

Factor analysis exercise

The SPSS file contains the following data for 538 respondents (NB the value 999 has been designated a missing data code, this means that all the 999 cells which appear in the file are excluded from any analyses, you can verify that this is the case by running SPSS descriptives.):

- ID number, age and sex of each respondent
- Responses on a 1-5 Likert scale to a 40-item personality scale (variables p1-p40)
- Responses on a 1-5 Likert scale to a 42-item scale assessing attitude to exercise (variables h1-h42)
- Four variables (eA1-eA4) which report responses (1 = yes, 2 = no) to the following questions: Have you engaged in regular exercise in the past 6 months; Do you currently engage in regular exercise; Do you intend to engage in regular exercise in the next 30 days; Do you intend to engage in regular exercise in the next 6 months.
- A set of 12 variables labelled ebAfallx, ebAfallhrs etc which are self-reports of times strenuous exercise typically taken per week in autumn, hours strenuous exercise per week in autumn, times moderate exercise typically taken per week in autumn, hours moderate exercise per week in autumn, times mild exercise typically taken per week in autumn, hours mild exercise per week in autumn, followed by responses to the same questions for spring. (Participants were given examples of types of exercise which would be categorised as strenuous, moderate, mild.)
- EqF, total score on the EQ-i:S, a measure of emotional intelligence.

The personality and exercise items are given at the end of this document. The personality scale assesses the five-factor model of personality and items have been recoded according to the scoring key which is also appended, i.e. all items labelled – have been reverse-coded.

Instructions for the exercise

1. Check that the item data are in order, i.e. run descriptives to make sure nothing is out of range. Run any exploratory methods on the other data that you think appropriate, e.g. descriptive statistics, histograms.
2. Run a factor analysis on the personality items, extracting five rotated factors. How well (or not) does the factor structure you obtain correspond to the scoring key for this scale?
3. Examine the scree diagram for the personality items. Does it support the extraction of five factors?
4. Examine the scree diagram for the exercise items and extract and interpret an appropriate number of rotated factors. Also consider the information that can be derived from: the KMO statistic, Bartlett's test, communalities, % variance explained by the factors.
5. Using the above results, score up the personality and exercise factors. You can either re-run the factor analyses, saving scores as variables or sum up the item scores from the high-loading items on each factor (reverse-keying where necessary). (Consider the relative merits of these two methods.) Calculate internal reliabilities for the personality and exercise factors, using the high-loading items.
6. Turn the exercise data into one or more composites which measure self-reported exercise behaviour, using any method you consider is appropriate.
7. Examine the correlations amongst personality, exercise attitude factors, emotional intelligence and self-report exercise behaviour. Also examine differences between males and females on all these variables. What do you conclude from your findings?

Variables

Surgency

- + Extraverted (24), Talkative (9), Energetic (7), Bold (23)
- Shy (10), Quiet (34), Withdrawn (12), Bashful(15)

Agreeableness

+ Kind (36), Cooperative (8), Sympathetic (33), Warm (19),
-Cold (40), Unsympathetic (5), Harsh (11), Rude (30)

Conscientiousness

+ Organised (14), Systematic (39), Practical (25), Efficient (17)
- Disorganised (26), Careless (16), Inefficient (35), Sloppy (28).

Emotional Stability

+ Unenvious (22), Relaxed (1)
- Moody (38), Temperamental (6), Envious (29), Fretful (31), Jealous (37), Touchy (21)

Intellect

+Intellectual (20), Creative (3), Complex (18), Imaginative (13), Philosophical (4), Deep (2),
-Unintellectual (27), Uncreative (32)

