

A comparison of three methods of common factor analysis

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Abstract

Minimum Rank Factor Analysis (MRFA), see Ten Berge (1998), and Ten Berge & Kiers (1991), is a method of common factor analysis which yields, for a given covariance matrix C , a diagonal matrix U of unique variances which are nonnegative and which entail a Gramian reduced covariance matrix $C-U$. Subject to these constraints, MRFA minimizes the amount of common variance left unexplained when any fixed number of common factors is extracted, and also makes possible an estimation of the amount of the unexplained common variance. By means of simulated covariance matrices, we compared the performance of MRFA and two popular methods of exploratory factor analysis: Minres and Maximum Likelihood Factor Analysis. The criteria for comparison included the accuracy of retrieval of the population factor loadings, the accuracy of communality estimates and the frequency of so called weak Heywood solutions. As none of the methods was superior on all criteria, the comparative advantages and drawbacks of various methods shall be discussed. Additionally, the impact of factors like sample size and the average population communality shall be illustrated.

References

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