QuACK 2025
Summer Bootcamp
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Session 4 Practice Activities

For today's practice, you'll go through some of the steps that we talked about from coming up with a research question to picking the right statistical test. Recall, these steps were:

- Identify your independent and dependent variables (and groups/levels)
- Decide what your null and alternative hypotheses are (H_0 and H_a)
- Pick your test, α, and do a power analysis
- Calculate your test statistics (e.g., t for t-tests or F for ANOVAs)
- Decide whether to retain or reject H_0
- Make sure you can clearly explain your conclusion in words!

This is similar to writing a pre-registration, which is useful for clarifying your own thinking about your studies, and for letting other people know what analyses you're committing to in advance!

1. Pick a research question and briefly describe how you would test it. It doesn't need to be related to the research you're currently doing. Here are some example questions:
    - *How does social media usage affect self-esteem among university students?*
    - *What is the impact of sleep quality on academic performance in college students?*
    - *Does mindfulness meditation reduce test anxiety in undergraduate students?*

    _____
    _____
    _____

2. Identify your independent and dependent variables. How will they be operationalized in your study? Are they continuous or categorical?
    IV(s):_____
    DV(s):_____

3. What are your null and alternative hypotheses?

    H_0:_____
    _____

    H_a:_____
    _____

4. Think about what your data would look like if you conducted the study you described in (1). What would your rows be? What would your columns be? Mock up a few rows of data below (you don't need to use all of the columns).

5. Now that you know what your data would look like and what kinds of variables you're working with, decide which statistical test you would use and explain why you chose it.

_____
_____
_____

6. Pretend that you ran a power analysis for an alpha of .05 and established that you need to collect 100 observations. You have now collected your data. Write pseudocode below for the analysis that you would run in R on your data.

7. Congrats! You found a significant result. Describe below whether you are retaining or rejecting H_0 and how you interpret your results:

_____
_____
_____