

The Parametric g-Formula for Latent Markov Models

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Post-treatment confounding poses a major challenge for causal inference on longitudinal data. When data is collected within an observational study design, there will be a self-selection process into the treatment groups and the causal effect of a treatment on an outcome of interest will be confounded. This problem intensifies with repeatedly measured outcomes when individuals are allowed to switch between treatment groups. E.g., a treatment might not have the expected effect on the outcome for some individuals and treatment might therefore be adjusted at follow-up. It is also possible that treatment affects some time-varying confounders which then affect treatment allocation at follow-up. If this happens, the average treatment effect will be confounded. To solve this problem of post-treatment confounding, the parametric g-formula has been proposed. In the social sciences, however, this framework needs to be extended as we are often confronted with outcomes that are not directly observable but are measured through indicators, i.e., are latent. For longitudinal data, latent Markov models are a common choice for modelling such outcomes. In this talk, I will present an extension of the parametric g-formula for unobserved outcomes. In a stepwise approach, we first estimate the measurement part of the latent Markov model. With the measurement model fixed, we then combine the estimation of the Markov-chain with the parametric g-formula to account for time-varying confounding.