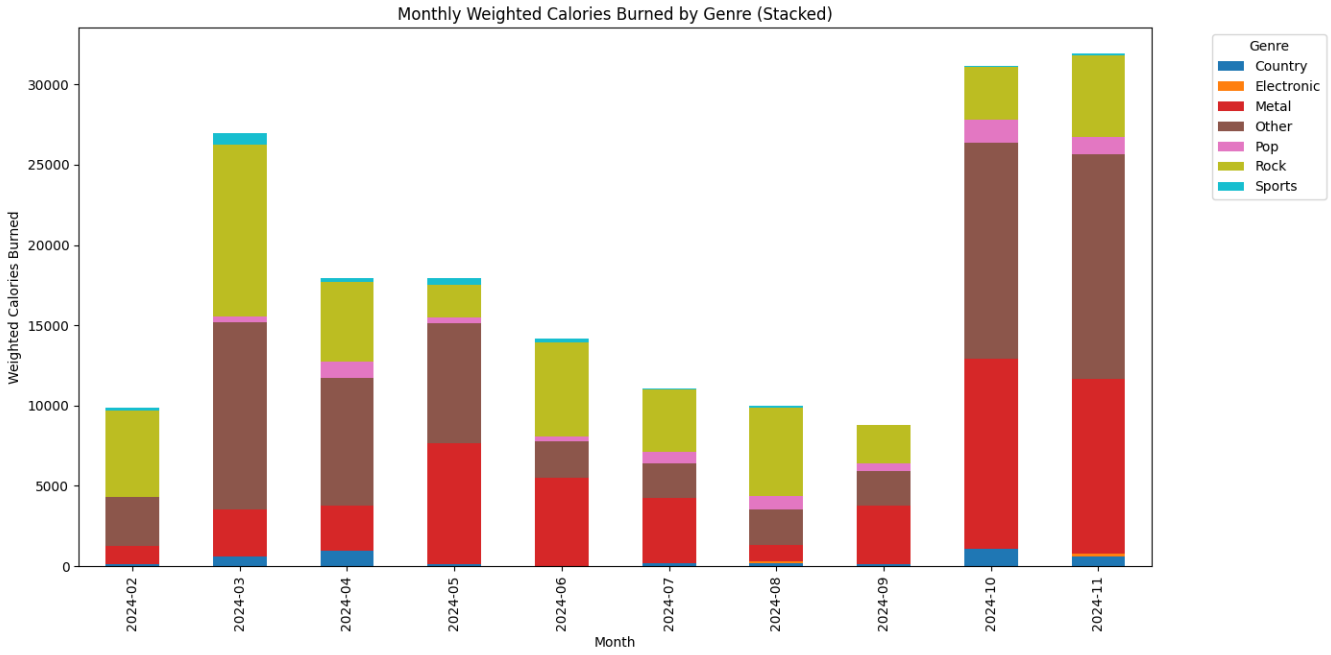
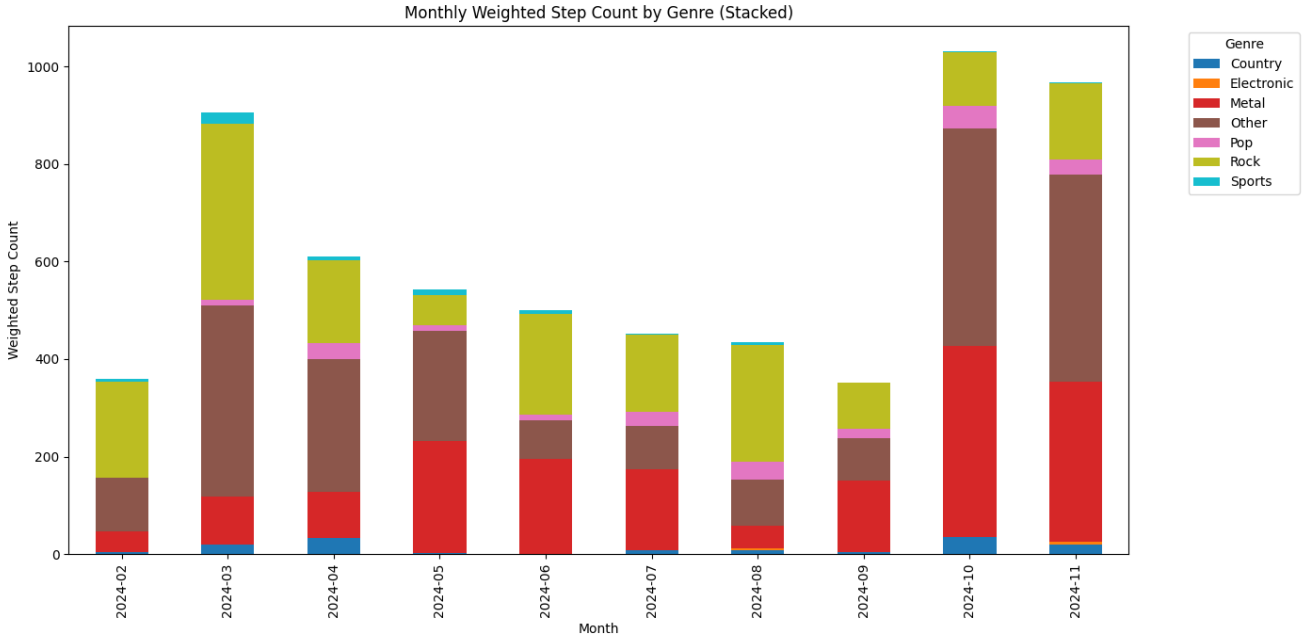
Music Genres vs Phyiscal Activity

