

```
2017 0 OUTPUT ACTIVATE PromaxRotationOutput.  
2017 0 M> OUTPUT ACTIVATE PromaxRotationOutput.  
2018 0 TITLE 'Promax Oblique Rotation'.  
2018 0 M> TITLE 'Promax Oblique Rotation'.
```

Promax Oblique Rotation

```
2019 0
2019 0 M>
2020 0 GET DATA
2020 0 M> GET DATA
2021 0 /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Promax Rotation\dataset.csv' /ENCODING='UTF
      8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"'
2021 0 M> /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Promax Rotation\dataset.csv' /ENCODING='
      UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"'
2022 0 /ARRANGEMENT=DELIMITED /FIRSTCASE=2
2022 0 M> /ARRANGEMENT=DELIMITED /FIRSTCASE=2
2023 0 /VARIABLES=
2023 0 M> /VARIABLES=
2024 0 school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0
      Fedu F8.0
2024 0 M> school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F
      8.0 Fedu F8.0
2025 0 Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studytime
      F8.0 failures F8.0
2025 0 M> Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studyti
      me F8.0 failures F8.0
2026 0 schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 in
      ternet A8 romantic A8
2026 0 M> schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8
      internet A8 romantic A8
2027 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.
2027 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.
2028 0 DATASET NAME PromaxRotationData.
2028 0 M> DATASET NAME PromaxRotationData.
2029 0 COMPUTE subject_id=$CASENUM.
2029 0 M> COMPUTE subject_id=$CASENUM.
2030 0 COMPUTE Dalc_R=6-Dalc.
2030 0 M> COMPUTE Dalc_R=6-Dalc.
2031 0 COMPUTE Walc_R=6-Walc.
2031 0 M> COMPUTE Walc_R=6-Walc.
```

Promax Oblique Rotation

```
2032 0 RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
2032 0 M> RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
2033 0 INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b.
2033 0 M> INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b
.
2034 0 EXECUTE.
2034 0 M> EXECUTE.
2035 0
2035 0 M>
2036 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
2036 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
2037 0 TITLE 'Promax Oblique Rotation'.
2037 0 M> TITLE 'Promax Oblique Rotation'.
```

Promax Oblique Rotation

```
2038 0 SUBTITLE 'Power-four target after initial varimax'.  
2038 0 M> SUBTITLE 'Power-four target after initial varimax'.
```

Promax Oblique Rotation
Power-four target after initial varimax

```

2039  0  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE /A
NALYSIS=G1 G2 G3 famrel freetime goout
2039  0 M>  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE
 /ANALYSIS=G1 G2 G3 famrel freetime goout
2040  0  /PRINT=INITIAL EXTRACTION KMO CORRELATION ROTATION /PLOT=EIGEN ROTAT
ION
2040  0 M>  /PRINT=INITIAL EXTRACTION KMO CORRELATION ROTATION /PLOT=EIGEN RO
TATION
2041  0  /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=PROMAX /
METHOD=CORRELATION.
2041  0 M>  /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=PROMA
X /METHOD=CORRELATION.

```

Factor Analysis

Notes

Output Created		18-JUL-2026 10:57:29
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Promax Rotation\dataset.csv
	Active Dataset	PromaxRotationData
	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.

Promax Oblique Rotation
Power-four target after initial varimax

Notes

Syntax		FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE /ANALYSIS=G1 G2 G3 famrel freetime goout /PRINT=INITIAL EXTRACTION KMO CORRELATION ROTATION /PLOT=EIGEN ROTATION /CRITERIA=FACTORS(2) ITERATE(500) /EXTRACTION=PAF /ROTATION=PROMAX /METHOD=CORRELATIO...
Resources	Processor Time	00:00:00.56
	Elapsed Time	00:00:00.48
	Maximum Memory Required	5704 (5.570K) bytes

[PromaxRotationData]

