

Causal Modeling in R

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Prediction vs. Explanation

Normal regression estimates associations. But we want **causal** estimates: what would happen if **everyone** in the study were exposed to x vs if **no one** was exposed.

Marginal Structural Models

- 1 Fit a model for the **exposure**, $x \sim z$ where z is all covariates
- 2 Get the predictions for that model, then invert them
- 3 Use the inverted probabilities as weights in a second model of $y \sim x$

G-Computation/G-Formula

- 1 Fit a model for $y \sim x + z$ where z is all covariates**
- 2 Create a duplicate of your data set for each level of x**
- 3 Set the value of x to a single value for each cloned data set (e.g $x = 1$ for one, $x = 0$ for the other)**

G-Computation/G-Formula

- 1 Make predictions using the model on the cloned data sets
- 2 Get the estimate you want, e.g.
 $\text{mean}(x_1) - \text{mean}(x_0)$

Picking variables for the model

- 1 Build a DAG
- 2 Choose a reasonable set of variables that blocks all other associations between x and y that are not causal

Work your way through
exercises.Rmd

Resources

Causal Inference: **The** book on causal inference. Free online.

Causal Inference Notebook: R code to go along with Causal Inference