From the stacked bar charts:

- **Metal and Rock**: These genres are associated with moderate to high levels of physical activity, likely reflecting more upbeat or energetic music's effect on the listener.
- **Electronic**: Showed variability, with some periods of high steps and calorie burn, possibly linked to its use during workouts or active sessions.
- **Pop and Country**: These genres generally align with moderate activity levels, showing consistent but not extreme physical activity.
- **Other Genres**: Categories like "Sports" and "Other" had mixed results, possibly due to data variability or external factors influencing activity.





Chi-Square Test

To test for a relationship between music genres (broad_genre) and activity levels (activity_level categorized by calories burned), a chi-square test was conducted:

- **Chi-Square Statistic**: 13.59
- **P-value**: 0.327
- **Degrees of Freedom**: 12

The p-value is greater than the significance level (0.05), leading to the conclusion that there is no statistically significant association between music genres and activity levels based on calories burned.

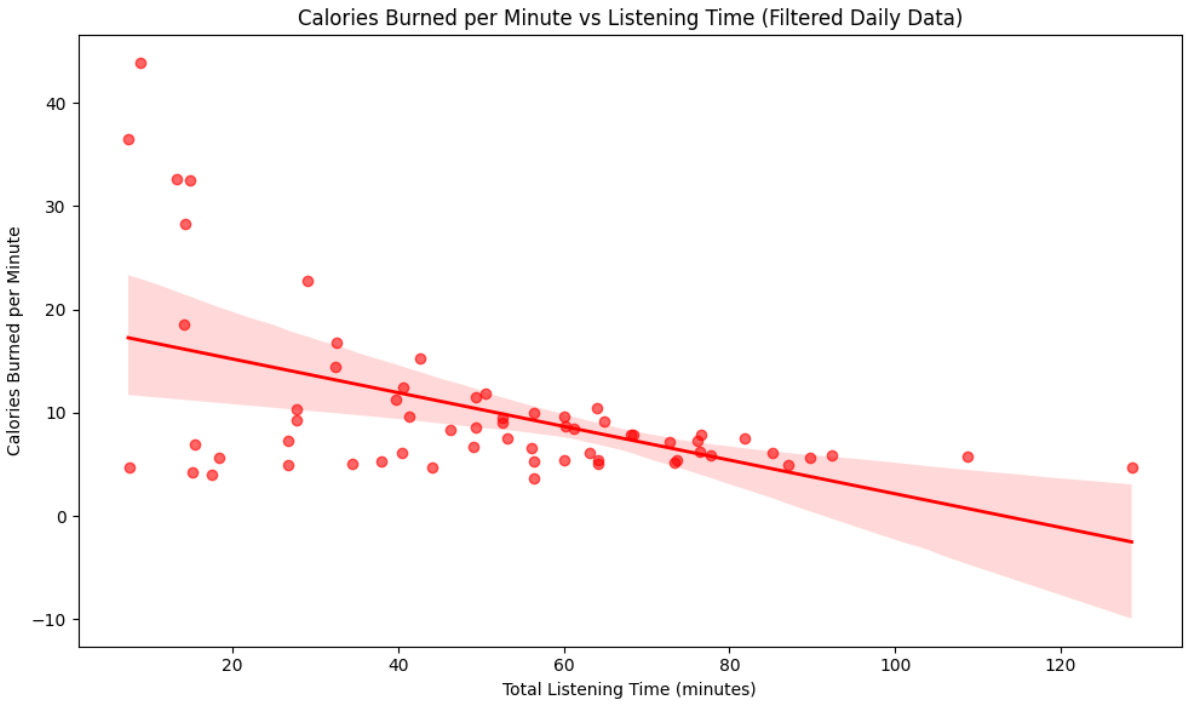
Conclusion

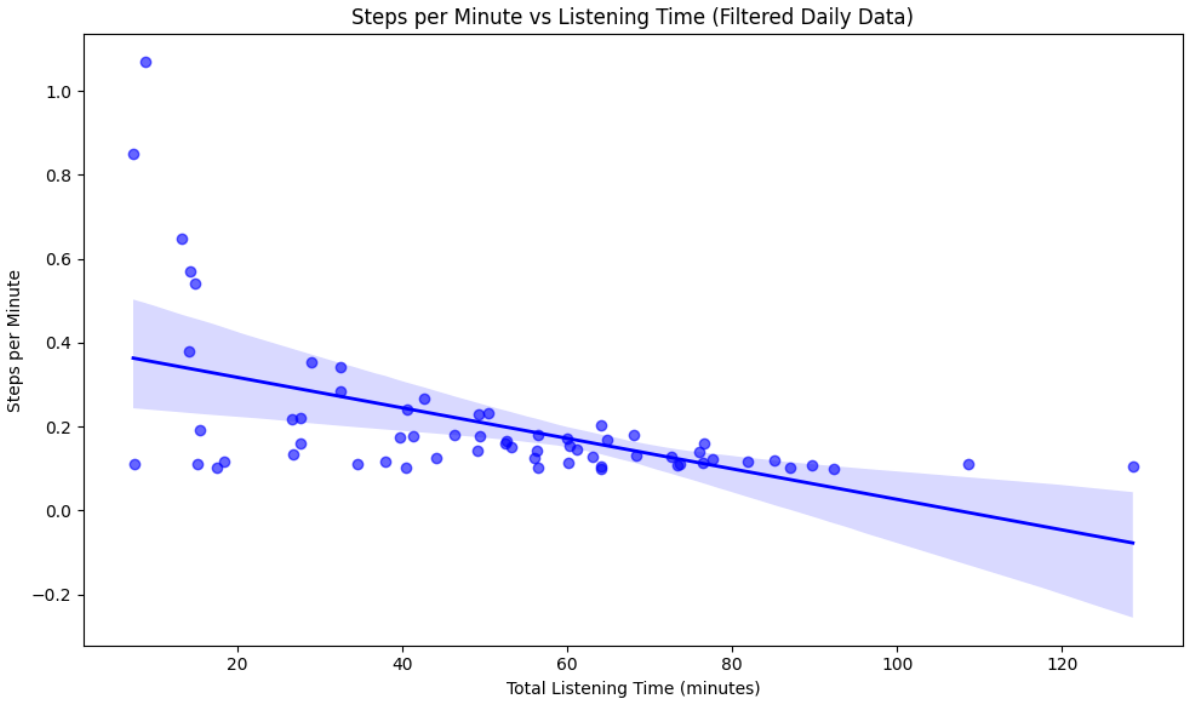
- The analysis indicates that **music genres may have a minor influence on physical activity**, with energetic genres like Metal, Rock, and Electronic showing some association with higher activity levels (e.g., more steps or calories burned).
- However, the overall relationship is not strong, and external factors likely play a more significant role in determining physical activity levels.

