Week 6 Monday

Confidence Intervals

Suppose that, in a simple random sample of 10,000 Americans, we find that 100 speak Chinese¹ at home.

Construct a 95% confidence interval for the proportion of Americans who speak Chinese at home.

p-values

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1. 37% of American college 2019 graduates majored in STEM. You want to test the hypothesis that the proportion of UCSD's 2023 graduating class majoring in STEM matches the 2019 national proportion. With a simple random sample of size 150, you find a sample proportion of 47% and a p-value of 0.01. Which of the following is accurate?

- (A) There is a 1% chance that the 37% of UCSD's 2023 graduates majored in STEM.
- (B) There is a 1% chance of observing a simple random sample of size 150 from UCSD's 2023 graduating class in which 40% major in STEM, if the true percentage is 37%.
- (C) The proportion of UCSD's 2023 graduates majoring in STEM is extremely different from 37%.
- (D) None of the above.

2. Suppose that you know for a fact that exactly 18.9% of Americans identify as Hispanic or Latino/a/x, but you have 100 friends who don't believe you and each of them individually sets out to collect a simple random sample of Americans to test to hypothesis that the proportion of Americans who identify as Hispanic or Latino/a/x is p = 0.189. All of them use a significance level of $\alpha = 0.05$. How many of your 100 friends do you expect will end up deciding that the true proportion is different from 18.9%?

- (A) 5
- (B) 18.9
- (C) 19
- (D) Not enough information to say

3. Consider the following statement:

With large sample sizes, even small differences between the null value and the observed point estimate can be statistically significant.

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This statement is:

- (A) True
- (B) False

4. Suppose you conduct a hypothesis test for a proportion based on a sample size of n = 50 and arrive at a p-value of 0.08. You then refer back to your notes and realize you've made a careless mistake: the sample size was really n = 500. If you redo your p-value calculation, you'll find that...

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- (A) The new p-value is still equal to 0.08.
- (B) The new p-value is bigger than 0.08.
- (C) The new p-value is less than 0.08.
- (D) None of the above.