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MSA-me

**- a Visual-Basic program for the
measure of sampling adequacy.**

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Part I

File: msa-me.exe
a VisualBasic Program for Windows PCs

Part II

UserNotes

PART II

USER NOTES

DISCLAIMER

This VB-program is provided without any explicit or implicit warranty of correct functioning. To use this program on your computer is your own risk. The program has been developed for my own research program. Researchers can use this program for scientific and research purposes, but intellectual property and copyright for the source code and program remains the property of Ingo Schindler.

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1. Description

The program msa-me.exe calculates the measure of sampling adequacy (MSA) based on any particular symmetric correlation matrix. The MSA was proposed by Kaiser & Rice in 1974 to indicating how near R^{-1} is to a diagonal matrix (Cureton & D'Agostino, 1983). The value of MSA is between 0 and 1. It is a criterion of how suitable the intercorrelations of variables is for a factor analysis (Backhaus et al., 2000). The value of MSA should not be under the critical value of 0.5 (see Tab.1). The procedure of calculating MSA is described in detail by Cureton & D'Agostino (1983: 389-391).

2. Input file

The correlation matrix is in ASCII (*.txt or *.cor), square (n x n) with a proceeding line for the value of n followed by the number of matrices. No column or row headings are allowed (see 'Test Run' for further information).

3. Procedure

- a) Select input file (use drive-, directory- and file-box).
- b) Press 'DATA' to load the selected file.
- c) Press 'Start' to start the calculation.
- d) Press 'Save' to store the results in a file (saved in the same directory shown in the directory-box).
- e) Press 'Show' to observe the results on the screen.
- f) Select new file to restart or press 'close' to stop the program.

4. Test run

The data used in this test run are from Cureton & D'Agostino (1983: 43) with slightly modifications in the additional matrix. The notes in brackets are only for explanation and not part of the data file.

Input file:

```
5 [number of n]
4 [number of matrix in the file]
[no line between these numbers and the first matrix]
1 .585 .658 .616 .555 [correlation matrix]
.585 1 .663 .634 .689
.658 .663 1 .697 .626
.616 .634 .697 1 .598
.555 .689 .626 .598 1

1 .685 .758 .716 .755
.685 1 .663 .634 .689
.758 .663 1 .697 .626
.716 .634 .697 1 .198
.755 .689 .626 .198 1

1 .785 .958 .616 .155
.785 1 .663 .634 .689
.958 .663 1 .697 .626
.616 .634 .697 1 .598
.155 .689 .626 .598 1

1 .685 .758 .716 .655
.685 1 .663 .634 .689
.758 .663 1 .697 .626
.716 .634 .697 1 .598
.655 .689 .626 .598 1
```

Results:

```
=====
No. 1 = 0,878
No. 2 = 0,321 *
No. 3 = 0,204 *
No. 4 = 0,886
```

```
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* = do not use this matrix for factor analysis [following Kaiser-Meyer-Olkin-criterion]
=====
```

5. Notes

- 1) The program does not check the input file format. If it is not correct the program terminate automatically.
- 2) The program save the results in the file with the name 'msa-valueX' (x=number of runs in the current session). The program does not check if this file name already exists. Thus, it may happen that your old data file is deleted.
- 3) If the correlation matrix is not sufficient for the calculation of the msa the program will be terminate or calculate the value of msa close to zero.
- 4) The limitation for the correlation matrix is 100 x 100 and the limit of the number of matrix in a file is 1000.

6. Literature

Bach, G. (1989) : Mathematik für Naturwissenschaftler. UTB 1501.

Gustav Fischer, Stuttgart. [the program „Lösung eines linearen Gleichungssystems“ p. 260 is used in the msa-me source code]

Backhaus, K., B. Erichson, W. Plinke and R. Weiber (2000): Multivariate Analyseverfahren. Springer Lehrbuch. 9th edition. Springer, Berlin.

Cureton, E. E. & D'Agostiono, R. B. (1983): Factor Analysis – An applied approach. Lawrence Erlbaum Publishers, London.

7. Table (adopted from Backhaus et al. 2000: 269)

<u>MSA</u>	<u>English</u>	<u>German</u>
≥ .9	marvelous	erstaunlich
≥ .8	meritorous	verdienstvoll
≥ .7	middling	ziemlich gut
≥ .6	mediocre	mittelmäßig
≥ .5	miserable	kläglich
< .5	unacceptable	untragbar

If you find bugs or mistakes in this program, please contact me immediately!
Any help and suggestions are welcome.

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