Effect of Drink and Music on Openness

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1 Abstract

Personality traits such as Openness are often assumed to be stable, but recent research suggests that certain environmental cues may induce short-term fluctuations. This study investigates whether the combination of alcohol consumption and music exposure can influence short-term changes in the Big Five trait Openness. Using a 3×3 between-subjects factorial design, we manipulated drink type (beer, tequila, vodka) and music genre (classical, country, dance), blocking for age, gender, and BMI. Participants completed a personality test before and after undergoing treatment, with the change in Openness score serving as the response variable. The data were analyzed using a two-way ANOVA with blocking to assess main and interaction effects. By evaluating how different combinations of drink and music may influence personality expression, this study explores the potential for situational modulation of psychological traits.

2 Introduction

Openness to Experience, one of the Five personality traits, captures an individual's willingness to engage with novel ideas and emotions. While traditionally viewed as stable, recent research suggests that personality traits like openness may exhibit short-term variability in response to situational stimuli. Two commonly encountered and socially embedded stimuli alcohol consumption and music exposure are known to affect cognition, and social behavior. For example, alcohol has been shown to lower inhibition and increase self-expression (Sayette, 1993), while music can influence mood, arousal, and social connection (Juslin & Sloboda, 2010). However, limited quantitative research has explored whether these two stimuli, individually or in combination, can measurably influence openness in real time.

Our study addresses this gap by exploring whether different types of alcoholic drinks and genres of music can lead to significant short-term changes in openness. We designed a 3×3 factorial experiment featuring three drinks (beer, tequila, vodka) and three music genres (classical, country, dance), with participants randomly assigned to one of the nine drink–music pairings. Participants completed a baseline Openness score and a follow-up measure post-treatment to capture any within-subject change. Our central research question is Do different combinations of drink and music impact short-term changes in a participant's level of openness? We also examined whether either factor alone has a statistically significant main effect or if their interaction plays a critical role.

Our motivation stems from the observation that alcohol and music are often consumed together in social settings, yet there is little understanding of how these combined experiences may shape interpersonal dynamics or personality expression. By investigating whether openness can be temporarily modulated through environmental stimuli, we aim to contribute to a better understanding of contextual influences on personality, with potential applications in fields such as psychology, marketing, therapy, and user experience design. Our findings could offer insight into how to create environments that promote open-mindedness and positive social engagement.

3 Methods

3.1 Design

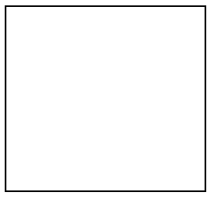
Our study used a 3 by 3 between-subjects factorial design, testing three drink types: beer, tequila, and vodka and three music genres: classical, country, and dance. To reduce

confounding, we blocked by age, gender, and BMI. Each group had gender-balanced participants aged 21 to 60, with even distribution across age and BMI categories

3.2 Sampling Methods

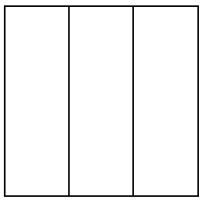
This study will be set up as a 3 x 3 factorial design.

Response Variable	Openness Change		
Type of Drink	Beer	Tequila	Vodka
Type of Music	Classical	Country	Dance
Blocking	Age 21-30 31-40 41-50 51-60	Gender Male Female	BMI Underweight (< 18.5) Average Weight (18.5 - 24.9) Overweight (> 24.9)

