

RELATIVE EFFICIENCY OF ESTIMATES BASED ON PERCENTAGES OF MISSINGNESS USING THREE IMPUTATION NUMBERS IN MULTIPLE IMPUTATION ANALYSIS

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ABSTRACT

Most researchers have faced the problem of estimation when data points are missing. The mostly adopt easy to implement procedures without considering the efficiency of their estimates. In this paper we looked at the relative efficiency of estimates in Multiple Imputation analysis, based on percentages of missing data using 3 different imputation numbers; 7, 5 and 3 on four different simulated data sets with 50%, 45%, 25% and 10% missing values. The variance of each data set with different percentages of missing value for each imputation number was computed using a proposed method. This proposed method was seen to yield lower variances compared to an existing method. The program was written and implemented in R. The pooled variance of the estimates was also computed based on the percentages of missing values in the different data sets. The relative efficiency were computed and compared among the 3 different imputation numbers using the T-test for paired sample test in SPSS. From the results it was observed that when the missingness was 50% the estimates from data set gotten from imputation number 7 was most efficient when compared to estimates from data sets gotten from imputation numbers 5 and 3. When the missingness was 10% and 25% the estimates from data set gotten from imputation number 5 were found to be most efficient followed by estimates from data sets gotten from imputation number 7 and then 3. The relative efficiency for 40% missingness compared among the 3 imputation numbers showed that estimates from imputation number 3 were most efficient.

Keywords: Multiple Imputation, Relative Efficiency, Imputation Variance, Missing Values and Shrinkage Parameter.