

```
2194 0 OUTPUT ACTIVATE SEMinAMOSOutput.  
2194 0 M> OUTPUT ACTIVATE SEMinAMOSOutput.  
2195 0 TITLE 'AMOS-Style Maximum-Likelihood SEM Diagnostics'.  
2195 0 M> TITLE 'AMOS-Style Maximum-Likelihood SEM Diagnostics'.
```

AMOS-Style Maximum-Likelihood SEM Diagnostics

```

2196 0
2196 0 M>
2197 0 GET DATA
2197 0 M> GET DATA
2198 0 /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Sca
le Testing\SEM in AMOS\dataset.csv' /ENCODING='UTF8' /
      DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"'
2198 0 M> /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and
Scale Testing\SEM in AMOS\dataset.csv' /ENCODING='UTF8
      ' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"'
2199 0 /ARRANGEMENT=DELIMITED /FIRSTCASE=2
2199 0 M> /ARRANGEMENT=DELIMITED /FIRSTCASE=2
2200 0 /VARIABLES=
2200 0 M> /VARIABLES=
2201 0 school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0
Fedu F8.0
2201 0 M> school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F
8.0 Fedu F8.0
2202 0 Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studytime
F8.0 failures F8.0
2202 0 M> Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studyti
me F8.0 failures F8.0
2203 0 schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 in
ternet A8 romantic A8
2203 0 M> schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8
internet A8 romantic A8
2204 0 famrel F8.0 freetime F8.0 goout F8.0 Dalc F8.0 Walc F8.0 health F8.0
absences F8.0 G1 F8.0 G2 F8.0 G3 F8.0.
2204 0 M> famrel F8.0 freetime F8.0 goout F8.0 Dalc F8.0 Walc F8.0 health F
8.0 absences F8.0 G1 F8.0 G2 F8.0 G3 F8.0.
2205 0 DATASET NAME SEMinAMOSData.
2205 0 M> DATASET NAME SEMinAMOSData.
2206 0 COMPUTE subject_id=$CASENUM.
2206 0 M> COMPUTE subject_id=$CASENUM.
2207 0 COMPUTE Dalc_R=6-Dalc.
2207 0 M> COMPUTE Dalc_R=6-Dalc.
2208 0 COMPUTE Walc_R=6-Walc.
2208 0 M> COMPUTE Walc_R=6-Walc.

```

AMOS-Style Maximum-Likelihood SEM Diagnostics

```
2209 0 RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
2209 0 M> RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
2210 0 INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b.
2210 0 M> INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b
.
2211 0 EXECUTE.
2211 0 M> EXECUTE.
2212 0
2212 0 M>
2213 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
2213 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
2214 0 TITLE 'AMOS Style Maximum Likelihood SEM Diagnostics'.
2214 0 M> TITLE 'AMOS Style Maximum Likelihood SEM Diagnostics'.
```

AMOS Style Maximum Likelihood SEM Diagnostics

```
2215 0 SUBTITLE 'Covariance-fit and localized standardized residual review'.  
2215 0 M> SUBTITLE 'Covariance-fit and localized standardized residual review'.  
w'.
```

AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review

```

2216  0  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE /ANALYSIS=G1 G2 G3 famrel freetime goout
2216  0 M> FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE /ANALYSIS=G1 G2 G3 famrel freetime goout
2217  0  /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
2217  0 M> /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
2218  0  /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=NOROTATE /METHOD=CORRELATION.
2218  0 M> /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=NOROTATE /METHOD=CORRELATION.

```

Factor Analysis

Notes

Output Created		18-JUL-2026 10:57:42
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\SEM in AMOS\dataset.csv
	Active Dataset	SEMinAMOSData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	MISSING=EXCLUDE: User-defined missing values are treated as missing.
	Cases Used	LISTWISE: Statistics are based on cases with no missing values for any variable used.

AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review

Notes

Syntax		FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE /ANALYSIS=G1 G2 G3 famrel freetime goout /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=NOROTATE /METHOD=CORRELATIO N.
Resources	Processor Time	00:00:00.34
	Elapsed Time	00:00:00.37
	Maximum Memory Required	5704 (5.570K) bytes

[SEMinAMOSData]

Correlation Matrix

		G1	G2	G3	famrel	freetime	goout
Correlation	G1	1.000	.865	.826	.049	-.094	-.074
	G2	.865	1.000	.919	.090	-.107	-.079
	G3	.826	.919	1.000	.063	-.123	-.088
	famrel	.049	.090	.063	1.000	.129	.090
	freetime	-.094	-.107	-.123	.129	1.000	.346
	goout	-.074	-.079	-.088	.090	.346	1.000

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.732
Bartlett's Test of Sphericity	Approx. Chi-Square	2220.632
	df	15
	Sig.	.000

AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review

Communalities

	Initial	Extraction
G1	.755	.775
G2	.880	.966
G3	.849	.878
famrel	.034	.045
freetime	.140	.474
goout	.125	.252

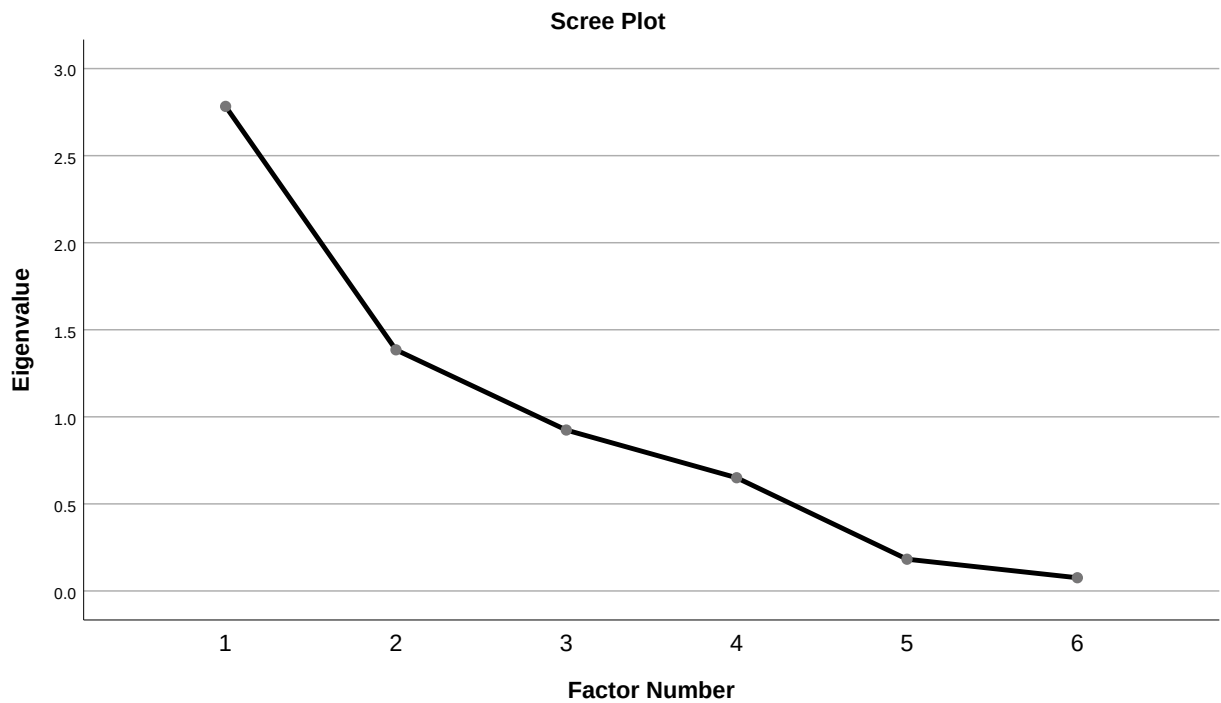
Extraction Method: Principal Axis Factoring.

