Lesson 17 - Two Grps - Two Means - Theoretical

Two Means (One categorical var and one Quantitative variable)

Parameter $\mu_1 - \mu_2$

Statistic $\bar{x}_1 - \bar{x}_2$

Validity Conditions Both Grps Symmetrical
OR
≥ 20 observations per group and not strongly skewed

Hypotheses

$H_0: \mu_1 - \mu_2 =$

$H_a: \mu_1 - \mu_2 \; > \; \neq \; <$

Standardized Statistic

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

null = 0

Pvalue

$H_a: <$ pt(t, n-2)

$>$ 1-pt(t, n-2)

$\neq$ 2*(1 - pt(abs(t), n-2))

CI = Statistic ± Multiplier * SE

$$(\bar{x}_1 - \bar{x}_2) \pm \left[qt\left(1 - \frac{\alpha}{2}, n-2\right)\right] * \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

Impacts SOE (pvalue)

↑ · Sample size ↓

↑ · Variability of sample (s) ↑

↑ · Difference btwn Stat and null ↓

Impacts Confidence Interval

↑ · Sample size ↓

↑ · Significance level (α) ↓

↑ · Variability (s) of sample ↑