Hypothesis Test (2024 Spring EN5423 - week06)

What is the primary purpose of hypothesis testing in statistics?

B) To assess the likelihood that a given hypothesis is true based on sample data.

- Hypothesis testing in statistics is primarily used to assess the strength of the evidence against the null hypothesis. It does not prove a hypothesis with absolute certainty but rather evaluates whether sample data are consistent with what is expected under the null hypothesis.

What does the null hypothesis (H0) usually state in hypothesis testing?

B) There is no difference or effect.

- The null hypothesis (H0) typically states that there is no difference or effect, or no change in general condition. It serves as a default position that there is no association or effect until evidence suggests otherwise.

Which type of error occurs when the null hypothesis is incorrectly rejected?

A) Type I Error.

- A Type I Error occurs when the null hypothesis is incorrectly rejected when it is actually true. This is akin to a false positive, where you wrongly conclude there is an effect or difference when there isn't.

What is a Type II Error in hypothesis testing?

C) Incorrectly failing to reject the null hypothesis.

- A Type II Error occurs when the null hypothesis is not rejected when it should be, meaning the test fails to identify an effect or difference that actually exists. This error is denoted by β (beta).

Why is normality testing important in statistical analysis?

C) It helps decide which statistical test is appropriate based on the distribution of the data.

- Normality testing is important because many statistical tests assume that the data follow a normal distribution. The choice between parametric and non-parametric tests often hinges on whether the data meet this assumption.

What is a common misinterpretation of the p-value?

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B) It represents the likelihood that the null hypothesis is correct.

- A common misinterpretation of the p-value is that it represents the probability that the null hypothesis is true. In reality, the p-value measures the probability of the observed data (or more extreme) given that the null hypothesis is true, not the probability of the null hypothesis itself.

What is 'p-hacking'?

B) The practice of manipulating data or analyses to produce a significant p-value.

- 'P-hacking' refers to the practice of manipulating data analysis until non-significant results become significant. This can involve conducting multiple analyses or altering data inclusion criteria and is considered unethical because it misrepresents the evidence.