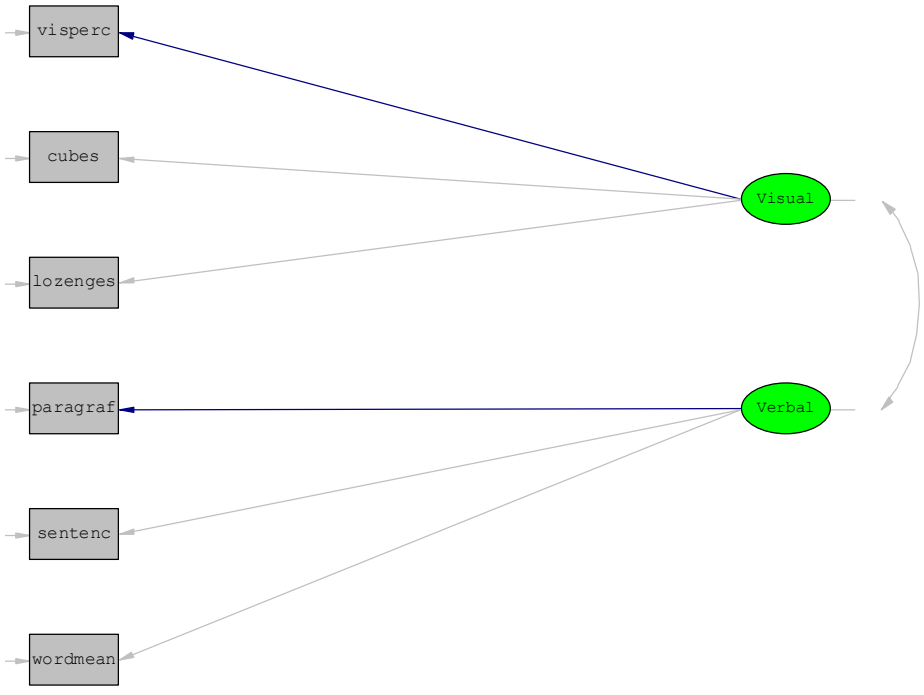
Standard errors for standardized solutions using student data

The data are the complete simulated scores of 815 students on six psychological tests (visual perception, cubes, lozenges, paragraph completion, sentence completion, and word meaning) along with the gender of the students. The corresponding data file is **GENDERC.LSF**, and the first few observations are shown below.