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

Promax Oblique Rotation
Power-four target after initial varimax

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			

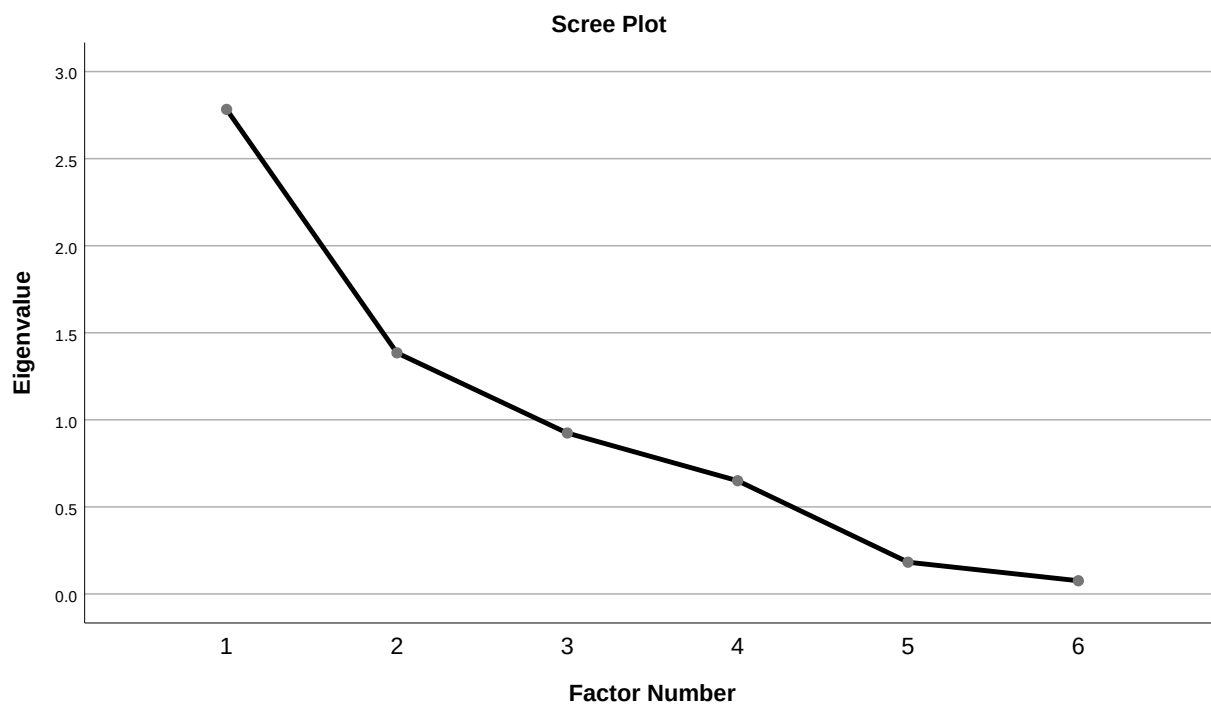
Total Variance Explained

Factor	Rotation Sums of Squared Loadings ^a
	Total
1	2.646
2	.816
3	
4	
5	
6	

Promax Oblique Rotation
Power-four target after initial varimax

Extraction Method: Principal Axis Factoring.

- a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.



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.

Promax Oblique Rotation
Power-four target after initial varimax

Pattern Matrix^a

	Factor	
	1	2
G1	.882	.013
G2	.986	.025
G3	.935	-.010
famrel	.102	.203
freetime	-.017	.686
goout	-.014	.500

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Structure Matrix

	Factor	
	1	2
G1	.880	-.123
G2	.983	-.127
G3	.937	-.154
famrel	.071	.187
freetime	-.122	.689
goout	-.091	.502

Extraction Method: Principal Axis Factoring.

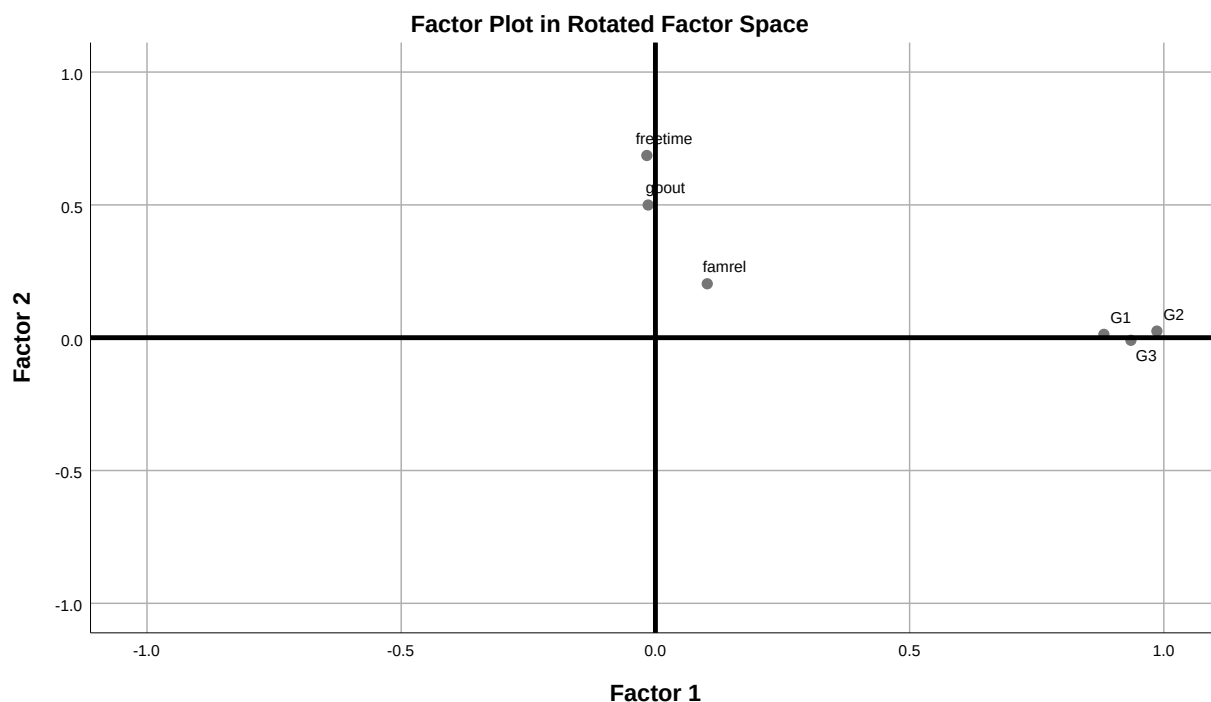
Rotation Method: Promax with Kaiser Normalization.