Listening time vs Exercise Intenstiy

Based on the analysis and visualizations:

1. **Scatter Plot Observations**:
    - The scatter plots for both **Steps per Minute vs Listening Time** and **Calories Burned per Minute vs Listening Time** show widely dispersed points with no clear pattern or clustering.
    - The regression lines are nearly flat, indicating a very weak or non-existent relationship between listening time and exercise intensity metrics.





Pearson Correlation Test

- **Correlation Coefficient:** 0.092
  This indicates a very weak positive correlation between average listening time and calories burned per minute.
- **P-value:** 0.131
  Since the p-value is greater than 0.05, the result is not statistically significant.

OLS Regression Results

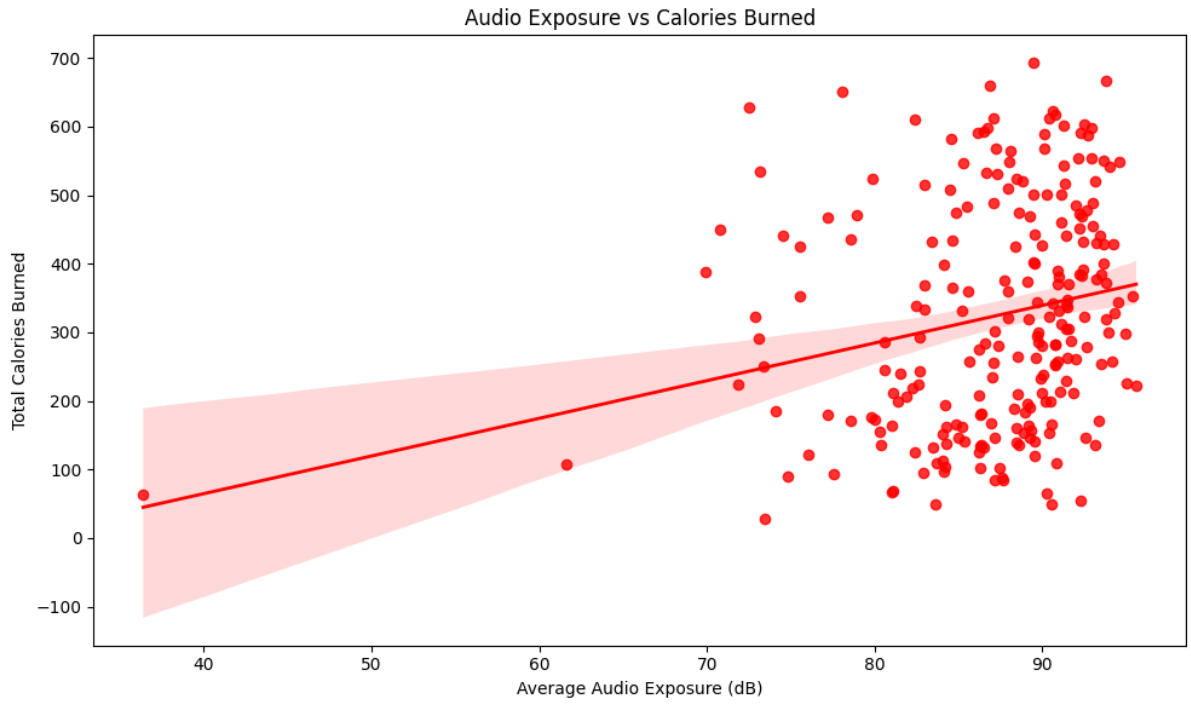
- **Intercept:** 5.3730
  The baseline calorie burn rate is approximately 5.37 calories per minute when total listening time is 0.
- **Coefficient for Total Listening Time:** 0.0042
  This implies a slight increase in calorie burn rate (0.0042 calories per minute) for every additional minute of listening time. However, the p-value (0.132) suggests that this effect is not statistically significant.
- **R-squared:** 0.009
  Only 0.9% of the variation in calories burned per minute is explained by the model, indicating that listening time is a poor predictor of calorie burn rates.

