Introduction to Statistics for the Social Sciences

Labs Sessions - Room 480 Marshall Bldg
February 9th – 13th

Agenda Week 3 - The purpose of this lab is to help us prepare for the material presented in Exam 1. Please answer each part of these 10 questions and have your answers approved before leaving lab. **Hand this in to your TA before leaving the lab.**

1. Mariska works at a cattle ranch, and all the ranchers want to cattle to gain as much weight as possible while still staying healthy. There is a new organic feed that claims to increase weight gain in the cattle compared to the old, traditional feed. Mariska wants to know if the new feed really does make a difference in how much weight the cattle gain. She gathers the first 100 cows that she finds in the meadow, and then **randomly assigns** those 100 cows into two groups (50 in each group). One group gets the new feed for 6 months, while the other group of cattle gets the old feed. She is not looking for any trends over time, but is just looking for a difference between the two types of cow chow (feed).

   Independent variable = ___________________________________________
   How many levels are there? ________________________________________
   Independent variable: Level of measurement (nominal, ordinal, interval or ratio) = ____________________________
   Independent variable: continuous or discrete = _______________________
   Dependent variable = _____________________________________________
   Dependent variable: Level of measurement (nominal, ordinal, interval or ratio) = ____________________________
   Dependent variable: continuous or discrete = _________________________
   Experimental sampling technique (random or convenience sampling) = _____________________________
   Experimental design: between or within? ______________________________
   Experimental design: random or non-random assignment = _______________
   Experimental design: quasi or true? ___________________________________
   Experimental design: cross sectional versus time series? __________________

   Mariska’s scale is really consistent but (unknown to Mariska) it actually adds exactly 20 pounds to each measurement. How would you describe the validity of this measure? (high or low) ____________________________
   How would you describe the reliability of this measure? (high or low) ____________________________

2. A pharmaceutical company wants to test whether a new drug works to reduce fever in sick children. They **randomly assign** the children into two groups, one group will get the drug, and the other group will not (they will get a placebo). They mark the containers in a way that **neither the children nor the experimenters** interacting directly with the participants know which type of pill they are taking, and therefore don’t know which condition they are in. They then take the children’s temperature using a traditional thermometer (Fahrenheit). They are not looking for any trends over time, but are just looking for a difference between the two types of drugs.

   Independent variable = _____________________________________________
   How many levels are there? ________________________________________
   Independent variable: Level of measurement (nominal, ordinal, interval or ratio) = ____________________________
   Independent variable: continuous or discrete = _________________________
   Dependent variable = _____________________________________________
   Dependent variable: Level of measurement (nominal, ordinal, interval or ratio) = ____________________________
   Dependent variable: continuous or discrete = _________________________
   Experimental sampling technique (random or convenience sampling) = _____________________________
   Experimental design: between or within? _______________________________________
   Experimental design: random or non-random assignment = _____________________________
   Experimental design: quasi or true? _______________________________________
   Experimental design: single blind, double blind, not at all blind _____________________________
   Experimental design: cross sectional versus time series? _____________________________
3. How is a simple random sample different from a systematic sample?

How would Stephanie use a snowball sample to find “Harry Potter” fans on campus?

How would Stephanie use a judgment sample to find students who are good at programming on campus?

4. Identify whether each of these is a “double-barreled” question?
   Do you prefer expensive fast food or inexpensive homemade food?
   Do you prefer long walks on the beach or short walks on the beach?
   Do you prefer long walks on the beach or short walks in the desert?

5. Identify the construct from this Likert scale: _______ Identify the construct from this Likert scale: _______

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I prefer fast food to homemade food</td>
<td>1. I prefer rap to pop music</td>
</tr>
<tr>
<td>2. I prefer fried foods to salads</td>
<td>2. I prefer Snoop Dogg to Taylor Swift</td>
</tr>
<tr>
<td>3. I prefer to get my food from drive-thru restaurants</td>
<td>3. I enjoy hip hop music</td>
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</tbody>
</table>

What would a score of 15 mean? ______________
What would a score of 3 mean? ______________

6. How is an open-ended question different from a closed-ended question?

How is a Pareto chart different from a bar chart?

How is a “parameter” different from a “statistic”?

7. Create an example and draw a negatively skewed distribution
   (label both axes and include a variable name on the “x” axis)

Create an example and draw a bimodal skewed distribution

Create an example and draw a positive correlation
   (label both axes carefully)

8. What type of study must you have if you want to make a “causal” conclusion _______
   (Quasi versus True)

Are correlational studies typically “quasi” or “true” experiments? Why?

A “cumulative frequency” column counts the number of scores _____ than the score we care about. (“smaller” or “larger”)

9. Use the “empirical rule” for the normal curve to fill in the area under the curve for each situation

<table>
<thead>
<tr>
<th>1σ</th>
<th>2σ</th>
<th>3σ</th>
</tr>
</thead>
<tbody>
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<td>1σ</td>
<td>2σ</td>
<td>3σ</td>
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</table>

Σ(x - x̄) = _______ Σ(x - µ) = _______

Write formula for: Population standard deviation: ______________________________________________

Write the formula for: Population variance: ______________________________________________

Write the formula for: Sample standard deviation: ______________________________________________

Write the formula for: Sample variance: ______________________________________________