

# The Effects of Coffee and Music on the Islanders' Memory

## Group 9: Taco Belles

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# Research Question

## **Do coffee and music affect human memory?**

As coffee and music become increasingly common in the workplace, it is important to see how they might affect employee work performance and productivity.

Many studies show the beneficial effects of caffeine on cognitive function and memory. Studies also show that music can enhance the attention and memory centers of the brain.

The results of this study may provide insight on how employers should provide employees with accommodations.

# Experimental Design

## Two-Way Randomized Block Design

Why?

- Based on the literature, we found two factors that we thought would have a significant effect on memory
- We also found evidence that there may be a potential significant nuisance factor so we decided to block too

# Variables Considered

**Response:** Difference in time taken to complete memory game before and after receiving treatments

**Factors:**

- Type of music (Classical, Heavy Metal, No music)
- Amount of coffee (1 cup, 2 cups, 3 cups)

**Block:** Gender

**Held Constant:** Age (30s)

**Uncontrollable:** Health conditions, Previous coffee drinking habits

# Decomposition Plot



Benchmark  
df = 1



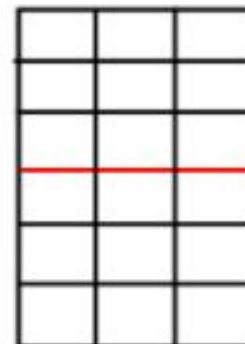
(Block)  
Gender  
df = 1



Music Treatment  
(Classical,  
Heavy mental,  
control)  
df = 2



Coffee Treatment  
(1 cup, 2 cup, 3 cup)  
df = 2

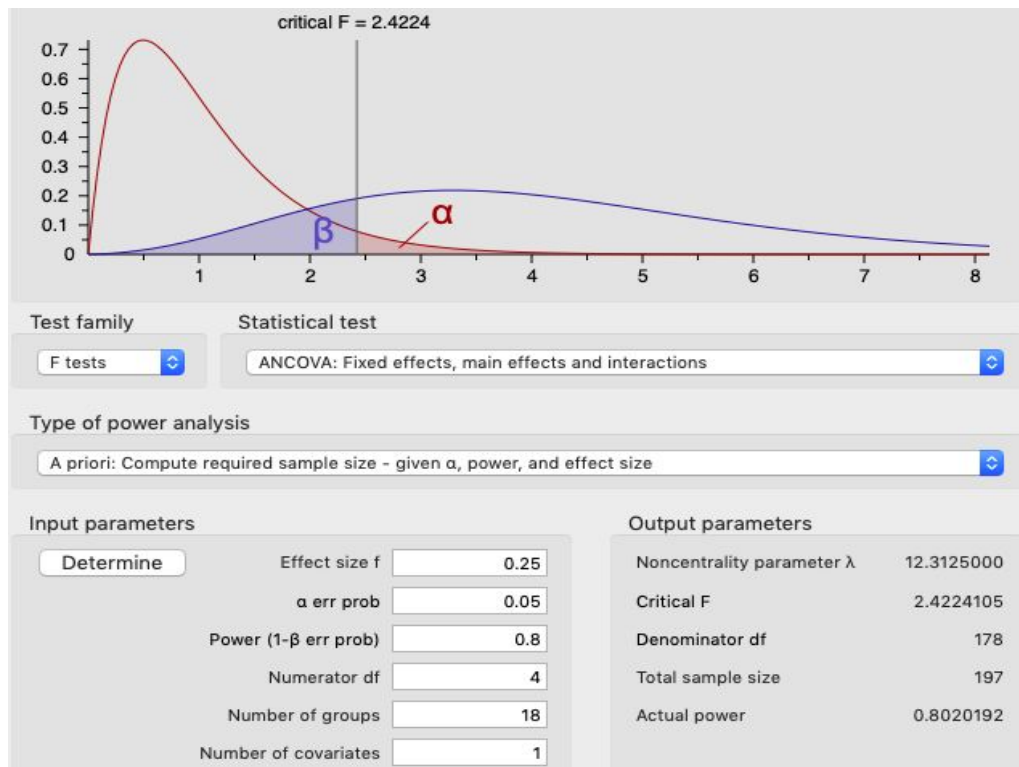


Interaction Between  
Coffee and Music  
df = 4

# Procedure

1. Obtain consent from 198 Islanders. Use the sample function in R to determine locations to search for participants. Once enough participants give consent, assign each randomly to a set of treatments, again using the sample function in R.
2. Have subject complete pairs memory game. Record time taken.
3. Give subject the treatments, starting with coffee then 10 minutes of listening to music.
4. Wait another 10 minutes then have subject complete memory game again. Record time taken.
5. Compute the difference in time taken to complete memory game before and after treatments.

