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A Comparison of Imputation Methods for Incomplete Longitudinal Data

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Abstract

This paper compared the Complete Case analysis (CC) method with 10 different imputation methods: the last observation carried forward imputation, the within-class mean imputation, the within-class random imputation, the regression imputation, the stochastic regression imputation, the sequential mean imputation and 4 multiple imputation methods, the within-class random multiple imputation, the stochastic regression multiple imputation, the sequential mean multiple imputation, and PROC MI (SAS procedure). We not only introduced the theoretical principles for each method, but also compared the performance of each method using data generated from the Korean Education and Employment Panel (KEEP) data for continuous, ordinal, and binary outcome variables.

When the outcome variable was continuous, the PROC MI method performed better than the other methods based on the bias of population mean estimate and coverage probability. When the outcome variables were ordinal or binary, Paik’s (1997) Seq_MI method performed better than the other methods. The results of this research showed that Paik’s method, intended to be used under monotone missing pattern conditions, performed well even under arbitrary missing pattern conditions.

Keywords: longitudinal study, missing data, imputation method

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