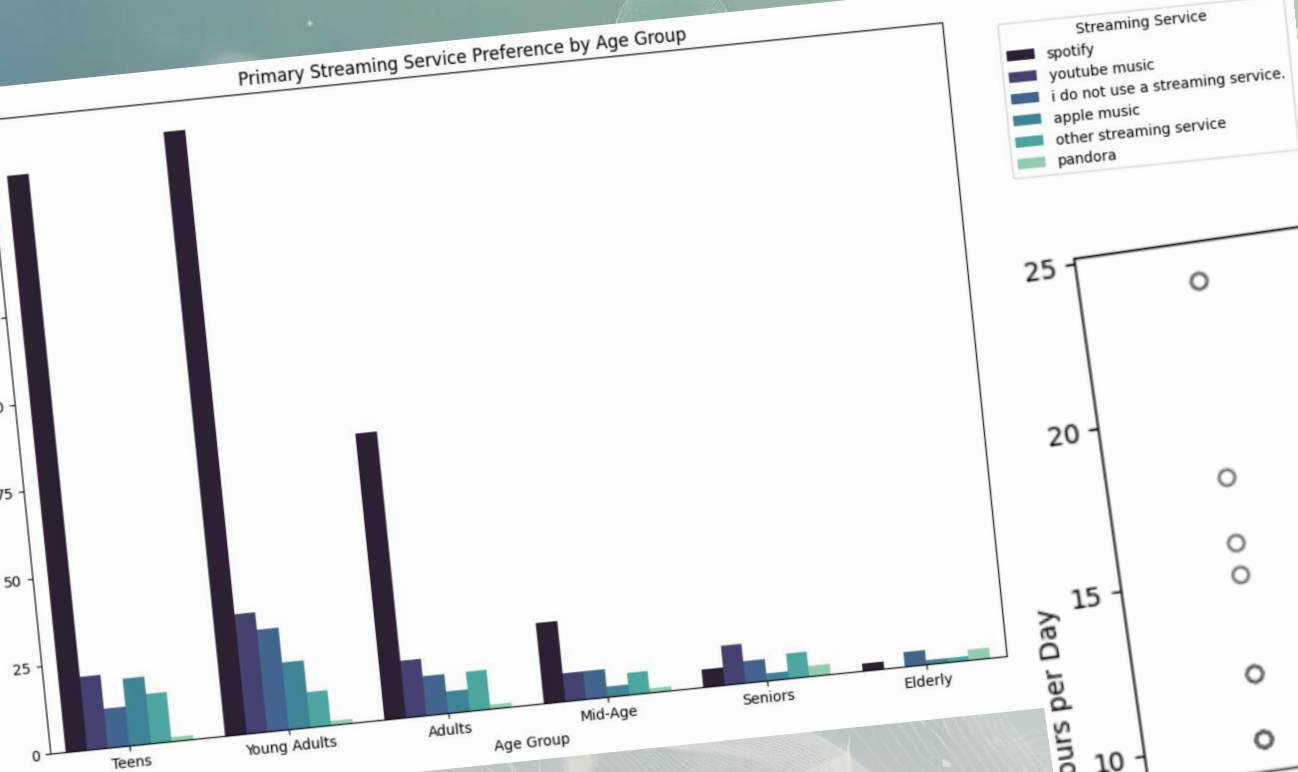
```
# Daily Music Listening Hours by Age Group
def listening_hours_by_age_group(df):
    plt.figure(figsize=(10, 6))
    sns.boxplot(data=df, x='Age Group', y='Hours per day', palette='coolwarm')
    plt.title("Daily Music Listening Hours by Age Group")
    plt.xlabel("Age Group")
