Formula sheet

At the exam, you will receive this formula sheet.

Pooled variance for i groups

$$s_p^2 = \frac{\sum_i (n_i - 1) s_i^2}{\sum_i (n_i - 1)}$$

Confidence interval for μ

$$\overline{y} \pm t^* \frac{s}{\sqrt{n}}.$$

t-test for H: $\mu_1 = \mu_2$
Test statistic:

$$t = \frac{\bar{y}_1 - \bar{y}_2}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}.$$

Test for H: $\rho = 0$
Test statistic:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}.$$

Contrasts

Sample estimation:

$$c = \sum_i a_i \bar{x}_i$$

Standard error:

$$\mathrm{SE}_c = s_p \sqrt{\sum_i \frac{a_i^2}{n_i}}.$$

Fisher Z-transformation

Transformation:

$$r_z = \frac{1}{2} \ln \left(\frac{1+r}{1-r} \right).$$

Inverse transformation:

$$r = \frac{e^{2r_z} - 1}{e^{2r_z} + 1}.$$

(Semi-)partial correlations
Formula's valid when working with DV y and two predictors.

$$pr_1 = \frac{r_{y1} - r_{y2} r_{12}}{\sqrt{(1 - r_{y2}^2)(1 - r_{12}^2)}} = \sqrt{\frac{R^2 - r_{y2}^2}{1 - r_{y2}^2}}$$

$$sr_1 = \frac{r_{y1} - r_{y2} r_{12}}{\sqrt{1 - r_{12}^2}} = \sqrt{R^2 - r_{y2}^2}$$

Adjusted R^2

$$R^2_{\text{adj}} = R^2 - \frac{p}{n-p-1}\left(1 - R^2\right).$$

Effect sizes

$$\eta_p^2 = \frac{SS_{\text{effect}}}{SS_{\text{effect}} + SS_{\text{error}}}, \quad \omega^2 = \frac{SS_{\text{effect}} - df_{\text{effect}} \times MSE}{MSE + SS_{\text{total}}}$$

Binomial model

$$p(X = x|N, \theta) = \binom{N}{x}\theta^x(1-\theta)^{N-x}, \quad \binom{N}{x} = \frac{N!}{(N-x)!x!}$$