Causal Inference Final Paper

Post-Treatment Bias

“concerns about post-treatment bias are not really (or only) about the post-treatment variable itself. The problem is that by conditioning on a post-treatment variable we have unbalanced the treatment and control groups with respect to every other possible confounder.” (6)

“In short, when we include a post-treatment variable in the set of conditioning variables either directly or indirectly, Assumption (1) is violated. As a result, ⌧ 6= for the reasons discussed above. Standard estimates such as the di↵erence in conditional means (ˆ ) will therefore be biased regardless of sample size, measurement precision, or estimation method.9 Further, the bias of standard estimates such as ˆ can be in any direction and of any magnitude depending on the value of unknown (and unknowable) parameters (e.g., Y , the e↵ect of the unmeasured confounder on the outcome). Once we have conditioned on a post-treatment variable, we have eliminated the assurance of unconfoundedness provided by randomization.” (11)

“the post-treatment covariate (x) and the outcome (y) share an unmeasured cause (u)”

“In our example, we might wish to estimate the e↵ect of the civics education class only among low-interest students to show that the e↵ect is not isolated to previously engaged students. Dropping respondents based on manipulation checks is often done to show that the estimated treatment e↵ect is larger among compliers, which might appear to suggest that the treatment is working through the researchers’ proposed mechanism. This reasoning is wrong. Selecting a portion of the data based on post-treatment criteria will not allow us to generate an unbiased estimate of the treatment e↵ect within an interesting subset of respondents. Instead, we will obtain a biased estimate among an endogenously selected group.” (13)

“Including control variables is therefore potentially appropriate, but only covariates that are unrelated to the treatment and preferably measured in advance” (23)

“Moderators that are vulnerable to treatment spillovers like racial resentment should be measured pre-treatment” (23)

Key Assumptions- IV

Ways Post-Treatment Bias is introduced

* Condition on a variable that is affected by the treatment
  + i.e., measure interest after participation in a program that may affect interest
  + effort to prevent omitted variable bias
  + account for noncompliance
  + measure a moderator after experimental manipulation
* Dropping or selecting observations based on criteria influenced by the treatment
  + Sometimes unavoidable
  + “The treatment itself may cause some respondents to be more likely to be omitted from the sample, a phenomenon which is usually termed non-random attrition.” (12)
  + “researchers frequently drop subjects who fail a post-treatment manipulation check or other measure of attention or compliance” (13)
    - “can imbalance the sample with respect to observed or unobserved confounders” (13)