Cannabis Habits and Music Listening

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Abstract

This paper intended to study the relationship between the time spent listening to music and cannabis consumption as well as method of consumption among my housemates. Time spent listening to music [hrs/week] (DV), weekly cannabis consumption [days/week] (IV_1), as well as consumption method (IV_2) were collected via a Google Form which was sent to my house's mailing list. Along with these, age, gender preference, and ethnicity were collected. The data was then cleaned, manipulated, and visualized in RStudio. The results found extremely weak correlation ($r = 0.0141$) between time spent listening to music and cannabis consumption [days/week] (Model 1). Surprisingly, there was a slightly lower than moderate correlation ($r = 0.3403$) between time spent listening to music and consumption method (Model 2), and a fairly moderate correlation ($r = 0.4353$) in the multivariate model (Model 3). However, Models 1 and 3 were determined to be statistically insignificant ($p > 0.05$), while Model 2 was determined significant through its 95% confidence interval. A study from a larger sample size is needed in order to acquire more statistically significant results as well as a more focused study on the perceived vs actual time spent listening to music while under the influence of cannabis.

Keywords: Music, Cannabis, Consumption Method, Human Experience

Introduction

Hypothesis	Null Hypothesis	Alternative
Hypothesis 1 (DV ~ IV_1)	Cannabis consumption DOES NOT affect time spent listening to music.	Cannabis consumption DOES affect time spent listening to music.
Hypothesis 2 (DV ~ IV_2)	Method of Cannabis Consumption DOES NOT affect time spent listening to music.	Method of Cannabis consumption DOES affect time spent listening to music.
Hypothesis 3 (DV ~ IV_1 + IV_2)	Cannabis consumption and method DO NOT affect time spent listening to music.	Cannabis consumption and method DO affect time spent listening to music.

Music, and more largely sound, has been such an innate part of the "human experience", and as such, I believe that there must be some innate connection between humans and music. Additionally, I believe that cannabis consumption also holds deep ancestral ties with the "human experience" due to the various ways in which the cannabis plant has been used for countless millennia. To clarify, by "human experience," I refer to the generalized experience of life as well as the shared adversities, pleasures, and experiences that come along with it. I believe that this idea ties into cannabis consumption due to, as I said, its use for thousands of years. There is plenty of information to point toward the unique relationship that we have with cannabis. Mainly, this can be seen by the abundance of cannabinoid receptors we have in our body (more than any other receptor). Beyond the effects that we can acquire through its consumption, cannabis, along with the greater plant it comes from, has been used in many practical uses as well. Thus, regardless of whether or not cannabis is consumed, the historical effects of the drug are nothing short of abundant. While cannabis is known to induce a more relaxed state, the link between cannabis consumption and the amount of time spent listening to music is quite understudied, so my goal is to identify a connection between the amount of time a person spends listening to

music and their cannabis habits. Studying the dependent variable, time spent listening to music (hrs/week), I sought to understand and answer the question: Do cannabis habits affect time spent listening to music?

There has been some research done regarding the dependent variable, however, studies concerning time spent listening to music are fairly sparse. I believe that this is important to understand since music also holds deep ties to the "human experience." These ties come in the form of emotional responses, mental images, and the processing of sound that is found in music. Prior research on the effects of music on the brain when combined with cannabis has found results which indicated a "dampened response to music" while also having "involvement in music reward" (Freeman Et al., 2018). This increased involvement in music reward while also dampening response provides some interesting insight into the complicated relationship between cannabis and music. However, other studies have concluded that "THC has a measurable influence on cerebral music processing and seems to enhance acoustic perception temporarily" (Fachner, 2006). The effects found in this study indicate that the use of cannabis can allow for, in a sense, a new perspective on music and allows for new neural pathways to connect when listening to music. I believe that these changes in how music is perceived would incentivize the consumer to listen to more music due to the neurological changes induced by cannabis. When studying the topographic EEG changes induced by cannabis when listening to music, the findings showed an "altered music perception, [along with] hyperfocusing on the musical time-space" (Fachner, 2002). Since the effects of cannabis show trends towards a more intent focus on music, I believe that this would lead to an increase in time spent listening to music.

My first independent variable is days consuming cannabis in a week. There were not any studies that I could find that measured this variable, and as such, I had no reference to look at

when using this variable. The effects of cannabis consumption on music can be explained by the text *The Space between the Notes* as "an expanded sense of time which is analogous with both hallucinogenic experience and musical form" (Fachner, 2002). What this statement indicates is the possibility of time spent listening to music not changing, but the perception of the amount of time spent changes. This finding leads me to believe that a new study involving perceived time spent vs actual time spent may reveal new information. "currently ignored or dismissed not only by the usual suspects…but also by the great majority of the academic community" (Webster, 2001). What this indicates is that the field has been significantly understudied which I believe to be due to the stigmatization of cannabis and other drugs due to a history of racism. In the more contemporary age, this has become less so – especially since the legalization of cannabis across many states. My secondary independent variable is cannabis consumption method; I also could not find any studies that looked at this variable. This variable is important to look at since the way in which cannabis is consumed leads to changes in the time before onset. As such I believe that categorizing by consumption method allows us to determine if different methods of consumption yield more tailored responses.

I hope to discover exactly how time spent listening to music relates to cannabis consumption habits. Ideally, I would like to confirm my suspicion that cannabis habits have a large effect on time spent listening to music, however, there's a chance that the universality of music breaches beyond the taboo of drug consumption. I have chosen a less-studied dependent variable that could possibly find evidence of certain trends pertaining to how cannabis consumption relates to time spent listening to music and the "human experience." I believe that the more cannabis a person consumes, the more time they will spend listening to music;

additionally, I am curious to see if my belief is confirmed that the medium through which cannabis is consumed affects the time spent listening to music.

