

New model-averaged estimators of concordance correlation coefficients for longitudinal overdispersed Poisson data

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Abstract

The concordance correlation coefficient (CCC) can be used to assess agreement among multiple observers for continuous and discrete responses. We consider not only subject, observer and time effects, but also interaction effects in extended overdispersed three-way Poisson mixed-effects models for longitudinal overdispersed Poisson data. To avoid fitting data with a misspecified model, thus yielding biased CCC estimates, this research proposes new model-averaged estimators of CCC by combining the estimators of the variance components (VC) approach with model selection via corrected conditional Akaike information criterion (CAICC) and corrected conditional Bayesian information criterion (CBICC) measures under extended overdispersed three-way Poisson mixed-effects models. Simulation studies are conducted to compare the performance of VC with and without model selection via CAICC and CBICC and the new model-averaged approach for longitudinal Poisson and overdispersed Poisson data sets. An application of corticospinal diffusion tensor tractography study is presented for illustration. It can be concluded that the new model-averaged approach is a reliable procedure yields small mean square errors and nominal 95% coverage rates.

Keyword: CAICC, Concordance correlation coefficient, Model averaging, Poisson mixed-effects model, Variance components