

# Subgroup Analysis Based on Structured Mixed-effects Models for Longitudinal Data

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**Abstract:** In recent years subgroup analysis has emerged as an important tool to identify unknown subgroup memberships. However, subgroup analysis is still under-studied for longitudinal data. In this paper, we propose a structured mixed-effects approach for longitudinal data to model subgroup distribution and identify subgroup membership simultaneously. In the proposed structured mixed-effects model, the heterogeneous treatment effect is modeled as a random effect from a two-component mixture model, while the membership of the mixture model is incorporated using a logistic model with respect to some covariates. One advantage of our approach is that we are able to derive the estimation of the treatment effects through an EM type algorithm which keeps the subgroup membership unchanged over time. Our numerical studies and real data example demonstrate that the proposed model outperforms other competing methods.