    plt.ylabel("Hours per Day")
    plt.show()
    save_or_replace_plot("listening_hours_by_age_group.png")

#Correlation Heatmap of Mental Health Factors
def plot_correlation_heatmap(df):
    mental_health_cols = ['Anxiety', 'Depression', 'Insomnia', 'OCD']
    corr = df[mental_health_cols].corr()
    plt.figure(figsize=(8, 6))
    sns.heatmap(corr, annot=True, cmap='coolwarm', vmin=-1, vmax=1)
    plt.title("Correlation Between Mental Health Factors")
    plt.show()
    save_or_replace_plot("correlation_heatmap.png")
```

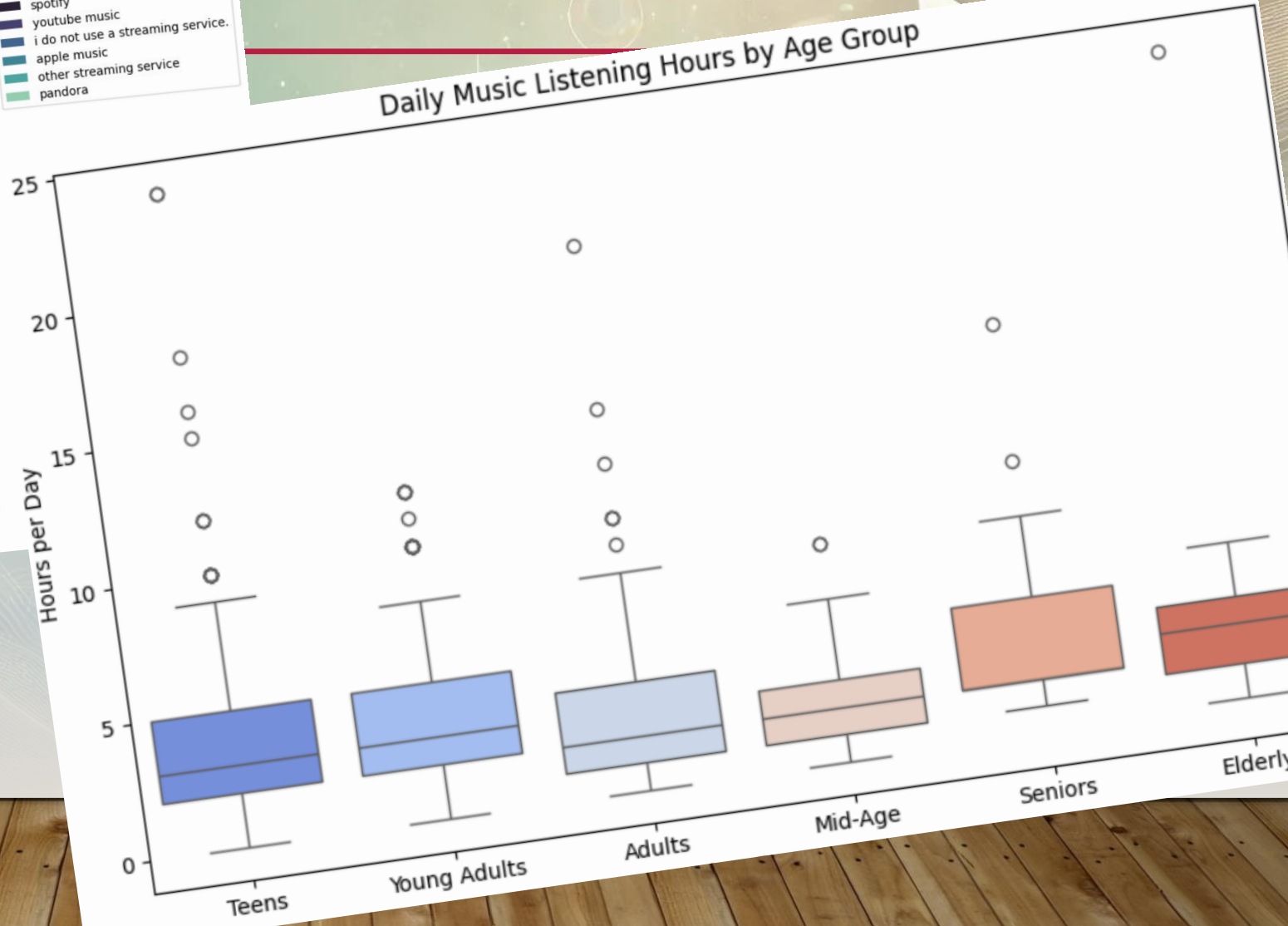


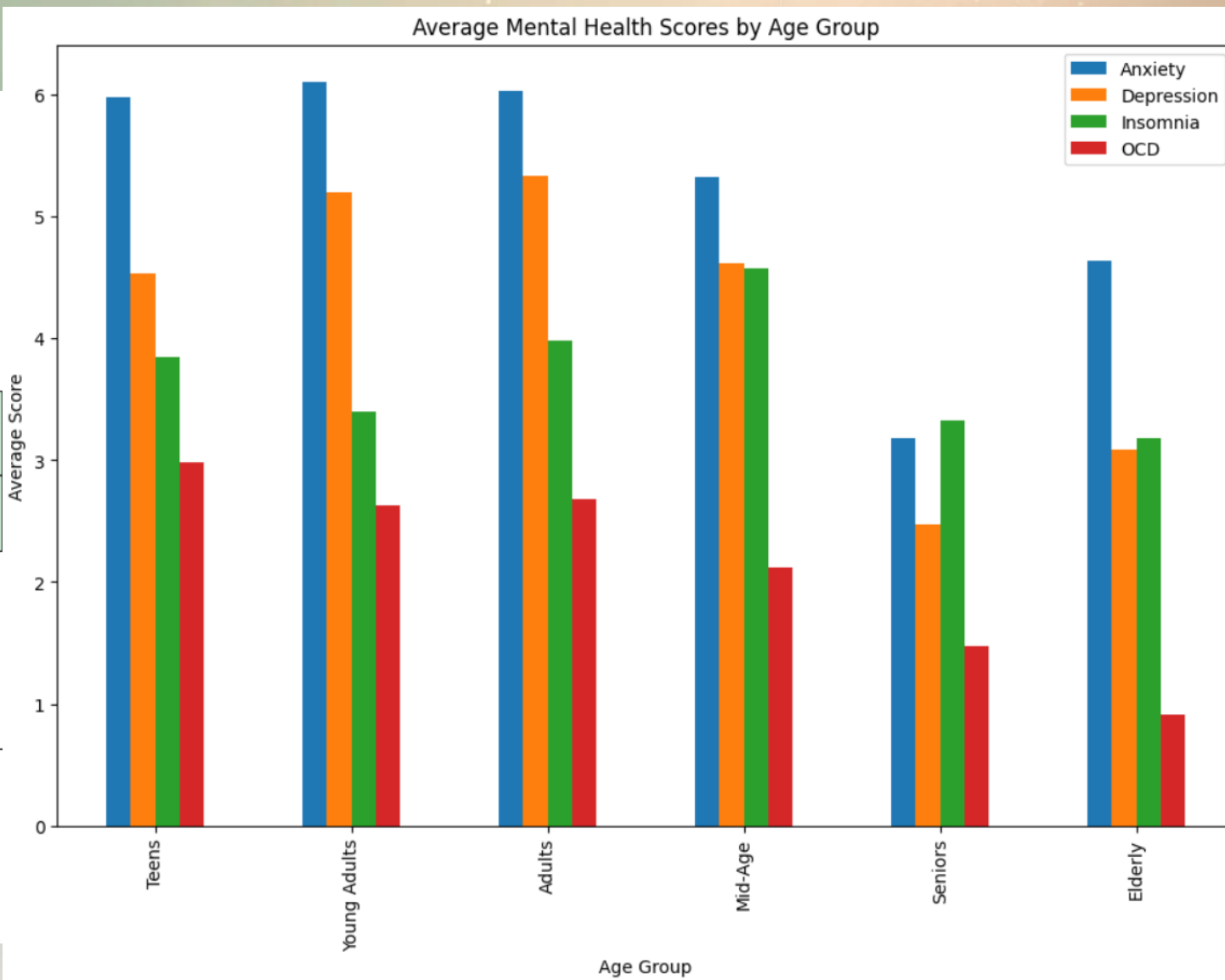
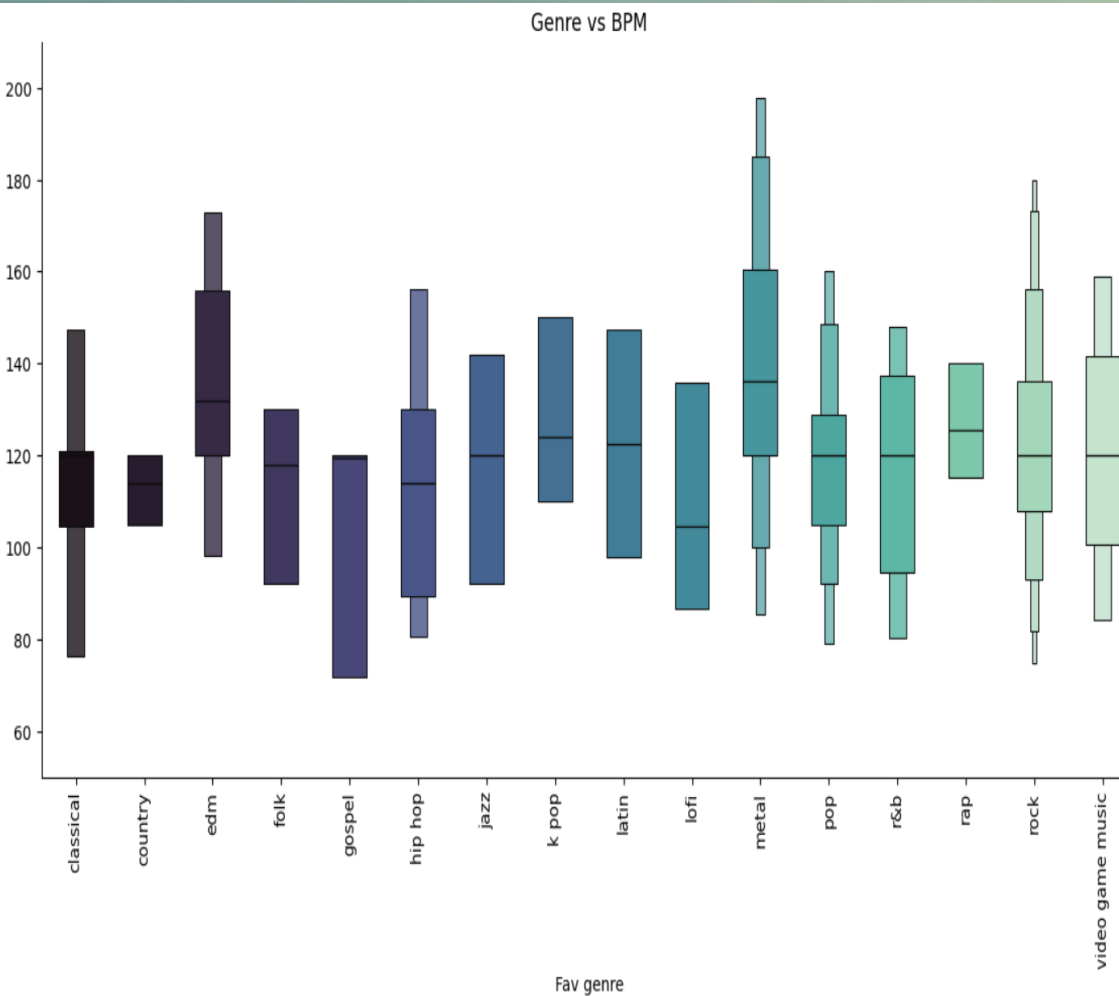