Promax Oblique Rotation
Power-four target after initial varimax

**Factor Correlation
Matrix**

Factor	1	2
1	1.000	-.154
2	-.154	1.000

Extraction Method: Principal
Axis Factoring.
Rotation Method: Promax with
Kaiser Normalization.



```
2042  0  ECHO 'Promax starts from varimax then permits factor correlation'.
2042  0 M>  ECHO 'Promax starts from varimax then permits factor correlation'.
Promax starts from varimax then permits factor correlation
2043  0  DESCRIPTIVES VARIABLES=G1 G2 G3 famrel freetime goout /STATISTICS=MEAN
STDDEV MIN MAX.
2043  0 M>  DESCRIPTIVES VARIABLES=G1 G2 G3 famrel freetime goout /STATISTICS=
MEAN STDDEV MIN MAX.
```

Descriptives

Promax Oblique Rotation
Power-four target after initial varimax

Notes

Output Created		18-JUL-2026 10:57:30
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Promax Rotation\dataset.csv
	Active Dataset	PromaxRotationData
	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.
Syntax		DESCRIPTIVES VARIABLES=G1 G2 G3 famrel freetime goout /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.02
	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				

2044 0 * END METHOD-SPECIFIC SPSS WORKFLOW.

Promax Oblique Rotation
Power-four target after initial varimax

```
2044  0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
2045  0
2045  0 M>
2046  0 SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale T
esting\Promax Rotation\SPSS_Output\sav\promax-rotation
      _spss_ready_data.sav' /COMPRESSED.
2046  0 M> SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scal
e Testing\Promax Rotation\SPSS_Output\sav\promax-rotat
      ion_spss_ready_data.sav' /COMPRESSED.
2047  0
2047  0 M>
2048  0 ECHO '=====
====='.
2048  0 M> ECHO '=====
====='.
=====
2049  0 ECHO 'PROMAX OBLIQUE ROTATION'.
2049  0 M> ECHO 'PROMAX OBLIQUE ROTATION'.
PROMAX OBLIQUE ROTATION
2050  0 ECHO 'Design: Power-four target rotation of an initial varimax princi
pal-axis solution.'.
2050  0 M> ECHO 'Design: Power-four target rotation of an initial varimax pri
ncipal-axis solution.'.
Design: Power-four target rotation of an initial varimax principal-axis soluti
on.
2051  0 ECHO 'Null hypothesis: Promax does not produce a simpler correlated-f
actor pattern.'.
2051  0 M> ECHO 'Null hypothesis: Promax does not produce a simpler correlate
d-factor pattern.'.
Null hypothesis: Promax does not produce a simpler correlated-factor pattern.
2052  0 ECHO 'Formula: Targetij=sign(lij)|lij|^4; regress target on varima
x loadings to obtain oblique transform.'.
2052  0 M> ECHO 'Formula: Targetij=sign(lij)|lij|^4; regress target on var
imax loadings to obtain oblique transform.'.
Formula: Targetij=sign(lij)|lij|^4; regress target on varimax loadings to o
btain oblique transform.
2053  0 ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
2053  0 M> ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
Variables: G1, G2, G3, famrel, freetime, goout
```

Promax Oblique Rotation
Power-four target after initial varimax

```
2054  0  ECHO 'Rows analyzed: 649'.
2054  0 M> ECHO 'Rows analyzed: 649'.
Rows analyzed: 649
2055  0  ECHO 'cross_loading_items = 0'.
2055  0 M> ECHO 'cross_loading_items = 0'.
cross_loading_items = 0
2056  0  ECHO 'factor_correlation = -0.6525460186327302'.
2056  0 M> ECHO 'factor_correlation = -0.6525460186327302'.
factor_correlation = -0.6525460186327302
2057  0  ECHO 'maximum_pattern_loading = 0.808825179126963'.
2057  0 M> ECHO 'maximum_pattern_loading = 0.808825179126963'.
maximum_pattern_loading = 0.808825179126963
2058  0  ECHO 'power = 4'.
2058  0 M> ECHO 'power = 4'.
power = 4
2059  0  ECHO 'Cross-check status: pass'.
2059  0 M> ECHO 'Cross-check status: pass'.
Cross-check status: pass
2060  0  ECHO '=====
====='.
2060  0 M> ECHO '=====
====='.
=====
2061  0
2061  0 M>
2062  0  OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and
Scale Testing\Promax Rotation\SPSS_Output\spv\promax-r
otation_spss_output.spv'.
2062  0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis a
nd Scale Testing\Promax Rotation\SPSS_Output\spv\proma
x-rotation_spss_output.spv'.
2063  0  OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING
2063  0 M> OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING
```