

Unit 7 - CIs and hypothesis tests for numerical data

Conditions for all

random says

Normal $n \geq 30$ or from normal pop

Independent $n < .1N$

• For Hypothesis tests

• always run Conditions,

alpha, Dof, and Hypotheses

• For CI run conditions and dof.

Numerical Confidence Intervals

Dof = $n - 1$

$$t^* = \frac{\bar{x} - M}{\left(\frac{s}{\sqrt{n}}\right)}$$

$$CI = \bar{x} \pm t^* \left(\frac{s}{\sqrt{n}}\right)$$

or $\text{InvT}_{\text{conf \% / dof}}$

Context: with ___% Confidence

the true parameter of ___

is from ___ to ___.

Numerical Difference Confidence Intervals

Dof: $(n_1 + n_2) - 2$

$$C.I. = (\bar{x}_1 - \bar{x}_2) \pm t^* \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$$

$$t^* = \frac{\bar{x} - M}{\left(\frac{s}{\sqrt{n}}\right)}$$

or $\text{InvT}_{\text{Dof \%}}$

With ___% Confidence, the true difference in means of

___ and ___ is from

___ to ___.

Since 0 is included in the Interval, there is not a significant difference

the two. **OR**. Since 0 isn't in our interval there's a significant difference

Numerical Hypothesis test

• Do Conditions, Alpha, Hypothesis, and Dof.

Dof: $n - 1$

$\alpha =$ usually $.05$

$$t^* = \frac{\text{obs} - \text{exp}}{\left(\frac{\sigma}{\sqrt{n}}\right)}$$

$\rightarrow t \text{cdf} \rightarrow p\text{-val} \rightarrow \text{Compare to reject / not reject}$

Hypothesis test numerical Differences

Dof: run these two

Separately, test both

smaller sample $\rightarrow n_1 - 1$

and $(n_1 + n_2) - 2$

$t^* =$

$$\frac{(\bar{x}_1 - \bar{x}_2) - (M_1 - M_2)}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

$\rightarrow t \text{cdf, compare p-value}$