

```
1536 0 OUTPUT ACTIVATE MeasurementModelOutput.  
1536 0 M> OUTPUT ACTIVATE MeasurementModelOutput.  
1537 0 TITLE 'Latent Measurement Model'.  
1537 0 M> TITLE 'Latent Measurement Model'.
```

Latent Measurement Model

```
1538 0
1538 0 M>
1539 0 GET DATA
1539 0 M> GET DATA
1540 0 /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Measurement Model\dataset.csv' /ENCODING='UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER=''
1540 0 M> /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Measurement Model\dataset.csv' /ENCODING='UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER=''
1541 0 /ARRANGEMENT=DELIMITED /FIRSTCASE=2
1541 0 M> /ARRANGEMENT=DELIMITED /FIRSTCASE=2
1542 0 /VARIABLES=
1542 0 M> /VARIABLES=
1543 0 school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0 Fedu F8.0
1543 0 M> school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0 Fedu F8.0
1544 0 Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studytime F8.0 failures F8.0
1544 0 M> Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studytime F8.0 failures F8.0
1545 0 schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 internet A8 romantic A8
1545 0 M> schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 internet A8 romantic A8
1546 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.
1546 0 M> 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.
1547 0 DATASET NAME MeasurementModelData.
1547 0 M> DATASET NAME MeasurementModelData.
1548 0 COMPUTE subject_id=$CASENUM.
1548 0 M> COMPUTE subject_id=$CASENUM.
1549 0 COMPUTE Dalc_R=6-Dalc.
1549 0 M> COMPUTE Dalc_R=6-Dalc.
1550 0 COMPUTE Walc_R=6-Walc.
1550 0 M> COMPUTE Walc_R=6-Walc.
```

Latent Measurement Model

```
1551 0 RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
1551 0 M> RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
1552 0 INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b.
1552 0 M> INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b
.
1553 0 EXECUTE.
1553 0 M> EXECUTE.
1554 0
1554 0 M>
1555 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
1555 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
1556 0 TITLE 'Latent Measurement Model'.
1556 0 M> TITLE 'Latent Measurement Model'.
```

Latent Measurement Model

```
1557 0 SUBTITLE 'Reliability validity and covariance fit before structural paths'.
```

```
1557 0 M> SUBTITLE 'Reliability validity and covariance fit before structural paths'.
```

```
>Warning # 2004 on line 1557. Command name: SUBTITLE
```

```
>The subtitle given exceeds 60 characters in length. The first 60 characters
```

```
>will be used.
```

Latent Measurement Model
Reliability validity and covariance fit before structural pa

```

1558  0  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE /A
NALYSIS=G1 G2 G3 famrel freetime goout
1558  0 M>  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE
/ANALYSIS=G1 G2 G3 famrel freetime goout
1559  0  /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
1559  0 M>  /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
1560  0  /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=NOROTATE
/METHOD=CORRELATION.
1560  0 M>  /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=NOROT
ATE /METHOD=CORRELATION.

```

Factor Analysis

Notes

Output Created		18-JUL-2026 10:56:40
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Measurement Model\dataset.csv
	Active Dataset	MeasurementModelData
	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.

Latent Measurement Model
Reliability validity and covariance fit before structural pa

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	00:00:00.58
	Elapsed Time	00:00:00.85
	Maximum Memory Required	5704 (5.570K) bytes

[MeasurementModelData]

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

Latent Measurement Model
Reliability validity and covariance fit before structural pa

