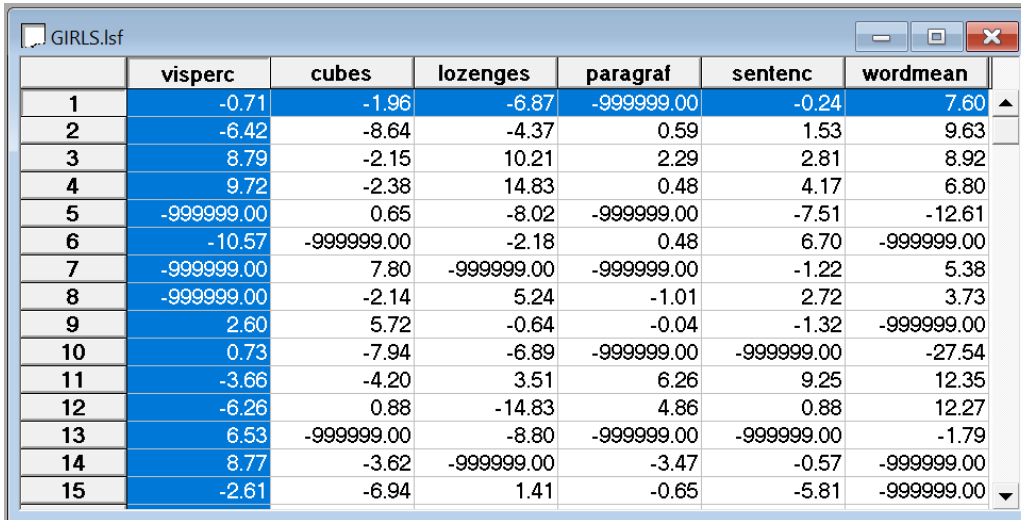


Two stage multiple imputation SEM using simulated data for girls

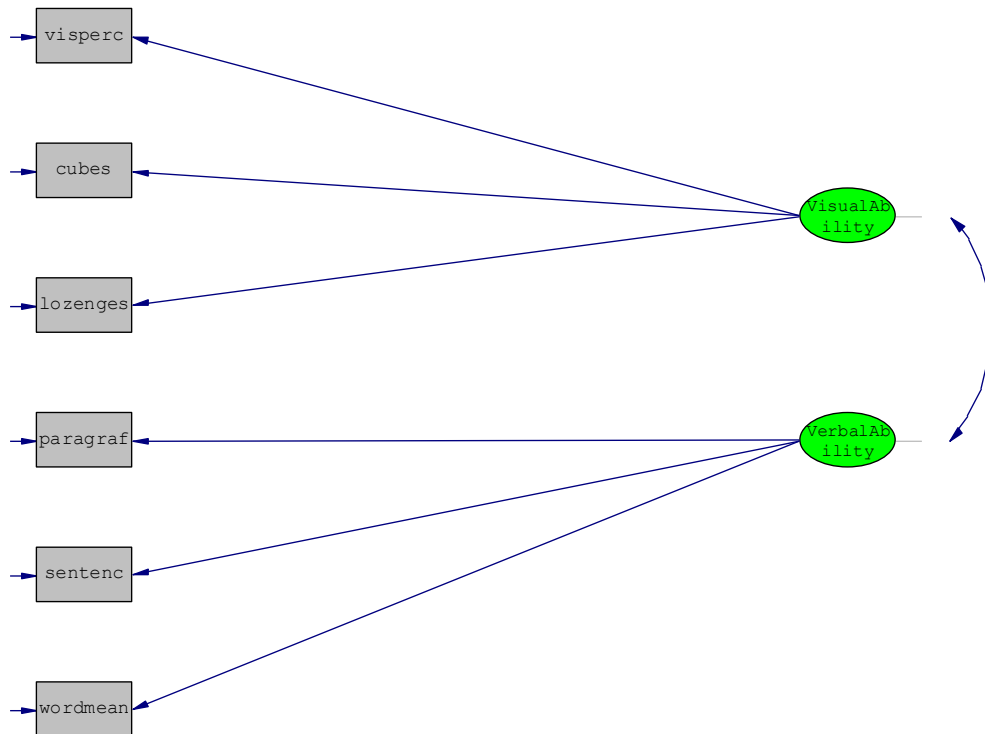
The data are the simulated scores of 1250 girls on six psychological tests (visual perception, cubes, lozenges, paragraph completion, sentence completion, and word meaning). The corresponding data file is **GIRLS.LSF**, and the first few observations are shown in the image below.



