**Lab 8 Discussion Question Notes**

1. Did we use a random sample?

* + Note that most methods used later in the discussion questions to make inference require a random sample. If this was not a random sample then state that but still use the methods for inference.

2. Two ways attempted to control for factors other than taste that could affect preference.

3. Proportion preferring bargain (last value in table 8.5 on page 62).

4. Perform a hypothesis step. You must do all of the following steps of the hypothesis step (you may use the back of the paper if you need more room).  *This section will go in the appendix of the EWA.*

* + Step 1: Check the assumptions (note that they are not all met).
    - Categorical Data
    - Data Randomly obtained.
    - Sampling distribution is normally distributed if n ≥15 and n(1-) ≥15.
  + Step 2: State the hypothesis:
    - : p =
    - : p > or : p < or : p ≠
  + Step 3: Calculate the test statistic.
  + Step 4: Calculate the p-value.
    - Draw a normal curve; plot your test statistic; shade the area based on the inequality in the ; use the normal table to find the shaded area under the normal curve. This is the p-value.
  + Step 5:
    - p-value < α => Reject => With p-value= , we have sufficient evidence that (state Ha in the context of the problem).
    - p-value > α => Do not Reject => With p-value= , we do not have sufficient evidence that (state Ha in the context of the problem).

\*\*\* You must do this by hand but you may use StatCrunch to check you work: Stat-> Proportion Stats-> One Sample -> with summary. Put # successes; # observations; set up hypothesis test with the correct inequality in the alternative. \*\*\*

*Note if you are doing the EWA on this lab you must have all steps in the appendix (if anything is missing points will be taken off).*

5. Compute and interpret 95% confidence interval.

* Note if you are doing the EWA on this lab you must show calculations by hand (if anything is missing points will be taken off). *This section will go in the appendix of the EWA.* 
  + Interpretation: We are % confident that the population proportion who prefer the bargain brand is between and .

\*\*\* You must do this by hand but you may use StatCrunch to check you work: Stat-> Proportion Stats-> One Sample -> with summary. Put # successes; # observations; select confidence interval. \*\*\* *Note if you are doing the EWA on this lab you must have all steps in the appendix (if anything is missing points will be taken off).*

6. Is it plausible that the two brands are equally preferred? Think of what value p would be if equally preferred and see if it is in the interval or not.

* + You must show justification of your answer.

7. Read the Reality Check

**EWA Instructions**

Due at beginning of lab on April 10th (late papers will be accepted with a 25% penalty assigned up to April 17th). Note any paper turned in after the start of lab (even if it is turned in at the end of lab) will be considered late. After April 17th anyone that has not turned in an EWA will receive a zero. Remember that if you are happy with your EWA grade from Lab 4, you do not have to write the EWA for Lab 8.

Papers must be **typed.**

Paper must be **written independently** (if your paper sounds a lot like another students paper you will both receive a zero and you will be reported to academic integrity).

Papers must be **printed out and turned in to the lab instructor**. Do not email me your paper.

Papers can be single spaced and two-sided (or any other format is okay as well).

How to write your paper?

* You want to write this paper so that someone without statistical knowledge understands what you did and what the results show.
* Only talk about the product you set up (don’t talk about the other products in the room you were in or the other rooms at all). Pretend that you were the only group doing a taste test.
* Make sure you mention which product you set up the taste test for and the results of that product.
* Follow the EWA Tips for 8 carefully.
* Biggest issue with EWA is students not including everything outlined on the tip sheet.
* You may use headers and work through the tips one at a time. (Treat this as a checklist)
* Don’t forget anything outlined on the Tips sheet as this is what is used for grading.
  + For example, under results it says that a roadmap is required. All you have to do is make a paragraph with one sentence per table you are going to include in this section. (all sentences go before the tables in a paragraph). This is not hard to do but if you don’t include it you get points off.
* Don’t forget the appendix – everything outlined in discussion questions 4 and 5 above – this can be handwritten.
  + Simply stapling your SAWA (what you fill out in lab) will not get your any credit for the appendix. You need to write out (neatly) all the information that is requested in the appendix and staple it to the end of the paper.

