Advanced course in questionnaire technique and clinimetrics

Exercise: Exploratory factor analysis

Exercise 1

In Appendix A the results of a factor analysis retaining 4, 3 and 2 factors, respectively, are presented. The loadings have been rotated with varimax rotation. The 19 items included are shown in the original questionnaire “F Spørgeskema til patienten” (side 1 and 2) and in the English wording of the items.

Course of action:

First look at the varimax rotated loadings from the analysis with 4 factors:

- Highlight with one colour all loadings numerically greater than 0.5
- Highlight with another colour all remaining loadings numerically greater than 0.3
- For each factor, keep a list of all items with colour one followed by all items with colour two
- Attempt to unify the content of the items listed under one headline for each factor
- Keep track of any items without any colour

Repeat the analysis with 3 factors and then with 2 factors.

What is in your eyes the optimal number of factors, and which items do you find most important in each of these factors?

Exercise 2

In Appendix B the results from the same analysis as in Exercise 1 are provided, but now with promax rotated loadings instead of varimax rotated loadings. Concentrate only on the analysis with the number of factors you found optimal in Exercise 1. Go through the same motions with different colours and so on.

Does anything change in comparison to Exercise 1?

In Appendix B the correlations between the factors are also provided. Do these correspond with your expectations from the given headlines?

Material

- Appendix A: eigenvalues and varimax rotated loadings (4, 3 and 2 factors)
- Appendix B: promax rotated loadings and factor correlations (4, 3 and 2 factors)
- The original questionnaire “F Spørgeskema til patienten”, side 1 and 2
- The English version of the items

Items f32p and f32q are not included in the analysis.

Appendix A

Factor analysis of the 19 items, n = 482. Factors extracted with the principal component method.

Eigenvalues

Factor	Eigenvalue	Cumulative proportion
1	6.192	0.326
2	1.597	0.410
3	1.242	0.475
4	1.115	0.534
5	0.955	0.584
6	0.881	0.630
7	0.799	0.673
8	0.724	0.711
9	0.710	0.748
10	0.652	0.782
11	0.610	0.815
12	0.569	0.844
13	0.523	0.872
14	0.490	0.898
15	0.467	0.922
16	0.432	0.945
17	0.391	0.966
18	0.346	0.984
19	0.307	1.000

Varimax rotated loadings – 4 factors

Item	Factor 1	Factor 2	Factor 3	Factor 4	Uniqueness
f32a	0.668	0.113	−0.185	0.258	0.441
f32b	0.712	0.014	−0.201	0.255	0.387
f32c	0.669	−0.060	−0.146	0.157	0.503
f32d	0.416	0.079	−0.346	0.483	0.468
f32e	0.601	0.179	−0.456	−0.042	0.397
f32f	0.561	0.174	−0.275	0.231	0.525
f32g	0.333	−0.007	−0.738	0.078	0.339
f32h	0.106	0.160	−0.812	0.110	0.292
f32i	0.506	0.477	0.023	−0.115	0.503
f32j	0.036	0.100	−0.112	0.721	0.457
f32k	0.211	0.213	−0.275	0.249	0.773
f32l	0.575	0.021	−0.180	0.368	0.502
f32m	0.114	0.064	−0.766	0.199	0.357
f32n	0.015	0.804	−0.077	0.072	0.342
f32o	0.318	0.097	−0.064	0.687	0.413
f32r	−0.018	0.642	−0.143	0.133	0.549
f32s	0.131	0.607	−0.108	0.168	0.575
f32t	0.328	0.439	−0.219	0.242	0.593
f32u	0.256	0.145	−0.295	0.622	0.439

Varimax rotated loadings – 3 factors

Item	Factor 1	Factor 2	Factor 3	Uniqueness
f32a	0.678	0.120	−0.230	0.473
f32b	0.716	0.020	−0.250	0.424
f32c	0.629	−0.064	−0.197	0.561
f32d	0.602	0.126	−0.355	0.496
f32e	0.434	0.150	−0.512	0.527
f32f	0.570	0.182	−0.312	0.544
f32g	0.285	−0.008	−0.759	0.342
f32h	0.111	0.170	−0.812	0.299
f32i	0.320	0.438	−0.034	0.704
f32j	0.443	0.192	−0.074	0.761
f32k	0.295	0.236	−0.280	0.779
f32l	0.672	0.047	−0.210	0.502
f32m	0.176	0.086	−0.761	0.383
f32n	0.015	0.805	−0.080	0.345
f32o	0.653	0.173	−0.054	0.540
f32r	0.029	0.655	−0.139	0.551
f32s	0.173	0.618	−0.114	0.575
f32t	0.378	0.454	−0.238	0.594
f32u	0.554	0.215	−0.282	0.567

