

Chi-square

✓ **Chi-square statistic:** $\chi^2 = \sum \frac{(O - E)^2}{E}$

✓ **Degrees of freedom:**

- Goodness of fit: $df = \text{categories} - 1$
- Homogeneity: $df = (r - 1)(c - 1)$
- Independence: $df = (r - 1)(c - 1)$

✓ **Expected counts** (homogeneity and independence): $E = \frac{(\text{row total})(\text{column total})}{\text{table total}}$

✓ **Interpretation:** a larger χ^2 is more evidence against H_0

✓ **Conditions:**

- Random sample
- Large counts: every expected count is at least 5

Linear regression

✓ **t-test for the slope:** $t = \frac{b - \beta_0}{SE_b}, df = n - 2$

✓ **Confidence interval for the slope:** $b \pm t^* \cdot SE_b$

✓ **Standard error of the slope:** $SE_b = \frac{s}{\sqrt{\sum (x_i - \bar{x})^2}}$

✓ **Conditions for inference on the slope:**

- Linear pattern in the scatterplot
- Independent residuals
- Roughly normal residuals
- Equal (constant) variance
- Random sample