

```
461 0 OUTPUT ACTIVATE ConfirmatoryCompositeAnalysisOutput.  
461 0 M> OUTPUT ACTIVATE ConfirmatoryCompositeAnalysisOutput.  
462 0 TITLE 'Confirmatory Composite Analysis'.  
462 0 M> TITLE 'Confirmatory Composite Analysis'.
```

Confirmatory Composite Analysis

```

463 0
463 0 M>
464 0 GET DATA
464 0 M> GET DATA
465 0 /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Confirmatory Composite Analysis\dataset.csv
      ' /ENCODING='UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='''
465 0 M> /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Confirmatory Composite Analysis\dataset.
      csv' /ENCODING='UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER=
      ''''
466 0 /ARRANGEMENT=DELIMITED /FIRSTCASE=2
466 0 M> /ARRANGEMENT=DELIMITED /FIRSTCASE=2
467 0 /VARIABLES=
467 0 M> /VARIABLES=
468 0 school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0
      Fedu F8.0
468 0 M> school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F
      8.0 Fedu F8.0
469 0 Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studyti
      me F8.0 failures F8.0
469 0 M> Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studyti
      me F8.0 failures F8.0
470 0 schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 in
      ternet A8 romantic A8
470 0 M> schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8
      internet A8 romantic A8
471 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.
471 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.
472 0 DATASET NAME ConfirmatoryCompositeAnalysisData.
472 0 M> DATASET NAME ConfirmatoryCompositeAnalysisData.
473 0 COMPUTE subject_id=$CASENUM.
473 0 M> COMPUTE subject_id=$CASENUM.
474 0 COMPUTE Dalc_R=6-Dalc.
474 0 M> COMPUTE Dalc_R=6-Dalc.
475 0 COMPUTE Walc_R=6-Walc.
475 0 M> COMPUTE Walc_R=6-Walc.

```

Confirmatory Composite Analysis

```
476 0 RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
476 0 M> RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
477 0 INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b.
477 0 M> INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b
.
478 0 EXECUTE.
478 0 M> EXECUTE.
479 0
479 0 M>
480 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
480 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
481 0 TITLE 'Confirmatory Composite Analysis'.
481 0 M> TITLE 'Confirmatory Composite Analysis'.
```

Confirmatory Composite Analysis

482 0 SUBTITLE 'Prespecified academic and social weighted composites'.

482 0 M> SUBTITLE 'Prespecified academic and social weighted composites'.

Confirmatory Composite Analysis
Prespecified academic and social weighted composites

```

483  0  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE /A
NALYSIS=G1 G2 G3 famrel freetime goout
483  0 M>  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE
/ANALYSIS=G1 G2 G3 famrel freetime goout
484  0    /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
484  0 M>    /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
485  0    /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PC /ROTATION=NOROTATE
/METHOD=CORRELATION.
485  0 M>    /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PC /ROTATION=NOROTA
TE /METHOD=CORRELATION.

```

Factor Analysis

Notes

Output Created		18-JUL-2026 10:54:33
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Confirmatory Composite Analysis\dataset.csv
	Active Dataset	ConfirmatoryCompositeAn alysisData
	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.

Confirmatory Composite Analysis
Prespecified academic and social weighted composites

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=PC /ROTATION=NOROTATE /METHOD=CORRELATIO N.
Resources	Processor Time	00:00:00.37
	Elapsed Time	00:00:00.36
	Maximum Memory Required	5704 (5.570K) bytes

[ConfirmatoryCompositeAnalysisData]

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

Confirmatory Composite Analysis
Prespecified academic and social weighted composites

Communalities

	Initial	Extraction
G1	1.000	.873
G2	1.000	.943
G3	1.000	.914
famrel	1.000	.232
freetime	1.000	.622
goout	1.000	.584