Total Variance Explained

Factor	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.783	46.381	46.381	2.650	44.166	44.166
2	1.385	23.080	69.461	.740	12.337	56.503
3	.924	15.402	84.863			
4	.650	10.835	95.698			
5	.182	3.038	98.736			
6	.076	1.264	100.000			

Extraction Method: Principal Axis Factoring.

AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review



Factor Matrix^a

	Factor	
	1	2
G1	.879	.053
G2	.980	.070
G3	.936	.033
famrel	.061	.204
freetime	-.153	.671
goout	-.114	.489

Extraction Method: Principal Axis Factoring.

a. 2 factors extracted. 41 iterations required.

```
2219 0 RELIABILITY /VARIABLES=G1 G2 G3 /SCALE('Academic measurement block')
ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR.
2219 0 M> RELIABILITY /VARIABLES=G1 G2 G3 /SCALE('Academic measurement block
') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR
```


AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review

Reliability

Notes		
Output Created		18-JUL-2026 10:57:42
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\SEM in AMOS\dataset.csv
	Active Dataset	SEMinAMOSData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
	Matrix Input	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\SEM in AMOS\sem_in_amos_sps s_syntax.sps
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.
Syntax		RELIABILITY /VARIABLES=G1 G2 G3 /SCALE('Academic measurement block') ALL /MODEL=ALPHA /STATISTICS=DESCRIPT IVE SCALE CORR.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.04

Scale: Academic measurement block

AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review

Case Processing Summary

		N	%
Cases	Valid	649	100.0
	Excluded ^a	0	.0
	Total	649	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.951	.953	3

Item Statistics

	Mean	Std. Deviation	N
G1	11.40	2.745	649
G2	11.57	2.914	649
G3	11.91	3.231	649

Inter-Item Correlation Matrix

	G1	G2	G3
G1	1.000	.865	.826
G2	.865	1.000	.919
G3	.826	.919	1.000

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
34.88	72.251	8.500	3

```
2220 0 RELIABILITY /VARIABLES=famrel freetime goout /SCALE('Social measureme
nt block') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SC
ALE CORR.
```

AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review

```
2220 0 M> RELIABILITY /VARIABLES=famrel freetime goout /SCALE('Social measurement block') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE
SCALE CORR.
```

Reliability

Notes

Output Created		18-JUL-2026 10:57:42
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\SEM in AMOS\dataset.csv
	Active Dataset	SEMinAMOSData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
	Matrix Input	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\SEM in AMOS\sem_in_amos_sps s_syntax.sps
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.
Syntax		RELIABILITY /VARIABLES=famrel freetime goout /SCALE ('Social measurement block') ALL /MODEL=ALPHA /STATISTICS=DESCRIPT IVE SCALE CORR.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.05

AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review

Scale: Social measurement block

Case Processing Summary

		N	%
Cases	Valid	649	100.0
	Excluded ^a	0	.0
	Total	649	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.419	.411	3

Item Statistics

	Mean	Std. Deviation	N
famrel	3.93	.956	649
freetime	3.18	1.051	649
goout	3.18	1.176	649

Inter-Item Correlation Matrix

	famrel	freetime	goout
famrel	1.000	.129	.090
freetime	.129	1.000	.346
goout	.090	.346	1.000