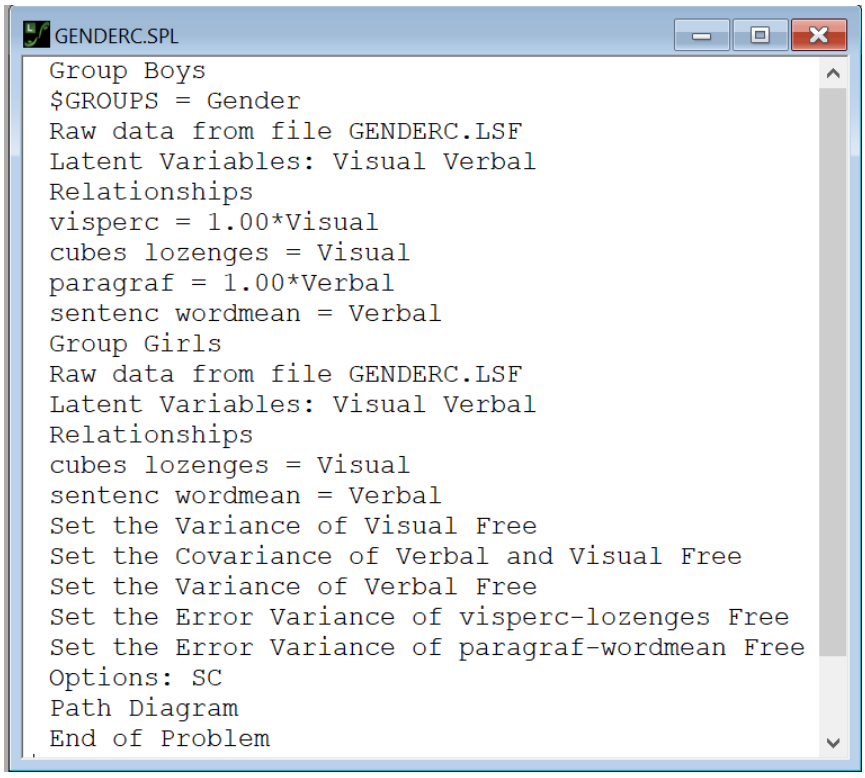
GENDERC.LSF

	visperc	cubes	lozenges	Gender	paragraf	sentenc	wordmean
1	-6.45	-8.07	-2.52	1.00	0.54	1.25	9.17
2	8.83	-3.73	11.51	1.00	2.46	2.89	9.31
3	-3.68	-3.84	5.57	1.00	5.55	7.62	10.74
4	-6.29	1.97	-17.09	1.00	3.20	-0.97	8.66
5	2.15	-4.17	4.80	1.00	4.53	2.59	5.69
6	-8.64	-4.84	-9.55	1.00	2.73	1.48	3.89
7	-8.02	1.18	-7.44	1.00	-3.75	-6.72	-6.29
8	11.14	-5.34	6.93	1.00	-1.35	-0.32	-3.71
9	12.67	0.67	8.08	1.00	-1.64	-5.71	-6.32
10	-3.69	-3.62	-19.14	1.00	-1.86	0.12	-2.94
11	-5.36	12.27	1.69	1.00	-4.93	-4.75	-11.62
12	3.60	-3.91	1.99	1.00	-1.25	-0.70	9.58
13	-3.54	1.12	-12.50	1.00	-6.98	-7.67	-16.31
14	6.55	1.40	9.23	1.00	0.05	-0.28	1.77
15	19.37	6.27	16.81	1.00	1.62	5.53	15.89

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.

