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### Socio-dynamic discrete choice: Theory and application

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## Part IV

### CHALLENGES

An econometric issue that arises in empirical estimation of a social feedback effect in discrete choice models using standard multinomial logit or nested logit models is that the error terms are assumed to be identically and independently distributed across decision makers (Ben-Akiva and Lerman, 1985). It is not obvious that this is in fact a valid assumption when we are specifically considering interdependence between decision makers' choices. We might reason that if there is a systematic dependence of each decision maker's choice on an explanatory variable that captures the aggregate choices of other decision makers who are in some way related to that decision maker, then there might be an analogous dependence in the error structure. Otherwise said, the same unobserved effects might be likely to influence the choice made by a given decision maker as well as the choices made by those in the decision maker's reference group. In terms of transportation mode choice, for example accessibility measures for residents in the neighborhood could play such a role to the extent that these were unable to be directly captured through explanatory variables in the utility specification. In this case, the use of transportation mode shares of neighbors living in the same zone as an explanatory variable will be correlated with the unobserved error of the given decision maker, which is a classic case of endogeneity. The results and coefficients of such a model are likely to be biased (Louviere et al 2006; Train 2009). In Part IV, we explore issues in the empirical estimation of discrete choice models with feedback effects, by specifically testing for correlation among agents in the error structure in an empirical case study of mode choice to work, through the used of mixed Generalized Extreme Value family models. We conclude highlighting important outstanding challenges and recommendations for future work in moving discrete choice models with aggregation social interactions in transportation into practice.