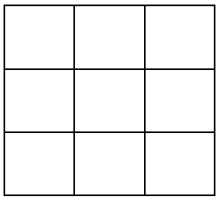


Benchmark

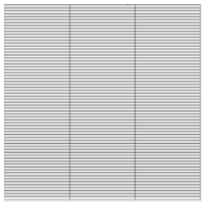
Drink



Music



Drink x Music



With Blocking

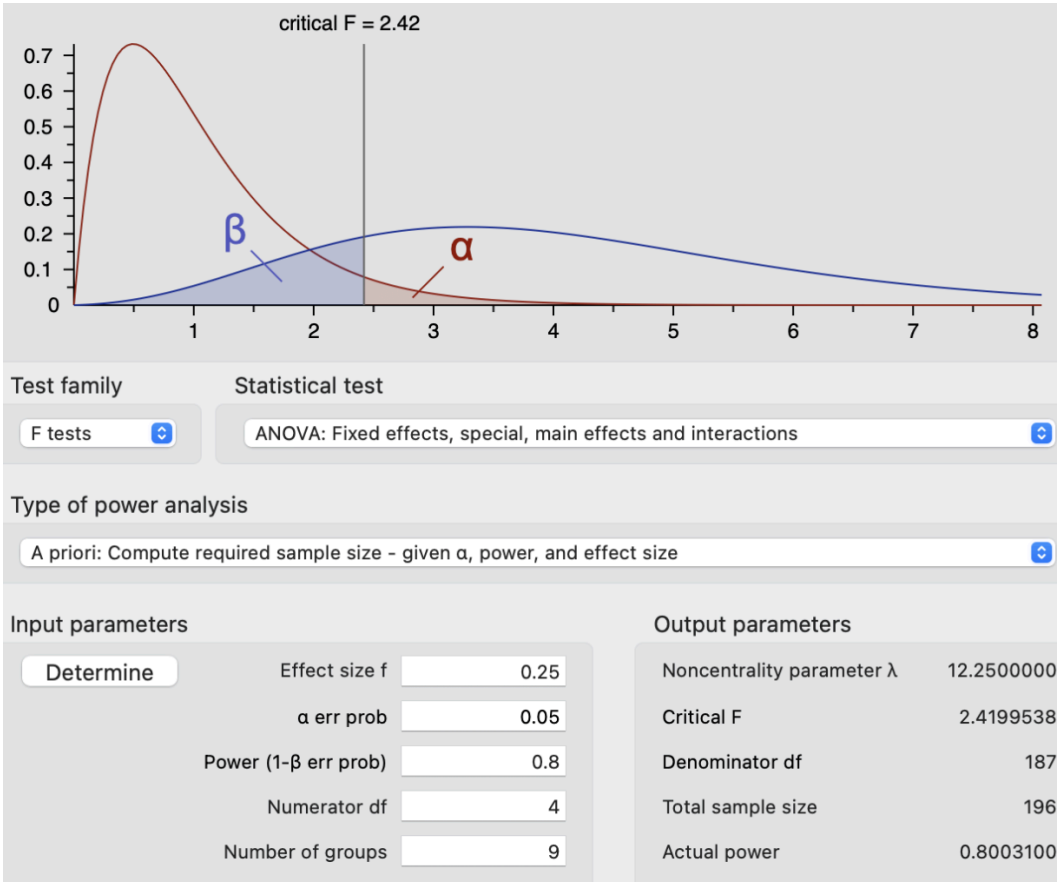
Benchmark D.F. = 1	Drink (Beer, Tequila Vodka) D.F. = 2	Music (Classical, Country, Dance) D.F. = 2	Interaction between Drink and Music D.F. = 4	Block Age (D.F. = 3) Gender (D.F. = 1) BMI (D.F. = 2)

We chose to focus on how alcohol and music affect coordination because both are known to influence the central nervous system and motor control. Alcohol has been shown to impair balance and reaction time, while different types of music may either enhance or

interfere with concentration and rhythm. By studying their combined effect, we aim to explore whether there is an interaction that either worsens or improves coordination outcomes. Dosage and genre were selected as key factors, since previous research suggests both alcohol's effects and music's influence are context- and intensity-dependent. We blocked by sex, age group, and BMI group to control for biological and physiological differences that might otherwise confound the results. For instance, coordination and alcohol tolerance can vary across age and body composition, and prior research has shown sex-based differences in motor performance and alcohol metabolism. This blocking structure helps ensure more accurate interpretation of the treatment effects.