Communalities

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

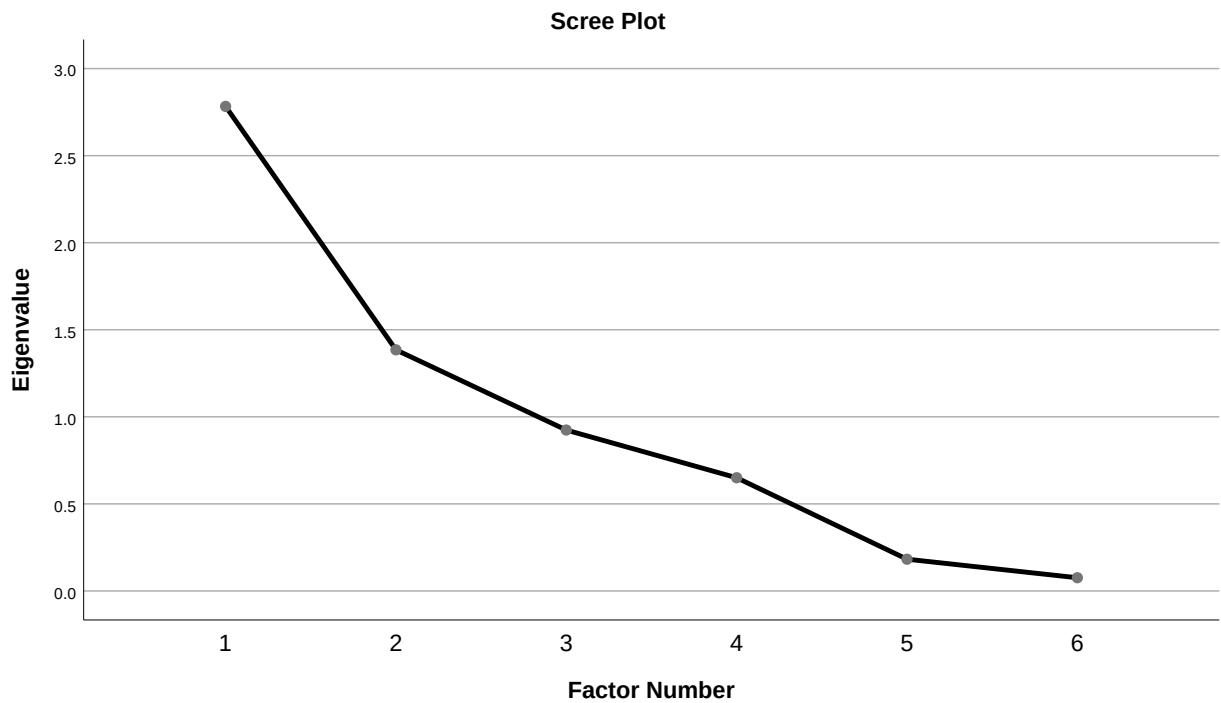
Extraction Method: Principal Axis Factoring.

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.

Latent Measurement Model
Reliability validity and covariance fit before structural pa



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.

```
1561 0 RELIABILITY /VARIABLES=G1 G2 G3 /SCALE('Academic measurement block')
ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR.
1561 0 M> RELIABILITY /VARIABLES=G1 G2 G3 /SCALE('Academic measurement block
') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR
```


Latent Measurement Model
Reliability validity and covariance fit before structural pa

Reliability

Notes

Output Created		18-JUL-2026 10:56:41
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Measurement Model\dataset.csv
	Active Dataset	MeasurementModelData
	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\Measurement Model\measurement_mod el_spss_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	00:00:00.09

Scale: Academic measurement block

Latent Measurement Model
Reliability validity and covariance fit before structural pa

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

```
1562 0 RELIABILITY /VARIABLES=famrel freetime goout /SCALE('Social measureme
nt block') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SC
ALE CORR.
```

Latent Measurement Model
Reliability validity and covariance fit before structural pa

```
1562  0 M>  RELIABILITY /VARIABLES=famrel freetime goout /SCALE('Social measur
ement block') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE
SCALE CORR.
```

Reliability

Notes

Output Created		18-JUL-2026 10:56:41
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Measurement Model\dataset.csv
	Active Dataset	MeasurementModelData
	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\Measurement Model\measurement_mod el_spss_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	00:00:00.06
	Elapsed Time	00:00:00.12

Latent Measurement Model
Reliability validity and covariance fit before structural pa

