

Wilasinee Prommanok 2012: Performance of Statistical Methods for Pretest - Posttest Design Under Assumption Violation. Master of Science (Statistics), Major Field: Statistics, Department of Statistics. Thesis Advisor: Associate Professor Premjai Trisaranuwatana, M.Stat. 131 pages.

This research focused on efficiency of eight statistical methods in analysis of pretest - posttest design. The methods were Anova on: (1) posttest score, (2) different score, (3) modified proportional percent change score, (4) log of ratio of posttest score and pretest score, (5) residual. Ancova on: (6) posttest score with pretest score as the covariate, (7) rank of posttest score with rank of pretest score as the covariate and (8) Quade's test. Controllable of Type I error at specified level of 0.05 and attainable 0.8 power of the test were criterias for decision of appropriate method. Studied data generated by Monte Carlo simulation technique under 3 major circumstances: Case 1: underlying assumption were met, Case 2: variances were heterogeneous, Case 3: distribution of pretest and posttest were Double Exponential distribution, Log-Normal distribution and Chi - Square distribution. The correlation coefficients under studied were 0.2, 0.5 and 0.9 where treatment effect and heterogeneity of error variance of the posttest were classified into 3 different levels (low, medium and high). The number of treatment was 3 and 5 with equal sample sizes of 10. The conclude of the research were as follows :

1. The 8 statistical methods could control type I error for all correlation coefficients : when data met the underlying assumption of the statistical methods, heterogeneity of error variances were at low and medium including when distribution of pretest and posttest were Double Exponential and Chi-Square.

2. The research indicated that the power of test these were not affected by number of treatment but was affected by the degree of correlation coefficients when the treatment effect in each group was different at low and medium level. Moreover, it was found that all methods showed a very high power of the test when treatment effect was difference at high level.

3. According to data in Case 1 and Case 2 these research showed that Anova on residual and Ancova on posttest score with pretest score as the covariate were best. While Anova on residual, Ancova on rank of posttest score with rank of pretest score as the covariate and Quade's test were best for Case 3.

---

Student's signature

---

Thesis Advisor's signature