Conclusion:

  - Both the correlation and regression results show statistically significant relationships, but the strength of the relationship is weak.
  - While the findings suggest a small positive impact of listening time on calories burned per minute, the weak relationship implies that other factors, such as physical activity type or intensity, play a larger role.

Audio Exposure vs Calories Burned

- **Observation**:
  - The regression line shows a **slight positive slope**, indicating a weak **positive correlation** between **average audio exposure (dB)** and **calories burned**.
  - Higher audio exposure **might** correspond to slightly more calories burned, but the relationship is weak and has significant variability.
  - The **confidence interval (shaded area)** is wide, especially at lower audio exposure levels, indicating a lack of strong predictive power.



Pearson Correlation Test

- **Correlation Coefficient**: 0.2509
- **P-value**: 0.0016

The positive correlation coefficient of 0.25 indicates a weak but statistically significant positive relationship between audio exposure and calories burned per minute. The p-value (< 0.05) confirms that this correlation is unlikely to have occurred by chance.

OLS Regression Results

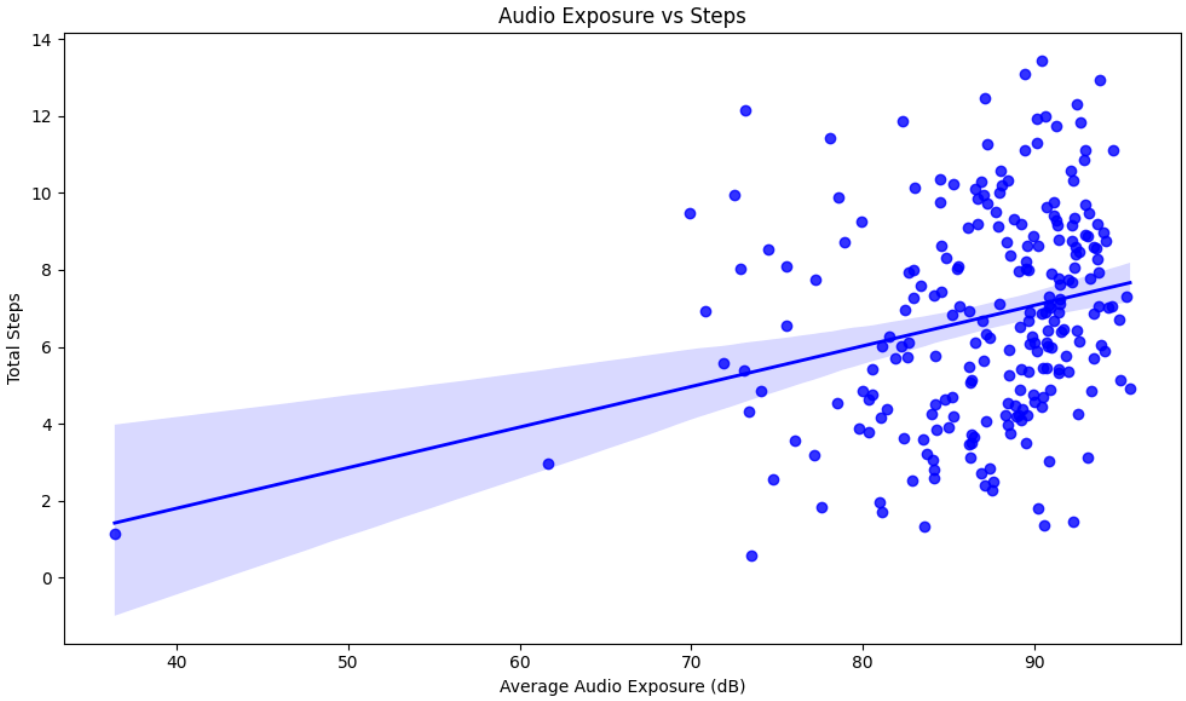
- **R-squared**: 0.042
  - This indicates that about 4.2% of the variance in calories burned per minute can be explained by total headphone audio exposure. While this is low, it suggests that listening time has a small impact.
- **P-value for Listening Time**: 0.002
  - The p-value indicates that audio exposure has a statistically significant effect on calories burned per minute.
- **Coefficient for Listening Time**: 0.0175
  - For every additional minute of audio exposure time, the model predicts an increase of 0.0175 calories burned per minute on average.