3.3 Sample Size Determination

We chose a statistical power of 0.8 for our analysis, which means there is an 80% chance of detecting a true effect if it exists. We set the significance level (α) at 0.05, reflecting a 5% risk of incorrectly rejecting the null hypothesis when it is actually true. For the effect size, we selected a medium value of 0.25, which reflects a moderate difference between groups that we consider practically meaningful. Our design includes 9 groups, and the factor with the largest degrees of freedom (numerator df = 4) was used for the power calculation. Using G*Power with these parameters under the F-test family for a fixed effects ANOVA model (main effects and interactions), the software suggested a total sample size of 196. To ensure equal group sizes and a balanced design, we plan to use 198 participants, resulting in 22 participants per group.



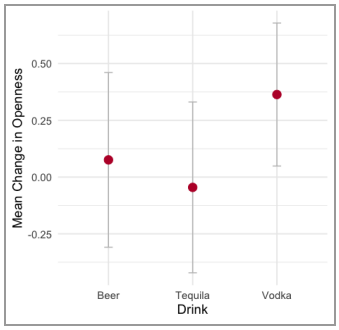
4 Results

4.1 Descriptive Statistics

The descriptive statistics show modest differences in mean change in openness across both drink and music types. Among drink types, vodka is associated with the highest average increase in openness (mean = 0.36), followed by beer (mean = 0.08), while tequila shows a slight average decrease (mean = -0.05). However, all standard errors are relatively large (ranging from 0.315 to 0.385), indicating substantial variability within each group.

Mean Change for Drink Type

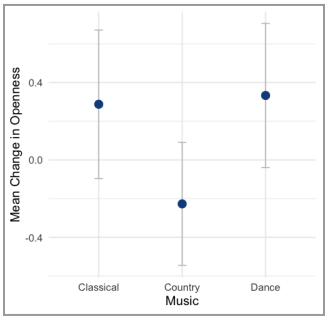
Drink	Mean Change	Standard Deviation	n
Beer	0.08	3.12	66
Tequila	-0.05	3.06	66
Vodka	0.36	2.56	66



For music types, dance and classical music are both associated with positive mean changes in openness (0.333 and 0.288, respectively), whereas country music corresponds to a negative mean change (-0.227). Again, standard errors are fairly wide, suggesting individual responses varied considerably within each music condition. These patterns provide preliminary insight into potential differences by group, which will be further examined through inferential analysis.

