

HYPOTHESIS TESTING: TWO POPULATION MEANS AND TWO POPULATION PROPORTIONS: PRACTICE 2*

Susan Dean
Barbara Illowsky, Ph.D.

This work is produced by The Connexions Project and licensed under the Creative Commons Attribution License †

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 explore the properties of hypothesis testing with two averages.

2 Given

The U.S. Center for Disease Control reports that the average 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 average life span was 45.3 years with a standard deviation of 12.7 years. Of the 82 nonwhites, the average life span was 34.1 years with a standard deviation of 15.6 years. Conduct a hypothesis test to see if the average life spans in the county were the same for whites and nonwhites.

3 Hypothesis Testing: Two Averages

Exercise 1

Is this a test of averages or proportions?

(Solution on p. 3.)

Exercise 2

State the null and alternative hypotheses.

(Solution on p. 3.)

a. H_0 :

b. H_a :

*Version 1.8: Apr 6, 2010 10:14 am GMT-5

†<http://creativecommons.org/licenses/by/2.0/>

Source URL: <http://cnx.org/content/col10522/latest/>

Saylor URL: <http://www.saylor.org/courses/ma121/>

<http://cnx.org/content/m17039/1.8/>

Attributed to: Barbara Illowsky and Susan Dean



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-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:

- Decision:
- Reason for the decision:
- Conclusion (write out in a complete sentence):

4 Discussion Question

Exercise 12

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

Solutions to Exercises in this Module

Solution to Exercise 1 (p. 1)

Averages

Solution to Exercise 2 (p. 1)

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

Solution to Exercise 3 (p. 2)

two-tailed

Solution to Exercise 4 (p. 2)

$\bar{X}_W - \bar{X}_{NW}$

Solution to Exercise 5 (p. 2)

The difference between the average life spans of whites and nonwhites.

Solution to Exercise 8 (p. 2)

5.42

Solution to Exercise 10 (p. 2)

0.0000

Solution to Exercise 11 (p. 2)

- a. Reject the null hypothesis