In this lab, you’ll design, conduct, and analyze your own experiment!

**Brainstorm a Question of Interest**

In your groups, come up with a question that can be investigated within the space, time, and material constraints of this lab period.

1. Choose a response variable.
   a. This can be either categorical or quantitative, but if you choose something categorical, something with only two categories is easier to analyze.
   b. Is this easily measured in a short (<5 min) period of time during this lab?
   c. Might this change based on the explanatory variable / treatment given? Quantities unlikely to change will not be interesting response variables.
   d. Some possibilities (just to get your creative juices flowing – you are encouraged to come up with your own!):
      i. Pulse rate (easy to measure, can change quickly)
      ii. Performance on something online (a short game or online quiz?)
      iii. Time to complete a task

2. Choose an explanatory variable.
   a. For simplicity, choose an explanatory variable with only two treatments.
   b. Can this be manipulated and administered during this lab period, so you have control over who gets which treatment and participants can get each treatment in a reasonable amount of time (<5 min)?
   c. Is this completely safe, non-invasive, and not at all mentally or physically disturbing for participants? (We’re not getting IRB approval – the treatment has to be something completely benign.)
   d. Some possibilities (you are encouraged to come up with your own!):
      i. Talking to someone of the opposite sex versus the same sex
      ii. Watching two different youtube videos evoking different emotions
      iii. Exercising for a brief time or not
      iv. Sitting or standing

3. Formulate a research question based on your chosen variables.

4. We’ll gather some of the top potential research questions, and then vote to determine the winner (the actual experiment to be conducted).
Design the Experiment

5. In groups, design this experiment to answer the chosen question. How will you decide who gets which treatment? What will you measure? Discuss all details of the experimental design.

6. Come together as a lab to discuss and decide on a procedure.

Conduct the Experiment

7. Assign units to treatments, administer the explanatory variable, and measure the response variable. If numeric, make sure you are all using the same units.

8. Enter your data via this google form:

   - Section 1 (11:15 lab)
   - Section 2 (12:20 lab)
   - Section 3 (1:25 lab)

Analyze the Data

9. Copy and paste the data into Minitab (wait until the class is done entering data). You can view the data collected here:

   - Section 1 (11:15 lab)
   - Section 2 (12:20 lab)
   - Section 3 (1:25 lab)

10. Create an appropriate visual display and numerical summary of the data (use the Minitab guide if you aren’t sure how to do this).

11. Does there appear to be any association between the explanatory variable and the response? (Later in the course we’ll learn how to determine whether the association is significant. Here we’re just looking for an informal assessment).

12. If there does appear to be an association, can we conclude that the association is causal? Why or why not?