CHOOSING THE CORRECT HYPOTHESIS TEST OR CONFIDENCE INTERVAL PROCEDURE

What is the parameter of interest?

MEAN

How many groups are there?

ONE

Is σ known?

YES

$$z_{obs} = \frac{\overline{x} - \mu_0}{\sigma / \sqrt{n}}$$

$$\overline{x} \pm z_{1-\alpha/2} \frac{\sigma}{\sqrt{n}}$$

NO

$$t_{obs} = \frac{\overline{x} - \mu_0}{s / \sqrt{n}}$$

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

TWO

Are there Matched Pairs?

YES

$$t_{obs} = \frac{\overline{x}_d}{s_d / \sqrt{n}}$$

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

NO

Are σ_1 and σ_2 known?

YES

$$z_{obs} = \frac{\overline{x}_1 - \overline{x}_2}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}}$$

$$\overline{x}_1 - \overline{x}_2 \pm z_{1-\alpha/2} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$$

NO

Can you assume $\sigma_1 = \sigma_2$?

YES

$$t_{obs} = \frac{\overline{x}_1 - \overline{x}_2}{s_p \sqrt{\dfrac{1}{n_1} + \dfrac{1}{n_2}}}$$

$$\overline{x}_1 - \overline{x}_2 \pm t_{n_1+n_2-2,1-\alpha/2} \, s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

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

NO

$$t_{obs} = \frac{\overline{x}_1 - \overline{x}_2}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}$$

$$\overline{x}_1 - \overline{x}_2 \pm t_{v,1-\alpha/2} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

$$v = \frac{\left(\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2} \right)^2}{\dfrac{\left(s_1^2 / n_1 \right)^2}{n_1 - 1} + \dfrac{\left(s_2^2 / n_2 \right)^2}{n_2 - 1}}$$

PROPORTION

How many groups are there?

ONE

$$z_{obs} = \frac{\hat{p} - p_0}{\sqrt{\dfrac{p_0(1 - p_0)}{n}}}$$

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

TWO

$$z_{obs} = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1 - \hat{p})\left(\dfrac{1}{n_1} + \dfrac{1}{n_2} \right)}}$$

$$\hat{p}_1 - \hat{p}_2 \pm z_{1-\alpha/2} \sqrt{\frac{\hat{p}_1(1 - \hat{p}_1)}{n_1} + \frac{\hat{p}_2(1 - \hat{p}_2)}{n_2}}$$