Discussion of "Decomposition and Interpretation of Treatment Effects in Settings with Delayed Outcomes"

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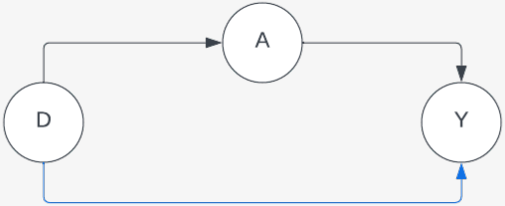
Summary

- RCT or selection-on-observables setting with binary treatment $D \in \{0, 1\}$.
- In practice, often exists a delay between treatment and outcome $Y \in \mathbb{R}$ realization.
- Consequently, study participants may take actions A which can affect Y.

Summary

- A may be affected by D, so researchers wish to "control" for them in order to identify direct effects of D on Y.



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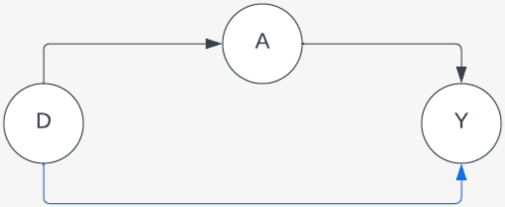

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- The paper contributes decomposition of common estimands in published work into:
  1. *Ceteris paribus* effects of D on Y;
  2. *Indirect effects* of A on Y;
  3. Selection terms.

Main Takeaways

- Framework clarifies assumptions needed to interpret estimands as convex combinations of:
  - "controlled" direct effects - $E[Y(1,a) - Y(0,a)|\Omega]$;
  - "controlled" indirect effects - $E[Y(0,a) - Y(0,0)|\Omega]$.

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- Conclusion: Required assumptions are potentially untenable in most settings.

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- Conclusion: Required assumptions are potentially untenable in most settings.
- Frequently used estimands typically do not have desired interpretation and may not satisfy strong sign preservation (Simpson's paradox).
- When estimands satisfy conditions above, any combination of "controlled" direct effects is identified via a fully saturated regression.

Contributions

- Authors examine frequently used specifications and clarify interpretations of estimands.
- Paper is narrowly focused, but also has clear broader implications for mediation analysis.
- Can be viewed as a negative paper, but contains constructive points - designs where (A, D) may be allocated randomly or selection-on-observable settings.

Comments and Suggestions

- Primary goal is identification of direct effects. Why do they matter?
- If goal is to identify ATE with implementation in mind, seems that the estimand of short regression is the one of interest:

$$\Delta_{short} = E[Y(1) - Y(0)] = E[Y(1, A(1)) - Y(0, A(0))]. \quad (1)$$

- If direct effects are of interest, it appears that careful experimental design may identify direct effects with fewer assumptions in RCTs.

Comments and Suggestions

- In particular, if (natural) direct effects $\Delta_{NDE} = E[Y(1, A(1)) - Y(0, A(1))]$ is of interest, it may be beneficial to discuss blinding.
- Under appropriate blinding $A = A(1)$, so $\Delta_{NDE} = \Delta_{short}$.
- Examples: 1) Moderna study (placebo vaccines); 2) Fertilizer experiment in Mali (placebo fertilizer).
- Granted, may not always be possible, or sensible under selection on observables.

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- Misclassification error of Y should not affect sign preservation properties (cf. Moderna study).