THE UNIVERSITY OF CHICAGO | DEPARTMENT OF STATISTICS

MASTER'S THESIS PRESENTATION

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Fixed-Effects vs. Random-Effects Models for Clustered Longitudinal Binary Outcomes

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ABSTRACT

In statistical studies of correlated data, there is often a debate over whether to use fixed-effects or random-effects models. We perform two simulation studies to empirically compare four different models of clustered longitudinal binary data. The goal of these studies is twofold: (1) to compare the four models in terms of estimation of the within-subject effect and (2) to evaluate each model's performance given a homogeneous vs. heterogeneous treatment effect. Collectively, the evidence suggests that under a homogeneous treatment effect, the fixed-effects and random-effects solutions both perform well in estimating the within-subject effect. However, when there is heterogeneity in the treatment effect, the random-effects models, particularly with a decomposition of between-subject and within-subject effects, are superior to the fixed-effects approach, demonstrating that a fixed-effects solution cannot handle treatment heterogeneity in the data.