

ALCOHOL TASTE PERCEPTION STUDY

RELEVANT JMP PLATFORMS AND STATISTICAL TECHNIQUES

Graph Builder : Comparative Line Graphs and Bar Charts.

Fit Y by X : ANOVA; Regression.

Fit Model : Multifactor ANOVA

PROBLEM STATEMENT

A food & beverage sensory testing laboratory has been engaged by a beverage producer to help better understand how one's perception of the quality of an alcoholic beverage changes throughout the time of drinking it.

Three different studies were done for three different alcoholic beverages (wine, beer, bourbon).



Experimental Design

For each beverage, a panel of 10 different tasters were selected from a pool of consumers who consider themselves to be regular drinkers of that beverage with an average level of knowledge/ability in distinguishing quality. The tasters were told they would be drinking 16 different unknown brands across 4 different tasting sessions and asked to rate the quality of each on a 1-10 scale with the scoring of (1-2: OK ; 3-4: Decent ; 5-6: Good ; 7-8: Very Good ; 9-10: Excellent). Unknown to them, however, is that they would in fact be tasting the same 4 brands in each session.

To examine how the tasters' ratings might change across a typical drinking experience, the experiment was conducted as follows:

1. 4 Different tasting sessions were scheduled (each one week a part).
2. Each session consisted of the tasters drinking the 4 brands in a ½ size serving (i.e., 6 oz for the wine and beer and 0.5 oz for the bourbon), resulting in the taster essentially having 2 drinks. For the wine, the tasters drank the 4 brands while eating a meal of pasta. For the beer, the tasters ate a beef burger and fries. For the bourbon, they ate a small serving of mixed nuts. This was designed to simulate a typical drinking experience for the beverages.
3. The order of tasting for each session was created such that each taster experienced each of the 4 brands in the 4 tasting positions. For example, one such arrangement would be:

Session 1: Brand A, Brand B, Brand C, Brand D
Session 2: Brand B, Brand A, Brand D, Brand C
Session 3: Brand C, Brand D, Brand A, Brand B
Session 4: Brand D, Brand C, Brand B, Brand A

DATA SETS

Taste_Perception_of_Wine_Across_Time.jmp

Taste_Perception_of_Beer_Across_Time.jmp

Taste_Perception_of_Bourbon_Across_Time.jmp

Each data set has the following format:

Tasting Session	Label for the 4 testings sessions (1, 2, 3, 4).
Taster	Name of the tasters
Order	Position of the tasting (1, 2, 3, 4)
Brand	Name of each of the 4 brands
Score	Quality rating provided by the taster

EXERCISES

Perform the following analyses for each beverage.

1. Create a variety of graphs that compare the scores across time accounting for the different tasters and brands. Are there any observable differences in the scores across the tasting order? If so, describe those differences. Are there any noticeable differences in scores between brands and tasters? In other words, do certain tasters tend to score higher/lower regardless of the brand, and do certain brands tend to have higher/lower scores regardless

of the taster? Why is important to make the comparison of scores across tasting order by accounting for the different tasters and brand?

2. Recreate the graphs above using a new variable ('Score from Avg').
Hint: Use the Formula Editor to create a new column with the formula: 'Score – Col Mean (Score)'. Do these new graphs make it easier to make the comparisons of scores across tasting order, taster, and brand?
3. Building Statistical Models.
 - a. Conduct a One Factor Analysis of Variance for the Scores with Order as the factor. Is there statistical evidence of a significant difference in Scores between the Tasting Order?
 - b. Conduct a One Variable Linear Regression for the Scores with Order as the variable.
Hint: A new variable with Order as a continuous variable for the Modeling Type needs to be created and used.
 - c. Compare the models constructed in a. and b. above. Which type of model is best at describing the potential change in taste perception across tasting order? Provide a quantitative measure of the effect of tasting order over time. Do you think it's reasonable to extrapolate this model to predict the effect of tasting order much beyond 4 (e.g., tasting order 6+)? Why would this be?
 - d. Construct a statistical model that includes all factors (tasting order, taster, and brand). Is there a significant effect of taster and/or brand? If so, what does this mean. Provide a quantitative measure of the effect of tasting order over time.
 - e. Compare the estimates of the effect of Tasting Order for the 3 variable model to the single variable regression model. Are these estimates the same or different? Why is this so? Examine the Confidence Intervals for the effect of Tasting Order for each model. Are they the same or different? Why is this so? (Hint: To display the Confidence Intervals, right-click on the Parameter Estimates tables in the report for each model and select > Columns > Lower 95% and Upper 95%).
 - f. Which of the models constructed do you think is best to use and why?
4. Do you have ideas for further experimentation that could help in better understanding how people perceive the quality of an alcoholic beverage across time?