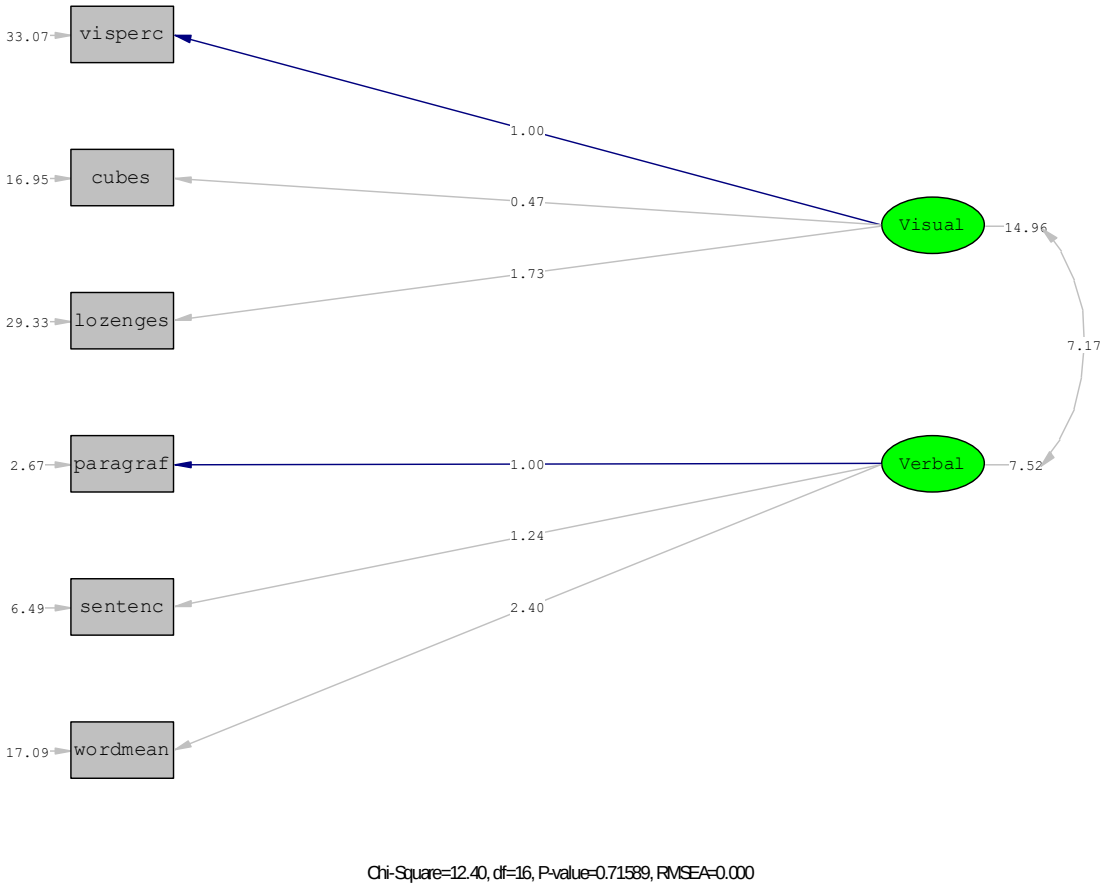


The SIMPLIS syntax file to assess the configural invariance of the theoretical model above for gender is shown in the image below.