Methods

Participants. I recruited participants from my house of 125 people by emailing a link to my survey and asking for their responses. My sample size was 19 with an average age of 21.5263. The sample consisted of 47.4% male participants, 42.1% female participants, and 10.5% other/prefer not to say participants. A large majority of the sample consisted of white people at 73.7% whereas only 26.3% of the study was Latino/Hispanic, 5.3% Asian, and 5.3% black or African-American. There was some overlap in ethnicities due to some people holding multiple identities. I did not remove any participants in order to be able to work with a wider range of data since my sample size is small. I also standardized the data since my scales were different between my dependent and independent variables.

Procedures. In this study, participants were asked to complete a brief survey regarding their habits surrounding cannabis consumption and time spent listening to music on a weekly basis. I asked the participants to answer questions that asked about their weekly averages of time spent listening to music (hrs/week), the average number of days spent consuming cannabis (days/week), as well as the medium through which they consumed cannabis. Additionally, for demographic information, I also collected the age, gender preference, and ethnicity of the participants.

Measures and Manipulations. The survey I created, *Music Listening and Cannabis Habits Survey*, can be found here. For the dependent variable, I asked participants "On average, how many hours a week do you spend listening to music?" to which they would provide an open-ended numeric response. For the first independent variable, I asked participants "On

average, how many days a week do you consume cannabis?" to which they would provide an open-ended numeric response. For the second independent variable, I asked participants "What is the PRIMARY method through which you consume cannabis?" to which they would select one option from the choices.

Tables and Figures

Table 1. This table shows the bivariate and multivariate relationships between the dependent variable: hours per week listening to music (lsn), and the independent variables: days per week spent consuming cannabis (csm) and whether a person consumes cannabis (prm).

Standardized βs

DV = lsn	**Model 1**	**Model 2**	**Model 3**
Estimated Effects			
Intercept	0	0	0
IV_1 = csm	0.0155 [-0.5254, 0.5564]	--	-0.3577 [-1.2648, 0.5494]
IV_2 = prm	--	0.3403 [0.0487, 0.6319]	0.5732 [-0.3339, 1.4802]
Model Summaries			
R^2	0.0002	0.1158	0.1895
F-Test	0.0041 (1, 17)	2.2261 (1, 17)	1.8703 (2, 16)

Note: * $p < 0.05$, ** $p < 0.01$. 95% confidence intervals are reported in brackets below the estimated slopes and degrees of freedom for the F-test are reported in parentheses.

Figure 1. This figure shows the distribution of ages in the dataset.

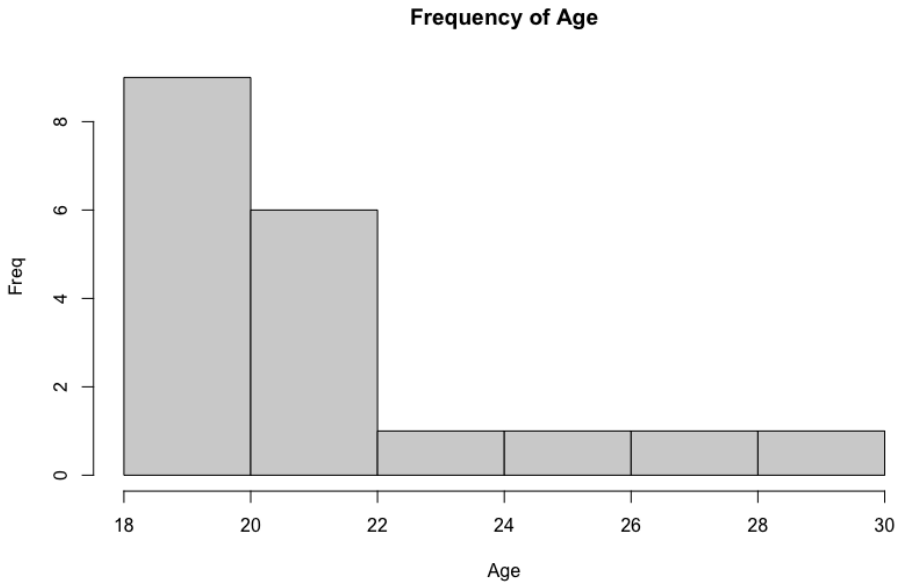


Figure 2. This figure shows the distribution of gender preference in the dataset.

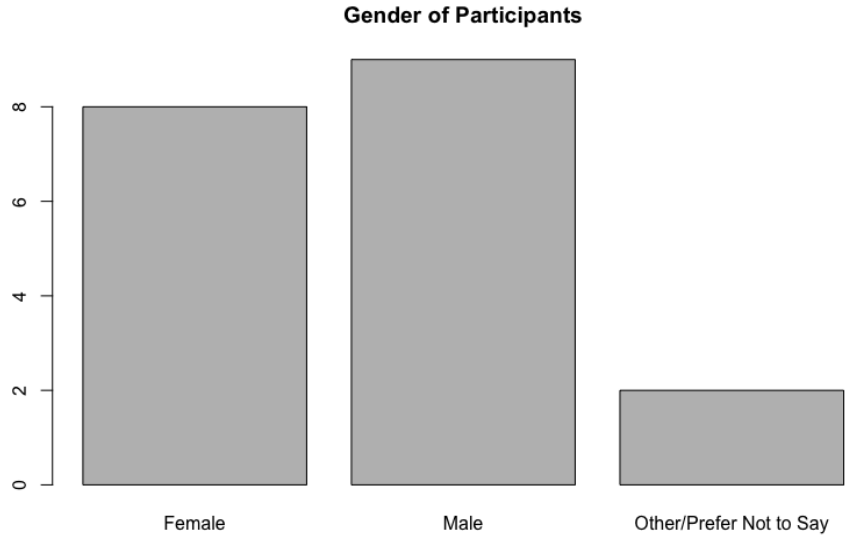


Figure 3. This figure shows the distribution of time listening to music (hrs/week) in the dataset.

