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Gaussian copula mixed models with non-ignorable missing outcomes. (English)

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Summary: This paper is concerned with the analysis of mixed data with ordinal and continuous outcomes with the possibility of non-ignorable missing outcomes. A copula-based regression model is proposed that accounts for associations between ordinal and continuous outcomes. Our approach entails specifying underlying latent variables for the mixed outcomes to indicate the latent mechanisms which generate the ordinal and continuous variables. Maximum likelihood estimation of our model parameters is implemented using standard software such as function `nlminb` in `R`. Results of simulations concern the relative biases of parameter estimates of joint and marginal models using data with non-ignorable outcomes. The proposed methodology is illustrated using a medical data obtained from an observational study on women with three correlated responses, an ordinal response of osteoporosis of the spine and two continuous responses of body mass index and waistline. The effect of the amount of total body calcium (Ca), job status (Job), type of dwelling (Ta) and age on all responses are investigated simultaneously.

MSC:

62H12 Estimation in multivariate analysis
62H05 Characterization and structure theory for multivariate probability distributions; copulas

Keywords:

non-ignorable missing outcomes; mixed outcomes; latent variables; likelihood-based; Gaussian copula

Software:

R; nlminb

Full Text: Link