

Monte Carlo study of multiple comparisons corrections in t -test

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Abstract

Multiple comparisons of treatments means are common in several fields of knowledge. The Students t -test is one of the first procedure developed, however the p -values associated with the t -test are inaccurate, since there is no control on the familywise Type I error. To solve this problem several corrections were developed for the t -test. In this work, based on Monte Carlo simulations, we evaluated the t -test and the following corrections: Bonferroni, Holm, Hochberg, Hommel, Benjamini-Hochberg (BH) and Benjamini-Hochberg-Yekutieli (BY) with respect to the power and type I error rate. The study was lead varying the sample size, the sample distribution and the degree of variability. For all instances we regard three balanced treatments, beside that, the probability distributions considered were: Normal, Logistic and Gumbel. Although the corrections are approaching when the sample size increase, our study reveals that the BH correction provide the best experimentwise type I error rate and the second overall most powerful correction.