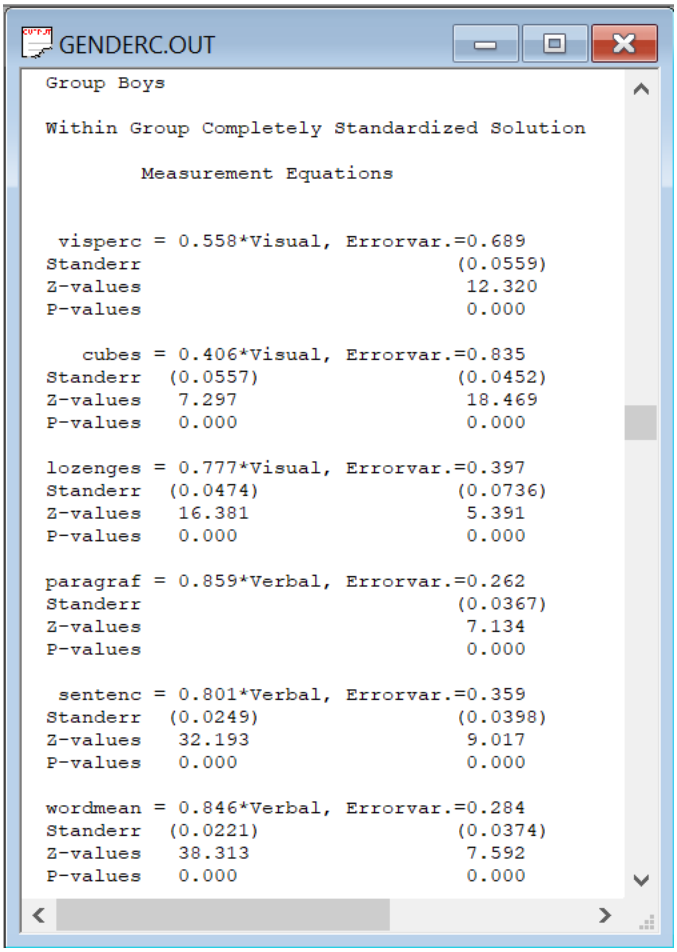


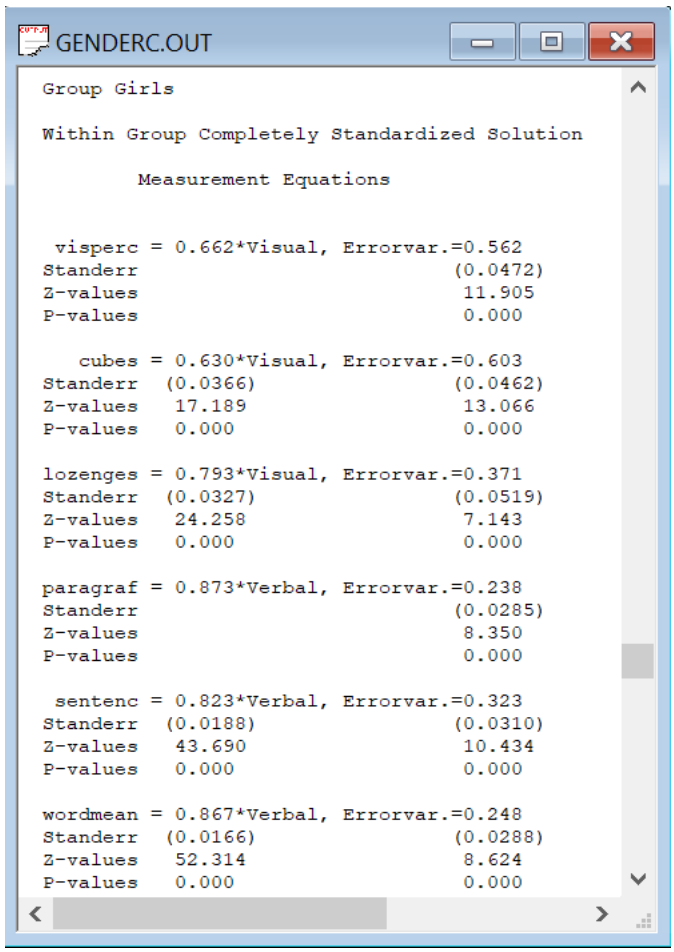
- Line 1 specifies the label for the first group.
- Line 2 specifies the grouping variable.
- Line 3 specifies the data file.
- Line 4 specifies the labels for the latent variables of the model.
- Lines 5 to 9 specify the theoretical model for the first group.
- Line 10 specifies the label for the second group.
- Line 11 specifies the data file.
- Line 12 specifies the labels for the latent variables of the model.
- Lines 13 to 20 specify the theoretical model for group 2.
- Line 21 requests the standardized and the completely standardized solutions.
- Line 22 requests a path diagram of the model.
- Line 23 indicates that no more SIMPLIS commands are to be processed.

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



The corresponding output file, **GENDERC.OUT**, is opened in a separate window. The within group completely standardized estimates along with the standard error estimates, the test statistic values, and the exceedance probabilities for the free parameters of the model for boys and girls, which are listed in this file, are shown in the images below.


GENDERC.OUT
Group Boys
Within Group Completely Standardized Solution
Measurement Equations
visperc = 0.558*Visual, Errorvar.=0.689
Standerr (0.0559)
Z-values 12.320
P-values 0.000
cubes = 0.406*Visual, Errorvar.=0.835
Standerr (0.0557) (0.0452)
Z-values 7.297 18.469
P-values 0.000 0.000
lozenges = 0.777*Visual, Errorvar.=0.397
Standerr (0.0474) (0.0736)
Z-values 16.381 5.391
P-values 0.000 0.000
paragraf = 0.859*Verbal, Errorvar.=0.262
Standerr (0.0367)
Z-values 7.134
P-values 0.000
sentenc = 0.801*Verbal, Errorvar.=0.359
Standerr (0.0249) (0.0398)
Z-values 32.193 9.017
P-values 0.000 0.000
wordmean = 0.846*Verbal, Errorvar.=0.284
Standerr (0.0221) (0.0374)
Z-values 38.313 7.592
P-values 0.000 0.000


GENDERC.OUT
Group Girls
Within Group Completely Standardized Solution
Measurement Equations
visperc = 0.662*Visual, Errorvar.=0.562
Standerr (0.0472)
Z-values 11.905
P-values 0.000
cubes = 0.630*Visual, Errorvar.=0.603
Standerr (0.0366) (0.0462)
Z-values 17.189 13.066
P-values 0.000 0.000
lozenges = 0.793*Visual, Errorvar.=0.371
Standerr (0.0327) (0.0519)
Z-values 24.258 7.143
P-values 0.000 0.000
paragraf = 0.873*Verbal, Errorvar.=0.238
Standerr (0.0285)
Z-values 8.350
P-values 0.000
sentenc = 0.823*Verbal, Errorvar.=0.323
Standerr (0.0188) (0.0310)
Z-values 43.690 10.434
P-values 0.000 0.000
wordmean = 0.867*Verbal, Errorvar.=0.248
Standerr (0.0166) (0.0288)
Z-values 52.314 8.624
P-values 0.000 0.000