Tutz, Gerhard; Schneider, Micha; Iannario, Maria; Piccolo, Domenico

Mixture models for ordinal responses to account for uncertainty of choice. (English)

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Summary: In CUB models the uncertainty of choice is explicitly modelled as a Combination of discrete Uniform and shifted Binomial random variables. The basic concept to model the response as a mixture of a deliberate choice of a response category and an uncertainty component that is represented by a uniform distribution on the response categories is extended to a much wider class of models. The deliberate choice can in particular be determined by classical ordinal response models as the cumulative and adjacent categories model. Then one obtains the traditional and flexible models as special cases when the uncertainty component is irrelevant. It is shown that the effect of explanatory variables is underestimated if the uncertainty component is neglected in a cumulative type mixture model. Visualization tools for the effects of variables are proposed and the modelling strategies are evaluated by use of real data sets. It is demonstrated that the extended class of models frequently yields better fit than classical ordinal response models without an uncertainty component.

MSC:

62-07 Data analysis (statistics) (MSC2010)
62H17 Contingency tables
62J12 Generalized linear models (logistic models)

Keywords:

ordinal responses; rating analysis; CUP model; CUB model

Software:

CUB; catdata; Fahrmeir

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