EPSY 5261 : Introductory Statistical Methods

Day 22

Standardized Effect Size

Learning Goals

- At the end of this lesson, you should be able to…
  - Explain what a standardized effect size is
  - Explain why we use standardized effect sizes
  - Compute standardized effect sizes and their confidence intervals using R Studio

But first, you have 15 minutes

- Create a concept map to answer the following questions:
  - When do I compute a confidence interval vs. a hypothesis test?
  - When do I use a t vs. z test?
  - When do I use the “pipe" (vertical bar; `|`), in my code?

Effect Size

- The *p*-value tells us the strength of evidence against a null hypothesis of no effect, or no difference (smaller *p*-value = stronger evidence against null hypothesis)
- The *p*-value does NOT tell us **how large the difference is** (or how strong the relationship is)

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Example Consideration

Example: SAT math prep course

- Suppose that students who took an SAT math prep course scored significantly higher than those who did not ($p < .0000001$).
- HOWEVER, suppose the 95% confidence interval for the difference in mean scores between those who took the course and those who did not was
- [2, 6] points (out of 800 total).
- Would you pay for the course?

Standardized Effect Size

Using standardized effect sizes makes the difference between means or proportions more interpretable. This is useful when other researchers might not be familiar with the metric on your outcome variable.

Standardized Effect Size for Difference in Means

Cohen's d

$$d = \frac{x_1 - x_2}{s}$$

Where

$$s = \frac{s_1 + s_2}{2}$$

Effect size for Difference in Proportions

Cohen's h

$$h = 2\text{arcsin}(\sqrt{p_1} - 2\text{arcsin}(\sqrt{p_2})$$

Exploring Effect Sizes Activity

(note this activity does not use real data)

Summary

- An standardized effect size often gives us a meaningful way to discuss difference in means or proportions.