ISI 3.2.1, education, p.210

A Gallup survey of 1001 randomly selected U.S. adults conducted May 2011 asked, “In your opinion, which one of the following is the main reason why students get education beyond high school?” Fifty three percent chose “to earn more money.” Use these data to test the hypothesis that 50% of US adults believe that the main reason why students get education beyond high school is to get more money.


We will conduct a \textit{z-test for a population proportion} and calculate a \textit{95\% confidence interval} for the appropriate population parameter.

HT

1. State the research question.

2-4. Report the values of the sample statistics.

\[ n = \]
\[ x = \]
\[ \hat{p} = x/n = \]

5-8. Define \( \pi \), state the appropriate hypotheses, and report the value of \( \pi \).

\( H_0 : \)
\[ \]
\( H_a : \)
\[ \]
\( \pi = \)
9-10. Use the Theory-based Inference applet to determine the values of the standardized test statistic, z, and p.value. Send in a screenshot of the applet labeled education showing all appropriate values.

\[ z = \]

\[ p.\text{value} = \]

11. Evaluate the strength of evidence against the null hypothesis indicated by p.value.

strength =

not much 0.10 moderate 0.05 strong 0.01 very strong

12-13. Assume \( \alpha = 0.05 \).

State the formal conclusion of this HT.

( R ) I reject the null hypothesis

( F ) I fail to reject the null hypothesis

Justify your formal conclusion.

14. What does this HT tell you about the research question? Be sure to include your level of confidence in your statement.

95% CI

15. Use the Theory-based Inference applet to construct a 95% CI for the appropriate population parameter. Send in a screenshot of the applet labeled education showing all appropriate values.

95% CI =

16. Interpret this CI.

Hint: With how much confidence? … what? … is where?

17. Explain more clearly your answer to question 16. Exactly what property is shared by all the numbers that are contained in this CI?

Hint: They are all the values of the parameter ___________ given ___________. Use the word “plausible” somewhere.
18. Exactly what property is shared by all the numbers that are NOT contained in this CI?

Hint: They are all the values of the parameter ____________ given ______________. Use the word “plausible” somewhere.

HT and CI

19. Are the conclusions of the HT and CI consistent with each other?
   Specifically, does your 95% CI support your formal conclusion to the HT?
   Why or why not?

90% CI

20. Calculate and report a 90% CI for the appropriate population parameter. At this new 90% level of confidence, do you reject (R) or fail to reject (F) the null hypothesis? Why?

centers and MEs of CIs

21. Finish the following sentence: As the level of confidence changes from 90% to 95% to 99%, the center of the confidence interval ____________ and the multiplier ______________ and the SE __________ and the margin of error of the confidence interval ______________.

sample size

22. Finish the following sentence: As the sample size n increases, the center of the CI ______________, the multiplier ______________, the SE ______________, and the ME ______________.

23-24. Reserved for applet image(s).