Reviewer's report

Title: A Simulation Study of Sample Size for Multilevel Logistic Regression Models

Version: 1 Date: 3 March 2007

Reviewer: wan tang

Reviewer's report:

General

This paper is carefully prepared and well written. Some new results based on simulation studies are reported. But, I do not think this paper is sufficiently novel to warrant publishing by the Journal. More specifically, I have the following concerns.

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1. This paper is totally based on simulation studies. The lack of theoretical justification of the findings in the simulation studies seriously weakens the importance of the paper.
2. All the simulation studies carried out in the paper are based on very stringent assumption, and this weakens its relevance and application to real study data. For example, both the individual and group explanatory variables \( x_{ij} \) and \( z_j \) are generated from the standard normal, and the groups random components \( u_{0j} \) and \( u_{1j} \) are also assumed normal. For practical purposes, various different classes of distribution other than the normal distribution should be investigated to make the results more applicable to real study designs. Even under the normal assumption, different values for the parameters should also be considered. For example, the variance of \( x_{ij} \) and \( z_j \) may be different and their difference may affect bias. Without a thorough study of the behaviors of the estimators under different settings, it may be too hasty to make the suggestions and recommendations as the authors did in the conclusion of the paper.
3. The sample size recommended by the authors does not look practical. This may depend on what magnitude of bias may be considered a serious problem. For example, in many situations, a 10% bias may well be acceptable. Such a degree of bias in general does not change the sign of the estimate, and thus can correctly suggest the association under study. In table 1, serious bias only occurs for the estimates of variance parameters \( \theta_0 \) and \( \theta_1 \) when the group size is 5, which makes it difficult to concur with the authors’ recommendation.
4. For the samples where convergences were not achieved, it is fine to discard the estimates of the parameters (if there are any). But the nature of these samples should be investigated. In other words, why the estimation did not converge for these samples? There is no report about any investigation on this important issue in the paper.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

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Discretionary Revisions (which the author can choose to ignore)

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What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article of limited interest

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.
Declaration of competing interests:

I declare that I have no competing interests