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

Latent Measurement Model
Reliability validity and covariance fit before structural pa

```
1563 0 ECHO 'Measurement quality is evaluated before structural interpretati
on'.
1563 0 M> ECHO 'Measurement quality is evaluated before structural interpret
ation'.
Measurement quality is evaluated before structural interpretation
1564 0 * END METHOD-SPECIFIC SPSS WORKFLOW.
1564 0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
1565 0
1565 0 M>
1566 0 SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale T
esting\Measurement Model\SPSS_Output\sav\measurement-m
odel_spss_ready_data.sav' /COMPRESSED.
1566 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scal
e Testing\Measurement Model\SPSS_Output\sav\measuremen
t-model_spss_ready_data.sav' /COMPRESSED.
1567 0
1567 0 M>
1568 0 ECHO '=====
====='.
1568 0 M> ECHO '=====
====='.
=====
1569 0 ECHO 'LATENT MEASUREMENT MODEL'.
1569 0 M> ECHO 'LATENT MEASUREMENT MODEL'.
LATENT MEASUREMENT MODEL
1570 0 ECHO 'Design: Reliability and validity of two prespecified CFA constr
ucts before structural paths.'.
1570 0 M> ECHO 'Design: Reliability and validity of two prespecified CFA con
structs before structural paths.'.
Design: Reliability and validity of two prespecified CFA constructs before str
uctural paths.
1571 0 ECHO 'Null hypothesis: The measurement model has no reliable loadings
or adequate covariance fit.'.
1571 0 M> ECHO 'Null hypothesis: The measurement model has no reliable loadi
ngs or adequate covariance fit.'.
Null hypothesis: The measurement model has no reliable loadings or adequate co
variance fit.
1572 0 ECHO 'Formula: x=Lambda xi+delta; y=Lambda eta+epsilon; Sigma=Lambda
Phi Lambda''+Theta.'.
```

Latent Measurement Model
Reliability validity and covariance fit before structural pa

```
1572 0 M> ECHO 'Formula: x=Lambda xi+delta; y=Lambda eta+epsilon; Sigma=Lamb
da Phi Lambda'+Theta.'.
Formula: x=Lambda xi+delta; y=Lambda eta+epsilon; Sigma=Lambda Phi Lambda'+The
ta.
1573 0 ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
1573 0 M> ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
Variables: G1, G2, G3, famrel, freetime, goout
1574 0 ECHO 'Rows analyzed: 649'.
1574 0 M> ECHO 'Rows analyzed: 649'.
Rows analyzed: 649
1575 0 ECHO 'cfi = 0.9973982062491278'.
1575 0 M> ECHO 'cfi = 0.9973982062491278'.
cfi = 0.9973982062491278
1576 0 ECHO 'factor_correlation = -0.14469453186032052'.
1576 0 M> ECHO 'factor_correlation = -0.14469453186032052'.
factor_correlation = -0.14469453186032052
1577 0 ECHO 'minimum_ave = 0.26809760378634656'.
1577 0 M> ECHO 'minimum_ave = 0.26809760378634656'.
minimum_ave = 0.26809760378634656
1578 0 ECHO 'minimum_cr = 0.46472892919002623'.
1578 0 M> ECHO 'minimum_cr = 0.46472892919002623'.
minimum_cr = 0.46472892919002623
1579 0 ECHO 'rmsea = 0.03334482463134081'.
1579 0 M> ECHO 'rmsea = 0.03334482463134081'.
rmsea = 0.03334482463134081
1580 0 ECHO 'srmr = 0.03566318315739957'.
1580 0 M> ECHO 'srmr = 0.03566318315739957'.
srmr = 0.03566318315739957
1581 0 ECHO 'Cross-check status: pass'.
1581 0 M> ECHO 'Cross-check status: pass'.
Cross-check status: pass
1582 0 ECHO '=====
====='.
1582 0 M> ECHO '=====
====='.
=====
1583 0
1583 0 M>
```

Latent Measurement Model
Reliability validity and covariance fit before structural pa

```
1584 0 OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and
Scale Testing\Measurement Model\SPSS_Output\spv\measur
ement-model_spss_output.spv'.
1584 0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis a
nd Scale Testing\Measurement Model\SPSS_Output\spv\mea
surement-model_spss_output.spv'.
1585 0 OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING
1585 0 M> OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING
```