A latent class mixture model combined with proportional odds model for repeated measurements in clinical trials

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For the analysis of longitudinal data in randomized controlled trials, generalized linear mixed-effects models or random coefficient models are known to provide a flexible and powerful tool to deal with heterogeneity among patients' profile. However, they are still based upon the "homogeneous" assumption in a sense that the effects of treatment is evaluated by the difference in mean response profiles. If subject x time interactions within each treatment arm are not negligible, the problem is not so simple. To this problem, Tango (1989) proposed mixture models in which 1) each treatment arm consists of a mixture of several ordered latent classes of profile of change from baseline, e.g., "improved", "unchanged", "worsened", and so on, 2) a low-degree polynomial can represent the "mean profile" for each of latent classes and 3) the effects of treatment can be characterized by the difference in the mixing proportions of these latent classes. Tango (1998) extended his model so that it can cope with improper longitudinal records with missing values, which is cited as a new approach by Everitt and Pickles (2004). However, Tango did not take both covariate adjustments and the nature of "ordered" classes into account in evaluating the effects of treatment.

In this presentation, we propose a generalized model by combining Tango's model with proportional odds model to take both covariate adjustments and the nature of "ordered" classes into account, where the effects of treatment is estimated by covariate-adjusted odds ratio. The proposed model is illustrated with data from some randomized controlled trial.

References

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