VISUAL SUMMARY

t Tests for Correlated Samples

Before You Begin: State H_0 and H_1.

Compute $\bar{X}_1$, S_1, n_1, $\bar{X}_2$, S_2, n_2, and covariance or r.

Or compute $\bar{D}$, $\Sigma\,D^2$, n.

Estimate the standard error of the difference between means:

Correlation   Difference

$$\text{estimated } \sigma_{difference} = \sqrt{(\text{estimated } \sigma_{\bar{X}_1})^2 + (\text{estimated } \sigma_{\bar{X}_2})^2 - (2 \cdot \text{cov})}$$

or

$$\sigma_{difference} = \sqrt{(\text{estimated } \sigma_{\bar{X}_1})^2 + (\text{estimated } \sigma_{\bar{X}_2})^2 - (2 \cdot r \cdot \text{estimated } \sigma_{\bar{X}_1} \cdot \text{estimated } \sigma_{\bar{X}_2})}$$

$$\text{Estimated } \sigma_{difference} = \sqrt{\frac{\frac{\Sigma D^2}{n} - D^2}{n-1}}$$

Compute t:
$$t = \frac{\bar{X}_1 - \bar{X}_2}{\text{estimated } \sigma_{difference}}$$

Compute t:
$$t = \frac{\bar{D}}{\text{estimated } \sigma_{difference}}$$

Compute the degrees of freedom:
$$df = (n-1)$$

Find the critical value in Table T

If $|t| >$ critical value, reject H_0