Advice:

* Write the paper sooner rather than later. There is a long time between when the lab is done and when the paper is due. It is better to write it when the processes are fresh in your mind then waiting and trying to remember what you did.

**STAT 201: Tips on EWA for Lab Session 8**

**Due Date**: A hard copy of our paper is due **at the beginning of lab on April 9th.**  Papers that are submitted after the beginning of lab on April 9th will receive a 25% late penalty and will only be accepted through April 16th. Papers submitted after April 16th will receive a zero.

**Overview of Paper Sections (with point assignments):**

**Title:** Make sure that your EWA has a descriptive title – EWA or Lab 8 or ‘Simply a Matter of Taste’, the book’s title is **unacceptable**. (1 point)

**Abstract:** This is a stand-alone section. It is written to give the reader a brief synopsis of the experiment and some general findings. This is written for a person who is doing research on a topic possibly related to your experiment. Be sure to be specific, yet brief. Even though the abstract comes first in your paper, it is written **last**. It is a summary of your paper, and is difficult to write well without having written your paper. This section can repeat things found later in the paper. In the abstract be sure to include:

* The purpose of the experiment (1 point)
* A *brief* description of the data collection and analysis (exclude fine details that comes later) (1 point)
* Your conclusion – which product was most preferred? (0.25 points)
* Major results that supported those conclusions: the results of your hypothesis test (in language that anyone could understand) and a good interpretation of your confidence interval for the proportion. (0.25 points each = 0.50 points)

**Materials and Methods:**  This section should include:

* Description of experiment’s purpose (Hint: what were you trying to decide?) (1 point)
* State the materials that were used. (1 point)
* Description of basic experiment – describe how the experiment was set-up (1 point)
* **Description of statistics and data collection:** State a single-blind test was done and why is it a single-blind test? (1 point). How was the assignment of the Brands determined? (0.5 points) How did we randomize which brand was given to each subject first? (0.5 points). State two factors that were used to reduce factors other than taste (1 point)
* Explanation of statistical methods. Methods used include: one-sample hypothesis test for the population proportion and the confidence interval for the proportion. **Elaborate on each method – do not just list them!** Describe not only what methods were used but *why* they were used **in the context of this taste test**. **Do NOT give any numbers**, just describe the analysis techniques that were performed.
  + Hint: Look back at lecture slides (outlines) for information on why we do a hypothesis test (in general what do we get from a hypothesis test) and what the purpose is of a confidence interval (what useful information do we get from these results)
  + 1.5 points for explanation of hypothesis test and 1.5 points for explanation of confidence interval performed in general terms.

**Results:** In this section, Tables and Figures are presented without interpretation. There should be a brief "road map" paragraph (at the beginning of this section) explaining to the reader what Tables and Figures are found in this section.

Results section should include:

* A roadmap **PARAGRAPH** should appear at the beginning of the Results section. The roadmap paragraph consists of approximately one sentence per table explaining to the reader what information is contained in the following tables. Do NOT tell why the table is important –you have already covered this in the materials and methods section. (1 point)
* Include a pie chart or a bar graph showing the proportion who preferred the bargain/brand name (1 point)
* Include a table with the # of subjects, # of subjects preferring the bargain brand, the sample proportion (). (1 point)
* Include a table with the results from your hypothesis test –include the test statistic, p-value, α, and decision. (2 points)
* Include a table with the lower and upper bounds of the confidence interval. (1 point)

**Discussion:** In this section, make sure that you do the following:

* Address the purpose of the experiment. (1 point)
* Discuss the results from the hypothesis test and confidence interval: Interpretation of Confidence interval (1 point). Interpretation of p-value and test statistic (1 point). Interpretation of the results of the hypothesis test (1 point). Comment on whether the confidence interval and hypothesis test lead to the same conclusion. (1 point)
* Discuss any shortcomings of the experiment – what else could be done to eliminate bias? (0.5 points)
* Ideas for further experimentation: what could be done to change the experiment? (0.5 points)

**Appendix:** Attach a sheet showing all work for the hypothesis test and confidence interval. This section can be handwritten. (3 points for all steps of hypothesis test worked out fully. 1 point for set up of confidence interval equation).

**Spelling and Grammar:** 2 points.