

Confidence Interval Estimation

$$\bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$\bar{x} \pm t_{\alpha/2, n-1} \frac{s}{\sqrt{n}}$$

$$\hat{p} \pm z_{\alpha/2} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$n = \left(\frac{z_{\alpha/2} \sigma}{E} \right)^2, \quad n = \left(\frac{z_{\alpha/2} s}{E} \right)^2$$

$$n = \frac{z_{\alpha/2}^2 \hat{p}(1-\hat{p})}{E^2}, \quad n_{\max} = \frac{z_{\alpha/2}^2}{4E^2}$$

$$(\bar{x}_1 - \bar{x}_2) \pm z_{\alpha/2} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$$

$$(\bar{x}_1 - \bar{x}_2) \pm t_{\frac{\alpha}{2}, v} s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}},$$

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

$$(\bar{x}_1 - \bar{x}_2) \pm t_{\frac{\alpha}{2}, v} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

$$v = \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2} \right)^2}{\left(\frac{s_1^2}{n_1} \right)^2 + \left(\frac{s_2^2}{n_2} \right)^2}$$

$$(\bar{x}_1 - \bar{x}_2) \pm z_{\alpha/2} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

$$\bar{d} \pm t_{\frac{\alpha}{2}, n-1} \frac{s_d}{\sqrt{n}}$$

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

Testing Statistical Hypotheses

$$z = \frac{\bar{x} - \mu_0}{\sigma / \sqrt{n}}$$

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

$$z = \frac{\bar{x} - \mu_0}{s / \sqrt{n}}$$

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

$$z = \frac{\bar{x}_1 - \bar{x}_2 - \Delta_0}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

$$z = \frac{\bar{x}_1 - \bar{x}_2 - \Delta_0}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$$t = \frac{\bar{x}_1 - \bar{x}_2 - \Delta_0}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$t = \frac{\bar{x}_1 - \bar{x}_2 - \Delta_0}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$$t = \frac{\bar{D} - \Delta_0}{s_D / \sqrt{n}}$$

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p}) \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}, \text{ where}$$

$$\hat{p}_1 = \frac{X_1}{n_1}, \hat{p}_2 = \frac{X_2}{n_2} \text{ and } \hat{p} = \frac{X_1 + X_2}{n_1 + n_2}$$