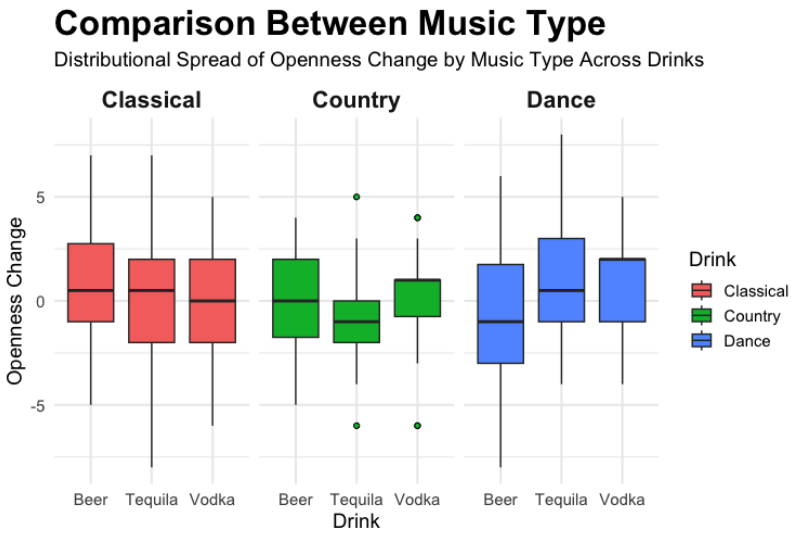
Mean Change for Music Genre

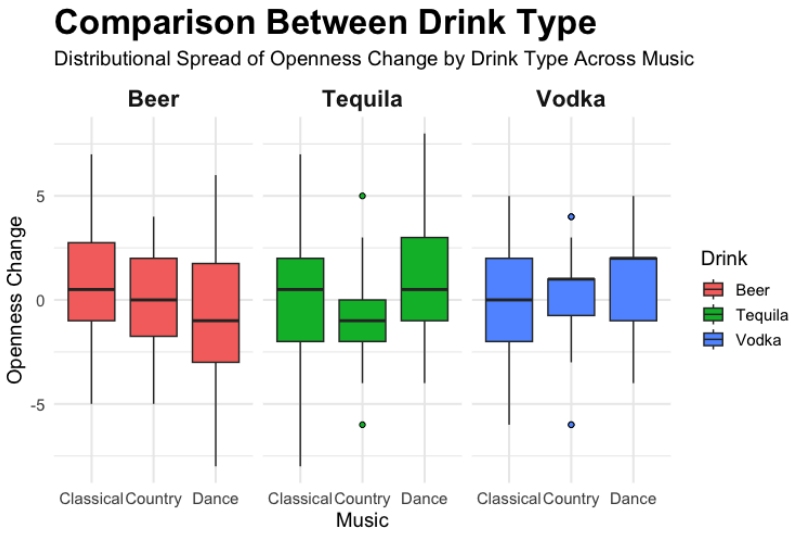
Music	Mean Change	Standard Deviation	n
Classical	0.29	3.12	66
Country	-0.23	2.58	66
Dance	0.33	3.02	66



To summarize these group differences, bar plots were generated to display the mean change in openness by drink type and by music type, with error bars representing standard errors. These plots provide a clear comparison of group averages and help

illustrate the variability within each category. While the mean differences are relatively small, the visualizations suggest that vodka is associated with the greatest average increase in openness among drinks, and dance music among music types. These patterns offer a descriptive overview of the data and set the stage for the subsequent inferential analysis.

