

E X P L O R E R

R e l e a s e 3 . 0

A Program for Common Factor Analysis
and Related Models

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Date and Time : 12-Feb-2011, 10:30:27
Number of variables : 5
Command file : mcd.txt
Listing file : mcd.lis

L i s t i n g o f C o m m a n d F i l e

```
<data>
  matrix = cov; file = 'mcd.cov1'; shape=lt; save;

<headers>
  'Covariance Data for Diener Satisfaction with Life Scale';
  'From McDonald: Test Theory: A Unified Treatment (1999, p. 87)';

<analysis>
  method=pf; matrix=cov; com = bigr; number = 1;

<labels>
  'Ideal'; 'Excellnt'; 'Satisfd'; 'GotAll'; 'NoChange';

<output>
  all;

<end>
```

Program Step:
Correlational Analysis

V a r i a n c e - C o v a r i a n c e M a t r i x

	1	2	3	4	5
	Ideal	Excellnt	Satisfd	GotAll	NoChange
1 Ideal	2.566				
2 Excellnt	1.560	2.493			
3 Satisfd	1.487	1.283	2.463		
4 GotAll	1.195	0.845	1.127	2.769	
5 NoChange	1.425	1.313	1.313	1.323	3.356

Program Step:
Correlational Analysis

C o r r e l a t i o n M a t r i x

	1	2	3	4	5
	Ideal	Excellnt	Satisfd	GotAll	NoChange
1 Ideal	1.000				
2 Excellnt	0.617	1.000			
3 Satisfd	0.591	0.518	1.000		
4 GotAll	0.448	0.322	0.432	1.000	
5 NoChange	0.486	0.454	0.457	0.434	1.000

Program Step:
Latent Roots and Vectors

E i g e n v a l u e s o f R

No.	Value	% Trace	Cum. %	No.	Value	% Trace	Cum. %
1	2.91549	58.310	58.310	4	0.45913	9.183	92.889
2	0.71253	14.251	72.560	5	0.35554	7.111	100.000
3	0.55731	11.146	83.707				

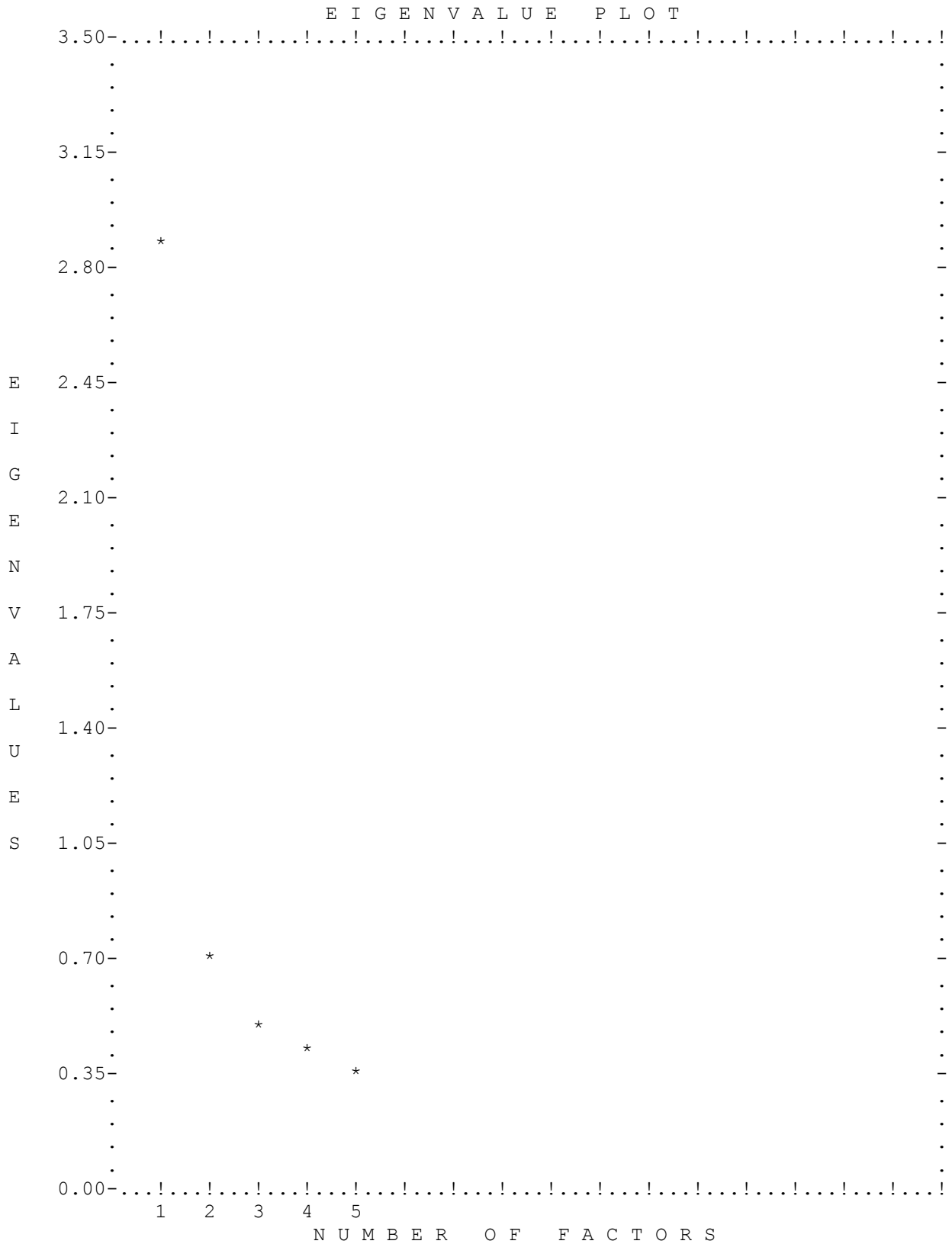
R is the unaltered correlation matrix.