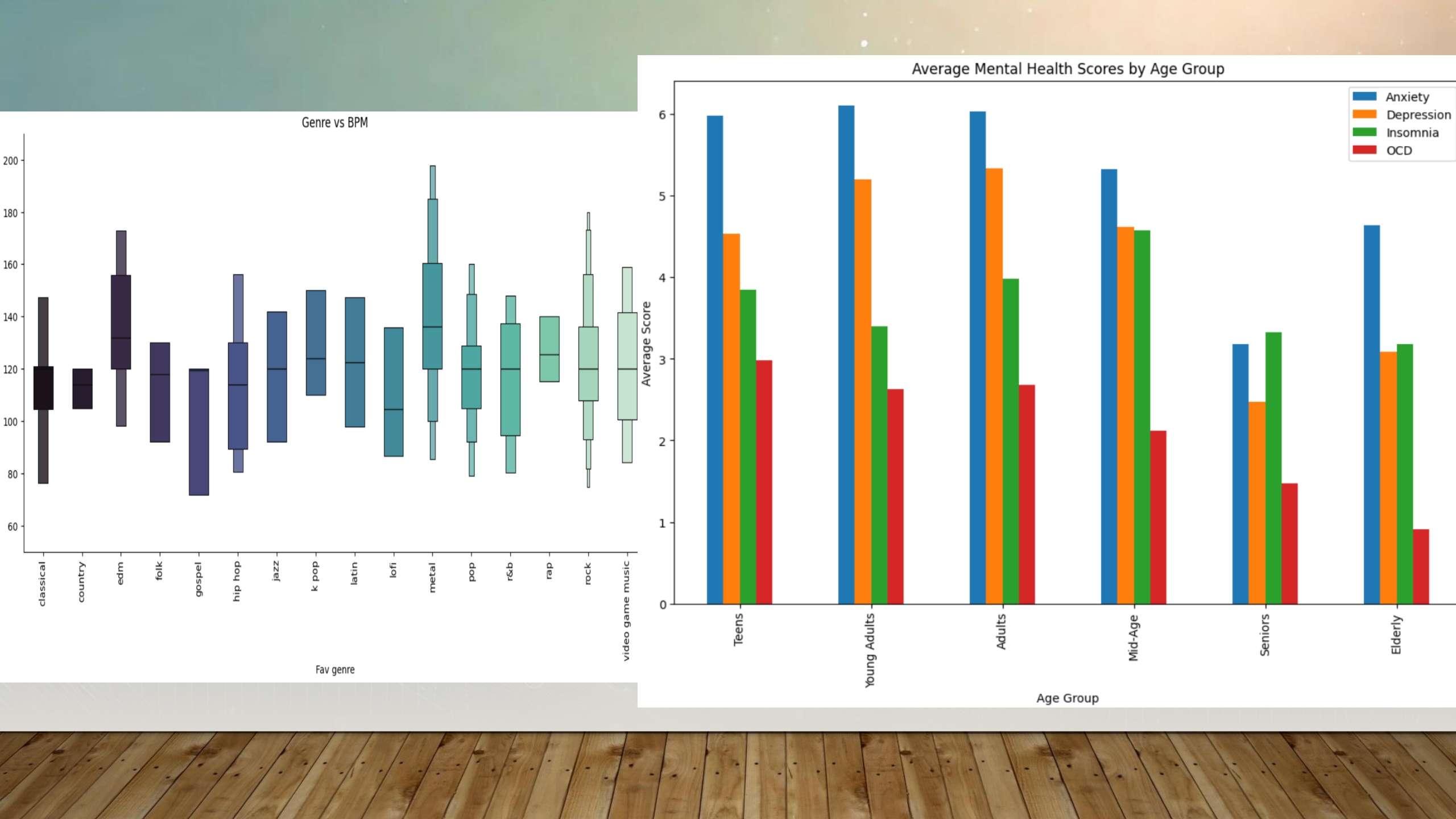
RESULTS

Primary Streaming Service Preference by Age Group

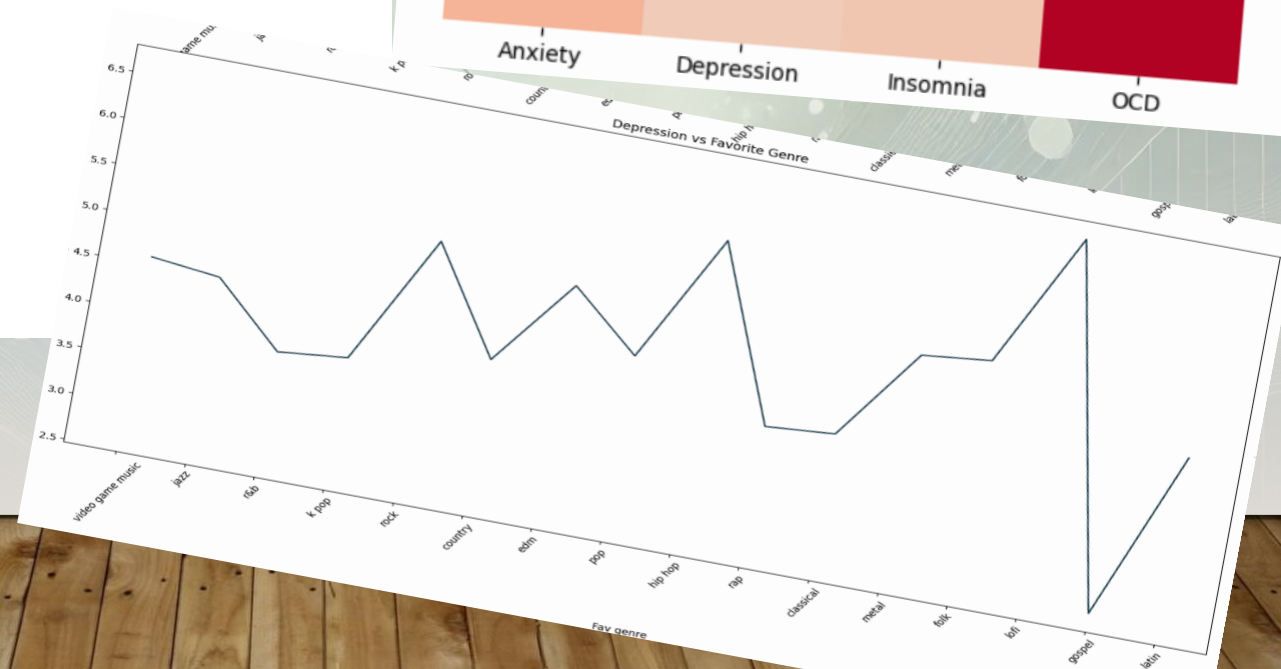
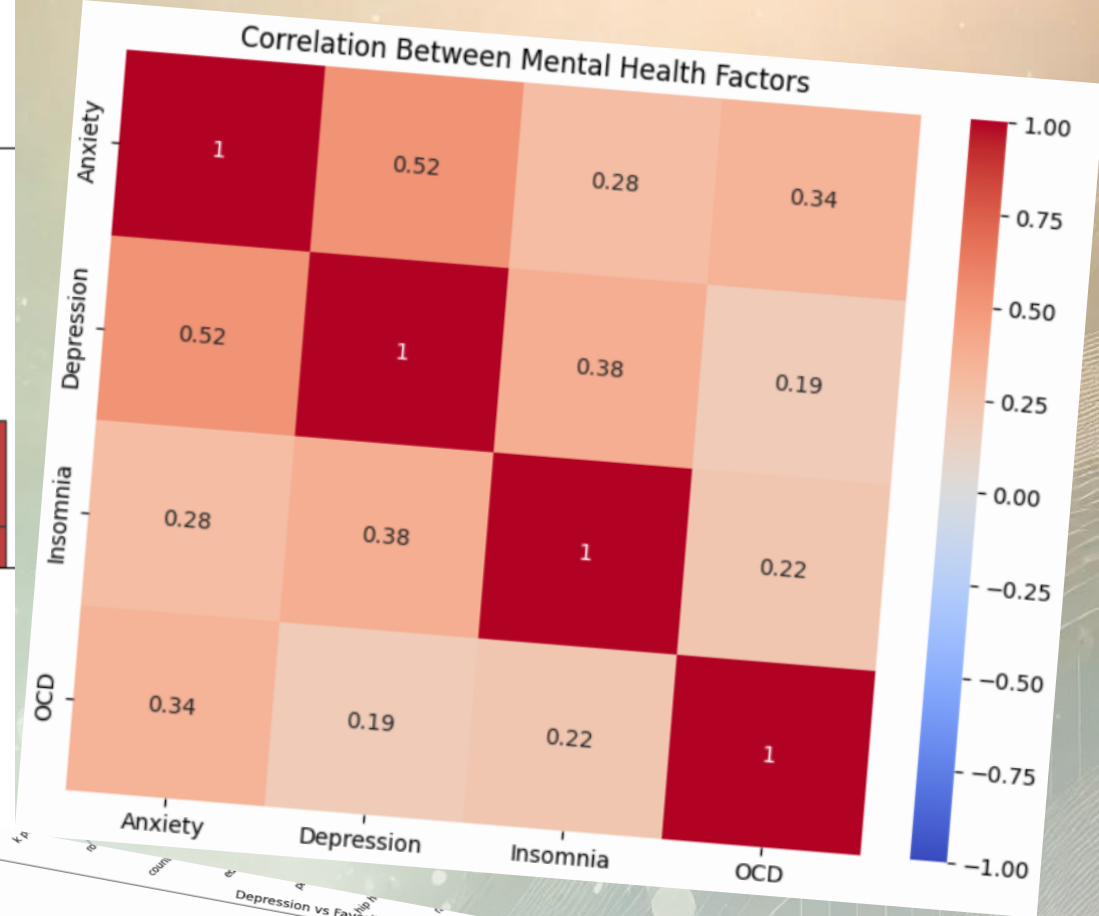
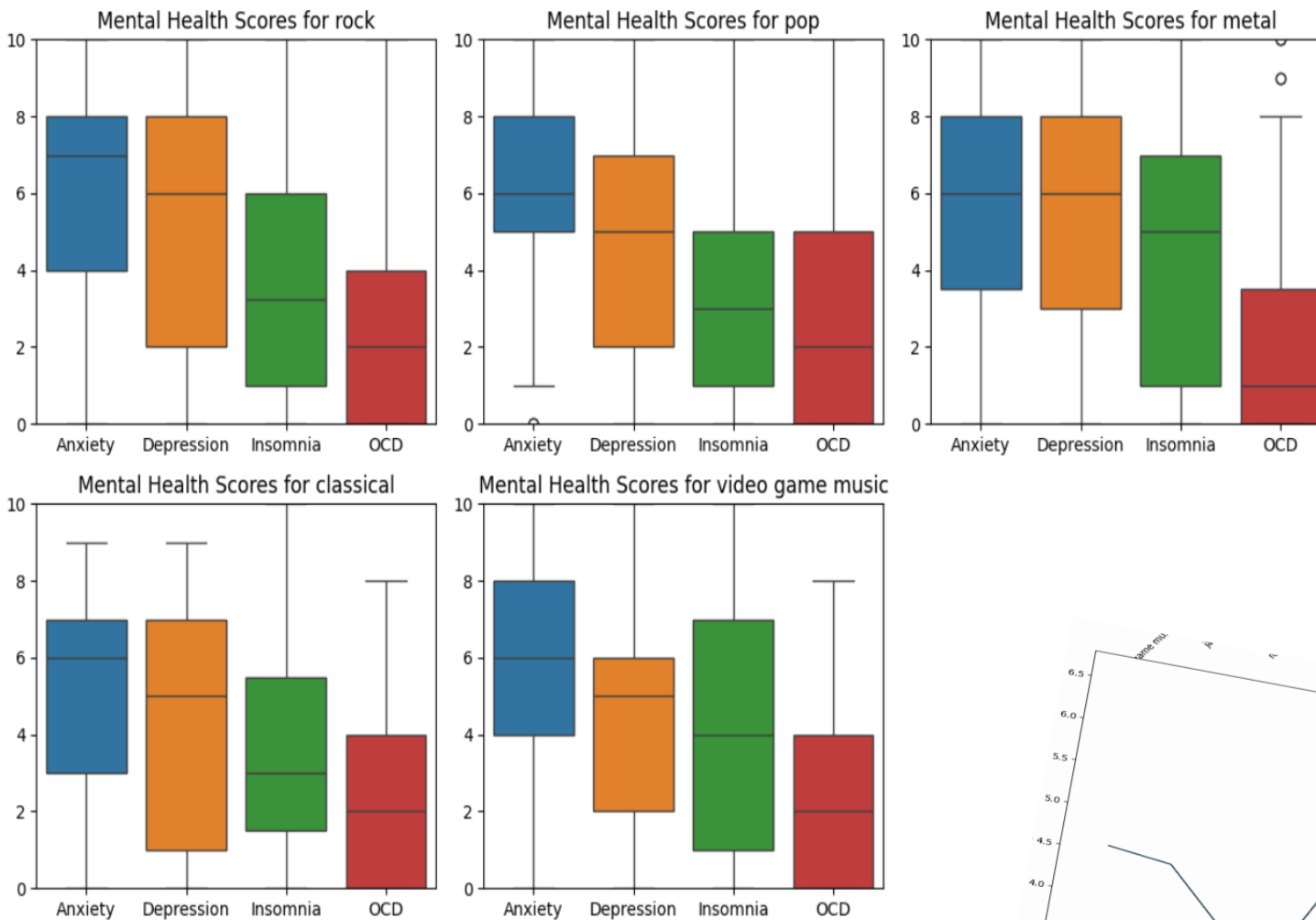


Daily Music Listening Hours by Age Group





Mental Health Scores by Popular Genre



OBSERVATIONS

- Individuals with insomnia may find solace in calming and soothing music like gospel, which could potentially help them relax or distract from their sleep difficulties.
- Lofi and Rap music genres, characterized by repetitive beats and rhythms, might appeal to individuals with OCD tendencies who seek comfort in structured patterns or rhythms.
- Lofi and Hip hop music, often expressing introspective themes and emotions, could resonate with those experiencing depression.
- Folk, K-pop, Jazz, and Rock music genres vary widely in style but may offer different forms of emotional release or distraction for individuals dealing with anxiety

LEARNINGS

- Got hands-on experience with various libraries like pandas, matplotlib, seaborn, etc.
- EDA(Exploratory Data Analysis)- finding correlation between different features
- File Handling in python
- Performing operations and visualisations on different forms of data like visual data, text data, etc.
- Object Oriented Programming

Thank You!!

