

HW 6 due Thursday 10/28

1. Holzinger & Swineford (1939) collected data on twenty-six psychological tests administered to 145 seventh- and eighth-grade children in the Grant-White school in Chicago. Nine of these tests were selected and for this example it was theorized that these measure three common factors: visual perception (P), verbal ability (V) and speed (S) such that the first three variables measure P, the next three measure V, and the last three measure S. The nine selected variables and their intercorrelations are given below:

```
VIS_PERC 1.000
CUBES    0.318 1.000
LOZENGES 0.436 0.419 1.000
PAR_COMP 0.335 0.234 0.323 1.000
SEN_COMP 0.304 0.157 0.283 0.722 1.000
WORDMEAN 0.326 0.195 0.350 0.714 0.685 1.000
ADDITION 0.116 0.057 0.056 0.203 0.246 0.170 1.000
COUNTDOT 0.314 0.145 0.229 0.095 0.181 0.113 0.585 1.000
S-C_CAPS 0.489 0.239 0.361 0.309 0.345 0.280 0.408 0.512 1.000
```

Here is the [SAS file](#) (a type=corr data set).

1.A. Perform an exploratory factor analysis using ML estimation with varimax rotation on the data set and discuss the results in terms of the theory stated above. Hand in the SAS code as well as relevant output.

1.B. Fit a confirmatory factor analysis model, allowing intercorrelations between factors. Hand in the SAS code as well as relevant output.

Hint: the "std" and "cov" paragraphs should look like this:

```
std
  e1-e9 = the1-the9,
  f1 f2 f3 = 1 1 1;
cov
  f1-f3 = phi1-phi3;
```

1.C. Draw the two path diagrams ("by hand" using pen is ok here), one for 1.A. and one for 1.B. Be sure to include all relevant path coefficients, including error terms and their path coefficients, correlations between factors, as relevant.

1.D. Compare the fits of the models in 1.A. and 1.B. in terms of their residual correlation matrices and discuss.

2. See the data set on stock returns, "[Daily stock returns data set](#)." The columns are companies; Man1, Man2, Man3 are manufacturing companies; Serv1, Serv2, Serv3, Serv4 are service companies.

2.A. Perform an exploratory factor analysis on the data set and report your conclusions. Hand in SAS code and relevant output.

2.B. Perform a confirmatory factor analysis (pick the obvious model) on the data set and report your conclusions. Hand in SAS code and relevant output.

2.C. Compare the fits of 2.A. and 2.B. in terms of their residual correlation matrices and discuss.

3. Use the article here. http://www.ewra.net/ew/pdf/EW_2005_9-10_05.pdf.

3.A. Use the correlation matrix of Table 3 and attempt to duplicate the results of Tables 4 and 5. Hand in SAS code, relevant output, and discuss.

3.B. Discuss the fit of the model you found in 3.A. in terms of residual correlation matrix.