Varimax rotated loadings – 2 factors

Item	Factor 1	Factor 2	Uniqueness
f32a	0.682	0.140	0.515
f32b	0.730	0.042	0.466
f32c	0.632	−0.047	0.598
f32d	0.691	0.155	0.499
f32e	0.640	0.192	0.554
f32f	0.637	0.208	0.551
f32g	0.665	0.055	0.555
f32h	0.543	0.236	0.650
f32i	0.262	0.440	0.738
f32j	0.398	0.198	0.803
f32k	0.390	0.258	0.781
f32l	0.670	0.065	0.547
f32m	0.571	0.148	0.652
f32n	0.020	0.809	0.345
f32o	0.560	0.178	0.655
f32r	0.071	0.664	0.554
f32s	0.178	0.626	0.577
f32t	0.424	0.472	0.597
f32u	0.605	0.239	0.577

Appendix B

Promax rotated loadings – 4 factors

Item	Factor 1	Factor 2	Factor 3	Factor 4	Uniqueness
f32a	0.690	0.006	0.024	0.130	0.441
f32b	0.753	−0.107	0.006	0.125	0.387
f32c	0.740	−0.168	0.029	0.035	0.503
f32d	0.324	−0.033	−0.186	0.411	0.468
f32e	0.609	0.084	−0.353	−0.245	0.397
f32f	0.545	0.078	−0.105	0.102	0.525
f32g	0.240	−0.116	−0.741	−0.087	0.339
f32h	−0.069	0.080	−0.860	−0.033	0.292
f32i	0.564	0.461	0.186	−0.261	0.503
f32j	−0.128	0.036	0.031	0.787	0.457
f32k	0.123	0.159	−0.188	0.184	0.773
f32l	0.572	−0.090	0.016	0.281	0.502
f32m	−0.055	−0.027	−0.798	0.082	0.357
f32n	−0.111	0.845	0.018	0.002	0.342
f32o	0.220	0.006	0.151	0.704	0.413
f32r	−0.154	0.665	−0.073	0.080	0.549
f32s	0.026	0.610	0.009	0.101	0.575
f32t	0.244	0.392	−0.071	0.145	0.593
f32u	0.110	0.050	−0.135	0.602	0.439

Correlations between factors – 4 factors

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	1.000			
Factor 2	0.441	1.000		
Factor 3	0.575	0.378	1.000	
Factor 4	0.646	0.476	0.505	1.000

Promax rotated loadings – 3 factors

Item	Factor 1	Factor 2	Factor 3	Uniqueness
f32a	0.728	−0.018	−0.011	0.473
f32b	0.790	−0.137	−0.032	0.424
f32c	0.717	−0.208	−0.013	0.561
f32d	0.604	−0.007	−0.177	0.496
f32e	0.357	0.039	−0.409	0.527
f32f	0.565	0.063	−0.132	0.544
f32g	0.148	−0.124	−0.760	0.342
f32h	−0.113	0.100	−0.857	0.299
f32i	0.283	0.414	0.129	0.704
f32j	0.472	0.118	0.094	0.761
f32k	0.232	0.178	−0.184	0.779
f32l	0.741	−0.095	0.000	0.502
f32m	−0.003	−0.001	−0.787	0.383
f32n	−0.172	0.872	0.017	0.345
f32o	0.732	0.059	0.187	0.540
f32r	−0.139	0.699	−0.063	0.551
f32s	0.048	0.634	0.009	0.575
f32t	0.296	0.404	−0.080	0.594
f32u	0.546	0.106	−0.100	0.567

Correlations between factors – 3 factors

	Factor 1	Factor 2	Factor 3
Factor 1	1.000		
Factor 2	0.536	1.000	
Factor 3	0.609	0.393	1.000

