IMPROVED ESTIMATION PROCEDURES FOR INTRACLASS CORRELATION PARAMETERS

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The problem of estimating intraclass correlation parameters, $\rho_i; i = 1, ..., L$, based on independent samples from $L(\geq 2)$ independent populations is considered. Several estimators that incorporate uncertain prior information (UPI) in the form of the hypothesis $H_0 : \rho_1 = \rho_2 = \ldots = \rho_L$ are proposed. These estimators include pre-test estimators, shrinkage estimators and improved versions of these. A bootstrap method for estimating standard errors of the proposed estimators is devised. The asymptotic mean square errors (AMSE) and asymptotic quadratic biases (AQB) of the proposed estimators are derived and compared, using Monte Carlo simulations, with those of the pooled and unrestricted estimators of the intraclass correlation parameters. From the simulations it is seen that, in terms of MSE, the proposed estimators are superior to the estimator obtained by simply taking the UPI for granted (pooled estimator) and to the one obtained by simply neglecting the UPI (unrestricted estimator). Two real-life data sets from the medical literature are used to illustrate the proposed methods.