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
10.30	4.718	2.172	3

AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review

```
2221 0 ECHO 'This base-SPSS package does not claim execution of the propriet
ary AMOS engine'.
2221 0 M> ECHO 'This base-SPSS package does not claim execution of the propr
ietary AMOS engine'.
This base-SPSS package does not claim execution of the proprietary AMOS engine
2222 0 * END METHOD-SPECIFIC SPSS WORKFLOW.
2222 0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
2223 0
2223 0 M>
2224 0 SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale T
esting\SEM in AMOS\SPSS_Output\sav\sem-in-amos_spss_re
ady_data.sav' /COMPRESSED.
2224 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scal
e Testing\SEM in AMOS\SPSS_Output\sav\sem-in-amos_spss
_ready_data.sav' /COMPRESSED.
2225 0
2225 0 M>
2226 0 ECHO '=====
====='.
2226 0 M> ECHO '=====
====='.
=====
2227 0 ECHO 'AMOS-STYLE MAXIMUM-LIKELIHOOD SEM DIAGNOSTICS'.
2227 0 M> ECHO 'AMOS-STYLE MAXIMUM-LIKELIHOOD SEM DIAGNOSTICS'.
AMOS-STYLE MAXIMUM-LIKELIHOOD SEM DIAGNOSTICS
2228 0 ECHO 'Design: Covariance-ML fit with standardized residual and modifi
cation-priority diagnostics.'.
2228 0 M> ECHO 'Design: Covariance-ML fit with standardized residual and mod
ification-priority diagnostics.'.
Design: Covariance-ML fit with standardized residual and modification-priority
diagnostics.
2229 0 ECHO 'Null hypothesis: The AMOS-style covariance model has exact fit
and no large localized residuals.'.
2229 0 M> ECHO 'Null hypothesis: The AMOS-style covariance model has exact f
it and no large localized residuals.'.
Null hypothesis: The AMOS-style covariance model has exact fit and no large lo
calized residuals.
2230 0 ECHO 'Formula: ML fit plus standardized residual covariance diagnosti
cs; largest residual flags respecification priority.'.
```

AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review

2230 0 M> ECHO 'Formula: ML fit plus standardized residual covariance diagnostics; largest residual flags respecification priority

.'.

Formula: ML fit plus standardized residual covariance diagnostics; largest residual flags respecification priority.

2231 0 ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.

2231 0 M> ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.

Variables: G1, G2, G3, famrel, freetime, goout

2232 0 ECHO 'Rows analyzed: 649'.

2232 0 M> ECHO 'Rows analyzed: 649'.

Rows analyzed: 649

2233 0 ECHO 'cfi = 0.9973982062491278'.

2233 0 M> ECHO 'cfi = 0.9973982062491278'.

cfi = 0.9973982062491278

2234 0 ECHO 'chi_square = 13.76397207713822'.

2234 0 M> ECHO 'chi_square = 13.76397207713822'.

chi_square = 13.76397207713822

2235 0 ECHO 'largest_residual_item_1 = famrel'.

2235 0 M> ECHO 'largest_residual_item_1 = famrel'.

largest_residual_item_1 = famrel

2236 0 ECHO 'largest_residual_item_2 = G2'.

2236 0 M> ECHO 'largest_residual_item_2 = G2'.

largest_residual_item_2 = G2

2237 0 ECHO 'maximum_standardized_residual = 0.11318873562601585'.

2237 0 M> ECHO 'maximum_standardized_residual = 0.11318873562601585'.

maximum_standardized_residual = 0.11318873562601585

2238 0 ECHO 'rmsea = 0.03334482463134081'.

2238 0 M> ECHO 'rmsea = 0.03334482463134081'.

rmsea = 0.03334482463134081

2239 0 ECHO 'Cross-check status: pass'.

2239 0 M> ECHO 'Cross-check status: pass'.

Cross-check status: pass

2240 0 ECHO '=====
====='

2240 0 M> ECHO '=====
====='

=====

2241 0

2241 0 M>

AMOS Style Maximum Likelihood SEM Diagnostics
Covariance-fit and localized standardized residual review

```
2242 0 OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and
Scale Testing\SEM in AMOS\SPSS_Output\spv\sem-in-amos_
      spss_output.spv'.
2242 0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis a
nd Scale Testing\SEM in AMOS\SPSS_Output\spv\sem-in-am
      os_spss_output.spv'.
2243 0 OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING
2243 0 M> OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING
```