

500 Class 14

<https://thomaseLove.github.io/500-2025/>

2025-04-24

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?

- ❶ What differentiates an observational study from a randomized controlled trial?
 - One key element: potential for selection bias.
- ❷ What is selection bias, and why should I care about it?
 - Baseline characteristics of comparison groups are different in ways that affect the outcome.
- ❸ 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.

- Final Project Submissions are due to Canvas at 9 AM on Monday 2025-04-28 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.