Project Math 15 Fall 2020 Jones Example

Title: Are SUV more common at Safeway or Whole Foods?

Data Summary							
Survey Question	Is vehicle an SUV?						
Example	Population 1= Cars at Safeway			Population 2 = Cars at Whole Foods			
Name	x1= # of Yes	n1 = # of cars	p1-hat	x2	n2	p2-hat	
Ann	25	120	0.208	36	125	0.288	
Bill	21	100	0.21	45	200	0.225	
Chris	12	50	0.24	31	60	0.517	
Total	58	270	0.2148	112	385	0.2909	-0.0761
	x1=58	n1= 270	p1-hat=.215	x2= 112	n2=385	p2hat=.291	p1hat-p2hat=-0.076

Requirements

The number of successes and failures x1=n1p1=58, n1q1=208, n2p2=112, and n2q2=273 for both samples is well above 5, our sample is large enough.

Since this data was collected by 3 people at different times of day and on different times during the week it is stratified. It is reasonable to conclude that vehicles were randomly selected. Therefore, the requirements have been met.

Confidence intervals

1-propzinteval p1	(.1737,.25593)

We are 90% confident that the proportion of Safeway patrons who drive SUVs is between 17.4% and 25.6%

1propZinterval p2 is (.25284,.32898)

We are 90% confident that the proportion of whole foods patrons who drive SUVs is between 25.3% and 32.9%

2PropZinterval p1-p1

We are 90% confident that the difference in the proportion of Safeway patrons who drive SUVs and Whole Foods patrons who drive SUVs is between -13.2% and -2.01%.

Since zero is not in this interval and all the values are negative it indicates that fewer Safeway patrons drive SUVs.

The proportion of SUV drivers at Safeway is between 2.01% and 13.2% lower than at Whole Foods.

Question

Test the claim that the proportion of SUVs at Whole Foods is higher than the proportion of SUVs at Safeway at the .05 level of significance. Use the following sample.

x1=58	n1= 270	p1-hat=.215	x2= 112	n2=385	p2hat=.291	p1hat-p2hat=-0.076

Hypothesis Test 2-propZTest

2)

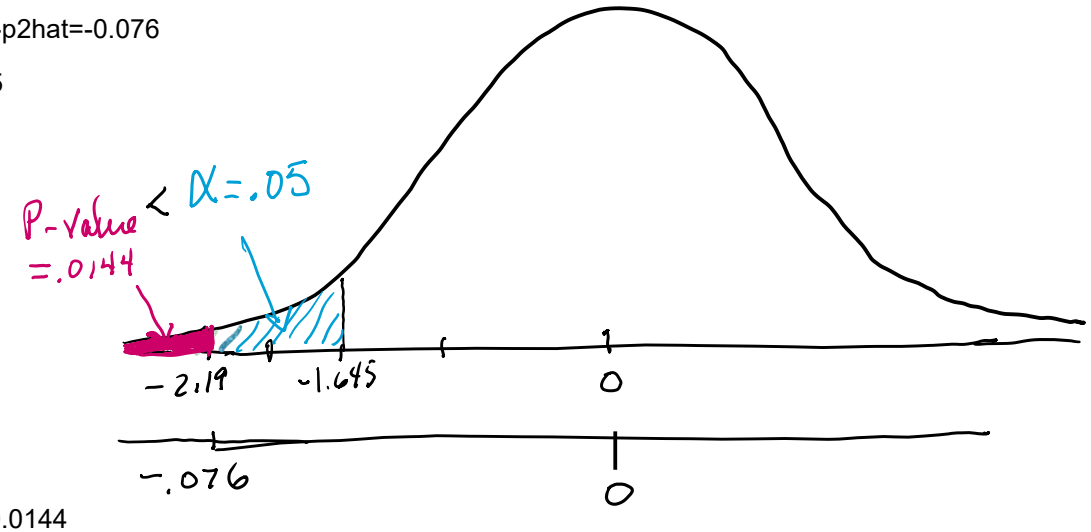
Ho: p1= p2
H1: p1<p2

3) PE: p1hat-p2hat=-0.076

4) CV: -1.645

5) TS: -2.19

6) Graph



7) p-value= 0.0144

8) Initial Conclusion: Reject H_0

9) There is sufficient evidence that the proportion of SUVs at Safeway is less than the proportion of SUVs at Whole Foods.

9a) If the population proportion of all cars that are SUVs at Safeway and Whole Foods were the same then there would only be a 1.44% chance that we would get a sample difference of .076 or more in a sample of this size.

Since our p-value =0.0144 < 0.05 our significance level, a sample difference as large or larger than 0.076 would be unusual to see if the proportions of SUVs at Safeway and Whole Foods were the same so we reject Ho.

9b) Since our test statistic lies in the critical region further from zero than our critical value, the test statistics for our sample is considered statistically significant. Therefore, we reject Ho that the proportion of SUVs at Safeway and Whole Foods are the Same.

9c) We are 90% confident that the difference in the proportion of Safeway patrons who drive SUVs and Whole Foods patrons who drive SUVs is between -13.2% and -2.01%. Since zero is not in this interval and all the values are negative it indicates that fewer Safeway patrons drive SUVs. The proportion of SUV drivers at Safeway is between 2.01% and 13.2% lower than at Whole Foods.