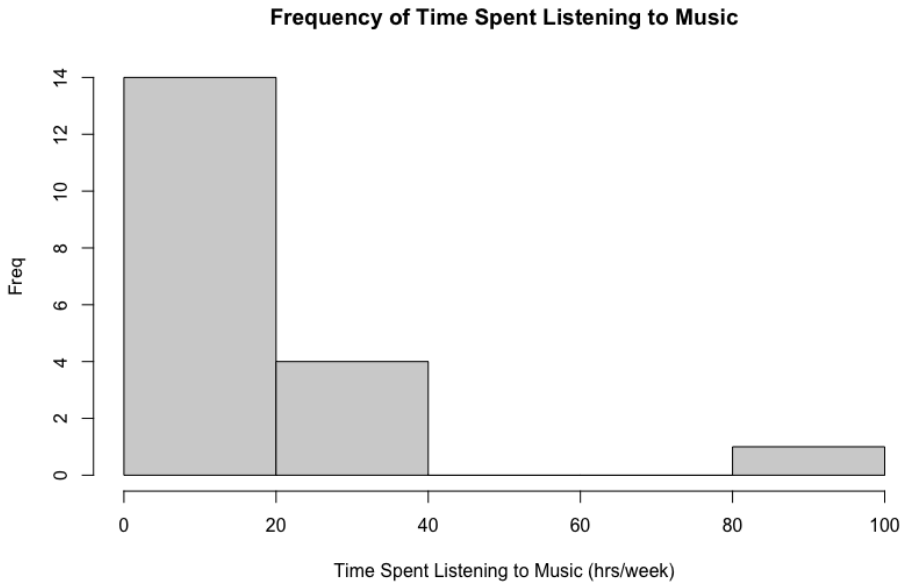


Figure 4. This figure shows the distribution of cannabis consumed (days/week) in the dataset.

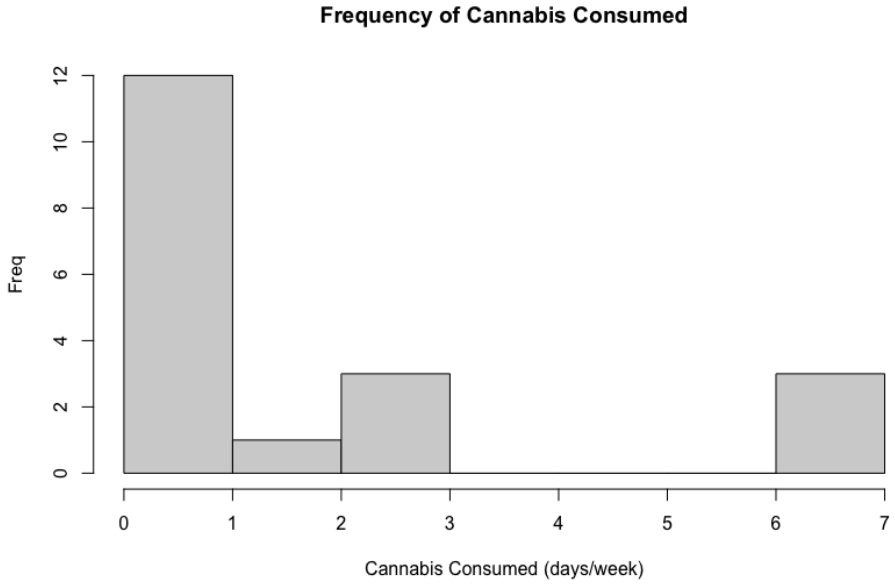


Figure 5. This figure shows the distribution of the consumption method in the dataset.

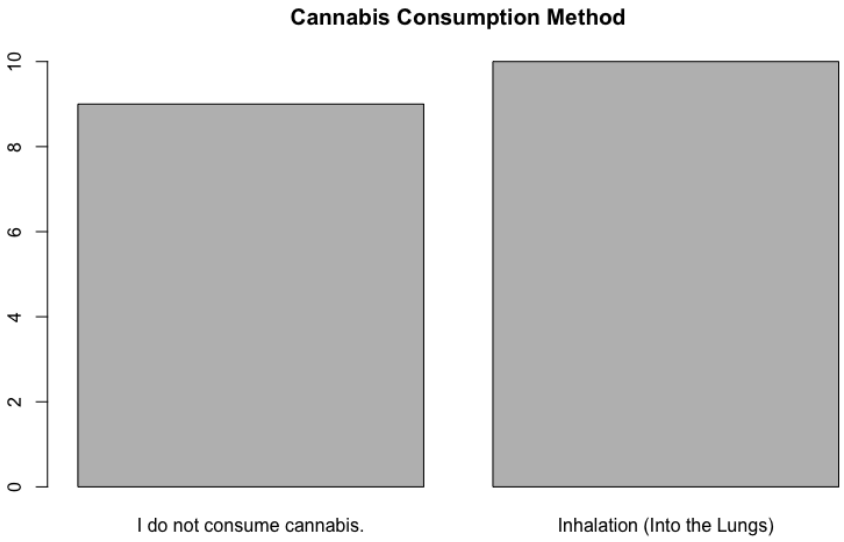


Figure 6. This figure shows the standardized bivariate relationship between time spent listening to music and cannabis consumed.

