

```
402 0 OUTPUT ACTIVATE CompositeReliabilityOutput.  
402 0 M> OUTPUT ACTIVATE CompositeReliabilityOutput.  
403 0 TITLE 'Composite Reliability'.  
403 0 M> TITLE 'Composite Reliability'.
```

Composite Reliability

```
404 0
404 0 M>
405 0 GET DATA
405 0 M> GET DATA
406 0 /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Composite Reliability\dataset.csv' /ENCODING='UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='''
406 0 M> /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Composite Reliability\dataset.csv' /ENCODING='UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='''
407 0 /ARRANGEMENT=DELIMITED /FIRSTCASE=2
407 0 M> /ARRANGEMENT=DELIMITED /FIRSTCASE=2
408 0 /VARIABLES=
408 0 M> /VARIABLES=
409 0 school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0 Fedu F8.0
409 0 M> school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0 Fedu F8.0
410 0 Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studytime F8.0 failures F8.0
410 0 M> Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studytime F8.0 failures F8.0
411 0 schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 internet A8 romantic A8
411 0 M> schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 internet A8 romantic A8
412 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.
412 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.
413 0 DATASET NAME CompositeReliabilityData.
413 0 M> DATASET NAME CompositeReliabilityData.
414 0 COMPUTE subject_id=$CASENUM.
414 0 M> COMPUTE subject_id=$CASENUM.
415 0 COMPUTE Dalc_R=6-Dalc.
415 0 M> COMPUTE Dalc_R=6-Dalc.
416 0 COMPUTE Walc_R=6-Walc.
416 0 M> COMPUTE Walc_R=6-Walc.
```

Composite Reliability

```
417 0 RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
417 0 M> RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
418 0 INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b.
418 0 M> INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b
.
419 0 EXECUTE.
419 0 M> EXECUTE.
420 0
420 0 M>
421 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
421 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
422 0 TITLE 'Composite Reliability'.
422 0 M> TITLE 'Composite Reliability'.
```

Composite Reliability

```
423 0 SUBTITLE 'Congeneric reliability from loading and uniqueness estimates'.
```

```
423 0 M> SUBTITLE 'Congeneric reliability from loading and uniqueness estimates'.
```

Composite Reliability Congeneric reliability from loading and uniqueness estimates

```

424  0  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE /A
NALYSIS=G1 G2 G3 famrel freetime goout
424  0 M>  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE
/ANALYSIS=G1 G2 G3 famrel freetime goout
425  0    /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
425  0 M>    /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
426  0    /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=NOROTATE
/METHOD=CORRELATION.
426  0 M>    /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=NOROT
ATE /METHOD=CORRELATION.

```

Factor Analysis

Notes

Output Created		18-JUL-2026 10:54:27
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Composite Reliability\dataset.csv
	Active Dataset	CompositeReliabilityData
	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.

Composite Reliability
Congeneric reliability from loading and uniqueness estimates

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	00:00:00.56
	Maximum Memory Required	5704 (5.570K) bytes

[CompositeReliabilityData]

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

Composite Reliability
Congeneric reliability from loading and uniqueness estimates

Communalities

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

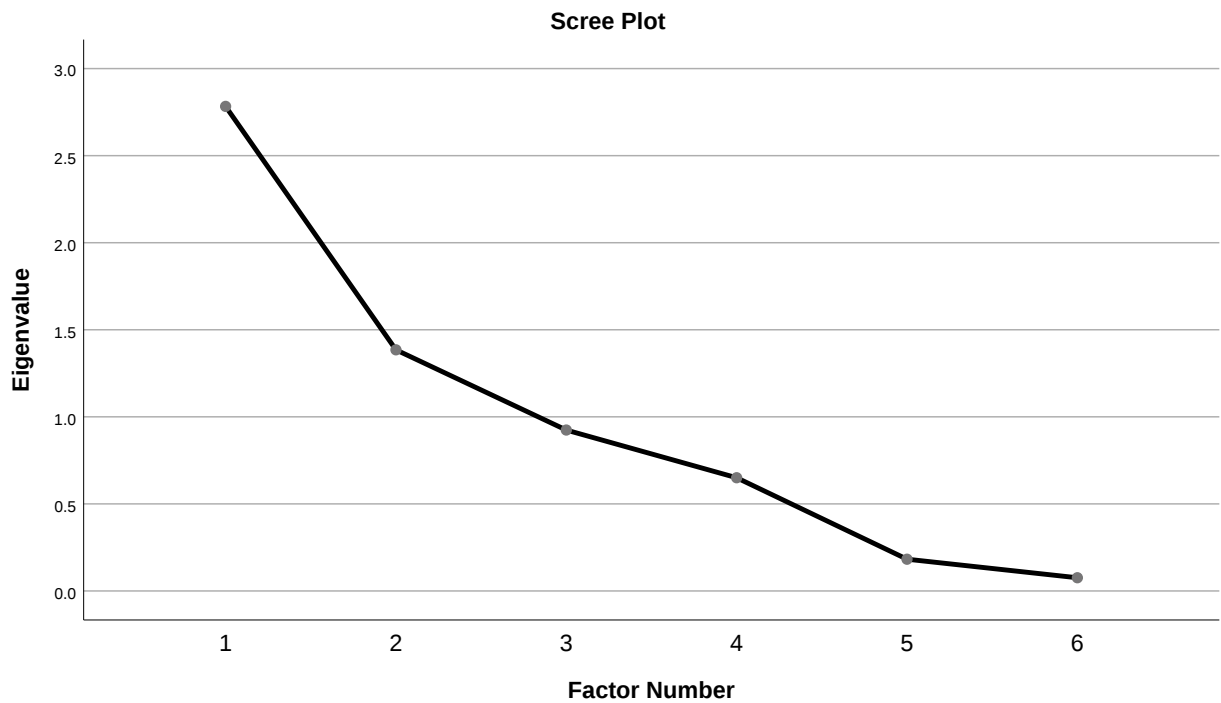
Extraction Method: Principal Axis Factoring.

