

**MARGINALIZING PATTERN-MIXTURE MODELS
FOR CATEGORICAL DATA SUBJECT TO MONOTONE MISSINGNESS**

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Many models to analyze incomplete data that allow the missingness to be non-random have been developed. Since such models necessarily rely on unverifiable assumptions, considerable research nowadays is devoted to assess the sensitivity of resulting inferences. A popular sensitivity route, next to local influence (Cook, 1986; Jansen *et al.*, 2003) and so-called intervals of ignorance (Molenberghs, Kenward and Goetghebeur, 2001), is based on contrasting more conventional selection models with members from the pattern-mixture model family. In the first family, the outcome of interest is modeled directly, while in the second family the natural parameter describes the measurement process, conditional on the missingness pattern. This implies that a direct comparison ought not to be done in terms of parameter estimates, but rather should pass by marginalizing the pattern-mixture model over the patterns. While this is relatively straightforward for linear models, the picture is less clear for the nevertheless important setting of categorical outcomes, since models ordinarily exhibit a certain amount of non-linearity. Following ideas laid out in Jansen and Molenberghs (2007), we offer ways to marginalize pattern-mixture-model-based parameter estimates, and supplement these with variance formulas. The modeling context is provided by the multivariate Dale model. The performance of the method and its usefulness for sensitivity analysis is scrutinized using simulations.