EPSY 5261: Introductory Statistical Methods

Day 8
Simulation-Based Hypothesis Testing

Learning Goals

- At the end of this lesson, you should be able to...
 - List the steps of a hypothesis test
 - Describe the purpose of a hypothesis test
 - Describe a simulation approach to hypothesis testing

Hypothesis Testing

Purpose: to test a claim about a population parameter

Steps of Hypothesis Testing

- 1. Formulate a research question
- 2. Write your hypotheses
- 3. Find **Distribution** of the Null Hypothesis
- 4. Compare Sample to the Distribution of Null Hypothesis
- 5. Get a p-value
- 6. Make a **decision** based on the p-value
- 7. Communicate your **conclusion** in context

Steps of Hypothesis Testing

- 1. Formulate a research question
- 2. Write your hypotheses
- 3. Find **Distribution** Considering the Null Hypothesis
- 4. Compare Sample to the Distribution of Null Hypothesis
- 5. Get a p-value
- 6. Make a decision to reject or fail to reject the p-value
- 7. Communicate your **conclusion** in context

Estimating a Distribution

- Goal: Obtain an estimate for the sampling variability expected given this sample
 - Simulation (resampling methods)
 - Traditional Parametric Methods (a mathematical function)

Estimating a Distribution

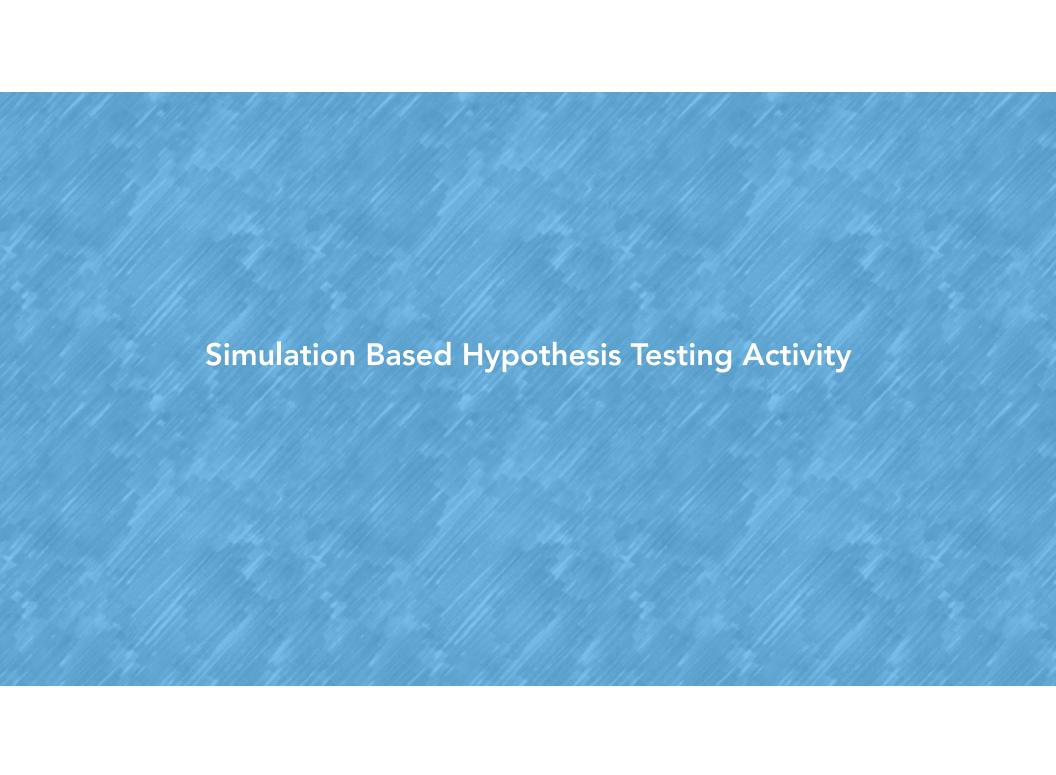
- Simulation (resampling methods)
- Traditional Parametric Methods (a mathematical function)

Recall: Day 5 Activity

- We have used simulation to get an estimate for variability before!
- We will do the same process here with 1 minor change to ensure we are centered at the null hypothesized value (not our sample statistic)

Sampling Distribution

- Recall: On Day 5, when we resampled we had a distribution centered at the sample statistic
- In hypothesis testing we want a distribution centered at the null hypothesized value
- We will explore the entire hypothesis test process in today's activity!



Summary

- There are many steps to the hypothesis test
- Hypothesis tests help us test a claim while taking into account sampling variability
- They provide one form of evidence to help answer a research question
- Simulation is one method to conduct a hypothesis test (it helps us estimate sampling variability and visualize the null hypothesized model)