# Sample Size & Power



**Sample size: 198**

**Power: 0.8**

**(18 groups with 11 participants each)**

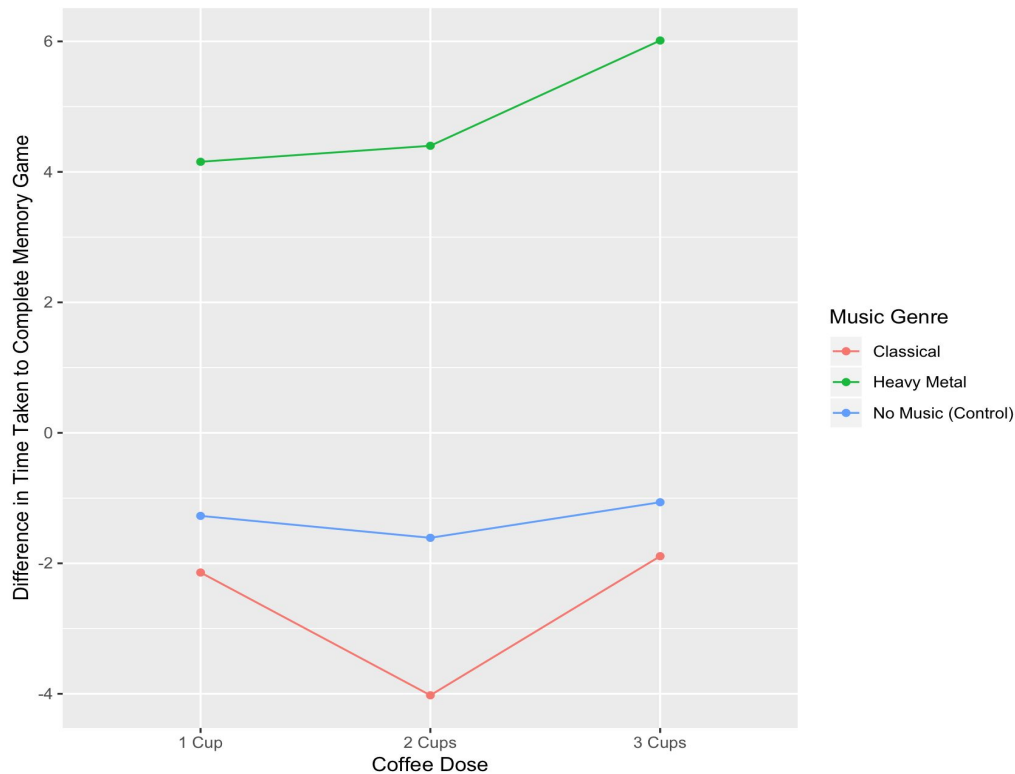
# Results – ANOVA Table

	df	Sum Sq	Mean Sq	F value	Pr(>F)
Coffee Dose	2	68	33.8	1.034	0.358
Music Genre	2	2130	1065.1	32.560	<b>7.21e-13</b>
Gender	1	17	16.6	0.507	0.477
Coffee Dose: Music Genre	4	40	10.1	0.308	0.872
Residuals	188	6150	32.7		

- Music genre has a statistically significant effect in the change of memory game speed.
- Coffee dose and the interaction between coffee dose and music are not significant.
- No statistically significant difference between genders.

