

**Independent Samples t-Test:**

$$s_p^2 = \frac{SS_1 + SS_2}{df_1 + df_2} = \frac{df_1 s_1^2 + df_2 s_2^2}{df_1 + df_2}$$

$$df_1 = n_1 - 1$$

$$df_2 = n_2 - 1$$

$$s_{(M_1 - M_2)} = \sqrt{\frac{s_p^2}{n_1} + \frac{s_p^2}{n_2}}$$

$$t = \frac{M_1 - M_2}{s_{(M_1 - M_2)}}$$

$$\begin{aligned} \text{estimated } d &= \frac{\text{estimated mean difference}}{\text{estimated standard deviation}} \\ &= \frac{M_1 - M_2}{\sqrt{s_p^2}} \end{aligned}$$

**Estimation:**

$$\text{One sample } t: \mu = M \pm t s_M$$

$$\text{Independent samples: } \mu_1 - \mu_2 = M_1 - M_2 \pm t s_{(M_1 - M_2)}$$

$$\text{Related measures: } \mu_D = M_D \pm t s_{M_D}$$

**Related Measures t-Test:**

$$t = \frac{M_D - \mu_D}{s_{M_D}}$$

$$s_{M_D} = \sqrt{\frac{s^2}{n}}$$

$$s^2 = \frac{SS}{df}$$

$$\text{estimated } d = \frac{\text{sample mean difference}}{\text{sample standard deviation}} = \frac{M_D}{s}$$

**Tukey's HSD:**

$$\text{HSD} = q_{\alpha, k, df_{\text{within-treatment}}} \cdot \sqrt{\frac{MS_{\text{within-treatment}}}{n}}$$

**Effect Sizes:**

$$r^2 = \frac{t^2}{t^2 + df}$$

$$\eta^2 = \frac{SS_{\text{between treatments}}}{SS_{\text{total}}}$$