

## Issues in the Application of Markov Latent Class Analysis to Surveys of Sensitive Topics

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Markov latent class analysis (MLCA) comprises a broad class of models and techniques for analyzing categorical longitudinal data subject to misclassification. An important application area is exploring data quality issues in panel surveys. Because MLCA does not rely on gold standard or replicate measurements, it can be applied to virtually any panel survey. For assessing data quality, MLCA has been used to compare interview modes and alternative questionnaire designs, estimate measurement bias, investigate the causes of misclassification, and many other measurement error issues. Despite many potential applications in survey work, MLCA has not enjoyed widespread use among survey methodologists because practical guidance on fitting MLC models to complex survey data is lacking.

This paper focuses on the application of MLCA to estimating the classification error associated with the measurement of rare events and sensitive topics such as illicit drug use, rape and sexual assaults, and other sensitive behaviors. For such behaviors, under-reporting is a key data quality issue. MLCA can be especially challenging for these data due to the small numbers of positives available for estimating false negative probabilities (under-reporting).

The paper reviews some of the issues we encountered in applying MLCA to evaluate classification error for rare crime in the National Crime Victimization Survey (NCVS). The NCVS is the only national survey in the United States to estimate the crime victimization rate among reported and unreported crimes. This analysis sought to answer four key questions about classification error in the NCVS: 1) What is the magnitude of the classification error for crime victimizations of interest? 2) Is the error stable over time for a set of cohorts? 3) What demographic groups have large differences in their classification error rates? and 4) How would accounting for classification error change the published NCVS estimates?

Key words: crime victimization, classification error, complex survey data analysis, latent transition analysis, under-reporting error