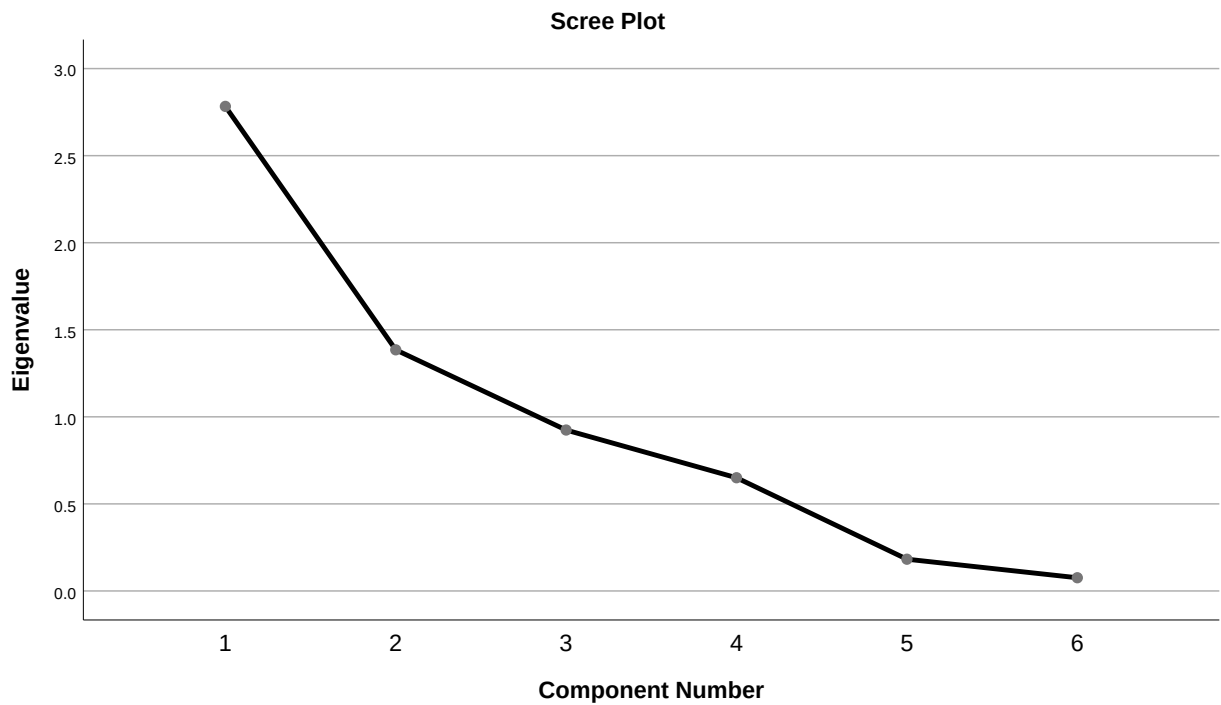
Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.783	46.381	46.381	2.783	46.381	46.381
2	1.385	23.080	69.461	1.385	23.080	69.461
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 Component Analysis.

Confirmatory Composite Analysis
Prespecified academic and social weighted composites



Component Matrix^a

	Component	
	1	2
G1	.931	.084
G2	.966	.093
G3	.954	.067
famrel	.085	.474
freetime	-.198	.763
goout	-.163	.747

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

```

486 0 COMPUTE academic_composite=MEAN(G1,G2,G3).
486 0 M> COMPUTE academic_composite=MEAN(G1,G2,G3).
487 0 COMPUTE social_composite=MEAN(famrel,freetime,goout).
487 0 M> COMPUTE social_composite=MEAN(famrel,freetime,goout).

```


Confirmatory Composite Analysis
Prespecified academic and social weighted composites

488 0 CORRELATIONS /VARIABLES=academic_composite social_composite /PRINT=TWOTAIL NOSIG.

488 0 M> CORRELATIONS /VARIABLES=academic_composite social_composite /PRINT=TWOTAIL NOSIG.

Correlations

Notes

Output Created		18-JUL-2026 10:54:33
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Confirmatory Composite Analysis\dataset.csv
	Active Dataset	ConfirmatoryCompositeAn alysisData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=academic_c omposite social_composite /PRINT=TWOTAIL ...
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.02

Confirmatory Composite Analysis
Prespecified academic and social weighted composites

Correlations

		academic_composite	social_composite
academic_composite	Pearson Correlation	1	-.070
	Sig. (2-tailed)		.076
	N	649	649
social_composite	Pearson Correlation	-.070	1
	Sig. (2-tailed)	.076	
	N	649	649

489 0 DESCRIPTIVES VARIABLES=G1 G2 G3 famrel freetime goout /STATISTICS=MEAN STDDEV MIN MAX.

489 0 M> DESCRIPTIVES VARIABLES=G1 G2 G3 famrel freetime goout /STATISTICS=MEAN STDDEV MIN MAX.

Descriptives

Notes

Output Created		18-JUL-2026 10:54:33
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Confirmatory Composite Analysis\dataset.csv
	Active Dataset	ConfirmatoryCompositeAn alysisData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.