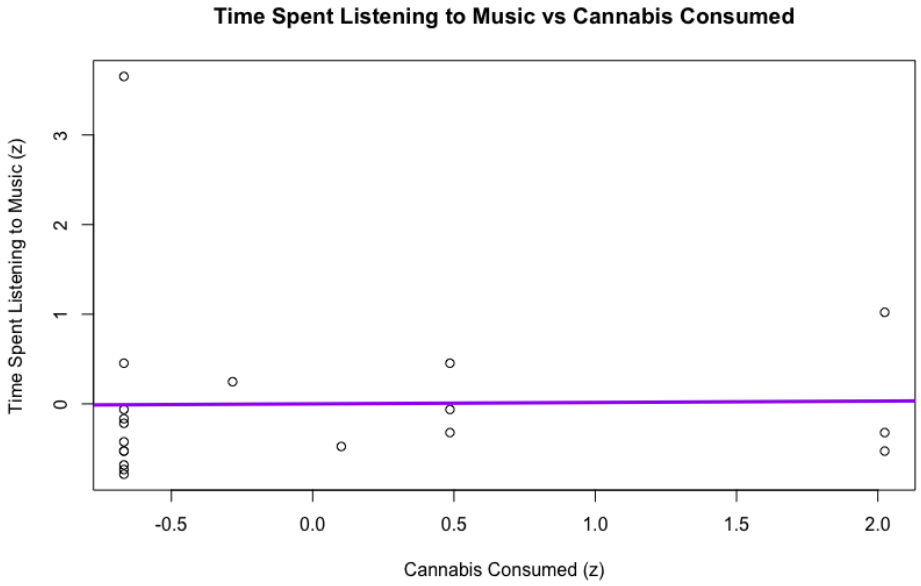


Figure 7. This figure shows the standardized bivariate relationship between time spent listening to music and consumption method.

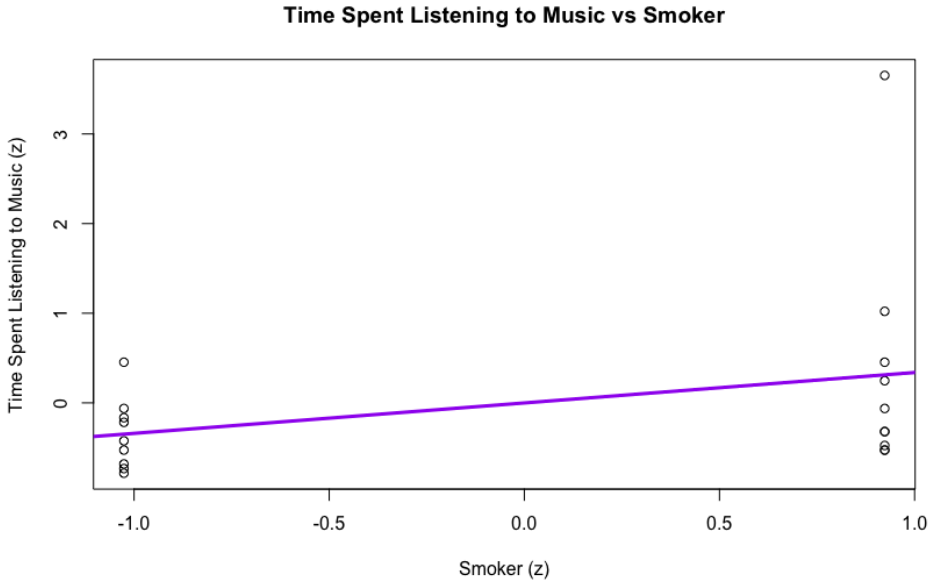


Figure 8. This figure shows the distribution of bootstrapped β values for Model 1.

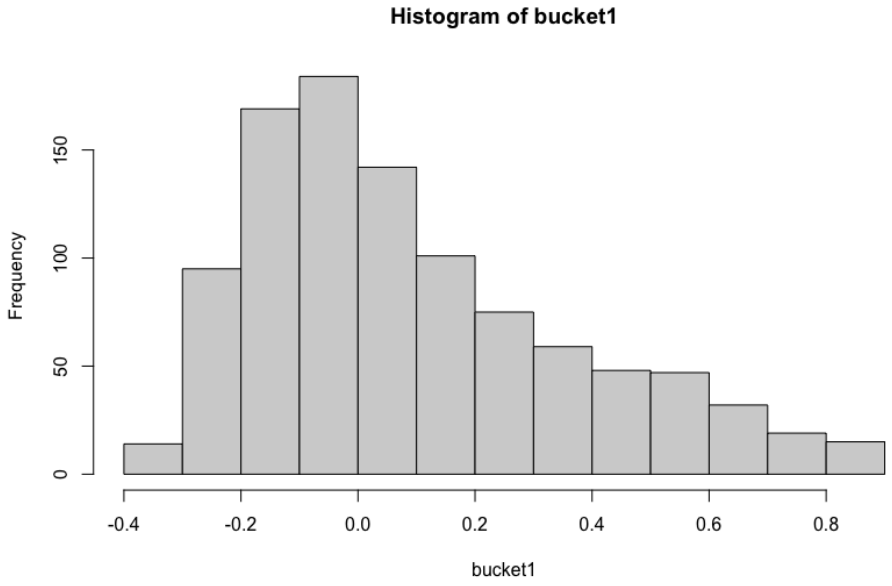


Figure 9. This figure shows the distribution of bootstrapped β values for Model 2.

