

Statistical Learning in Mediation Analysis

Lab 1: Counterfactuals for mediation analysis

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MODULE 14

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Contents of this lab

- 1 Understanding nested counterfactuals
- 2 Using nested counterfactuals to compute mediational effects

Counterfactuals and nested counterfactuals

Assume we have a population consisting of only 5 individuals. The treatment and counterfactual values for mediator and outcome for these five individuals are given in the table below.

- Compute controlled direct effect $E[Y(1,0) - Y(0,0)]$
- Compute natural indirect effect $E[Y(1, M(1)) - Y(1, M(0))]$
- Compute the average treatment effect $E[Y(1) - Y(0)]$

| Subject | A | M(1) | M(0) | Y(1,1) | Y(1,0) | Y(0,1) | Y(0,0) |
|---------|---|------|------|--------|--------|--------|--------|
| 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 3 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 4 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| 5 | 0 | 1 | 1 | 0 | 1 | 0 | 1 |