Chi-Squared Goodness of Fit Hypothesis Test

Note #1: We are now looking at CATEGORICAL DATA

H_0 :

$p_1 =$

$p_2 =$

.

.

.

$p_k =$

H_a : H_0 is not true

Note #2: If all the proportions are the same, use -

$H_0 : p_1 = p_2 = \ldots = p_k = \#$

Note #3:

$df = k - 1$

$$\chi^2 = \sum \frac{(O-E)^2}{E} = \#$$

As you will see in the examples and checkpoint questions, the Chi-Squared calculation shown above will use categorical data despite our applying the same rules as we do for proportions

Steps in Hypothesis Testing

1. Define the population characteristic (i.e. parameter) about which hypotheses are to be tested.

2. State the null hypothesis H_0.

3. State the alternative hypothesis H_a.

4. State the significance level for the test α.

5. Check all assumptions and state name of test.

6. State the name of the test.

7. State *df* if applicable (not applicable in proportion land).

8. Display the test statistic to be used without any computation at this point. $\chi^2 = \sum \frac{(O-E)^2}{E} = \#$

9. Compute the value of the test statistic, showing specific numbers used.

10. Calculate the *P* – value.

11. Sketch a picture of the situation.

12. State the conclusion in two sentences -
    1. Summarize in theory discussing H_0.
    2. Summarize in context discussing H_a.

Chi-Squared Goodness of Fit Hypothesis Test

Steps in Chi-Squared GOF Hypothesis Testing

p_1 = true proportion of ...

p_2 = true proportion of ...

1. .
.
.

p_k = true proportion of ...

2. H_0 : $p_1 = \#$
$p_2 = \#$
.
.
.
$p_k = \#$

3. H_a : H_0 is not true

4. State α.

5. Assumptions:
   1. Random Samples
   2. Expected Counts ≥ 5

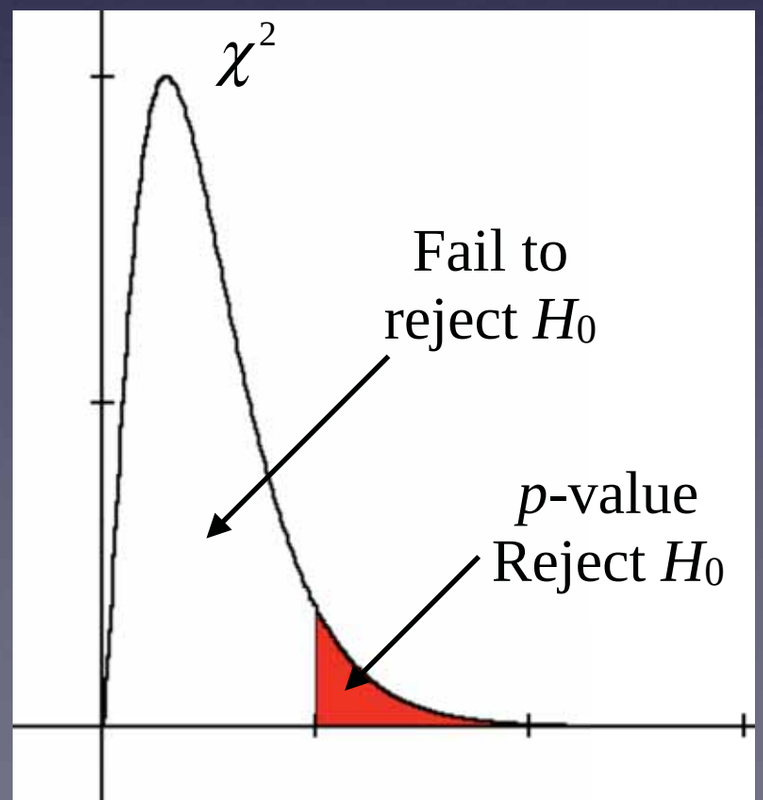
6. χ^2 GOF Test

7. $df = k - 1$

8/9. $$\chi^2 = \sum \frac{(O-E)^2}{E} = \sum \frac{(\text{Observed} - \text{Expected})^2}{\text{Expected}} = \#$$

10. $$P - value = P(\chi^2 > \#) = \chi^2 cdf(\#, 1E99, df)$$

11.



12. State the conclusion in two sentences -
    1. Summarize in theory discussing H_0.
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