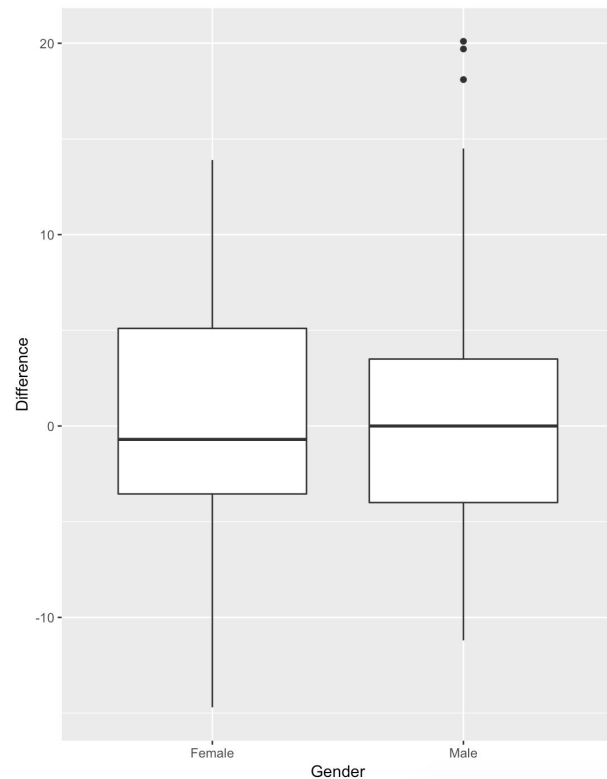
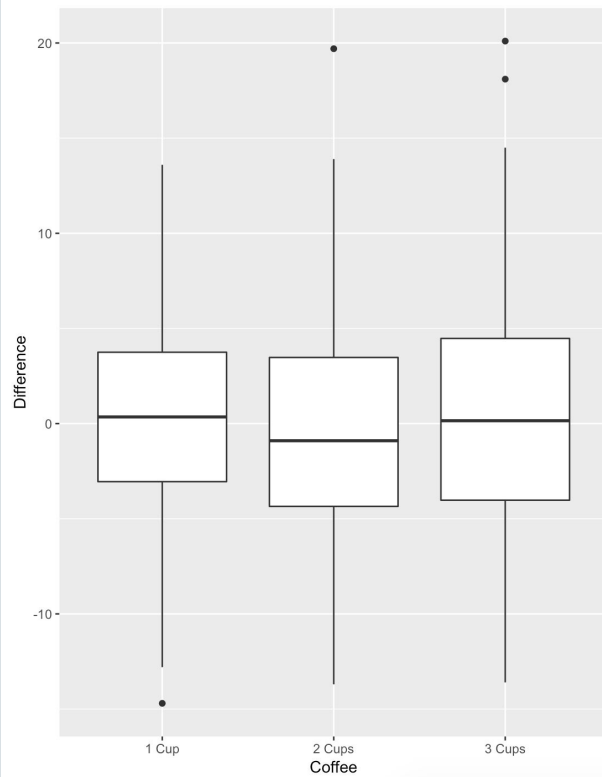
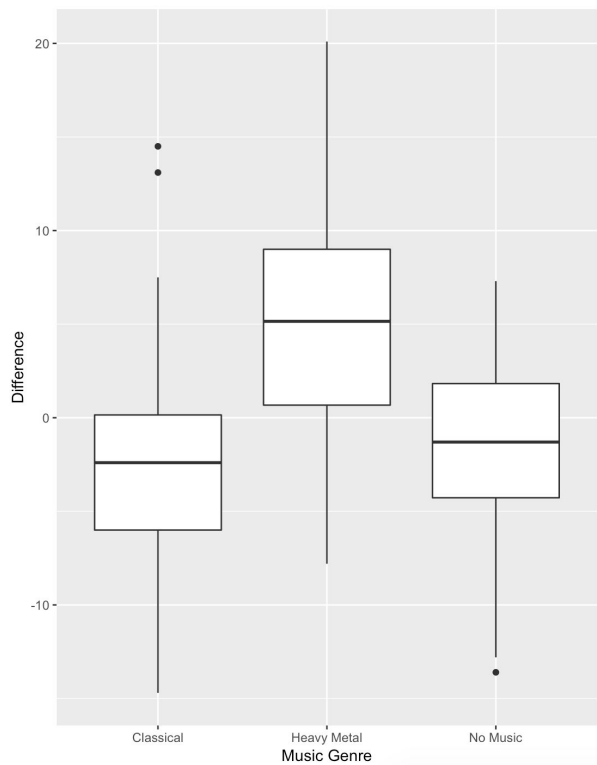


# Results – Interaction Plot



- No interaction between coffee dosage and music genre
- Regardless of number of cups of coffee consumed, memory of participants improved after listening to classical music, and worsened after listening to heavy metal.

# Results – Box Plots



# Conclusion

- Given the ANOVA results and visualized through our interaction plots and box plots, we conclude that music appears to affect memory performance, while we do not have evidence to suggest that coffee affects memory or that there is interaction between music and coffee.
- From the music genre boxplot, it appears that the significance comes from a decreased memory performance when listening to heavy metal music.
- This means that while working in a busy office, we suggest that people avoid listening to heavy metal music and other music in similar genres such as hard rock.