Cramming Sam's Tips for Chapter 17: Exploratory factor analysis

Preliminary analysis

- Scan the correlation matrix; look for variables that don't correlate with any other variables, or correlate very highly (r = .9) with one or more other variables.
- In factor analysis, check that the determinant of this matrix is bigger than 0.00001; if it is then multicollinearity isn't a problem.
- In the table labelled *KMO and Bartlett's Test* the KMO statistic should be greater than .5 as a bare minimum; if it isn't, collect more data. You should check the KMO statistic for individual variables by looking at the diagonal of the anti-image matrices again, these values should be above .5 (this is useful for identifying problematic variables if the overall KMO is unsatisfactory).
- Bartlett's test of sphericity will usually be significant (the value of *Sig.* will be less than .05); if it's not you've got a disaster on your hands.

Factor extraction

- To decide how many factors to extract, look at the table labelled *Communalities* and the column labelled *Extraction*. If these values are all .7 or above and you have less than 30 variables then the SPSS default (Kaiser's criterion) for extracting factors is fine. Likewise, if your sample size exceeds 250 and the average of the communalities is .6 or greater then the default option is fine. Alternatively, with 200 or more participants the scree plot can be used.
- Check the bottom of the table labelled *Reproduced Correlations* for the percentage of 'nonredundant residuals with absolute values greater than 0.05'. This percentage should be less than 50% and the smaller it is, the better.

Interpretation

- If you've conduced orthogonal rotation then look at the table labelled *Rotated Component Matrix*. For each variable, note the factor/component for which the variable has the highest loading (by 'high' I mean loadings above .4 when you ignore the plus or minus sign). Try to make sense of what the factors represent by looking for common themes in the items that load on them.
- If you've conducted oblique rotation then do the same as above but for the table labelled *Pattern Matrix*. Double-check what you find by doing the same thing for the structure matrix.

Reliability

- Reliability analysis is used to measure the consistency of a measure.
- Remember to reverse-score any items that were reverse-phrased on the original questionnaire before you run the analysis.

- Run separate reliability analyses for all subscales of your questionnaire.

- Cronbach's α indicates the overall reliability of a questionnaire, and values around .8 are good (or .7 for ability tests and the like).

- The *Cronbach's Alpha if Item Deleted* column tells you whether removing an item will improve the overall reliability. Values greater than the overall reliability indicate that removing that item will improve the overall reliability of the scale. Look for items that dramatically increase the value of α and remove them.

- If you remove items, rerun your factor analysis to check that the factor structure still holds.