Theta (reliability of first principal component) = 0.821
Condition number (largest/smallest eigenvalue) = 0.82002220E+01

The trace of a matrix is the sum of it's diagonal elements. If the matrix is Gramian (no eigenvalues less than zero), then the trace represents the total variance. If some of the eigenvalues are negative then percentages are based on just non-negative elements.

For this problem the positive trace is: 5.000.

Total iterations for eigenvalues was: 7.



Program Step:
Partial/Multiple Correlation

P a r t i a l C o r r e l a t i o n s

	1	2	3	4	5
	Ideal	Excellnt	Satisfd	GotAll	NoChange
1 Ideal	0.521				
2 Excellnt	0.397	0.435			
3 Satisfd	0.302	0.200	0.430		
4 GotAll	0.191	-0.034	0.179	0.286	
5 NoChange	0.146	0.180	0.146	0.236	0.341

(Diagonal values are squared-multiple correlations. Off-diagonals are correlations between each variable pair, with all others partialled out.)

Program Step:
Partial/Multiple Correlation

M e a s u r e s o f S a m p l i n g A d e q u a c y

1	Ideal	0.981	3	Satisfd	0.986	5	NoChange	0.991
2	Excellnt	0.982	4	GotAll	0.988			

Total MSA = 0.985, median = 0.986.
Kaiser-Myer-Olkin statistic = 0.972.

(Note: This is Kaiser's final (1981) version of the MSA. A value of -.999 means that the MSA is unacceptable. KMO is an earlier version of MSA)

Program Step:
Latent Roots and Vectors

I n i t i a l E i g e n v a l u e s o f C*

No.	Value	% Trace	Cum. %	No.	Value	% Trace	Cum. %
1	6.65243	88.843	88.843	4	-0.01229	0.000	100.000
2	0.64648	8.634	97.477	5	-0.12055	0.000	100.000
3	0.18892	2.523	100.000				

C* is the 'reduced' covariance matrix.

The trace of a matrix is the sum of it's diagonal elements. If the matrix is Gramian (no eigenvalues less than zero), then the trace represents the total variance. If some of the eigenvalues are negative then percentages are based on just non-negative elements.

For this problem the positive trace is: 7.488.

*** Warning: Negative eigenvalues found. Matrix is non-Grammian.

Program Step:
Initial Factor Solution

Common factor extraction summary:

Method = Principal Axes
Initial communality estimates are largest off-diagonal elements.

