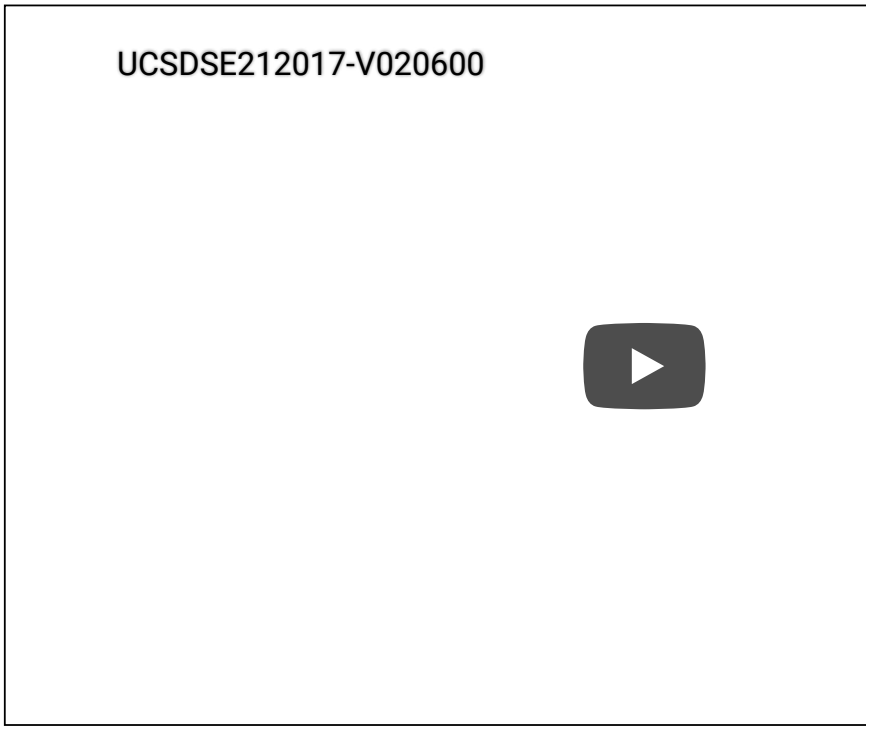
Hypothesis Testing - Z and T Tests
Part 1



Start of transcript. Skip to the end.

- [Lecturer] Hello, and welcome back.

In the last lecture we discussed perhaps the original

hypothesis test, and what we would like to do now

is talk about some more modern ones.

And specifically we'll talk about what happens

when you have a normal or near-normal distribution

Part 2

Start of transcript. Skip to the end.

- [Instructor] So far we assumed

that we knew the standard deviation sigma,

but admittedly that's a little artificial,

because most of the time we don't know what sigma is,

and that's that we would like to do today.

So what if you want to test for the mean mu

but we don't know the standard

13.4_Hypotheis_testing_-_Z_and_T_Tests

POLL

We first calculate the p-value of a sample under a t-test. We then receive additional information about the distribution variance and calculate the p-value again under a z-test. Which of the following do you think will happen?

- **The p value will increase.**
- **The p value will decrease.**
- **It could be both.**

Submit

1

0/1 point (graded)

This is the T-test version of Q5 in section 13.2.

- We now want to test the null hypothesis H_0

H_0 : In college, the average GPA of men is equal to the average GPA of women.

H_1 : In college, the average GPA of men is different from the average GPA of women.

A sample of 10 men's GPA in college has sample mean 2.9, and a sample of 10 women's GPA has sample mean 3.1. We also know the GPAs of men and women have the same **estimated standard deviation** 0.2. Calculate the p value.

The checker accepts answers with tolerance 0.001.

0.025347318677468145 ✖ **Answer:** 0.0382

0.025347318677468145

Explanation

Let $\overline{X}$ be the men's average GPA, $\overline{Y}$ be the women's average GPA.

The p value is $P\left(|\overline{X}-\overline{Y}\,)\,| \geq |2.9-3.1|\right) = 0.0382$ where $\frac{\overline{X}-\overline{Y}}{\sqrt{2s^2/n}}$ follows a t-distribution with degree of freedom $2n-2$ under the the null hypothesis.

Submit You have used 4 of 4 attempts

Answers are displayed within the problem

2

1.0/1.0 point (graded)

The null hypothesis says that a sprinter's reaction time follows a normal distribution with mean **at most** 0.150 seconds. Six measurements of a sprinter's reaction time show 0.152, 0.154, 0.166, 0.147, 0.161, and 0.159 seconds. What is the p value?

The checker accepts answers with tolerance 0.001

0.033611332865 ✔ **Answer:** 0.033611332848360709

0.033611332865

Explanation

Thre problem is almost the same as the one in slides 16-18, just with numbers changed.

The sample mean is $\bar{X} = 0.1565$, the sample variance is $S^2 = 4.67 \times 10^{-5}$, and the sample size $n = 6$.

The T-Test statistic is $T = \frac{\bar{X}-\mu}{S/\sqrt{n}} = 2.3299$. Hence the p-value is $1 - f_{n-1}\,(t) = 0.336$

Submit You have used 1 of 4 attempts

Answers are displayed within the problem

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