Practical Issues and Challenges

March 4

Outline

1. Analysis-relevant practical considerations

2. Discussion

3. Preview of next week

Broken experiments

- Protocol is all about planning and anticipation

- Recall Rubin: "design trumps analysis"

- Elegence: Design so that the mean-difference is all we need

- Unfortunately, all experiments are broken experiments

Broken experiments

- Attrition

- Noncompliance

  - One-sided (failure to treat)
  - One-sided (control group gets treated)
  - Cross-over

- Missing data

Analysis of data with attrition

Considerations:

- Symmetric, possibly random, attrition

- One-sided or systematic attrition

- Pre-treatment/post-treatment

- Pre-measurement/post-measurement

Noncompliance analysis

Choices:

1. Intention to treat analysis

2. As-treated analysis

3. Exclude noncompliant cases

4. Estimate a Local Average Treatment Effect (LATE)

    ○ aka Compliance Average Treatment Effect (CATE)

One-sided noncompliance

$$ITT = \overline{Y}_1 - \overline{Y}_0$$

$$LATE = \frac{ITT}{Pct.Compliant}$$

We need to observe compliance to estimate the LATE

Two-sided noncompliance

1. This is more complex analytically

2. Stronger assumptions are required to analyze it

    - Especially monotonicity
    - e.g., no one who who go to the library if not encouraged but who won't go to the library if encouraged

3. This is a classic design trumps analysis problem

Missing Data

Problems:

- Missing data is a threat to representativeness

- Missing data increases our uncertainty

Solutions:

- Case deletion

- Imputation

Cluster random assignment

- Cluster randomization is fine if cluster means are similar

- Otherwise, clustering introduces inefficiencies

- Or we can change our unit of analysis

  - Contrast people as units versus clusters as units

Pretreatment

- An experiment involves:

  1. Units
  2. Treatment(s)
  3. Outcome(s)
  4. Context(s)

- Does our experiment work in this context on these subjects?

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Scenarios

- Discuss scenarios that deal with:

  1. Ethics
  2. Practical issues

- Think about:

  - What should we do in each situation?
  - Are ethical principles violated?
  - How does the situation affect our analysis?

- Not necessarily a "right" answer

Next week

- Four examples of lab experiments

- Each of you should present one article:

    - 10 minute overview of design
    - Come up with 2-3 discussion questions