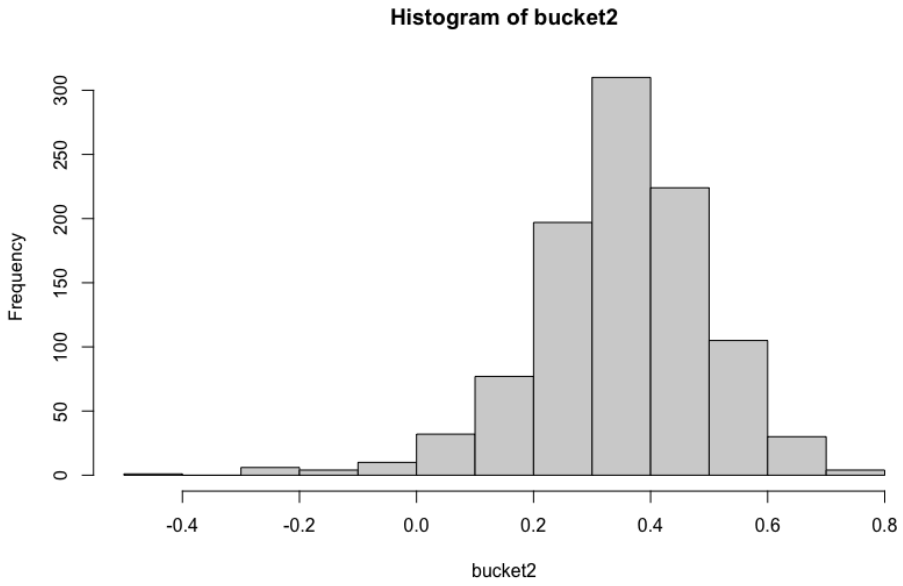
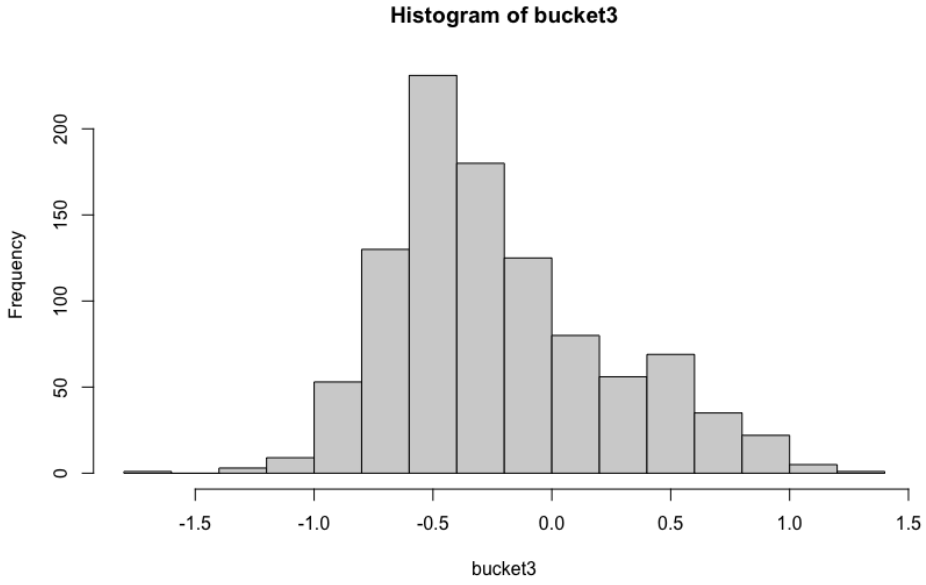


Figure 10. This figure shows the distribution of bootstrapped β values for Model 3.



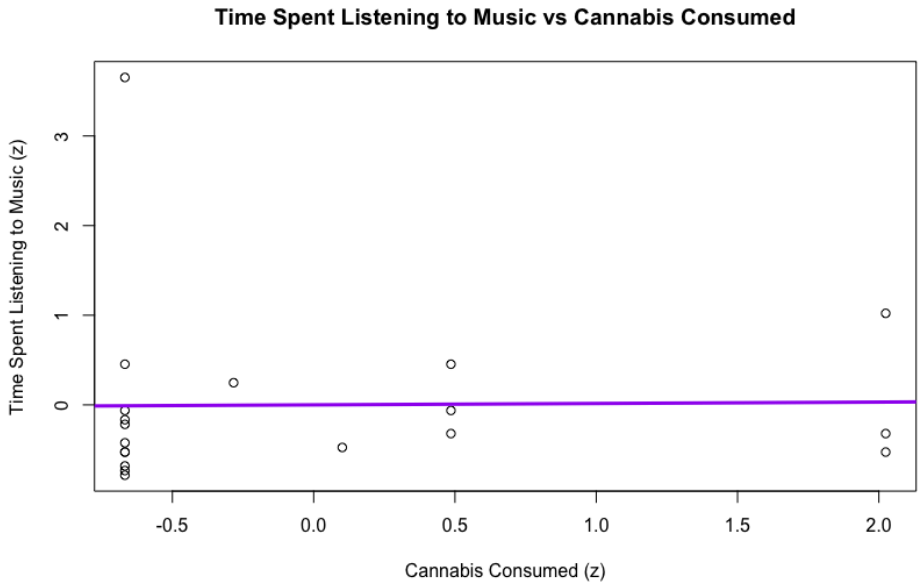
Results

Variable	Description
time	Time of survey submission.
age	Age of the participant.
sex	Sex of the participant.
eth	Ethnicity of the participant.
lsn	Average time spent listening to music (hours per week).
csm	Average number of days cannabis is consumed (days per week).
prm	Primary method of cannabis consumption.

