

```
941 0 OUTPUT ACTIVATE EigenvaluesOutput.  
941 0 M> OUTPUT ACTIVATE EigenvaluesOutput.  
942 0 TITLE 'Correlation-Matrix Eigenvalues'.  
942 0 M> TITLE 'Correlation-Matrix Eigenvalues'.
```

Correlation-Matrix Eigenvalues

```
943 0
943 0 M>
944 0 GET DATA
944 0 M> GET DATA
945 0 /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Eigenvalues\dataset.csv' /ENCODING='UTF8' /
      DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"'
945 0 M> /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Eigenvalues\dataset.csv' /ENCODING='UTF8
      ' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"'
946 0 /ARRANGEMENT=DELIMITED /FIRSTCASE=2
946 0 M> /ARRANGEMENT=DELIMITED /FIRSTCASE=2
947 0 /VARIABLES=
947 0 M> /VARIABLES=
948 0 school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0 Fedu F8.0
948 0 M> school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0 Fedu F8.0
949 0 Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studytime F8.0 failures F8.0
949 0 M> Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studytime F8.0 failures F8.0
950 0 schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 internet A8 romantic A8
950 0 M> schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 internet A8 romantic A8
951 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.
951 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.
952 0 DATASET NAME EigenvaluesData.
952 0 M> DATASET NAME EigenvaluesData.
953 0 COMPUTE subject_id=$CASENUM.
953 0 M> COMPUTE subject_id=$CASENUM.
954 0 COMPUTE Dalc_R=6-Dalc.
954 0 M> COMPUTE Dalc_R=6-Dalc.
955 0 COMPUTE Walc_R=6-Walc.
955 0 M> COMPUTE Walc_R=6-Walc.
```

Correlation-Matrix Eigenvalues

```
956 0 RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
956 0 M> RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
957 0 INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b.
957 0 M> INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b
.
958 0 EXECUTE.
958 0 M> EXECUTE.
959 0
959 0 M>
960 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
960 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
961 0 TITLE 'Correlation Matrix Eigenvalues'.
961 0 M> TITLE 'Correlation Matrix Eigenvalues'.
```

Correlation Matrix Eigenvalues

```
962 0 SUBTITLE 'Ordered PCA roots and explained variance'.  
962 0 M> SUBTITLE 'Ordered PCA roots and explained variance'.
```

Correlation Matrix Eigenvalues
Ordered PCA roots and explained variance

```

963  0  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE /A
NALYSIS=G1 G2 G3 famrel freetime goout
963  0 M>  FACTOR /VARIABLES=G1 G2 G3 famrel freetime goout /MISSING=LISTWISE
/ANALYSIS=G1 G2 G3 famrel freetime goout
964  0    /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
964  0 M>    /PRINT=INITIAL EXTRACTION KMO CORRELATION /PLOT=EIGEN
965  0    /CRITERIA=FACTORS(6) ITERATE(500) /EXTRACTION=PC /ROTATION=NOROTATE
/METHOD=CORRELATION.
965  0 M>    /CRITERIA=FACTORS(6) ITERATE(500) /EXTRACTION=PC /ROTATION=NOROTA
TE /METHOD=CORRELATION.

```

Factor Analysis

Notes

Output Created		18-JUL-2026 10:55:34
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Eigenvalues\datas et.csv
	Active Dataset	EigenvaluesData
	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.

Correlation Matrix Eigenvalues
Ordered PCA roots and explained variance

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(6) ITERATE(500) /EXTRACTION=PC /ROTATION=NOROTATE /METHOD=CORRELATIO N.
Resources	Processor Time	00:00:00.52
	Elapsed Time	00:00:00.76
	Maximum Memory Required	5704 (5.570K) bytes

[EigenvaluesData]

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

Correlation Matrix Eigenvalues
Ordered PCA roots and explained variance

Communalities

	Initial	Extraction
G1	1.000	1.000
G2	1.000	1.000
G3	1.000	1.000
famrel	1.000	1.000
freetime	1.000	1.000
goout	1.000	1.000