1	Relaxed	1	2	3	4	5
2	Deep	1	2	3	4	5
3	Creative	1	2	3	4	5
4	Philosophical	1	2	3	4	5
5	Unsympathetic	1	2	3	4	5
6	Temperamental	1	2	3	4	5
7	Energetic	1	2	3	4	5
8	Cooperative	1	2	3	4	5
9	Talkative	1	2	3	4	5
10	Shy	1	2	3	4	5
11	Harsh	1	2	3	4	5
12	Withdrawn	1	2	3	4	5
13	Imaginative	1	2	3	4	5
14	Organized	1	2	3	4	5
15	Bashful	1	2	3	4	5
16	Careless	1	2	3	4	5
17	Efficient	1	2	3	4	5
18	Complex	1	2	3	4	5
19	Warm	1	2	3	4	5
20	Intellectual	1	2	3	4	5
21	Touchy	1	2	3	4	5
22	Unenvious	1	2	3	4	5
23	Bold	1	2	3	4	5
24	Extraverted	1	2	3	4	5
25	Practical	1	2	3	4	5
26	Disorganized	1	2	3	4	5
27	Unintellectual	1	2	3	4	5
28	Sloppy	1	2	3	4	5
29	Envious	1	2	3	4	5
30	Rude	1	2	3	4	5
31	Fretful	1	2	3	4	5
32	Uncreative	1	2	3	4	5
33	Sympathetic	1	2	3	4	5
34	Quiet	1	2	3	4	5
35	Inefficient	1	2	3	4	5

36	Kind	1	2	3	4	5
37	Jealous	1	2	3	4	5
38	Moody	1	2	3	4	5
39	Systematic	1	2	3	4	5
40	Cold	1	2	3	4	5
1	Doing physical exercise makes me feel more positive and optimistic	1	2	3	4	5
2	Becoming overweight would make my life less enjoyable	1	2	3	4	5
3	Exercise sessions give me time to think.	1	2	3	4	5
4	Having heart disease would impede me in pursuing my career.	1	2	3	4	5
5	I am a very active person					
6	Bad weather often stops me from taking exercise	1	2	3	4	5
7	Compared to others of the same sex and age as myself, I feel that I am at higher risk of obesity.	1	2	3	4	5
8	If I don't exercise enough now, I am likely to have health problems later.	1	2	3	4	5
9	I find that taking exercise is too much hard work.	1	2	3	4	5
10	If I developed heart disease there is a good chance that it would be treated successfully	1	2	3	4	5
11	Exercise sessions are a good way to meet new people.	1	2	3	4	5
12	The costs associated with buying equipment etc. prevent me from participating in some sports and activities.	1	2	3	4	5
13	It is important to exercise to maintain my general health.	1	2	3	4	5
14	Becoming overweight would shorten my life expectancy	1	2	3	4	5
15	Having heart disease would seriously affect my quality of life	1	2	3	4	5
16	I find exercise sessions boring.	1	2	3	4	5
17	It is important to exercise in order to maintain strength and flexibility.	1	2	3	4	5
18	I am much more active than most people my age.					
19	Lack of exercise would put me at risk of heart disease.	1	2	3	4	5
20	When I exercise regularly my energy levels are higher.	1	2	3	4	5
21	Having heart disease would have negative effects on my family life.	1	2	3	4	5
22	It is important to follow medical advice about taking sufficient exercise in order to avoid health problems.	1	2	3	4	5
23	I lack the discipline to exercise regularly.	1	2	3	4	5
24	Taking regular exercise helps me look more attractive.	1	2	3	4	5

25	Being overweight would have negative effects on my family life.	1	2	3	4	5
26	Exercising helps me feel less stressed.	1	2	3	4	5
27	Having heart disease would shorten my life expectancy	1	2	3	4	5
28	I find it inconvenient to exercise regularly.	1	2	3	4	5
29	Exercising regularly helps me to avoid gaining weight.	1	2	3	4	5
30	If I had heart disease I would still be able to enjoy life	1	2	3	4	5
31	Taking regular exercise will help ensure that I have a long, healthy life.	1	2	3	4	5
32	Lack of exercise would put me at risk of becoming overweight.	1	2	3	4	5
33	Lack of time due to family and/or social commitments stops me from exercising as much as I would like.	1	2	3	4	5
34	Having heart disease would affect my social life.	1	2	3	4	5
35	I often fail to take exercise because I feel too tired.	1	2	3	4	5
36	Compared to others of the same sex and age as myself, I feel that I am at higher risk of heart disease.	1	2	3	4	5
37	I derive a lot of enjoyment from taking exercise	1	2	3	4	5
38	Being overweight would affect my career prospects	1	2	3	4	5
39	I enjoy the social aspects of exercising (e.g. meeting with friends after a game or a session at the gym).	1	2	3	4	5
40	Being overweight would affect my social life	1	2	3	4	5
41	Lack of time due to work commitments stops me from exercising as much as I would like.	1	2	3	4	5
42	If I became overweight my quality of life would not be affected.	1	2	3	4	5