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.

Composite Reliability
Congeneric reliability from loading and uniqueness estimates



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.

```

427  0  RELIABILITY /VARIABLES=G1 G2 G3 /SCALE('Academic measurement block')
ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR.
427  0  M> RELIABILITY /VARIABLES=G1 G2 G3 /SCALE('Academic measurement block
') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR

```

Composite Reliability
Congeneric reliability from loading and uniqueness estimates

Reliability

Notes

Output Created		18-JUL-2026 10:54:27
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Composite Reliability\dataset.csv
	Active Dataset	CompositeReliabilityData
	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\Composite Reliability\composite_relia bility_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	00:00:00.02
	Elapsed Time	00:00:00.06

Scale: Academic measurement block

Composite Reliability
Congeneric reliability from loading and uniqueness estimates

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

```
428 0 RELIABILITY /VARIABLES=famrel freetime goout /SCALE('Social measureme
nt block') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SC
ALE CORR.
```

Composite Reliability
Congeneric reliability from loading and uniqueness estimates

```
428 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 10:54:28
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Composite Reliability\dataset.csv
	Active Dataset	CompositeReliabilityData
	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\Composite Reliability\composite_reliability_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=DESCRIPTIVE SCALE CORR.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.05

Composite Reliability
Congeneric reliability from loading and uniqueness estimates

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

Composite Reliability
Congeneric reliability from loading and uniqueness estimates

```
429 0 ECHO 'Composite reliability does not impose equal loadings'.
429 0 M> ECHO 'Composite reliability does not impose equal loadings'.
Composite reliability does not impose equal loadings
430 0 * END METHOD-SPECIFIC SPSS WORKFLOW.
430 0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
431 0
431 0 M>
432 0 SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale T
esting\Composite Reliability\SPSS_Output\sav\composite
-reliability_spss_ready_data.sav' /COMPRESSED.
432 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scal
e Testing\Composite Reliability\SPSS_Output\sav\compos
ite-reliability_spss_ready_data.sav' /COMPRESSED.
433 0
433 0 M>
434 0 ECHO '=====
====='.
434 0 M> ECHO '=====
====='.
=====
435 0 ECHO 'COMPOSITE RELIABILITY'.
435 0 M> ECHO 'COMPOSITE RELIABILITY'.
COMPOSITE RELIABILITY
436 0 ECHO 'Design: Congeneric reliability computed from CFA loadings and u
niquenesses for each construct.'.
436 0 M> ECHO 'Design: Congeneric reliability computed from CFA loadings an
d uniquenesses for each construct.'.
Design: Congeneric reliability computed from CFA loadings and uniquenesses for
each construct.
437 0 ECHO 'Null hypothesis: Composite reliability is at or below the decla
red adequacy threshold.'.
437 0 M> ECHO 'Null hypothesis: Composite reliability is at or below the de
clared adequacy threshold.'.
Null hypothesis: Composite reliability is at or below the declared adequacy th
reshold.
438 0 ECHO 'Formula: CR=(sum lambda)^2/[(sum lambda)^2+sum theta].'.
438 0 M> ECHO 'Formula: CR=(sum lambda)^2/[(sum lambda)^2+sum theta].'.
Formula: CR=(sum lambda)^2/[(sum lambda)^2+sum theta].
439 0 ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
```

Composite Reliability
Congeneric reliability from loading and uniqueness estimates

```
439  0 M> ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
Variables: G1, G2, G3, famrel, freetime, goout
440  0 ECHO 'Rows analyzed: 649'.
440  0 M> ECHO 'Rows analyzed: 649'.
Rows analyzed: 649
441  0 ECHO 'academic_cr = 0.9534645459795349'.
441  0 M> ECHO 'academic_cr = 0.9534645459795349'.
academic_cr = 0.9534645459795349
442  0 ECHO 'constructs = 2'.
442  0 M> ECHO 'constructs = 2'.
constructs = 2
443  0 ECHO 'minimum_cr = 0.46472892919002623'.
443  0 M> ECHO 'minimum_cr = 0.46472892919002623'.
minimum_cr = 0.46472892919002623
444  0 ECHO 'social_cr = 0.46472892919002623'.
444  0 M> ECHO 'social_cr = 0.46472892919002623'.
social_cr = 0.46472892919002623
445  0 ECHO 'Cross-check status: pass'.
445  0 M> ECHO 'Cross-check status: pass'.
Cross-check status: pass
446  0 ECHO '=====
====='.
446  0 M> ECHO '=====
=====
=====
====='.
=====
447  0
447  0 M>
448  0 OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and
Scale Testing\Composite Reliability\SPSS_Output\spv\co
mposite-reliability_spss_output.spv'.
448  0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis a
nd Scale Testing\Composite Reliability\SPSS_Output\spv
\composite-reliability_spss_output.spv'.
449  0 OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING
449  0 M> OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING
```