Lab Activity: Hypothesis Testing – Two Population Proportions

In this lab activity, you will conduct hypothesis testing for claims involving the proportions of two independent populations.

Student Learning Outcomes

By the end of this chapter, you should be able to do the following:

- Perform hypothesis testing for two independent population proportions using Statcato
- Interpret the results of hypothesis tests

Preliminary

Read Chapter 10 Hypothesis Testing: Two Means, Paired Data, Two Proportions in:

Illowsky, Barbara, and Susan Dean. Collaborative Statistics. Connexions. 2 Mar. 2010 <http://cnx.org/content/col10522/1.37/>.

Background

In this activity, you will test claims involving the proportions of female population in two countries. Choose two countries from the table below for your experiment. Record your choices in **LR: Data**.

Country	Female Population	Total Population	Percent Female
Australia	10734838	21515754	49.89%
Canada	17008350	33759742	50.38%
Chile	8456100	16746491	50.49%
China	644502452	1330141295	48.45%
Czech Republic	5228334	10201707	51.25%
Denmark	2792214	5515575	50.62%
Dominican Republic	4827137	9794487	49.28%
Egypt	39684485	80471869	49.31%
Ethiopia	44692240	88013491	50.78%
France	33096095	64768389	51.10%
Georgia	2405671	4600825	52.29%
Germany	41809492	82282988	50.81%
Greece	5486512	10749943	51.04%
Haiti	4640831	9203083	50.43%
India	564474223	1173108018	48.12%
Indonesia	121381228	242968342	49.96%
Iran	33117760	67037517	49.40%
Iraq	14645875	29671605	49.36%
Israel	3667232	7353985	49.87%
Italy	29603104	58090681	50.96%

Jamaica	1438866	2847232	50.54%
Japan	65006136	126804433	51.26%
Korea, South	24298574	48636068	49.96%
Malaysia	13003185	26160256	49.71%
Mali	6967508	13796354	50.50%
Netherlands	8473913	16783092	50.49%
New Zealand	2136328	4252277	50.24%
Pakistan	85652500	177276594	48.32%
Russia	75250112	139390205	53.99%
Sweden	4576420	9074055	50.43%
Thailand	33584258	66404688	50.58%
Turkey	38581127	77804122	49.59%
United Kingdom	30922413	61284806	50.46%
United States	157479477	310232863	50.76%

Source: U.S. Census Bureau, International Data Base, Midyear Population 2010

Formulating the Hypothesis Test

Answer the following questions in **LR: Hypotheses**.

- State the claim that you are testing. Make a guess on the relationship between the proportions of females of the two countries you have chosen.
    - The proportion of females in _(country 1)_ is _(less than/greater than/equal to/not equal to)_ the proportion of females in _(country 2)_.
- State the null and alternative hypotheses.
    - H_0:
    - H_a:
- Is this a right-tailed, left-tailed, or two-tailed test?
- Define the random variable for this test.

Performing the Hypothesis Test

Using Statcato, you will perform calculations for the hypothesis test using a significance level of 0.01 ($\alpha = 0.01$).

Performing Hypothesis Test: 2-Population Proportions

Go to `Statistics > Hypothesis Tests > 2-Population Proportions`.

- For **Inputs,** select **Summarized sample data**. Enter the number of events (number of females) and the number of events (total population) for the two countries.
- For **Significance Level**, enter **0.01**.
- For **Alternative Hypothesis**, choose the appropriate form of the alternative hypothesis in the drop-down menu. Enter **0** in the **Hypothesized Mean Difference** text box.

- Click **OK**.

Copy the computation results to **LR: Hypothesis Test**.

Making Conclusions

Based on the computer-generated results, you will make decisions and draw conclusions for the hypothesis tests. Record your answers in **LR: Interpretation**.

Decisions on Null Hypothesis

Recall that

- If $\alpha \leq$ p-value, do not reject H_0.
- If $\alpha >$ p-value, reject H_0.

Based on the significance level α and the computed p-values, decide whether to reject H_0 and explain why.

Conclusions

Based on your decisions on the null hypothesis, make a conclusion about your claim. For example, your conclusion could be worded as follows:

> At the 5% level of significance, the sample data (shows / does not show) sufficient evidence to support the claim that _____.

Discussion

Answer the following questions in **LR: Discussion**.

1. Does your conclusion match your expectation? What do you think are the reasons behind the presence or lack of difference between the two proportions?