Ch 10 formulas

Pooled-Variance t Test for the Difference Between Two Means

$$t_{STAT} = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{S_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

(10.1)

Confidence Interval Estimate for the Difference Between the Means of Two Independent Populations

$$(\bar{X}_1 - \bar{X}_2) \pm t_{\alpha/2}\sqrt{S_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$$

(10.2)

or

$$(\bar{X}_1 - \bar{X}_2) - t_{\alpha/2}\sqrt{S_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)} \leq \mu_1 - \mu_2$$

$$\leq (\bar{X}_1 - \bar{X}_2) + t_{\alpha/2}\sqrt{S_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$$

Paired t Test for the Mean Difference

$$t_{STAT} = \frac{\bar{D} - \mu_D}{\frac{S_D}{\sqrt{n}}}$$

(10.3)

Confidence Interval Estimate for the Mean Difference

$$\bar{D} \pm t_{\alpha/2}\frac{S_D}{\sqrt{n}}$$

(10.4)

or

$$\bar{D} - t_{\alpha/2}\frac{S_D}{\sqrt{n}} \leq \mu_D \leq \bar{D} + t_{\alpha/2}\frac{S_D}{\sqrt{n}}$$

$$S_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{(n_1 - 1) + (n_2 - 1)}$$

Z Test for the Difference Between Two Proportions

$$Z_{STAT} = \frac{(p_1 - p_2) - (\pi_1 - \pi_2)}{\sqrt{\bar{p}(1 - \bar{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \quad (10.5)$$

F Test Statistic for Testing the Ratio of Two Variances

$$F_{STAT} = \frac{S_1^2}{S_2^2} \quad (10.7)$$

χ^2 Test for the Difference Between Two Proportions

$$\chi^2_{STAT} = \sum_{all\ cells} \frac{(f_o - f_e)^2}{f_e} \quad (11.1)$$

Computing the Estimated Overall Proportion for c Groups

$$\bar{p} = \frac{X_1 + X_2 + \cdots + X_c}{n_1 + n_2 + \cdots + n_c} = \frac{X}{n} \quad (11.3)$$

Confidence Interval Estimate for the Difference Between Two Proportions

$$(p_1 - p_2) \pm Z_{\alpha/2}\sqrt{\left(\frac{p_1(1 - p_1)}{n_1} + \frac{p_2(1 - p_2)}{n_2}\right)} \quad (10.6)$$

or

$$(p_1 - p_2) - Z_{\alpha/2}\sqrt{\frac{p_1(1 - p_1)}{n_1} + \frac{p_2(1 - p_2)}{n_2}} \leq (\pi_1 - \pi_2)$$

$$\leq (p_1 - p_2) + Z_{\alpha/2}\sqrt{\frac{p_1(1 - p_1)}{n_1} + \frac{p_2(1 - p_2)}{n_2}}$$

Computing the Estimated Overall Proportion for Two Groups

$$\bar{p} = \frac{X_1 + X_2}{n_1 + n_2} = \frac{X}{n} \quad (11.2)$$

Computing the Expected Frequency

$$f_e = \frac{Row\ total \times Column\ total}{n} \quad (11.4)$$