

Yale SCHOOL OF PUBLIC HEALTH

Biostatistics

Causal Inference Under Approximate Neighborhood Interference

Michael Leung, PhD
Assistant Professor
Department of Economics
University of Southern California

12:00 Noon Eastern Time, Tuesday, September 15, 2020

Join us by zoom:

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ABSTRACT

This paper studies causal inference in randomized experiments under network interference. Most of the literature assumes a model of interference under which treatments assigned to alters beyond a certain network distance from the ego have no effect on the ego's response. However, many models of social interactions do not satisfy this assumption. This paper proposes a substantially weaker model of "approximate neighborhood interference" (ANI), under which treatments assigned to alters further from the ego have a smaller, but potentially nonzero, impact on the ego's response. We show that ANI is satisfied in well-known models of social interactions. We also prove that, under ANI, standard inverse-probability weighting estimators can consistently estimate useful exposure effects and are asymptotically normal under asymptotics taking the network size large. For inference, we consider a network HAC variance estimator. Under a finite population model, we show the estimator is biased but that the bias can be interpreted as the variance of unit-level exposure effects. This generalizes Neyman's well-known result on conservative variance estimation to settings with interference.