

Publication

Modeling History Dependence in Network-Behavior Coevolution

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Spatial interdependence-the dependence of outcomes in some units on those in others-is substantively and theoretically ubiquitous and central across the social sciences. Spatial association is also omnipresent empirically. However, spatial association may arise from three importantly distinct processes: common exposure of actors to exogenous external and internal stimuli, interdependence of outcomes/behaviors across actors (contagion), and/or the putative outcomes may affect the dimensions along which the clustering occurs (selection). Accurate inference about any of these processes generally requires an empirical strategy that addresses all three well. From a spatial-econometric perspective, this suggests spatiotemporal empirical models with exogenous covariates (common exposure) and spatial lags (contagion), with the spatial weights being endogenous (selection). From a longitudinal network-analytic perspective, the same three processes are identified as potential sources of network effects and network formation. From that perspective, actors' self-selection into networks (by, e.g., behavioral homophily) and actors' behavior that is contagious through those network connections likewise demands theoretical and empirical models in which networks and behavior coevolve over time. This paper begins building such models by, on theoretical side, extending a Markov type-interaction model to allow endogenous tie-formation, and, on empirical side, merging a simple spatial-lag logit model of contagious behavior with a simple p^* -logit model of network formation. One interesting consequence of network-behavior coevolution-identically, endogenous patterns of spatial interdependence-emphasized here is how it can produce history-dependent political dynamics, including equilibrium path and path dependence (Page 2006). The paper concludes with an illustrative application to alliance formation and conflict behavior among the great powers in the first half of the twentieth century.

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