METRO STATE UNIVERSITY

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DATA 211 – DATA VISUALIZATION
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THE EFFECT OF AUDIO ENVIRONMENT ON STUDY FOCUS AND PRODUCTIVITY

A 14-DAY SELF-STUDY USING R AND DATA VISUALIZATION

SCAN TO CONNECT
HTTPS://GITHUB.COM/MLARS290/STUDY-FOCUS-AUDIO-PORTFOLIO

INTRODUCTION

Many students study with background audio—such as **music**, **lectures**, or **ambient noise**—but research on its effects is mixed. Some sounds improve concentration, while others may create distraction.

This project investigates how **four audio environments—Silence, Instrumental Music**, **Music with Lyrics**, and Lecture Audio—affected my **focus** and **productivity** over a 14-day period of real study sessions.

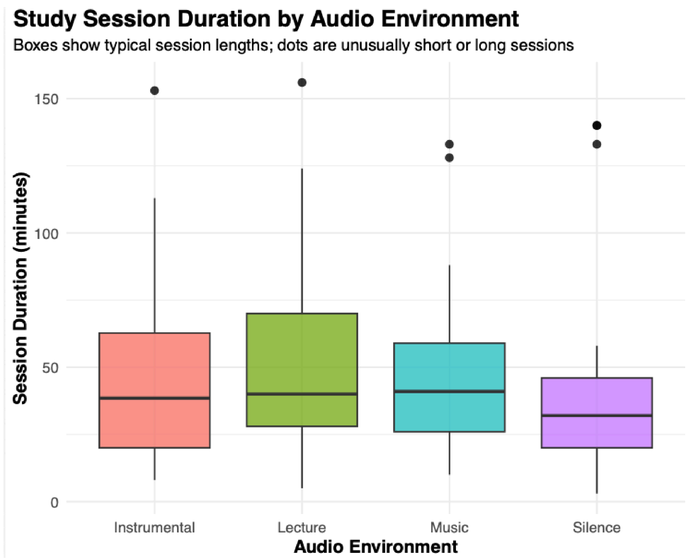

FIGURE 1. STUDY SESSION DURATIONS ACROSS AUDIO ENVIRONMENTS. SILENCE SHOWED THE WIDEST VARIABILITY.

OBJECTIVE

The objective of this study is to compare how different audio environments influence:

- **average study focus**
- **study session duration**
- **total time spent studying**

The goal is to identify which **audio environment** best supports **concentrated** and **effective studying.**

KEY FINDINGS

- **Silence** had the **highest average focus score**
- **Instrumental music** produced **strong, consistent focus**
- **Lecture audio** and **music with lyrics** showed **lower typical focus**
- Session duration varied, but **longer sessions did not result in higher focus**
- Visualizations show **clear differences** in concentration between environments

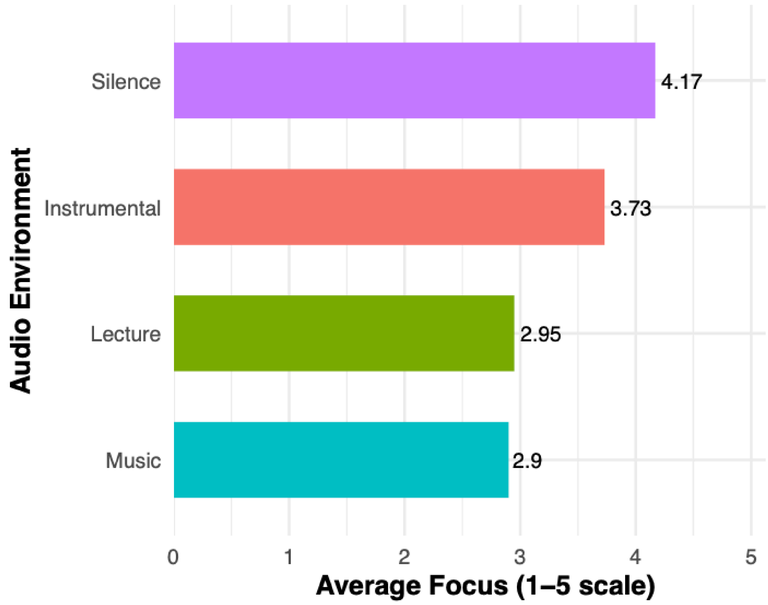

FIGURE 2. AVERAGE FOCUS SCORES (1–5) BY AUDIO ENVIRONMENT. SILENCE AND INSTRUMENTAL MUSIC SCORED THE HIGHEST.

ANALYSIS

The ANOVA showed a **significant difference** in mean focus across audio environments ($p < 0.001$).

Silence and **instrumental music** produced **higher focus**, while **lecture audio** and **music with lyrics** resulted in **lower focus**.

These results match the trends seen in the visualizations.

METHODOLOGY

- Self-tracking study conducted over **14 consecutive days**
- **87 study sessions** recorded across **four audio conditions**
- Variables collected: **audio environment**, **duration**, **activity type**, **date/time**, and **self-rated focus (1–5)**
- Data cleaned and analyzed in R using:
  - **dplyr** for summarization
  - **ggplot2** for visualization
  - **One-way ANOVA** to compare mean focus across environments

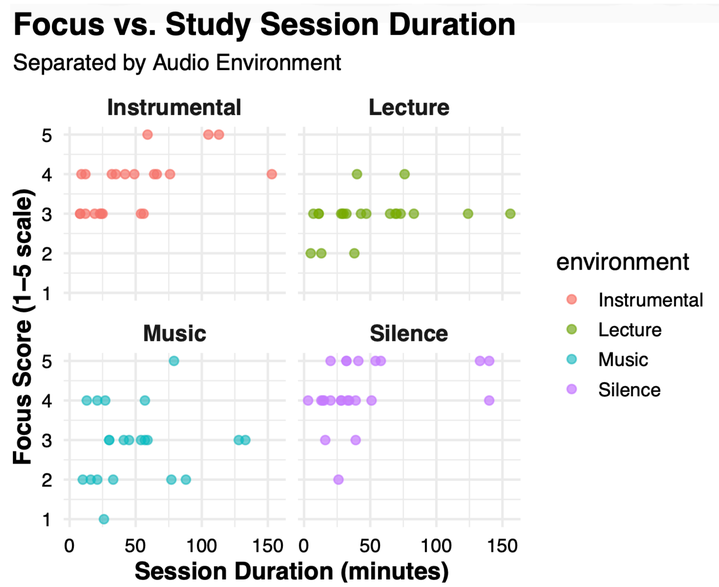

FIGURE 3. FOCUS SCORES VS. SESSION DURATION. NO STRONG RELATIONSHIP BETWEEN LONGER SESSIONS AND HIGHER FOCUS.

CONCLUSION

Quieter audio environments supported the **highest focus** during studying.

Silence and **instrumental music** were the **most effective**, while **lyrics** and **lecture audio** lowered concentration.

Future work could include more participants, more sound types, or a longer study period.