Editorial

Advances in mental health research are not only dependent on the quality of research procedures and measures, but also increasingly dependent on data analytic strategies available to investigators. As the research accumulates more knowledge, complex questions must be addressed appropriately using state-of-the art statistical methods. This issue includes seven articles from several leading statisticians who endeavored to develop or adapt novel and efficient methods, examine analytic strategies, and perform clinically important applications in mental health research.

Specifically, Hedeker and colleagues examined mixed-effects logistic regression models, particularly how covariates can influence the error variances (within subject variation) and the variance of random effects (between-subject variation). In another article, Jo and colleagues proposed a two-step approach to identifying causal treatment effect, where formulation of trajectory strata and identification of causal effects are separated. This is a flexible approach as the difference in the outcome trajectories in subpopulations under one treatment condition would change when exposed to another treatment condition.

Three articles address emerging problems arising from medical research, particularly in mental health and aging research. The major goal of Petkova and Tarpey is to distinguish seemingly homogeneous groups of subjects in a clinically relevant way by partitioning a uni-modal distribution for the trait of interest without the assumption of distinct underlying cluster. Huang and colleagues generalized the traditional event onset time measure through the use of a stochastic process model to address a practical concern that disease onset is uncertain due to the fluctuation of the clinical conditions. Elliot and colleagues noted that confounding between the child's restraint use and driver behavior can bias restraint effectiveness estimates away from the null if survivable crashes are more common in certain restraint types. Using a marginal-structural-model-type estimator, they presented a novel analysis of fatality risk for children aged 2 through 6 in child restraint systems relative to seat belts.

We also included two articles that compare commonly used statistical methods or offer insightful perspectives into a variety of important concepts. In particular, imputation has been commonly used to deal with incomplete data. Demirtas and colleagues compared the performances of two continuous imputation models for longitudinal ordinal data that typically arise from psychiatric research. Vanderweele and Vansteelandt discussed a number of conceptual issues concerning the identification conditions for mediation, particulary, the counterfactuals based on hypothetical interventions and the consistency and composition assumptions.

With this issue, we hope to encourage and enhance research activities for work on the statistical challenges related to mental health research including areas in social behavior science, psychology and psychiatry. Also, we will make efforts to create a forum in SII for investigators to present statistical methods and applications in the mental health research.

Last, but not the least, we included five articles of general interests. The topics are diverse, ranging from financial statistics, Bayesian models, to the variable and model selections for high dimensional data with sparsity.

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