Confirmatory Composite Analysis
Prespecified academic and social weighted composites

Notes

Syntax	DESCRIPTIVES VARIABLES=G1 G2 G3 famrel freetime goout /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time 00:00:00.05
	Elapsed Time 00:00:00.04

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
G1	649	0	19	11.40	2.745
G2	649	0	19	11.57	2.914
G3	649	0	19	11.91	3.231
famrel	649	1	5	3.93	.956
freetime	649	1	5	3.18	1.051
goout	649	1	5	3.18	1.176
Valid N (listwise)	649				

```

490 0 * END METHOD-SPECIFIC SPSS WORKFLOW.
490 0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
491 0
491 0 M>
492 0 SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale T
esting\Confirmatory Composite Analysis\SPSS_Output\sav
\confirmatory-composite-analysis_spss_ready_data.sav' /COMPRESSED.
492 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scal
e Testing\Confirmatory Composite Analysis\SPSS_Output\
sav\confirmatory-composite-analysis_spss_ready_data.sav' /COMPR
ESSED.
493 0
493 0 M>
494 0 ECHO '=====
====='.
494 0 M> ECHO '=====
====='.
=====

```

Confirmatory Composite Analysis
Prespecified academic and social weighted composites

```
495 0 ECHO 'CONFIRMATORY COMPOSITE ANALYSIS'.
495 0 M> ECHO 'CONFIRMATORY COMPOSITE ANALYSIS'.
CONFIRMATORY COMPOSITE ANALYSIS
496 0 ECHO 'Design: Fixed weighted composites evaluated by their outer load
ings and reproduced correlation matrix.'.
496 0 M> ECHO 'Design: Fixed weighted composites evaluated by their outer l
oadings and reproduced correlation matrix.'.
Design: Fixed weighted composites evaluated by their outer loadings and reprod
uced correlation matrix.
497 0 ECHO 'Null hypothesis: The prespecified two-composite model has inade
quate reliability or residual fit.'.
497 0 M> ECHO 'Null hypothesis: The prespecified two-composite model has in
adequate reliability or residual fit.'.
Null hypothesis: The prespecified two-composite model has inadequate reliabili
ty or residual fit.
498 0 ECHO 'Formula: Composite scores=Xw; outer loading=cor(x_i,score); SRM
R=sqrt(mean residual correlation^2)'.
498 0 M> ECHO 'Formula: Composite scores=Xw; outer loading=cor(x_i,score);
SRMR=sqrt(mean residual correlation^2)'.
Formula: Composite scores=Xw; outer loading=cor(x_i,score); SRMR=sqrt(mean res
idual correlation^2).
499 0 ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
499 0 M> ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
Variables: G1, G2, G3, famrel, freetime, goout
500 0 ECHO 'Rows analyzed: 649'.
500 0 M> ECHO 'Rows analyzed: 649'.
Rows analyzed: 649
501 0 ECHO 'academic_composite_reliability = 0.9693952591759201'.
501 0 M> ECHO 'academic_composite_reliability = 0.9693952591759201'.
academic_composite_reliability = 0.9693952591759201
502 0 ECHO 'composite_correlation = -0.08877463872252819'.
502 0 M> ECHO 'composite_correlation = -0.08877463872252819'.
composite_correlation = -0.08877463872252819
503 0 ECHO 'constructs = 2'.
503 0 M> ECHO 'constructs = 2'.
constructs = 2
504 0 ECHO 'social_composite_reliability = 0.7128393255337119'.
504 0 M> ECHO 'social_composite_reliability = 0.7128393255337119'.
social_composite_reliability = 0.7128393255337119
```

Confirmatory Composite Analysis
Prespecified academic and social weighted composites

```
505 0 ECHO 'Cross-check status: pass'.
505 0 M> ECHO 'Cross-check status: pass'.
Cross-check status: pass
506 0 ECHO '=====
====='.
506 0 M> ECHO '=====
====='.
=====

507 0
507 0 M>
508 0 OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and
Scale Testing\Confirmatory Composite Analysis\SPSS_Out
put\spv\confirmatory-composite-analysis_spss_output.spv'.
508 0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis a
nd Scale Testing\Confirmatory Composite Analysis\SPSS_
Output\spv\confirmatory-composite-analysis_spss_output.spv'.
509 0 OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING
509 0 M> OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING
```