Conclusion:

- There is **no strong evidence** that audio exposure significantly impacts calorie burn levels. The weak correlation suggests other factors likely play a more dominant role.

Audio Exposure vs Steps

- **Observation**:
  - The regression line here also shows a **slight positive slope**, indicating a weak **positive correlation** between **average audio exposure (dB)** and **steps**.
  - As audio exposure increases, there is a slight tendency for step counts to increase, but again, the relationship is not strong.
  - The wide spread of points around the line and the large confidence interval at lower audio exposure levels reflect high variability.



Conclusion:

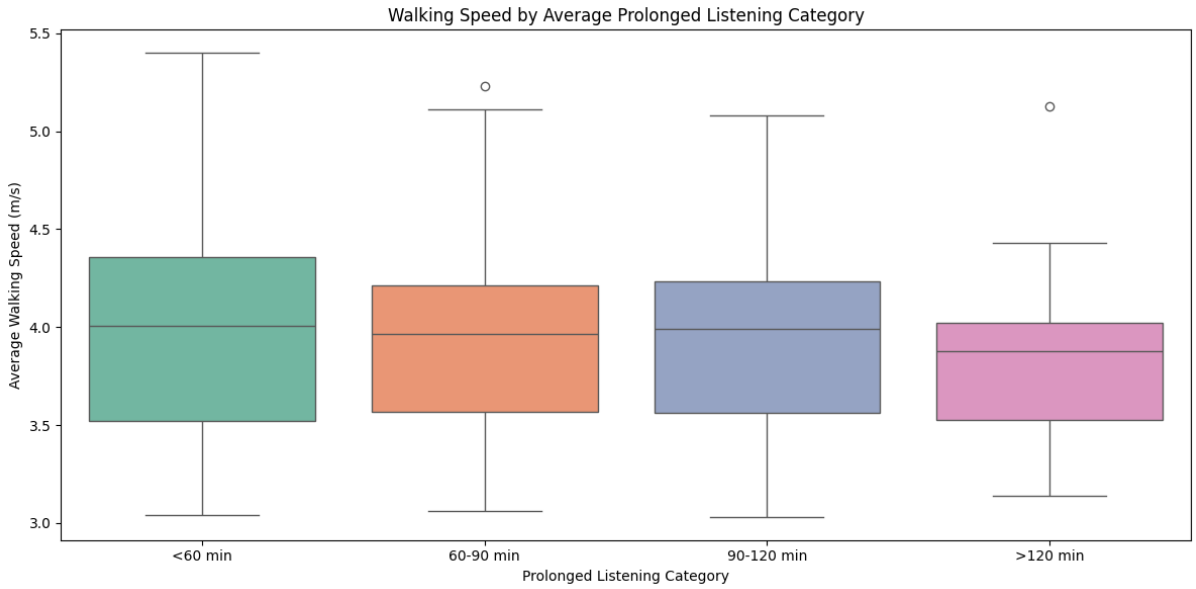
- Similar to calories burned, **audio exposure does not strongly correlate** with step counts. While there may be a slight trend, it is not meaningful or robust enough to suggest a significant association.

