500 Class 15

https://thomaselove.github.io/500-2024/

2024-05-02

Section 1

Some Closing Thoughts

A Few Advantages of Propensity Methodology

- Results can be persuasive even to audiences with limited statistical training.
- Though estimating the PS requires some care, the comparability of treated and control patients can be verified simply.
- PS methods address selection bias well.
- PS methods may be combined with other sorts of adjustments.

Strategic Issues

- How can we make our investigations compelling to our intended audience?
- Why is this hard?
  - Audience is not focused on statistical techniques
  - Audience may have limited training in statistics
- Why is this important?
  - Who makes key policy decisions?
  - Who needs to be convinced by the evidence?
- Design observational studies
  - Exert as much experimental control as possible, carefully consider the selection process, and anticipate hidden biases
- Focus on simple comparisons
  - Increase impact of results on consumers
- Compare subjects who looked comparable prior to treatment
- Use sensitivity analyses to delimit discussions of hidden biases due to unobserved covariates

Some Cautions and Limitations

- Hidden Bias: Beware unmeasured covariates which affect outcomes and/or assignment.
    - Sensitivity Analysis helps quantify the problem
- This is a reasonable method with fairly large samples.
    - Matching vs. stratification vs. adjustment methods
- Options narrow as an investigation proceeds.
    - Sadly, though OS work cries out for design, we're often working with secondary data, where we have fewer options

What should always be done in an OS … and often isn't?

1. Collect data so as to be able to model selection
2. Demonstrate need for adjustment - selection bias
3. Carefully record intervention time - adjust only for things present before or at time of intervention.
4. Ensure baseline characteristic overlap [comparability]
5. Check baseline characteristic balance after adjustment
6. Specify relevant post-adjustment population with care
7. Estimate treatment effect in light of adjustment
8. Estimate sensitivity of results to potential hidden bias

How Can We Avoid Being Misled by Observational Studies?

1. What differentiates an observational study from a randomized controlled trial?
   - One key element: potential for selection bias.
2. What is selection bias, and why should I care about it?
   - Baseline characteristics of comparison groups are different in ways that affect the outcome.
3. What can be done to deal with selection bias in observational studies?
   - Propensity score methods for overt bias.
   - Sensitivity analyses to deal with hidden bias.

Thank you very much.

Special thanks to Leila Hojat, for her remarkable and hard work this semester.

- Final Project Submissions are due to Canvas at 9 AM on Monday 2023-05-06 from everyone.
- When prompted via email by the University (usually in late April), please visit https://webapps.case.edu/courseevals/ and complete the course evaluations before they close.