The Chi Square Test

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Based on Chapter 23 of The Basic Practice of Statistics (6th ed.)

Concepts:

- **Two-Way Tables**
- The Problem of Multiple Comparisons
- Expected Counts in Two-Way Tables
- The Chi-Square Test Statistic
- Cell Counts Required for the Chi-Square Test
- Uses of the Chi-Square Test
- The Chi-Square Distributions

Objectives:

- otesale.co.uk Construct and interpret two
- Describe the problem Conditional comparisons.
 Calculate Conditional comparisons.
- > Calculate concerned counts in trop-way tables.
- Describe the chi-sq Predist tatistic.
- Describe the cell counts required for the chi-square test.
- > Describe uses of the chi-square test.
- Describe the chi-square distributions.
- Perform a chi-square goodness of fit test.

References:

Moore, D. S., Notz, W. I, & Flinger, M. A. (2013). The basic practice of statistics (6th ed.). New York, NY: W. H. Freeman and Company.

The Chi-Square Test Interpretation

The chi-square test is an overall test for detecting relationships between two categorical variables. If the test is significant, it is important to look at the data to learn the nature of the relationship. There are three ways to look at the data:

- **1) Compare selected percents:** which cells occur in very different percentages than the other cells?
- **2)** Compare observed and expected cell counts: which cells have more or less observations than would be expected if H₀ were true?
- **3)** Look at the terms of the chi-square statistic: which cells contribute the most to the value of λ^2 ?



In the example, only 5 graduate students preferred face-to-face instruction, compared with the expected value of 18.

- Forty undergraduate students preferred face-to-face instruction, while the expected value was 27.
- Therefore, researchers can conclude not only that there is an association between the variables, but they can also describe the association.
- Researchers can conclude that graduate students prefer online instruction, whereas undergraduate students prefer face-to-face instruction.