Iteration Summary:

Iteration	Criterion	Pct. Meeting Criterion
1	0.317099	0.00
2	0.075006	0.00
3	0.023145	0.00
4	0.012047	0.00
5	0.005477	40.00
6	0.002614	60.00
7	0.001242	80.00
8	0.000595	100.00

Program Step:
Latent Roots and Vectors

F i n a l E i g e n v a l u e s o f C*

No.	Value	% Trace	Cum. %	No.	Value	% Trace	Cum. %
1	6.51346	94.542	94.542	4	-0.04950	0.000	100.000
2	0.34446	5.000	99.542	5	-0.32670	0.000	100.000
3	0.03158	0.458	100.000				

C* is the 'reduced' covariance matrix.

The trace of a matrix is the sum of it's diagonal elements. If the matrix is Gramian (no eigenvalues less than zero), then the trace represents the total variance. If some of the eigenvalues are negative then percentages are based on just non-negative elements.

For this problem the positive trace is: 6.890.

Program Step:
Initial Factor Solution

C o m m u n a l i t i e s

No. Name	Initial	Final	Difference (Initial - Final)	Unique Variances
1 Ideal	1.560	1.665	-0.105	0.901
2 Excellnt	1.560	1.220	0.340	1.273
3 Satisfd	1.487	1.318	0.169	1.145
4 GotAll	1.323	0.906	0.417	1.863
5 NoChange	1.425	1.405	0.020	1.951
Means:	1.471	1.303	0.168	1.427
Medians:	1.487	1.318	0.169	1.273

Program Step:
Initial Factor Solution

I n i t i a l L o a d i n g s

F 1

1	Ideal	1.290
2	Excellnt	1.104
3	Satisfd	1.148
4	GotAll	0.952
5	NoChange	1.185

Reliabilities for first (general) factor:

Coefficient omega = 0.819
Coefficient alpha = 0.817

Program Step:
Initial Factor Solution

S t a n d a r d i z e d L o a d i n g s

F 1

1	Ideal	0.805
2	Excellnt	0.699
3	Satisfd	0.732
4	GotAll	0.572
5	NoChange	0.647

Program Step:
Residuals Analysis

S t a n d a r d i z e d R e s i d u a l s

	1	2	3	4	5
	Ideal	Excellnt	Satisfd	GotAll	NoChange
1 Ideal	0.542				
2 Excellnt	0.095	1.044			
3 Satisfd	0.004	0.012	0.869		
4 GotAll	-0.027	-0.196	0.031	2.057	
5 NoChange	-0.068	0.003	-0.035	0.173	1.388

(Residual correlations are remainders after subtracting reproduced correlations from original correlations. If a covariance matrix was factored then residuals were standardized.)

Program Step:
 Residuals Analysis

Distribution of Standardized Residuals
 (Based on sub-diagonal elements of correlation matrix):

Interval	Freq.	Pct.	H i s t o g r a m
> .5	0	0.0	
.4 - .5	0	0.0	
.3 - .4	0	0.0	
.2 - .3	0	0.0	
.1 - .2	1	10.0	****
0 - .1	5	50.0	*****
-.1 - 0	3	30.0	*****
-.2 - -.1	0	0.0	
-.3 - -.2	1	10.0	****
-.4 - -.3	0	0.0	
-.5 - -.4	0	0.0	
< -.5	0	0.0	

(Note: Each symbol represents 0.25 correlations.)

Residual Summary Statistics (for sub-diagonal elements):

Minimum value	=	-0.196	(between GotAll and Excellnt)
Maximum value	=	0.173	(between NoChange and GotAll)
Average (root-mean-square)	=	0.084	

Program Step:
Residuals Analysis

Largest Residual for Each Variable Pair

1	Ideal	with	2	Excellnt	=	0.095
2	Excellnt	with	4	GotAll	=	-0.196
3	Satisfd	with	5	NoChange	=	-0.035
4	GotAll	with	2	Excellnt	=	-0.196
5	NoChange	with	4	GotAll	=	0.173

Program Step:
Initial Factor Solution

F a c t o r S c o r e W e i g h t s

F 1

1	Ideal	0.564
2	Excellnt	0.266
3	Satisfd	0.329
4	GotAll	0.238
5	NoChange	0.537

(Factor scores weights are estimated by regression method.)