

```
1659 0 OUTPUT ACTIVATE NFIOOutput.  
1659 0 M> OUTPUT ACTIVATE NFIOOutput.  
1660 0 TITLE 'Normed Fit Index'.  
1660 0 M> TITLE 'Normed Fit Index'.
```

Normed Fit Index

```

1661 0
1661 0 M>
1662 0 GET DATA
1662 0 M> GET DATA
1663 0 /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Sca
le Testing\NFI\dataset.csv' /ENCODING='UTF8' /DELCASE=
      LINE /DELIMITERS=', ' /QUALIFIER='''
1663 0 M> /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and
Scale Testing\NFI\dataset.csv' /ENCODING='UTF8' /DELCA
      SE=LINE /DELIMITERS=', ' /QUALIFIER='''
1664 0 /ARRANGEMENT=DELIMITED /FIRSTCASE=2
1664 0 M> /ARRANGEMENT=DELIMITED /FIRSTCASE=2
1665 0 /VARIABLES=
1665 0 M> /VARIABLES=
1666 0 school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0
Fedu F8.0
1666 0 M> school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F
8.0 Fedu F8.0
1667 0 Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studytime
F8.0 failures F8.0
1667 0 M> Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studyti
me F8.0 failures F8.0
1668 0 schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 in
ternet A8 romantic A8
1668 0 M> schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8
internet A8 romantic A8
1669 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.
1669 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.
1670 0 DATASET NAME NFIData.
1670 0 M> DATASET NAME NFIData.
1671 0 COMPUTE subject_id=$CASENUM.
1671 0 M> COMPUTE subject_id=$CASENUM.
1672 0 COMPUTE Dalc_R=6-Dalc.
1672 0 M> COMPUTE Dalc_R=6-Dalc.
1673 0 COMPUTE Walc_R=6-Walc.
1673 0 M> COMPUTE Walc_R=6-Walc.

```

Normed Fit Index

```
1674 0 RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
1674 0 M> RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
1675 0 INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b.
1675 0 M> INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b
.
1676 0 EXECUTE.
1676 0 M> EXECUTE.
1677 0
1677 0 M>
1678 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
1678 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
1679 0 TITLE 'Normed Fit Index'.
1679 0 M> TITLE 'Normed Fit Index'.
```

Normed Fit Index

```
1680 0 SUBTITLE 'Raw proportional chi-square reduction from independence model'.
```

```
1680 0 M> SUBTITLE 'Raw proportional chi-square reduction from independence model'.
```

```
>Warning # 2004 on line 1680. Command name: SUBTITLE
```

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

Normed Fit Index
Raw proportional chi-square reduction from independence mode

```

1681  0  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE /A
NALYSIS=G1 G2 G3 famrel freetime goout
1681  0 M>  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE
 /ANALYSIS=G1 G2 G3 famrel freetime goout
1682  0  /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
1682  0 M>  /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
1683  0  /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=NOROTATE
 /METHOD=CORRELATION.
1683  0 M>  /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=NOROT
ATE /METHOD=CORRELATION.

```

Factor Analysis

Notes

Output Created		18-JUL-2026 10:56:57
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\NFI\dataset.csv
	Active Dataset	NFIData
	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.

Normed Fit Index
Raw proportional chi-square reduction from independence mode

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	00:00:00.31
	Elapsed Time	00:00:00.44
	Maximum Memory Required	5704 (5.570K) bytes

[NFIData]

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

Normed Fit Index
Raw proportional chi-square reduction from independence mode

Communalities

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

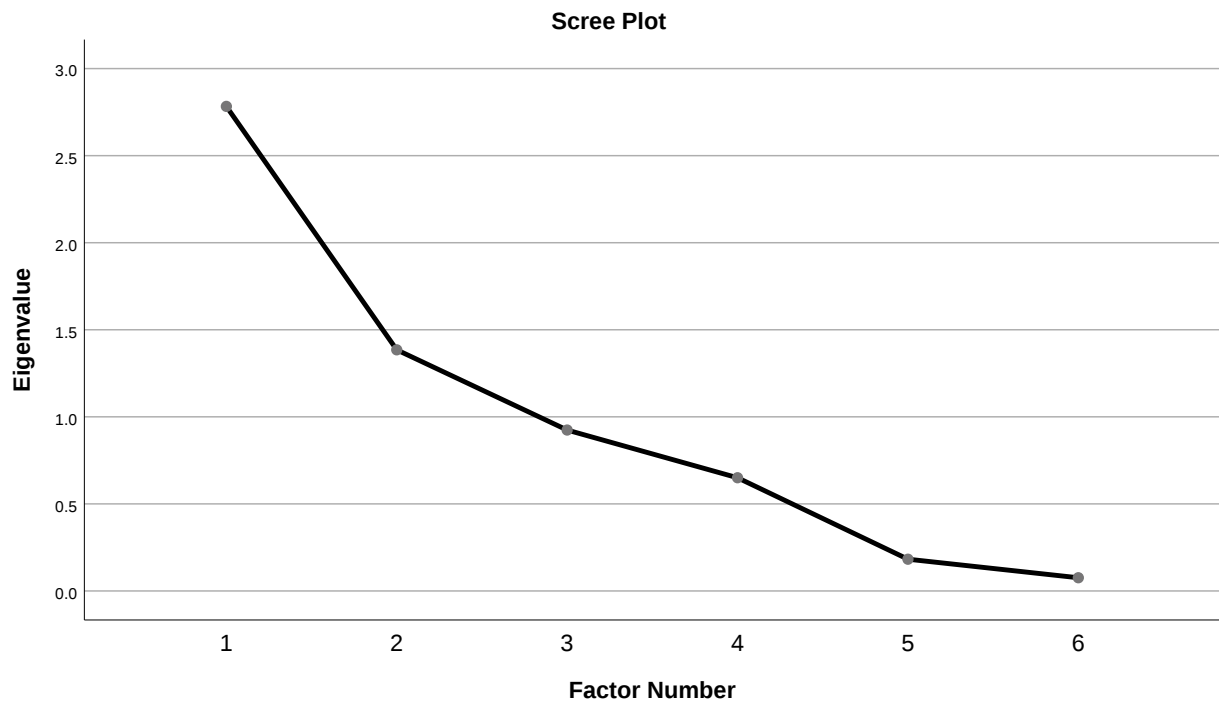
Extraction Method: Principal Axis Factoring.