➢ *Descriptive Statistics*.

- DV
  - ```
    > describe(muca$lsn) #lsn Stats
       vars  n  mean    sd median trimmed  mad min max range skew kurtosis   se
    X1    1 19 16.21 19.38     10   12.94 7.41   1  87    86 2.53     6.49 4.45
    ```
- IV_1
  - ```
    > describe(muca$csm) #csm Stats
       vars  n mean  sd median trimmed mad min max range skew kurtosis  se
    X1    1 19 1.74 2.6      0    1.53   0   0   7     7 1.15    -0.22 0.6
    ```
- IV_2
  - ```
    > summary(muca$prm) #prm Stats
     I do not consume cannabis. Inhalation (Into the Lungs)
                                  9                        10
    ```
- Age
  - ```
    > describe(muca$age) #age Stats
       vars  n  mean   sd median trimmed  mad min max range skew kurtosis   se
    X1    1 19 21.53 2.78     21   21.24 1.48  19  29    10  1.4     0.86 0.64
    ```
- Gender
  - ```
    > summary(muca$sex) #sex Stats
                    Female                       Male Other/Prefer Not to Say
                         8                          9                        2
    ```
    ```

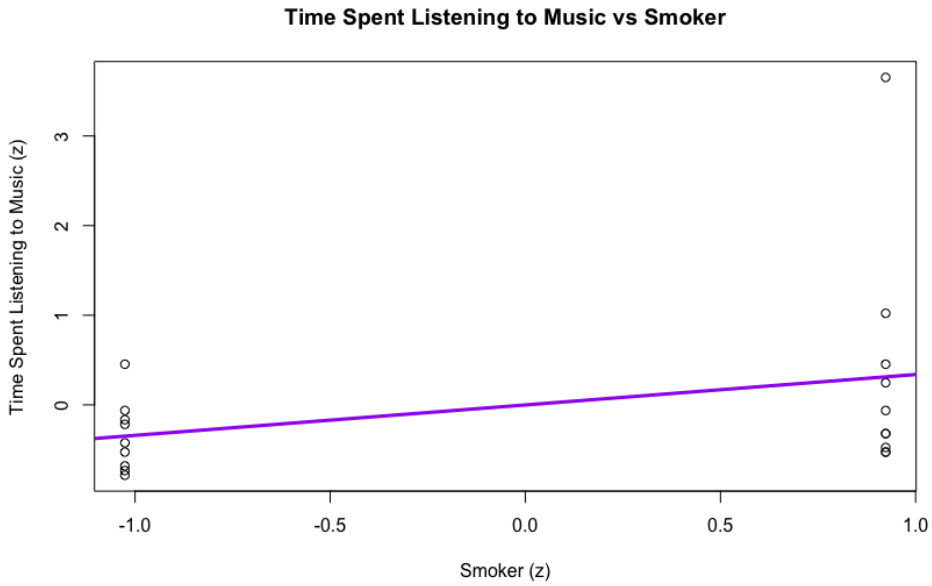
- *Bivariate Linear Models.*
  - *Model 1:*



-
- *Sampling Error:*

```
> sd(bucket1) #Model 1
[1] 0.2704708
```

- *Model 2:*



- *Sampling Error:*

```
> sd(bucket2) #Model 2
[1] 0.1484738
```

➢ *Multivariate Linear Model.*

- *Slope:*

```
> round(coef(mod3), 4) #Slope and Intercept
(Intercept)  scale(csm)  scale(prm)
     0.0000     -0.3577      0.5732
```

- *Sampling Error:*

```
> sd(bucket3) #Model 3
[1] 0.4705935
```

➢ *Standardized βs Table + Reprinted Bivariate LM Figures.*

Standardized βs

DV = lsn	**Model 1**	**Model 2**	**Model 3**
Estimated Effects			
Intercept	0	0	0
IV_1 = csm	0.0155 [-0.5254, 0.5564]	--	-0.3577 [-1.2648, 0.5494]
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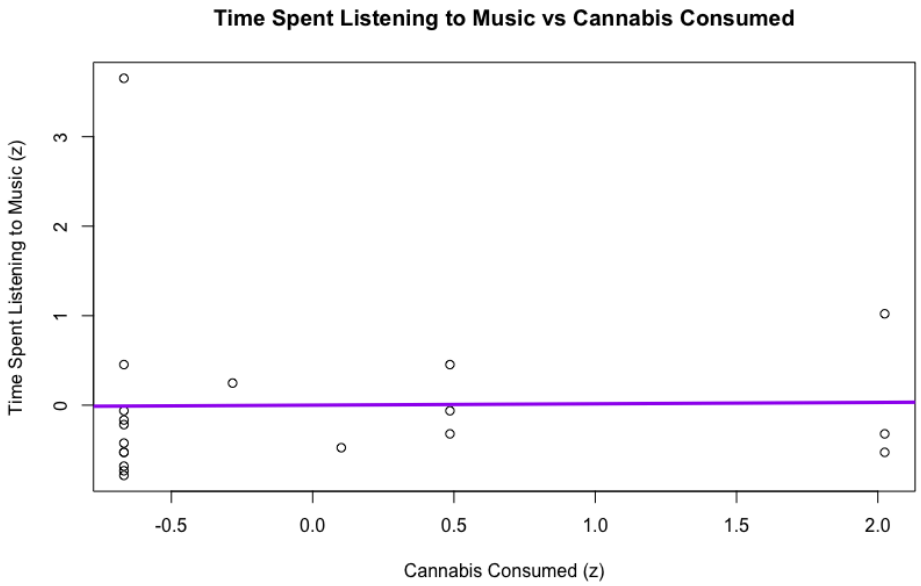
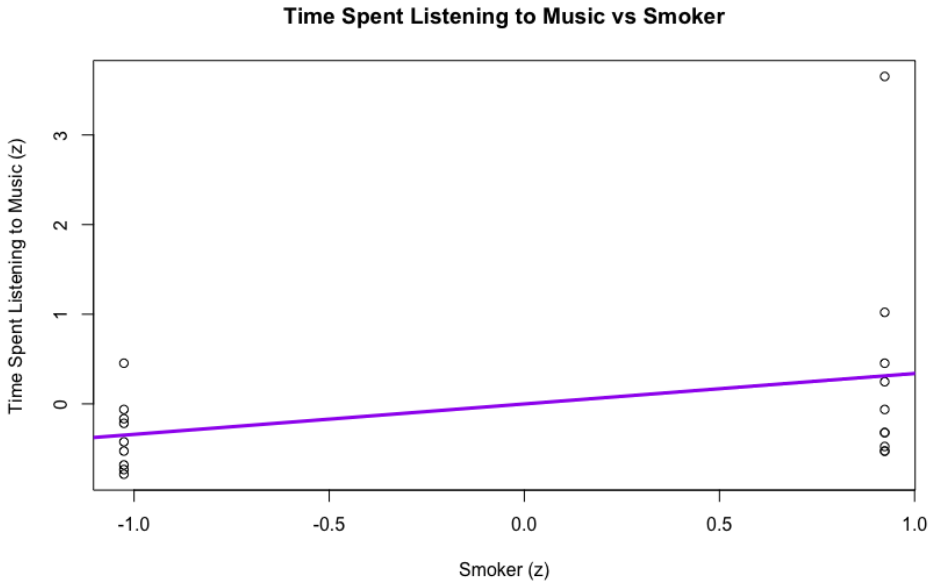
F-Test	0.0041 (1, 17)	2.2261 (1, 17)	1.8703 (2, 16)

Note: * $p < 0.05$, ** $p < 0.01$. 95% confidence intervals are reported in brackets below the estimated slopes and degrees of freedom for the F-test are reported in parentheses.


Time Spent Listening to Music vs Cannabis Consumed
Time Spent Listening to Music (z)
0
1
2
3
-0.5
0.0
0.5
1.0
1.5
2.0
Cannabis Consumed (z)


Time Spent Listening to Music vs Smoker
Time Spent Listening to Music (z)
0
1
2
3
-1.0
-0.5
0.0
0.5
1.0
Smoker (z)

- *Hypothesis 1.*
  - *Null:* Weekly cannabis consumption DOES NOT affect time spent listening to music.
  - *Alternative:* Weekly cannabis consumption DOES affect time spent listening to music.
  - The linear model I used for Hypothesis 1 was lsn ~ csm + error.
  - *Slope:*

```
> round(coef(mod1), 4) #Slope and Intercept
(Intercept)  scale(csm)
     0.0000      0.0155
```

  - *95% CI:*

```
> round(coef(mod1)[2] - (1.96 * sd(bucket1)), 4) #Lower csm Bound
scale(csm)
   -0.5146
> round(coef(mod1)[2] + (1.96 * sd(bucket1)), 4) #Upper csm Bound
scale(csm)
    0.5456
```

  - *T-Value:*

```
> round(summary(mod1)$coefficients[,3], 4) #T-Value
(Intercept)  scale(csm)
     0.0000      0.0639
```

  - *P-Value:*

```
> round(summary(mod1)$coefficients[,4], 4) #P-Value
(Intercept)  scale(csm)
     1.0000      0.9498
```

The slope tells us that as the standardized independent variable, weekly cannabis consumption, increases by 1, the standardized dependent variable, time spent listening to music, increases by 0.0155. There is a 95% chance that the true population mean for standardized weekly cannabis consumption is contained between -0.5146 and 0.5456. The size of the difference relative to the variation in the sample data is 0.0639. When the null hypothesis is true, the probability that the model is true is equal to 0.9498. There is no statistical evidence present in any of the inferential statistics to support the alternative hypothesis in favor of the alternative. Thus, for Model 1, we fail to reject the null hypothesis in favor of the alternative.

➢ *Hypothesis 2.*

- *Null:* The method of cannabis consumption DOES NOT affect time spent listening to music.
- *Alternative:* The method of cannabis consumption DOES affect time spent listening to music.
- The linear model I used for Hypothesis 2 was lsn ~ prm + error.
- *Slope:*

```
> round(coef(mod2), 4) #Slope and Intercept
(Intercept)  scale(prm)
     0.0000      0.3403
```

- *95% CI:*

```
> round(coef(mod2)[2] - (1.96 * sd(bucket2)), 4) #Lower prm Bound
scale(prm)
    0.0493
> round(coef(mod2)[2] + (1.96 * sd(bucket2)), 4) #Upper prm Bound
scale(prm)
    0.6313
```

- *T-Value:*

```
> round(summary(mod2)$coefficients[,3], 4) #T-Value
(Intercept)  scale(prm)
      0.000       1.492
```

- *P-Value:*

