Formula Sheet – Final Exam – SCCC 312A

Classical (Wald) $1-\alpha$ CI for p:

$$\left(\hat{p} - z(\alpha/2)\sqrt{\frac{\hat{p}(1-\hat{p})}{n}},\ \hat{p} + z(\alpha/2)\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}\right)$$

Agresti-Coull $1-\alpha$ CI for p:

$$\left(\tilde{p} - z(\alpha/2)\sqrt{\frac{\tilde{p}(1-\tilde{p})}{\tilde{n}}},\ \tilde{p} + z(\alpha/2)\sqrt{\frac{\tilde{p}(1-\tilde{p})}{\tilde{n}}}\right)$$

where $\tilde{n} = n + [z(\alpha/2)]^2$ and $\tilde{p} = \frac{x + 0.5[z(\alpha/2)]^2}{\tilde{n}}$.

$1-\alpha$ CI for μ:

$$\left(\bar{x} - t(n-1, \alpha/2)\frac{s}{\sqrt{n}},\ \bar{x} + t(n-1, \alpha/2)\frac{s}{\sqrt{n}}\right)$$

Test statistic (hypothesis test about μ):

$$t^* = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$$

CI and test statistics for μ_d in paired-sample t-test: Same as above but with $\bar{x}_d$ and s_d.

Test statistic (hypothesis test about p):

$$z^* = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

$1-\alpha$ CI for $\mu_1 - \mu_2$:

$$\left((\bar{x}_1 - \bar{x}_2) - t(df, \alpha/2)\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}},\ (\bar{x}_1 - \bar{x}_2) + t(df, \alpha/2)\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}\right)$$

Test statistic (comparing two means, independent samples):

$$t^* = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$1-\alpha$ CI for $p_1 - p_2$:

$$\left((\hat{p}_1 - \hat{p}_2) - z(\alpha/2)\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}},\ (\hat{p}_1 - \hat{p}_2) + z(\alpha/2)\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}\right)$$

Test statistic (comparing two proportions):

$$z^* = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})(\frac{1}{n_1} + \frac{1}{n_2})}}$$

where $\hat{p}$ is the pooled sample proportion.