

Fact Sheet – Two Proportion Test (11.1)

This test is used to compare the proportion of one population that has a certain trait to the proportion of a second population that has a certain trait.

Example: The proportion of COS students who own an iPhone is the same as the proportion of students at Reedley College that own an iPhone.

Conditions

To test hypotheses regarding two population proportions, p_1 and p_2 , the following three conditions must be met.

- The two samples are independently obtained using simple random sampling or through a randomized experiment.
- $n\hat{p}_1(1-\hat{p}_1) \geq 10$ and $n\hat{p}_2(1-\hat{p}_2) \geq 10$
- $20n_1 \leq N_1$ and $20n_2 \leq N_2$

Hypothesis Test

Step 1

You must identify which population will be population 1.

The null hypothesis will be $p_1 = p_2$. H_1 will be either $p_1 < p_2$, $p_1 > p_2$, or $p_1 \neq p_2$.

Step 3

The test statistic is $z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p}) \cdot \frac{n_1 + n_2}{n_1 \cdot n_2}}}$, where $\hat{p} = \frac{x_1 + x_2}{n_1 + n_2}$.

Just write “Two Proportion Test”, rather than writing the test statistic.

Step 4

To compute the test statistic and P-value using StatCrunch ...

Stat > Proportions > Two sample > Summary

Enter number of successes and number of trials for each sample. Click Next.

Leave the value for p1-p2 as 0. Select the appropriate sign for H1. Click Calculate.