

Attributing Effects in Cluster Randomized Trials or Observational Studies: The case of a Get-Out-The-Vote Campaign

Analysis of an experiment or observational study requires a probability model: commonly, a model for the dependence of outcomes Y on confounders X and a potentially causal variable Z . The requirement carries an element of circularity: to determine the *magnitude* of Z 's effect on Y , the analyst first decides, speculatively, the *functional form* of Y 's dependence on Z and X . Randomization inference in the style of Fisher avoids this circle, permitting analysis of Z 's effects on Y even as the statistician remains entirely agnostic about the conditional distribution of Y given X and Z . However, it is sometimes thought not to apply to observational studies, and with certain types of data it has long been capable only of testing null hypotheses of no effect (but not also generating estimates of, nor confidence intervals for, positive or negative effects). Recent work of Rosenbaum (2001, 2002) lifts both of these limitations, substantially broadening the utility and applicability of randomization inference.

We illustrate this by applying randomization inference to analyze A. Gerber and D. Green's New Haven Vote 98 campaign. Conceived as both a get-out-the-vote campaign and a field experiment in political participation, the study (2000) randomly assigned households to treatment and desired to estimate the effect of treatment on the individuals nested within the households. Treating it as a randomized trial, we estimate the number of voters who would not have voted had the campaign not prompted them to — that is, the total number of votes attributable to the interventions of the campaigners — while taking into account non-random compliance and the non-independence of observations within households. In the process, we extend existing methodology to handle these special features. This analysis uses an updated release of the data (2005); as originally released, Gerber and Green's data contain certain flaws and omissions that render the study more like an observational study than a randomized experiment (Imai, 2005). Analysis of these older data demands techniques appropriate to observational studies; we use full matching with propensity scores. These two approaches and versions of the data yield substantively consonant estimates of various GOTV interventions' effects.

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