Package 'hornpa'

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Type Package

Title Horn's (1965) Test to Determine the Number of Components/Factors

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Description A stand-alone function that generates a user specified number of random datasets and computes eigenvalues using the random datasets (i.e., implements Horn's [1965, Psychometrika] parallel analysis <https://link.springer.com/article/10.1007/BF02289447>). Users then compare the resulting eigenvalues (the mean or the specified percentile) from the random datasets (i.e., eigenvalues resulting from noise) to the eigenvalues generated with the user's data. Can be used for both principal components analysis (PCA) and common/exploratory factor analysis (EFA). The output table shows how large eigenvalues can be as a result of merely using randomly generated datasets. If the user's own dataset has actual eigenvalues greater than the corresponding eigenvalues, that lends support to retain that factor/component. In other words, if the i(th) eigenvalue from the actual data was larger than the percentile of the (i)th eigenvalue generated using randomly generated data, empirical support is provided to retain that factor/component. Horn, J. (1965). A rationale and test for the number of factors in factor analysis. Psychometrika, 32, 179-185.

License GPL-3

RoxygenNote 7.1.2

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R topics documented:

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hornpa   *Perform Horn's Parallel Analysis using Simulated Data*

Description

A stand alone function to run a parallel analysis. The program generates a specified number of datasets based on the number of variables entered by the user. Eigenvalues are computed for the each dataset and collected. The mean and the specified percentile (95th is the default) are computed. The output table shows how large eigenvalues can be as a result of merely using randomly generated datasets. If the user's own dataset has an actual eigenvalue greater than the generated eigenvalue, that lends support to retain that factor. In other words, if the i(th) eigenvalue from the actual data was larger than the percentile of the (i)th eigenvalue generated using randomly generated data, empirical support is provided to retain that factor. Horn's (1965) article suggested using the mean vs. the 95th percentile commonly used today (O'Conner, 2000).

If principal axis factoring is specified, squared multiple correlations are substituted in the diagonal of the correlation matrix.

Usage

```
hornpa(k, size = 100, reps = 100, seed = NA, p = 0.95, method = c("pca", "pa"))
```

Arguments

k	The number of variables in your dataset.
size	The number of observations in your dataset.
reps	How many simulated datasets to create.
seed	Use an optional seed to reproduce the same results each time.
p	Specify the percentile which to evaluate the eigenvalues. Defaults to the 95th percentile.
method	Specify what type of analysis is run (using a principal component analysis or principal axis factoring). Defaults to pca if not specified.

Details

User specifies the number of variables in the synthetic dataset, the number of observations, the number of correlation matrices to generate, and the percentile.

Value

Mean and the specified percentile eigenvalues based on a user defined set of random datasets. Compare the eigenvalues from your dataset to the eigenvalues generated with the synthetic datasets. Results are comparable to the SPSS and SAS syntax written by O'Connor (2000).

References

Horn, J. (1965). A rationale and test for the number of factors in factor analysis. Psychometrika, 32, 179-185.

O'Connor, B. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test, Behavior Research Methods, Instruments and Computers, 32, 396-402.

Examples

```
hornpa(k = 10, size = 100, reps = 200)
hornpa(k = 15, size = 100, reps = 200, method = "pa", seed = 123)
hornpa(k = 12, size = 200, reps = 100, p = .99)
```

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