Promax rotated loadings – 2 factors

Item	Factor 1	Factor 2	Uniqueness
f32a	0.705	−0.018	0.515
f32b	0.782	−0.137	0.466
f32c	0.699	−0.209	0.598
f32d	0.709	−0.003	0.499
f32e	0.645	0.049	0.554
f32f	0.638	0.067	0.551
f32g	0.708	−0.106	0.555
f32h	0.528	0.122	0.650
f32i	0.169	0.414	0.738
f32j	0.380	0.116	0.803
f32k	0.356	0.184	0.781
f32l	0.710	−0.096	0.547
f32m	0.582	0.019	0.652
f32n	−0.190	0.876	0.345
f32o	0.561	0.054	0.655
f32r	−0.096	0.705	0.554
f32s	0.029	0.637	0.577
f32t	0.337	0.409	0.597
f32u	0.595	0.109	0.577

Correlations between factors – 2 factors

	Factor 1	Factor 2
Factor 1	1.000	
Factor 2	0.545	1.000

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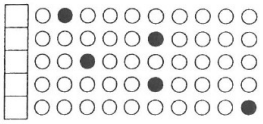


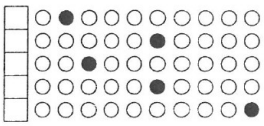
F Spørgeskema til patienten - side 1

Dette spørgeskema er indrettet således, at der efter hvert spørgsmål følger en række cirkler. Når du svarer, bedes du venligst udfylde den cirkel, der hører til det rigtige svar. Hvis ingen af svarene passer dig, så prøv at komme så tæt på det rigtige svar som muligt.

Eksempel:	slet ikke	lidt	en hel del	virkelig meget
A. Hvor ofte har du den sidste måned følt dig generet af:				
1. mundtørhed	○	●	○	○
2. vand i kroppen	○	○	○	●

1. Hvor meget har du den sidste måned været generet af:

	slet ikke	lidt	en hel del	virkelig meget
a. nedtrykthed (30)	○	○	○	○
b. en følelse af håbløshed i forhold til fremtiden (54)	○	○	○	○
c. en følelse af, at alting er en anstrengelse (71)	○	○	○	○
d. en følelse af ikke at være noget værd (79)	○	○	○	○
e. nervøsitet og indre uro (2)	○	○	○	○
f. at bekymre dig for meget om ting (31)	○	○	○	○
g. at være ængstelig eller frygtsom (33)	○	○	○	○
h. anfald af stærk angst eller panik (72)	○	○	○	○



F Spørgeskema til patienten - side 2

1. Hvor meget har du den sidste måned været generet af:

	slet ikke	lidt	en hel del	virkelig meget
i. at have let ved at blive forarget eller irriteret (11)	○	○	○	○
j. tanker om at tage dit eget liv (15)	○	○	○	○
k. at have let til gråd (20)	○	○	○	○
l. en følelse af at være låst fast eller fanget i en fælde (22)	○	○	○	○
m. pludselig at blive angst uden grund (23)	○	○	○	○
n. raseriudbrud, som du ikke kan kontrollere (24)	○	○	○	○
o. ensomhedsfølelse (29)	○	○	○	○
p. at føle manglende interesse for tingene (32)	○	○	○	○
q. anspændthed eller stress (57)	○	○	○	○
r. at føle trang til at slå, såre eller skade nogen (63)	○	○	○	○
s. ofte at havne i heftige diskussioner eller at føle dig trængt op i en krog (74)	○	○	○	○
t. følt dig så rastløs, at du ikke kan sidde stille (78)	○	○	○	○
u. selvbebrejdelser (26)	○	○	○	○

The English version of the items in “F Spørgeskema til patienten” side 1 and 2

These questions ask about your feelings during the last month. They can be scored on a scale from “not at all”, through “mild” and “moderate”, to “severe”.

How much were you bothered by:

F32a: feeling blue

F32b: feeling hopeless about the future

F32c: feeling everything is an effort

F32d: feeling worthless

F32e: nervousness or shakiness inside

F32f: worrying too much about things

F32g: feeling fearful

F32h: spells of terror or panic

F32i: feeling easily annoyed or irritated

F32j: thoughts of ending your life

F32k: crying easily

F32l: feeling of being caught or trapped

F32m: suddenly scared for no reason

F32n: temper outbursts that you could not control

F32o: feeling lonely

F32p: feeling no interest in things *

F32q: feeling tense or keyed up *

F32r: having urges to beat, injure or harm someone

F32s: getting into frequent arguments

F32t: feeling so restless you couldn’t sit still

F32u: blaming yourself for things

** not included in the analysis*