	visperc	cubes	lozenges	paragraf	sentenc	wordmean
1	-0.71	-1.96	-6.87	-999999.00	-0.24	7.60
2	-6.42	-8.64	-4.37	0.59	1.53	9.63
3	8.79	-2.15	10.21	2.29	2.81	8.92
4	9.72	-2.38	14.83	0.48	4.17	6.80
5	-999999.00	0.65	-8.02	-999999.00	-7.51	-12.61
6	-10.57	-999999.00	-2.18	0.48	6.70	-999999.00
7	-999999.00	7.80	-999999.00	-999999.00	-1.22	5.38
8	-999999.00	-2.14	5.24	-1.01	2.72	3.73
9	2.60	5.72	-0.64	-0.04	-1.32	-999999.00
10	0.73	-7.94	-6.89	-999999.00	-999999.00	-27.54
11	-3.66	-4.20	3.51	6.26	9.25	12.35
12	-6.26	0.88	-14.83	4.86	0.88	12.27
13	6.53	-999999.00	-8.80	-999999.00	-999999.00	-1.79
14	8.77	-3.62	-999999.00	-3.47	-0.57	-999999.00
15	-2.61	-6.94	1.41	-0.65	-5.81	-999999.00

Note that the data values of -999999.00 are missing data values. If a different global missing data value code is used, it should be assigned using the **Define Variables** dialog box.

The theoretical model is a measurement model that specifies that the six psychological tests are indicators of visual ability and verbal ability of Junior High students. A path diagram for this model is depicted in the image below.



The SIMPLIS syntax file to fit the theoretical model to the average sample covariance matrix of 30 MCMC imputations is shown in the image below.

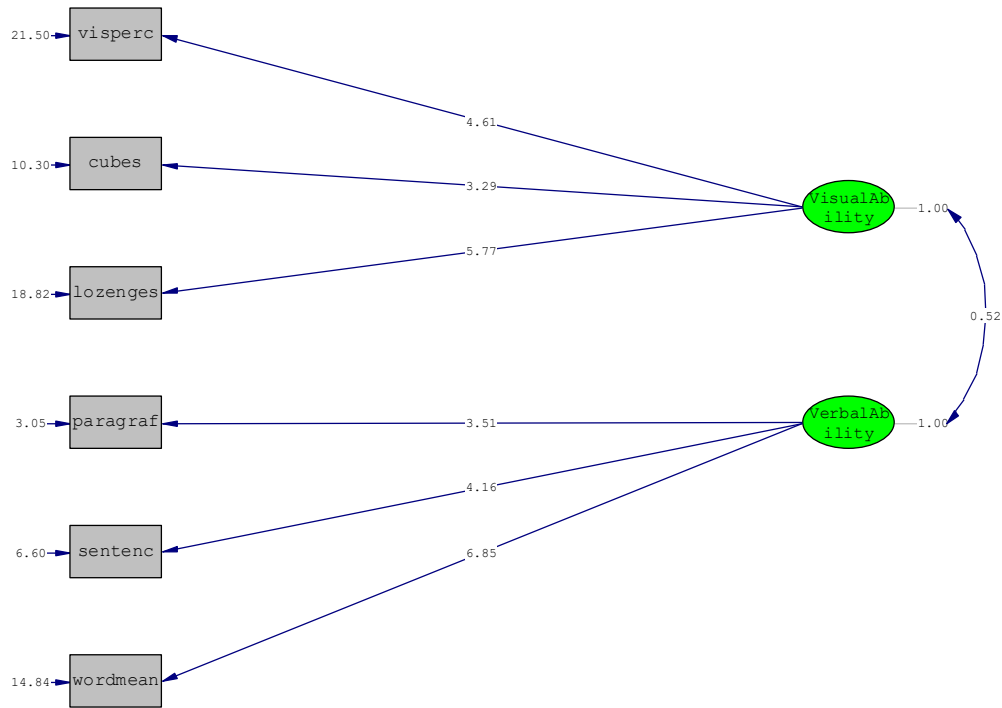
```

GIRLS4A.SPL
Raw Data from File GIRLS.LSF
Latent Variables
VisualAbility VerbalAbility
Relationships
visperc cubes lozenges = VisualAbility
paragraf sentenc wordmean = VerbalAbility
LISREL Output: SC ME=ML MI2S NM=30 IX=103829 IM=MC
Path Diagram
End of Problem

```

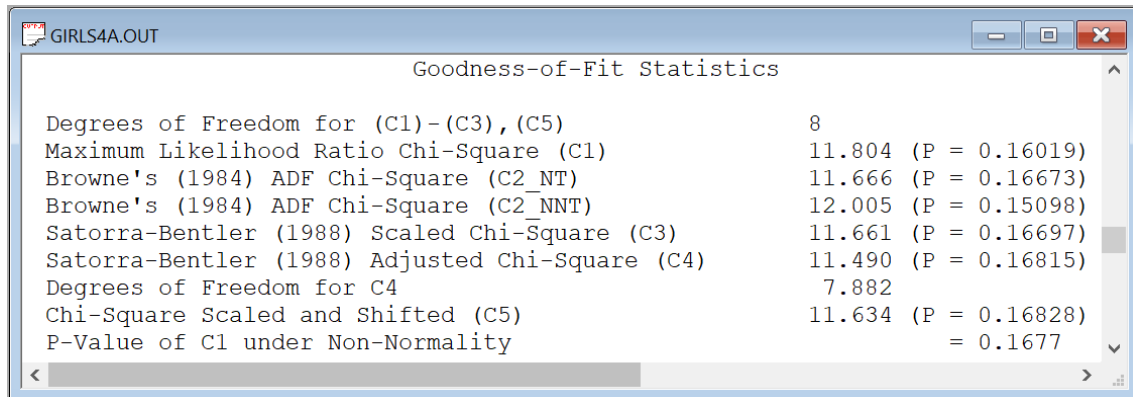
- Line 1 specifies the data file.
- Lines 2 and 3 specify the labels for the two latent variables.
- Lines 4 to 6 specify the measurement model for the six psychological tests.
- Line 7 requests that the results in the output file should be given in terms of the LISREL model for the measurement model (LISREL Output). It also requests that the completely standardized solution should be written to the output file (SC), and robust maximum likelihood estimation (ME = ML). The MI2S option invokes the two-stage multiple imputation SEM method to fit the model to the average sample covariance matrix of the NM = 30 MCMC imputations (IM = MC) based on an initial random seed of IX = 103829.
- Line 8 requests a path diagram of the model.
- Line 9 indicates that no more SIMPLIS commands are to be processed.

When the SPL file above is opened in LISREL and the **Run LISREL** icon is clicked, the following path diagram is obtained.



Chi-Square=11.66, df=8, Pvalue=0.16697, RMSEA=0.019

The corresponding output file, **GIRLS4A.OUT**, is opened in a separate window. The Chi-square test statistic values listed in this file are shown in the image below.



These Chi-square test statistic values indicate that the theoretical measurement model for numerical and verbal ability is supported by the data.