Hypothesis Testing: Two Population Means and Two Population Proportions: Practice 2*

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Abstract

This module provides a practice of Hypothesis Testing: Two Population Means and Two Population Proportions: as a part of Collaborative Statistics collection (col10522) by Barbara Illowsky and Susan Dean.

1 Student Learning Outcome

- The student will conduct a hypothesis test of two means.

2 Given

The U.S. Center for Disease Control reports that the mean life expectancy for whites born in 1900 was 47.6 years and for nonwhites it was 33.0 years. (http://www.cdc.gov/nchs/data/dvs/nvsr53_06t12.pdf) Suppose that you randomly survey death records for people born in 1900 in a certain county. Of the 124 whites, the mean life span was 45.3 years with a standard deviation of 12.7 years. Of the 82 nonwhites, the mean life span was 34.1 years with a standard deviation of 15.6 years. Conduct a hypothesis test to see if the mean life spans in the county were the same for whites and nonwhites.

3 Hypothesis Testing: Two Means

Exercise 1 *(Solution on p. 3.)*

Is this a test of means or proportions?

Exercise 2 *(Solution on p. 3.)*

State the null and alternative hypotheses.

a. H_0 :
b. H_a :

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Exercise 3 ***(Solution on p. 3.)***

Is this a right-tailed, left-tailed, or two-tailed test? How do you know?

Exercise 4 ***(Solution on p. 3.)***

What is the Random Variable of interest for this test?

Exercise 5 ***(Solution on p. 3.)***

In words, define the Random Variable of interest for this test.

Exercise 6

Which distribution (Normal or student's-t) would you use for this hypothesis test?

Exercise 7

Explain why you chose the distribution you did for the above question.

Exercise 8 ***(Solution on p. 3.)***

Calculate the test statistic.

Exercise 9

Sketch a graph of the situation. Label the horizontal axis. Mark the hypothesized difference and the sample difference. Shade the area corresponding to the $p-$value.

Figure 1

Exercise 10 ***(Solution on p. 3.)***

Find the $p-$value:

Exercise 11 ***(Solution on p. 3.)***

At a pre-conceived $\alpha = 0.05$, what is your:

a. Decision:
b. Reason for the decision:
c. Conclusion (write out in a complete sentence):

4 Discussion Question

Exercise 12

Does it appear that the means are the same? Why or why not?

Solutions to Exercises in this Module

Solution to Exercise (p. 1)
Means
Solution to Exercise (p. 1)

a. $H_0 : \mu_W = \mu_{\text{NW}}$
b. $H_a : \mu_W \neq \mu_{\text{NW}}$

Solution to Exercise (p. 2)
two-tailed
Solution to Exercise (p. 2)
$\overline{X}_W - \overline{X}_{\text{NW}}$
Solution to Exercise (p. 2)
The difference between the mean life spans of whites and nonwhites.
Solution to Exercise (p. 2)
5.42
Solution to Exercise (p. 2)
0.0000
Solution to Exercise (p. 2)

a. Reject the null hypothesis