 Key Finding: Headphone audio exposure (measured in dB) shows a **weak positive correlation** with both calorie burn levels and step counts, but the relationships are not strong or consistent enough to draw meaningful conclusions.
 Implications: Audio exposure is likely **not a major factor** influencing physical activity. Other variables, such as the type of activity or environmental factors, are likely more significant.

Prolonged listening to specific music genres vs walking speed & asymmetry

1. Walking Speed by Average Prolonged Listening Category

- **Observations**:
  - The median walking speed (central line in each box) remains consistent across all categories, with slight variation.
  - The <60 min and 60-90 min categories show slightly higher median walking speeds compared to >120 min.
  - There is no strong evidence suggesting that prolonged listening impacts walking speed significantly.
  - The distribution (IQR) of walking speed is wide across all categories, indicating high variability within each group.



Walking Asymmetry ANOVA:

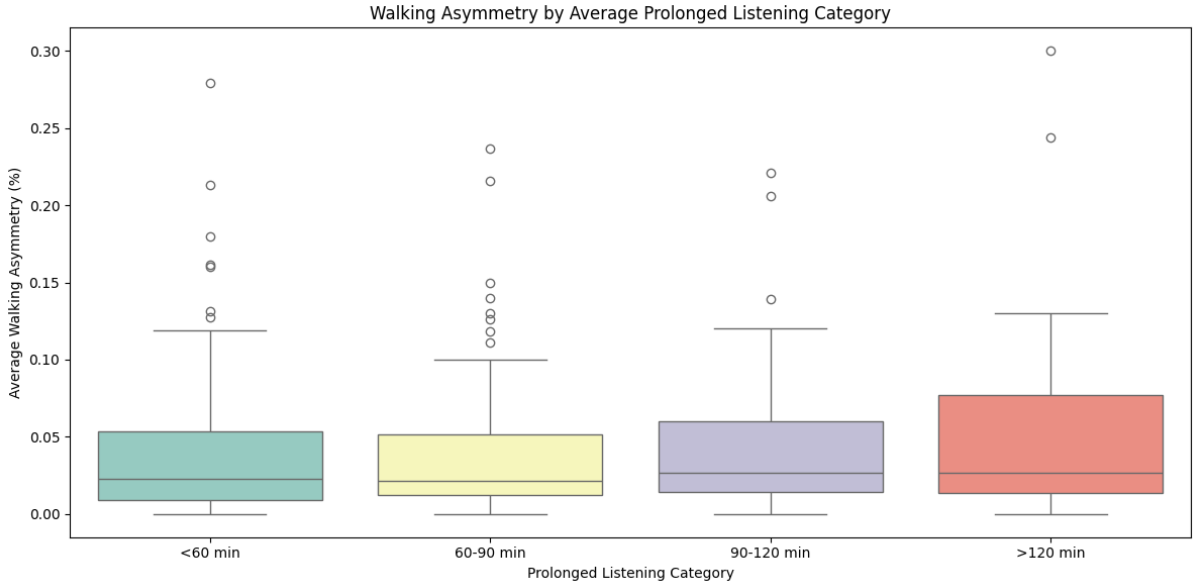
- **F-Statistic**: 0.733
  - Indicates the ratio of variance between groups to variance within groups. A lower value suggests that group means are not significantly different.
- **P-Value**: 0.533
  - A p-value > 0.05 indicates no significant difference between the groups for walking asymmetry.

Conclusion:

- No strong correlation is observed between prolonged listening duration and walking speed.
- Any small differences may be due to external factors rather than listening habits.

