EXERCISE 24

Factor analysis

Before you start

Before proceeding with this practical, please read Chapter 15.

A personality study

Ten participants are given a battery of personality tests, comprising the following items: *Adventure*; *Agoraphobia*; *Anxiety*; *Arachnophobia*; *Extraversion*; *Sociability*. The purpose of this project is to ascertain whether the correlations among the six variables can be accounted for in terms of comparatively few latent variables, or factors.

Preparing the data set

The data are shown in Table 1. Name the variables in **Variable View** and assign longer names in the **Label** column. Ensure that the values in the **Decimals** column are 0. Click the **Data View** tab to open **Data View** and enter the data.

Table 1. The questionnaire data

Participant	Advent	Agora	Anxiety	Arachno	Extrav	Sociab
1	44	68	71	80	54	52
2	77	30	39	41	90	80
3	50	55	46	45	46	48
4	57	33	33	39	64	62
5	45	75	74	90	55	48
6	91	47	39	48	87	91
7	54	70	66	69	44	48
8	31	40	33	36	37	36
9	45	75	85	93	50	42
10	70	35	45	44	66	78

Procedure for the factor analysis of the raw data

Follow the procedure described in Section 15.2.2, requesting the **Univariate descriptives**, **Initial solution**, **Coefficients**, **Reproduced**, **Scree plot**, and **Varimax** options.

Interpretation of the results

After a table of descriptive statistics, there is a table labelled **Correlation Matrix**. Is there any evident pattern that would suggest that the R-matrix might be accounted for in terms of relatively few factors (components)? Examine the remainder of the output in the manner outlined in Section 15.2.3, considering the **scree plot**, the table labelled **Component** (factor) **Matrix** listing the unrotated loadings for each factor, the residuals and the final rotated matrix in the table labelled **Rotated Component Matrix**.

- **How might the patterns among the correlations in the R-matrix be explained psychologically? Look at the table Rotated Component Matrix and make a list of the loadings that are greater than about 0.5 on each factor (component).**

Procedure for the factor analysis of the correlation matrix

Sometimes (e.g., after a large psychometric study) it is convenient to run a factor analysis from a table of correlation coefficients rather than from raw scores. Following the procedure described in Section 15.3.2, type the appropriate commands and the lower triangular version of the R-matrix (the correlation matrix in the **SPSS Viewer**) into the syntax window. Include the following items.

- The MATRIX DATA command with the appropriate variable names (including *rowtype_*).
- A BEGIN DATA command.
- Rows of correlation coefficients (each preceded by CORR).
- A row indicating the size of N (preceded by N and then the size of N repeated for as many variables as you have).
- An END DATA command concluding with a full stop (.).

When the data syntax is complete, run the factor analysis by clicking **Run** in the toolbar and selecting **All**. **Data View** should now appear similar to that shown in Chapter 15, Figure 12.

If all is well, proceed to prepare the FACTOR command by studying the model shown in Chapter 15, Figure 13. Run the factor analysis by selecting the command and clicking the **Run** button, as described above. Confirm that the results of the analysis are the same as those obtained when you began with the raw scores.