```
> round(summary(mod2)$coefficients[,4], 4) #P-Value
(Intercept)  scale(prm)
      1.000       0.154
```

The slope tells us that as the standardized independent variable, method of consumption, is equal to 1, the standardized dependent variable, time spent listening to music, increases by 0.3403. There is a 95% chance that the true population mean for the standardized cannabis consumption method is contained between 0.0493 and 0.6313. The size of the difference relative to the variation in the sample data is 1.492. When the null hypothesis is true, the probability that the model is true is equal to 0.154. Since the 95% confidence interval does not contain 0, there is statistical evidence against the null hypothesis. Thus, for Model 2, we reject the null hypothesis in favor of the alternative.

- *Hypothesis 3.*
  - *Null:* Cannabis consumption and method DO NOT affect time spent listening to music.
  - *Alternative:* Cannabis consumption and method DO affect time spent listening to music.
  - The linear model I used for Hypothesis 3 was lsn ~ csm + prm + error.
  - *Slope:*

```
> round(coef(mod3), 4) #Slope and Intercept
(Intercept)  scale(csm)  scale(prm)
     0.0000     -0.3577      0.5732
```

  - *95% CI:*

```
> round(coef(mod3)[2] - (1.96 * sd(bucket3)), 4) #Lower csm Bound
scale(csm)
     -1.28
> round(coef(mod3)[2] + (1.96 * sd(bucket3)), 4) #Upper csm Bound
scale(csm)
    0.5647
> round(coef(mod3)[3] - (1.96 * sd(bucket3)), 4) #Lower prm Bound
scale(prm)
   -0.3492
> round(coef(mod3)[3] + (1.96 * sd(bucket3)), 4) #Upper prm Bound
scale(prm)
    1.4955
```

  - *T-Value:*

```
> round(summary(mod3)$coefficients[,3], 4) #T-Value
(Intercept)  scale(csm)  scale(prm)
     0.0000     -1.2062      1.9328
```

  - *P-Value:*

```
> round(summary(mod3)$coefficients[,4], 4) #P-Value
(Intercept)  scale(csm)  scale(prm)
     1.0000      0.2453      0.0712
```

The slope tells us that as the standardized independent variables, cannabis consumption and method, increase by 1 and equals 1 – respectively – the standardized dependent variable, time spent listening to music, increases by 0.2155. There is a 95% chance that the true population mean for standardized cannabis consumption is contained between -1.28 and 0.5647. There is a 95% chance that the true population mean for the standardized cannabis consumption method is contained between -0.3492 and 1.4955. The size of the difference relative to the variation in the sample data for cannabis consumption is -1.2062. The size of the difference relative to the variation in the sample data for the standardized cannabis consumption method is 1.9328. When the null hypothesis is true, the probability that the model for standardized cannabis consumption is true is equal to 0.2453. When the null hypothesis is true, the probability that the model for the standardized cannabis consumption method is true is equal to 0.0712. There is no statistical evidence present in any of the inferential descriptions to support the alternative hypothesis in favor of the alternative. Thus, for Model 3, we fail to reject the null hypothesis in favor of the alternative. The effects of the second independent variable, method of consumption, are important to control because of the different ways in which cannabis interacts with the body depending on the consumption method. The initial onset of effects, as well as the length of time the effects are felt, are directly connected to how cannabis is consumed. As such, by controlling for consumption methods, we can understand better how cannabis consumption relates to time spent listening to music. From Model 1 to Model 3, there is a significant change in the slope for csm from a positive slope to a negative slope. From Model 2 to Model 3, there is not a significant change in the slope for prm. These changes in slopes, especially between Model 1 and Model 3, indicate that partial mediation is present when introducing the second independent variable, the consumption method.

Discussion

Based on the linear models presented above, we can see that the data didn't provide much in terms of statistical significance. Although, Model 2 presented statistical significance through its 95% confidence interval. What we can see from this is that the method of cannabis consumption could play some role in the time spent listening to music. However, there are plenty of limitations that may have played a role in affecting the study. The smaller sample size does not help in achieving statistical significance due to the Central Limit Theorem which states that as the sample size increases, the data will become more normally distributed. This limitation could be addressed by acquiring a large sample and studying that data. Another limitation present was the lack of data for other consumption methods of cannabis since people only chose between not consuming cannabis and smoking. However, I addressed this limitation in my data by changing the results to whether or not somebody consumed cannabis in the form of a boolean. While there wasn't necessarily much present in the data, the insight provided by the second model indicates a more focused study on cannabis consumption methods and time spent listening to music could reveal new information.

References

Fachner, J. (2002). The space between the notes-Research on cannabis and music perception. Looking Back, Looking Ahead-Popular Music Studies, 20, 308-319.

Fachner, J. (2002). Topographic EEG changes accompanying cannabis-induced alteration of music perception—Cannabis as a hearing aid?. Journal of Cannabis Therapeutics, 2(2), 3-36.

Fachner, J. (2006). An ethno-methodological approach to cannabis and music perception, with EEG brain mapping in a naturalistic setting. Anthropology of Consciousness, 17(2), 78-103.

Freeman, T. P., Pope, R. A., Wall, M. B., Bisby, J. A., Luijten, M., Hindocha, C., ... & Curran, H. V. (2018). Cannabis dampens the effects of music in brain regions sensitive to reward and emotion. International Journal of Neuropsychopharmacology, 21(1), 21-32.

Webster, P. (2001). Marijuana and music: A speculative exploration. Journal of Cannabis therapeutics, 1(2), 93-105.