Factor Analysis

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[DataSet1] C:\Documents and Settings\jelhai\My Documents\My Docs
#1\Business\Teaching\_USD\_Multivariate Stats\Computer Examples
\Ch13 EFA Ex\Ch13 EFA Ex Data.sav
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Communalities

	Initial	Extraction
atspph1	.420	.518
atspph2	.344	.412
atspph3	.470	.563
atspph4	.182	.230
atspph5	.417	.529
atspph6	.270	.251
atspph7	.233	.204
atspph8	.238	.274
atspph9	.405	.567
atspph10	.331	.340

Extraction Method: Principal Axis Factoring.

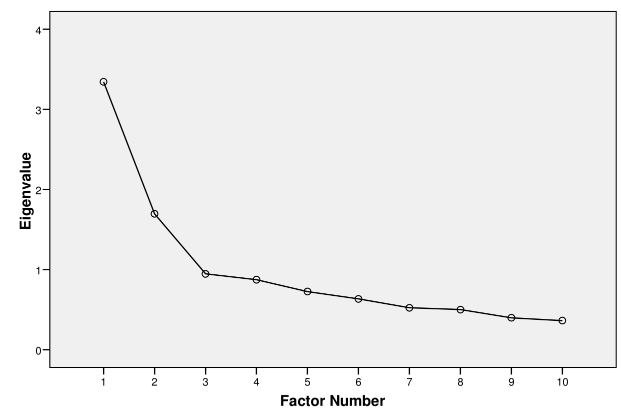
Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.344	33.440	33.440	2.780	27.805	27.805	2.437
2	1.696	16.957	50.397	1.107	11.069	38.873	2.148
3	.946	9.457	59.854				
4	.873	8.730	68.584				
5	.726	7.259	75.843				
6	.634	6.336	82.178				
7	.522	5.222	87.400				
8	.500	4.996	92.396				
9	.398	3.976	96.372				
10	.363	3.628	100.000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Scree Plot



Factor Matrix[a]

	Factor	
	1	2
atspph3	.692	-.289
atspph1	.618	-.368
atspph5	.601	-.409
atspph9	.599	.456
atspph2	.587	.261
atspph10	.464	.354
atspph6	.463	-.190
atspph7	.413	-.182
atspph8	.406	.331
atspph4	.297	.376

Extraction Method: Principal Axis Factoring.

a. 2 factors extracted. 8 iterations required.

Pattern Matrix[a]

	Factor	
	1	2
atspph5	.764	-.101
atspph1	.740	-.053
atspph3	.721	.062
atspph6	.480	.045
atspph7	.440	.027
atspph9	.009	.749
atspph10	.007	.580
atspph2	.171	.550
atspph8	-.013	.529
atspph4	-.126	.519

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Structure Matrix

	Factor	
	1	2
atspph3	.748	.369
atspph5	.721	.223
atspph1	.718	.261
atspph6	.499	.249
atspph7	.451	.214
atspph9	.327	.753
atspph2	.405	.623
atspph10	.254	.583
atspph8	.212	.523
atspph4	.095	.465

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.

Factor Correlation Matrix

Factor	1	2
1	1.000	.424
2	.424	1.000

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.

Matrix

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Run MATRIX procedure:

PARALLEL ANALYSIS:

Principal Axis / Common Factor Analysis

Specifications for this Run:
Ncases    568
Nvars       6
Ndatsets   10
Percent    95

Random Data Eigenvalues
         Root        Means     Prcntyle
     1.000000      .148576      .206499
     2.000000      .082817      .165011
     3.000000      .024823      .055795
     4.000000     -.020282      .012964
     5.000000     -.058929     -.031484
     6.000000     -.124755     -.081246


Compare the random data eigenvalues to the

real-data eigenvalues that are obtained from a

Common Factor Analysis in which the # of factors

extracted equals the # of variables/items, and the

number of iterations is fixed at zero;

To obtain these real-data values using SPSS, see the

sample commands at the end of the parallel.sps program,

or use the rawpar.sps program.
Warning: Parallel analyses of adjusted correlation matrices

eg, with SMCs on the diagonal, tend to indicate more factors

than warranted (Buja, A., & Eyuboglu, N., 1992, Remarks on
parallel analysis. Multivariate Behavioral Research, 27, 509-
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540.).
The eigenvalues for trivial, negligible factors in the real data commonly surpass corresponding random data eigenvalues for the same roots. The eigenvalues from parallel analyses can be used to determine the real data eigenvalues that are beyond chance, but additional procedures should then be used to trim trivial factors.

Principal components eigenvalues are often used to determine the number of common factors. This is the default in most statistical software packages, and it is the primary practice in the literature. It is also the method used by many factor analysis experts, including Cattell, who often examined principal components eigenvalues in his scree plots to determine the number of common factors. But others believe this common practice is wrong. Principal components eigenvalues are based on all of the variance in correlation matrices, including both the variance that is shared among variables and the variances that are unique to the variables. In contrast, principal axis eigenvalues are based solely on the shared variance among the variables. The two procedures are qualitatively different. Some therefore claim that the eigenvalues from one extraction method should not be used to determine the number of factors for the other extraction method. The issue remains neglected and unsettled.

