Chi-Square Hypothesis Test

- Step 3: Calculate the Test Statistic
  - This is chi-square test statistic

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e}$$

  - where
    - f_o represents observed frequencies
    - f_e represents expected frequencies

Degrees of Freedom

- The degrees of freedom for the chi-square goodness-of-fit test are $k - 1$
  - k is the number of levels of the discrete variable
- The degrees of freedom for the chi-square test for independence is found by multiplying the df for each factor
  - $df = (k_1 - 1)(k_2 - 1)$

Expected Frequencies

- Computing expected frequencies:

$\frac{ac}{n}$	$\frac{bc}{n}$	c
$\frac{ad}{n}$	$\frac{bd}{n}$	d
a	b	

Odds

- Odds of event occurrence are determined by

$$\frac{p}{1-p}$$

  - where p is the probability of event occurrence
- Odds range from 0 to infinity, the greater the probability of event occurrence, the larger the odds

Odds Ratio

- The odds ratio (OR) is a measure of effect size for a significant χ^2 test for independence. It is computed by taking the ratio of the odds for each group