University of California, Irvine
Statistics Seminar

Causal Inference for Dynamic Groups: Examining Cognitive Behavioral Therapy Session Attendance and Post-treatment Depression

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(Bldg. #314 on campus map)

Group therapy is a common modality for treating substance use disorders and mental health conditions. Many therapy groups are dynamic (i.e., open enrollment), with membership changing over time. Estimation of causal effects using observational data in the group setting is complicated by the possibility of interference - treatment received by one individual may affect potential outcomes of others. Frameworks for causal inference under interference have been developed for non-dynamic groups. For example, Hong and Raudenbush (2006) assume an individual's potential outcomes could be affected by a scalar function of treatment assignments of their peers, and assume strong ignorability of treatment assignment conditional on the propensity score. However, the networked structure of dynamic group participants implies that arbitrary constraints would be required to fit the propensity score model. We adapt the existing framework to the dynamic group setting by defining peer treatment assignments in a manner suitable for dynamic groups. We then employ a prognostic score approach (Hansen, 2008) after assuming strong ignorability within covariate levels to avoid the intractability of the propensity score approach in the dynamic group setting. Similar to propensity scores, prognostic scores reduce the dimension of covariates. We apply our framework to examining the effect of group cognitive behavioral therapy session attendance on post-treatment depressive symptoms among residential substance abuse treatment patients.

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