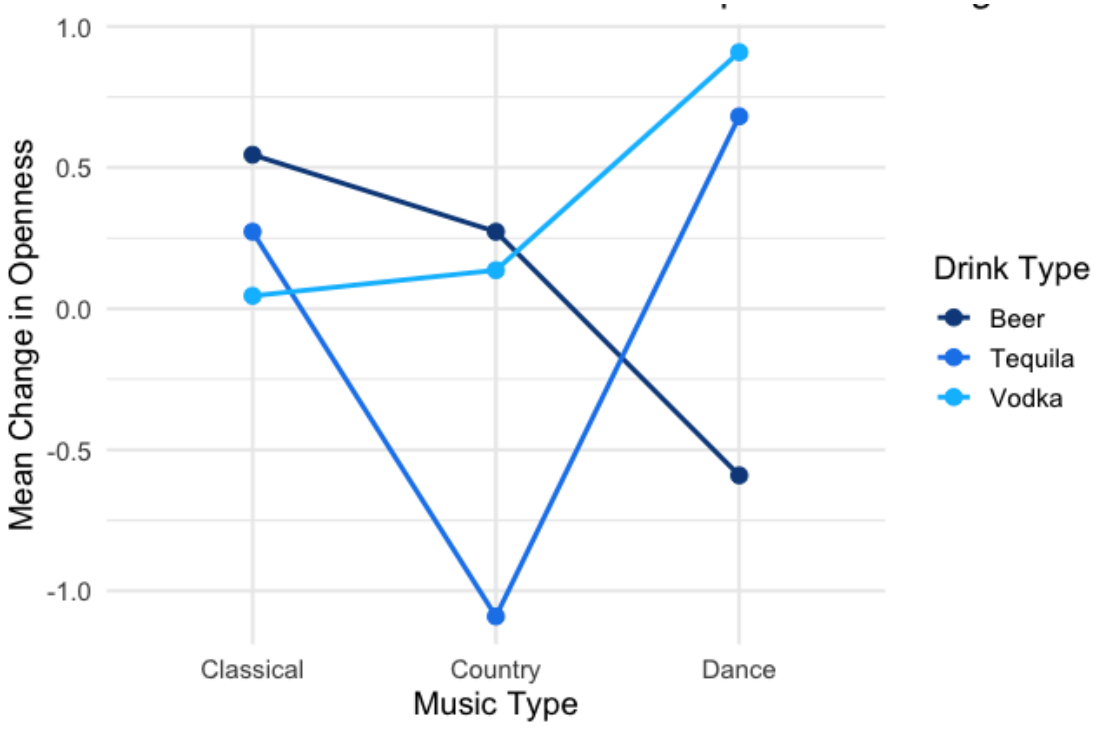




4.2 Interaction Plot

The interaction plot displays how the average change in openness varies across different combinations of drink and music types. Notably, the lines for each drink type cross, suggesting the possibility of an interaction effect. For instance, individuals who consumed tequila showed a substantial drop in openness when listening to country music, followed by a sharp increase with dance music. In contrast, vodka drinkers experienced a consistent increase in openness across all music types, while beer drinkers showed a modest increase with classical and country music but a decrease with dance music. These differing patterns imply that the impact of music on openness may depend on the type of drink consumed. The visual evidence of non-parallel lines suggests an interaction between drink and music type, which will be further tested using ANOVA.

Interaction Plot: Drink x Music on Openness Change



4.3 ANOVA Results

The ANOVA results indicate that none of the predictors, drink type, music type, age group, gender, BMI group, or the interaction between drink and music, have a statistically significant effect on the change in openness. All p-values exceed the 0.05 significance level, suggesting that the observed differences in openness change across groups could be due to random variation. Among the variables, age group ($p = 0.105$) and BMI group ($p = 0.126$) come closest to significance, indicating they may have a modest influence worth exploring further. The interaction between drink and music also approaches significance ($p = 0.183$), but remains non-significant. Overall, the model explains little of the variance in openness change, with most of the variability captured by the residuals.

	Degrees of Freedom	**Sum Square**	**Mean Square**	**F Value**	**P Value**
Drink	2	5.8	2.914	0.355	0.702
Music	2	12.8	6.399	0.778	0.461
Gender	1	12.4	12.391	1.507	0.105
Age Group	3	51.1	17.036	2.073	0.33
BMI Group	2	34.5	12.238	2.097	0.126
Drink: Music	4	51.8	12.944	1.575	0.183
Residuals	183	1504.2	8.220		

5 Discussion/Conclusion

We assumed an alpha level of 0.05. Under this assumption, neither the type of drink, the type of music, nor their interaction had a statistically significant effect on Openness scores. This suggests that, despite common beliefs, neither alcohol consumption nor music exposure reliably shifted personality states in the short term as measured by the Openness dimension. Blocking variables such as gender, age, and BMI were also not statistically significant. However, the blocking factor Gender had a p-value of 0.105. While this does not meet the conventional significance threshold, it hints at a potential effect of gender on changes in openness that could be worth exploring in future studies with larger samples or targeted designs.

The goal of our study was to examine whether external drink and music could influence short-term personality expression, particularly Openness to Experience. Our design was grounded in the theory that personality, though often seen as stable, can exhibit state-like fluctuations under certain situational conditions. We were especially interested in whether combining alcohol and music might produce synergistic or antagonistic effects on cognitive flexibility and emotional openness.

We used a 3 x 3 factorial design with blocks and originally calculated that a sample size of 196 would be necessary to detect a medium effect ($f = 0.25$) with a power of 0.8, based on the factor with the largest degrees of freedom (4 for the interaction term). However, we sampled a total of 198 participants to maintain a balanced design, ensuring that each of the 9 groups had exactly 22 participants. Blocking was done by age, gender, and BMI group to minimize within-group variation and account for biological and psychosocial factors that may influence personality shifts.

While our ANOVA results did not show statistically significant main or interaction effects, the experimental design and sample structure allow for future replications with larger samples, refined measurements, or altered interventions (e.g., using stronger or more individualized music stimuli or varying alcohol content). Additionally, visual analyses such as interaction plots and boxplots showed consistent patterns across treatments, but without dramatic shifts in central tendency. This visual consistency supports our quantitative findings. Nevertheless, the near-significance of gender as a blocking factor suggests that demographic influences may play a subtle role, particularly in personality traits tied to emotion and expression.

Overall, while our study did not find strong evidence for situational modulation of Openness, it contributes to a growing field of research on dynamic personality states and offers a methodologically sound framework for future experimental personality research.

6 References

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