

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