

A Bayesian semiparametric latent variable approach to causal mediation

Yisheng Li

*The University of Texas MD Anderson Cancer Center
E-mail: ysli@mdanderson.org*

Abstract: In assessing causal mediation effects in randomized studies, a challenge is that the direct and indirect effects can vary across participants due to different measured and unmeasured characteristics. In that case, the population effect estimated from standard approaches implicitly averages over and does not estimate the heterogeneous direct and indirect effects. We propose a Bayesian semiparametric method to estimate heterogeneous direct and indirect effects via clusters, where the clusters are formed by both individual covariate profiles and individual effects due to unmeasured characteristics. These cluster-specific direct and indirect effects can be estimated through a set of regression models where specific coefficients are clustered by a stick-breaking prior. To let clustering be appropriately informed by individual direct and indirect effects, we specify a data-dependent prior. We conduct simulation studies to assess performance of the proposed method compared to other methods. We use this approach to estimate heterogeneous causal direct and indirect effects of an expressive writing intervention for patients with renal cell carcinoma.