Walking Asymmetry by Average Prolonged Listening Category

- **Observations**:
    - The median walking asymmetry remains nearly constant across all categories.
    - Variability (IQR) increases slightly in the >120 min category, but the difference is not significant.
    - Outliers are more prominent in higher listening categories, indicating occasional deviations in walking asymmetry on specific days.

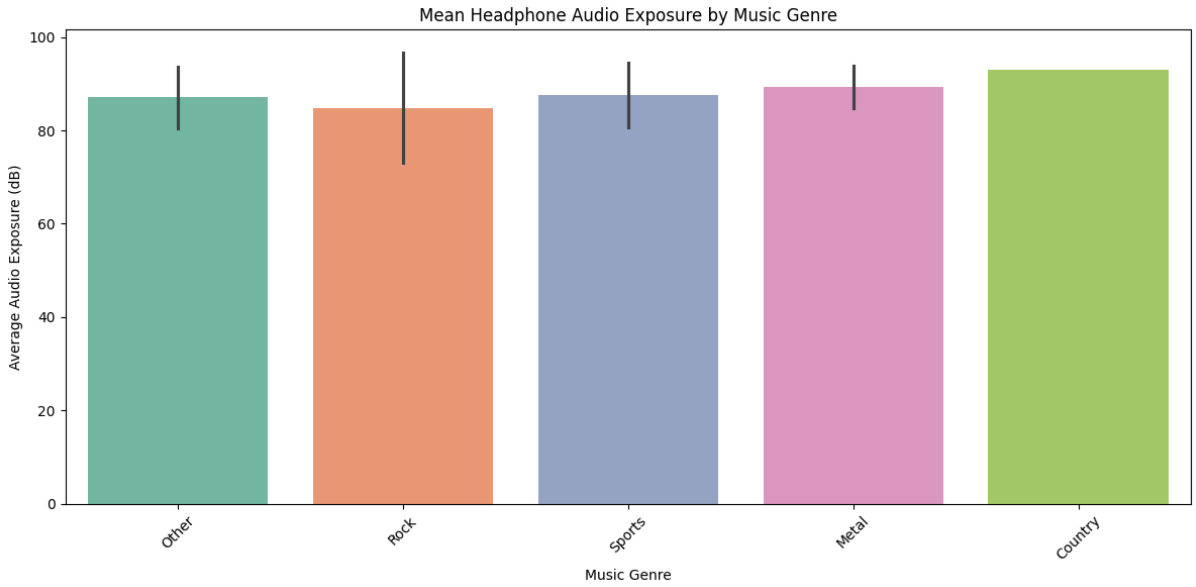


Conclusion:

- Prolonged listening does not show a significant effect on walking asymmetry.
- The slight increase in variability in higher categories could be influenced by small sample sizes or external factors.

Music Genres vs Headphone Exposure Levels

1. **Bar Plot Observations**:
    - The average headphone audio exposure levels are similar across genres such as "Rock," "Metal," "Sports," "Country," and "Other."
    - The height of the bars indicates that **no significant differences in average audio exposure levels** were found between the genres.
    - The error bars (representing variability) show some genres (e.g., "Sports" and "Other") have slightly more variability, indicating that listeners of these genres may have more diverse volume preferences.
2. **Key Takeaways**:
    - There is no evidence to suggest a strong relationship between **music genre** and **headphone audio exposure levels**.
    - Average audio exposure is consistent across genres, and the differences in variability are minimal.



ANOVA Test Results:

- **F-Statistic**: 0.701, a measure of the variance between group means relative to the variance within groups.
- **P-Value**: 0.6498, indicating the probability of observing this result if the null hypothesis (no difference between group means) is true. Since the p-value is **greater than 0.05**, we fail to reject the null hypothesis.

Conclusion

The analysis suggests that **music genres do not significantly influence headphone audio exposure levels**. While individual preferences and behaviors may vary, no meaningful trend or relationship was observed between genres and exposure levels in the aggregated data.