The goodness of fit problem in generalized latent variable models for ordinal data

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Abstract
Generalized latent variable models (GLVMs) are a useful tool to explain the interrelationships among a set of observed variables through a smaller set of latent variables. In this paper we deal with the problem of goodness of fit of GLVMs when the observed variables are ordinal. Usually, goodness of fit tests are performed by means of the Pearson and the likelihood ratio statistics, which have approximated chi-square distribution. Nevertheless, if the number of manifest variables and/or the number of categories of each variable are large and the sample size is small, the multiway contingency table of the observed variables presents sparse data and the true distribution of usual goodness of fit statistics is badly approximated by the chi-square distribution. To solve the sparseness problem a number of theoretical strategies has been proposed. In this paper we focus first on the traditional global tests by carrying out Monte Carlo simulations in a wide range of conditions so that different degrees of sparseness are examined. Second, we consider diagnostic procedures based on residuals calculated from the marginal frequencies of first and second-order. Unlike the global tests, the analysis of residuals allows to individuate the items responsible for a poor fit and suggests the way in which the model may be improved.

References

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