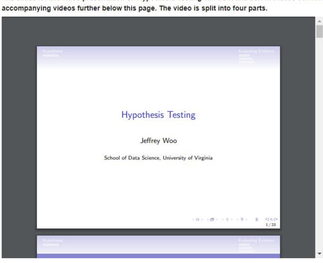
0.4: Hypothesis Testing

The slides for the video presentation on Hypothesis Testing can be found below. Please download the slides and then follow along the accompanying videos further below this page. The video is split into four parts.

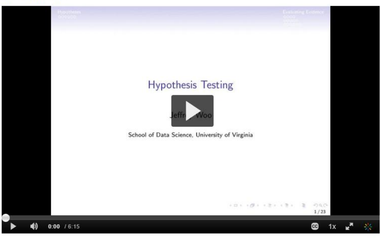


PART 1: HYPOTHESES

Learning Objectives

- Understand that hypothesis testing allows us to distinguish patterns seen in data between those that are due to change and those that reflect a real feature.
- Know that hypothesis statements are about population parameters.
- Know the difference between a 2-sided test and a 1-sided test.
- Given a question of interest, express relevant null and alternative hypotheses.

Video for Part 1

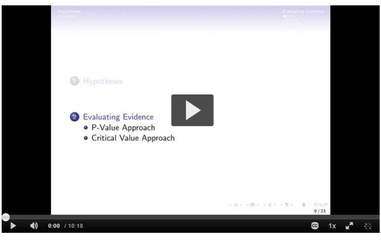


PART 2: EVALUATING EVIDENCE (P-VALUES)

Learning Objectives

- Know that we evaluate evidence against the null hypothesis in hypothesis testing.
- Know that the evaluation is done by assuming the null hypothesis is true.
- Explain what a test statistic measures.
- Explain why larger test statistics provide more evidence against the null hypothesis.
- Define the significance level.
- Define the p-value.
- Explain why smaller p-values provide more evidence against the null hypothesis.
- Know how we compare the p-value with the significance level to make a conclusion.
- Know that in a test for a population mean, the t statistic is compared with a t distribution with n-1 degrees of freedom.
- Know how to sketch the pdf of a t distribution and use relevant areas under the pdf to find p-values.
- Know how to use R to calculate p-values.

Video for Part 2



PART 3: EVALUATING EVIDENCE (CRITICAL VALUES)

Learning Objectives

- Explain how critical values are associated with the significance level.
- Know how we compare the test statistic with its critical value to make a conclusion.
- Know how to sketch the pdf of a t distribution and use areas under the pdf to find critical values.
- Know how to use R to calculate critical values.

Video for Part 3

PART 4: WORKED EXAMPLE

Learning Objectives

- Know how to carry out a hypothesis test (write null and alternative hypotheses, calculate test statistic, obtain p-value and / or critical value, make conclusion in context).

Video for Part 4