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.

Normed Fit Index
Raw proportional chi-square reduction from independence mode



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.

```
1684 0 RELIABILITY /VARIABLES=G1 G2 G3 /SCALE('Academic measurement block')
ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR.
1684 0 M> RELIABILITY /VARIABLES=G1 G2 G3 /SCALE('Academic measurement block
') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR
```

Normed Fit Index
Raw proportional chi-square reduction from independence mode

Reliability

Notes

Output Created		18-JUL-2026 10:56:57
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\NFI\dataset.csv
	Active Dataset	NFIData
	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\NFI\nfi_spss_synt ax.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	00:00:00.03
	Elapsed Time	00:00:00.05

Scale: Academic measurement block

Normed Fit Index
Raw proportional chi-square reduction from independence mode

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

```
1685  0  RELIABILITY /VARIABLES=famrel freetime goout /SCALE('Social measureme
nt block') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SC
ALE CORR.
```

Normed Fit Index
Raw proportional chi-square reduction from independence mode

```
1685  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 10:56:57
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\NFI\dataset.csv
	Active Dataset	NFIData
	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\NFI\nfi_spss_synt ax.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	00:00:00.05
	Elapsed Time	00:00:00.07

Normed Fit Index
Raw proportional chi-square reduction from independence mode

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

1686 0 ECHO 'NFI does not apply the CFI noncentrality correction'.

Normed Fit Index
Raw proportional chi-square reduction from independence mode

```
1686 0 M> ECHO 'NFI does not apply the CFI noncentrality correction'.
NFI does not apply the CFI noncentrality correction
1687 0 * END METHOD-SPECIFIC SPSS WORKFLOW.
1687 0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
1688 0
1688 0 M>
1689 0 SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale T
esting\NFI\SPSS_Output\sav\nfi_spss_ready_data.sav' /C
OMPRESSED.
1689 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scal
e Testing\NFI\SPSS_Output\sav\nfi_spss_ready_data.sav'
/COMPRESSED.

1690 0
1690 0 M>
1691 0 ECHO '=====
====='.
1691 0 M> ECHO '=====
====='.
=====
1692 0 ECHO 'NORMED FIT INDEX'.
1692 0 M> ECHO 'NORMED FIT INDEX'.
NORMED FIT INDEX
1693 0 ECHO 'Design: Proportional reduction in ML chi-square from independen
ce to target CFA model.'.
1693 0 M> ECHO 'Design: Proportional reduction in ML chi-square from indepen
dence to target CFA model.'.
Design: Proportional reduction in ML chi-square from independence to target CF
A model.
1694 0 ECHO 'Null hypothesis: The target model does not reduce discrepancy r
elative to independence.'.
1694 0 M> ECHO 'Null hypothesis: The target model does not reduce discrepanc
y relative to independence.'.
Null hypothesis: The target model does not reduce discrepancy relative to inde
pendence.
1695 0 ECHO 'Formula:  $NFI = (chi2\_baseline - chi2\_target) / chi2\_baseline$ '.
1695 0 M> ECHO 'Formula:  $NFI = (chi2\_baseline - chi2\_target) / chi2\_baseline$ '.
Formula:  $NFI = (chi2\_baseline - chi2\_target) / chi2\_baseline$ .
1696 0 ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
1696 0 M> ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
```

Normed Fit Index
Raw proportional chi-square reduction from independence mode

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

1697 0 ECHO 'Rows analyzed: 649'.

1697 0 M> ECHO 'Rows analyzed: 649'.

Rows analyzed: 649

1698 0 ECHO 'baseline_chi_square = 2230.3839347203802'.

1698 0 M> ECHO 'baseline_chi_square = 2230.3839347203802'.

baseline_chi_square = 2230.3839347203802

1699 0 ECHO 'chi_square_reduction = 2216.619962643242'.

1699 0 M> ECHO 'chi_square_reduction = 2216.619962643242'.

chi_square_reduction = 2216.619962643242

1700 0 ECHO 'nfi = 0.9938288776820553'.

1700 0 M> ECHO 'nfi = 0.9938288776820553'.

nfi = 0.9938288776820553

1701 0 ECHO 'target_chi_square = 13.76397207713822'.

1701 0 M> ECHO 'target_chi_square = 13.76397207713822'.

target_chi_square = 13.76397207713822

1702 0 ECHO 'Cross-check status: pass'.

1702 0 M> ECHO 'Cross-check status: pass'.

Cross-check status: pass

1703 0 ECHO '=====
====='

1703 0 M> ECHO '=====
====='

=====

1704 0

1704 0 M>

1705 0 OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and
Scale Testing\NFI\SPSS_Output\spv\nfi_spss_output.spv'

1705 0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis a
nd Scale Testing\NFI\SPSS_Output\spv\nfi_spss_output.s
pv'.

1706 0 OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING

1706 0 M> OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING