

Example from the Powerpoint presentation

Suppose you hypothesize that OSU students will, on average, have higher ACT scores than the national average. You go about testing your hypothesis by randomly sampling 15 students who are currently enrolled at OSU. Their ACT scores are as follows:

20, 19, 14, 17, 16, 18, 22, 18, 17, 19, 20, 15, 16, 21, 23

You obtain normative data for the ACT from the U.S. government website:

http://nces.ed.gov/programs/digest/d09/tables/dt09_147.asp

There you find that the average ACT score for 2009 (the last year reported) was equal to 21.1 with a standard deviation of 5.1. You treat these values as population parameters to which you will compare your estimated mean for OSU students.

Do “OSU Students” have a higher mean than the norm, as predicted? Use a z-test for means to answer this question.

Problem to work and turn in on Tuesday

Suppose a researcher expects long-term alcoholic men to have lower IQ scores, on average, compared to the general population. The researcher samples 20 different men and measures their IQ with the Ravens, which has a normed mean = 100 and std. dev. = 16. Do the data below support his hypothesis that the population of long-term alcoholics, on average, have lower IQs than the general population?

125, 120, 110, 115, 100, 105, 120, 120, 105, 105, 105, 110, 115, 110, 110, 105, 109, 100, 95, 120

Work through the steps in NHST as shown in class and on the video. Be sure to:

- A. Write your hypotheses in 3-valued logic form.
- B. Sketch a standard normal distribution and set up the rejection region using an a priori p-value (that is, alpha) equal to .05 and appropriate critical values.
- C. Compute z_{obs} using the formula from class.
- D. Judge whether or not z_{obs} falls in the rejection region and state if your result is statistically significant or nonsignificant.
- E. State your conclusion in words (e.g., “It appears that the population mean...”).
- F. Compute p_{obs} by looking up your z_{obs} in the z-table and doubling the value.
- G. Compute and interpret the effect size (small, medium, large using Cohen’s conventions)
- H. Compute and interpret the confidence interval (narrow, middling, wide based on the standard deviation)