



Intro to Stats

Independent t-tests

Independent t-tests

- ▶ Difference in average score between two separate groups
- ▶ Each participant tested once
- ▶ Same outcome measure in each group

What does it mean?

MeanGroup 1 – Mean Group2

 Spread (SD's) of the groups' data points

- ▶ t is increased (likely significant) when:
 - Two groups' means are very different
 - When spread (SDs) is very small

Calculating

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2} \right) \left(\frac{n_1 + n_2}{n_1 n_2} \right)}}$$

\bar{X}_1 = mean for group 1

\bar{X}_2 = mean for group 2

n_1 = number of participants in group 1

n_2 = number of participants in group 2

s_1^2 = variance for group 1

s_2^2 = variance for group 2

Degrees of Freedom

- ▶ **Degrees of freedom (df):** Describes number of scores in sample that are free to vary (without changing value of descriptive statistic).
- ▶ Needed to identify the critical value
- ▶ $df = (n_1 - 1) + (n_2 - 1)$ (for t-test)

Significance

- ▶ **Remember:** Just because means are different, it does not mean they are meaningfully different
- ▶ Need to examine significance
 - i.e., likelihood that the differences are due to chance

Effect Sizes

- ▶ A measure of the magnitude of the difference between groups

$$ES = \frac{\bar{X}_1 - \bar{X}_2}{SD}$$

- ▶ Small = .0 to .2
- ▶ Medium = .2 to .5
- ▶ Large = above .5