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Factor Analysis

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Communalities

	Initial	Extraction
atspph1	.420	.447
atspph2	.344	.274
atspph3	.470	.544
atspph4	.182	.046
atspph5	.417	.403
atspph6	.270	.236
atspph7	.233	.201
atspph8	.238	.119
atspph9	.405	.222
atspph10	.331	.140

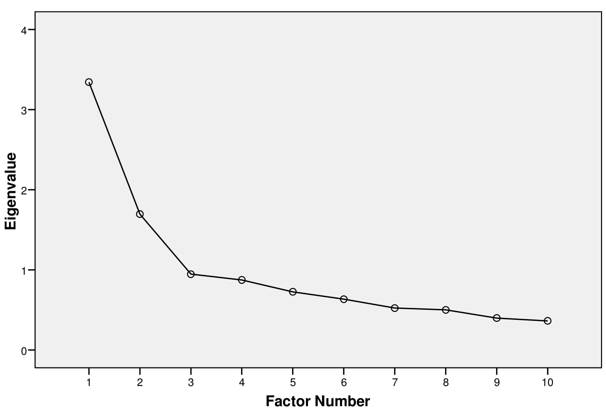
Extraction Method: Maximum Likelihood.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.344	33.440	33.440	2.631	26.313	26.313
2	1.696	16.957	50.397			
3	.946	9.457	59.854			
4	.873	8.730	68.584			
5	.726	7.259	75.843			
6	.634	6.336	82.178			
7	.522	5.222	87.400			
8	.500	4.996	92.396			
9	.398	3.976	96.372			
10	.363	3.628	100.000			

Extraction Method: Maximum Likelihood.

Scree Plot



Factor Matrix[a]

	Factor
	1
atspph3	.738
atspph1	.668
atspph5	.635
atspph2	.523
atspph6	.485
atspph9	.471
atspph7	.449
atspph10	.374
atspph8	.345
atspph4	.215

Extraction Method: Maximum Likelihood.

a. 1 factors extracted. 5 iterations required.

Goodness-of-fit Test

Chi-Square	df	Sig.
261.337	35	.000

Rotated Factor Matrix[a]

a. Only one factor was extracted. The solution cannot be rotated.

Factor Analysis

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Communalities

	Initial	Extraction
atspph1	.420	.533
atspph2	.344	.400
atspph3	.470	.572
atspph4	.182	.217
atspph5	.417	.500
atspph6	.270	.244
atspph7	.233	.206
atspph8	.238	.265
atspph9	.405	.583
atspph10	.331	.368

Extraction Method: Maximum Likelihood.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.344	33.440	33.440	2.776	27.764	27.764	2.440
2	1.696	16.957	50.397	1.111	11.112	38.876	2.144
3	.946	9.457	59.854				
4	.873	8.730	68.584				
5	.726	7.259	75.843				
6	.634	6.336	82.178				
7	.522	5.222	87.400				
8	.500	4.996	92.396				
9	.398	3.976	96.372				
10	.363	3.628	100.000				

Extraction Method: Maximum Likelihood.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Factor Matrix[a]

	Factor	
	1	2
atspph3	.708	-.265
atspph1	.647	-.339
atspph5	.604	-.368
atspph9	.582	.494
atspph2	.574	.265
atspph6	.464	-.169
atspph10	.450	.407
atspph7	.424	-.161
atspph8	.394	.332
atspph4	.266	.382

Extraction Method: Maximum Likelihood.

a. 2 factors extracted. 4 iterations required.

Goodness-of-fit Test

Chi-Square	df	Sig.
75.791	26	.000

Pattern Matrix[a]

	Factor	
	1	2
atspph1	.750	-.050
atspph5	.744	-.099
atspph3	.733	.051
atspph6	.476	.038
atspph7	.441	.029
atspph9	.007	.761
atspph10	-.015	.613
atspph2	.193	.526
atspph8	.007	.512
atspph4	-.127	.505

Extraction Method: Maximum Likelihood.
Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Structure Matrix

	Factor	
	1	2
atspph3	.755	.362
atspph1	.729	.268
atspph5	.702	.217
atspph6	.492	.240
atspph7	.453	.216
atspph9	.330	.764
atspph2	.416	.608
atspph10	.245	.607
atspph8	.224	.515
atspph4	.087	.451

Extraction Method: Maximum Likelihood.
Rotation Method: Promax with Kaiser Normalization.

Factor Correlation Matrix

Factor	1	2
1	1.000	.425
2	.425	1.000

Extraction Method: Maximum Likelihood.
Rotation Method: Promax with Kaiser Normalization.