16+ Statistics - Summary

General terms:

- **Null hypothesis** – States that there is no difference between the groups that you are comparing.
- **P-value** – the 'cut-off point' for accepting or rejecting the null hypothesis (usually $p \leq 0.05$).

Standard deviation

- Quantifies how 'spread out' the data is from the mean.
- Commonly used to plot error bars.

$$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$$

Student's t-test

- Compares means of two data sets.
- Paired t-test used for data sets from same individuals, unpaired t-test used otherwise.

Paired

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

Unpaired

$$t = \frac{|\bar{x}_A - \bar{x}_B|}{\sqrt{\frac{{s_A}^2}{n_A} + \frac{{s_B}^2}{n_B}}}$$

Chi-squared test

- Used to compare observed frequencies to expected frequencies.
- The sums of both the observed and expected frequencies must be equal.

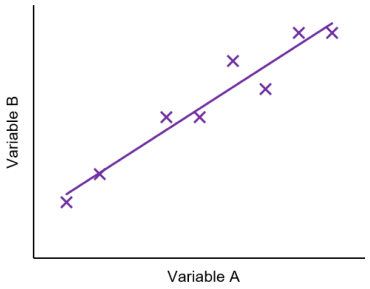
$$\chi^2 = \sum \frac{(Observed - Expected)^2}{Expected}$$

Spearman's rank correlation coefficient

- Used when investigating whether a correlation exists between two variables.
- Correlations can be both positive and negative.

$$r_s = 1 - \frac{6\sum d^2}{n^3 - n}$$

Strong positive correlation



Strong negative correlation