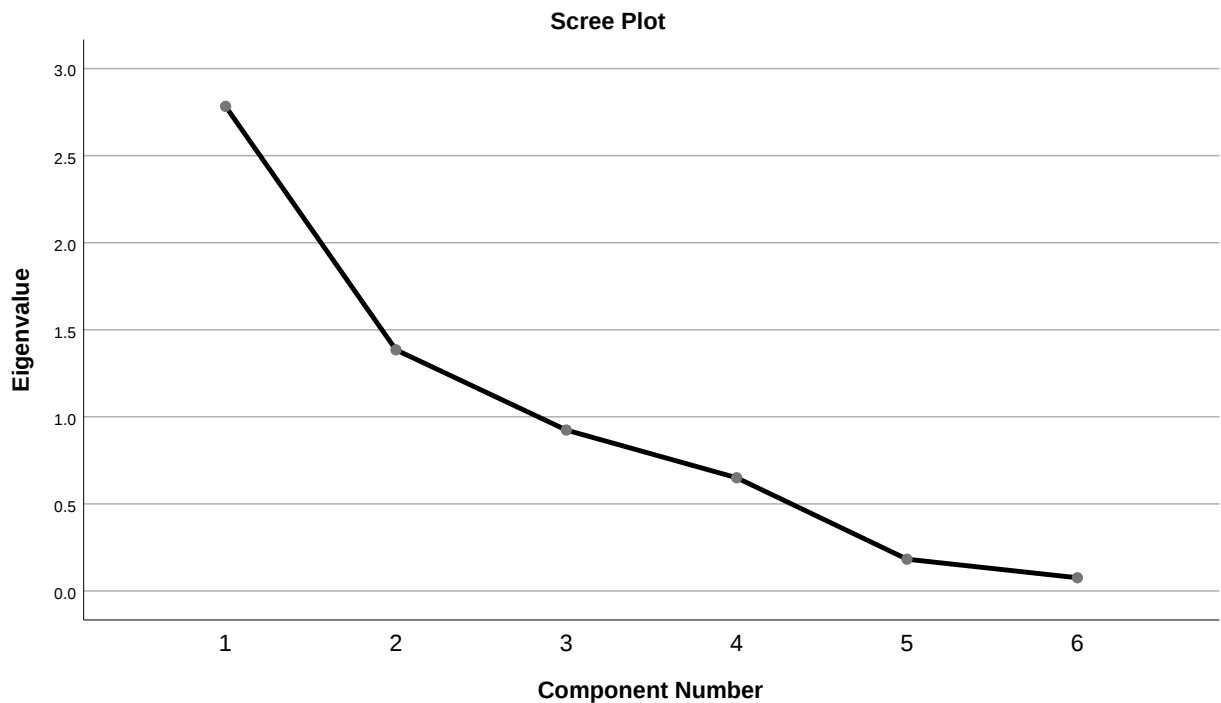
Extraction Method: Principal Component Analysis.

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	.924	15.402	84.863
4	.650	10.835	95.698	.650	10.835	95.698
5	.182	3.038	98.736	.182	3.038	98.736
6	.076	1.264	100.000	.076	1.264	100.000

Extraction Method: Principal Component Analysis.

Correlation Matrix Eigenvalues
Ordered PCA roots and explained variance



Component Matrix^a

	Component					
	1	2	3	4	5	6
G1	.931	.084	-.083	-.023	.342	.050
G2	.966	.093	-.039	-.009	-.102	-.213
G3	.954	.067	-.055	-.003	-.234	.167
famrel	.085	.474	.873	.081	.011	.006
freetime	-.198	.763	-.193	-.584	-.010	.002
goout	-.163	.747	-.338	.550	-.001	.000

Extraction Method: Principal Component Analysis.

a. 6 components extracted.

```

966  0  ECHO 'The six eigenvalues sum to six for a correlation matrix'.
966  0  M>  ECHO 'The six eigenvalues sum to six for a correlation matrix'.
The six eigenvalues sum to six for a correlation matrix
967  0  DESCRIPTIVES VARIABLES=G1 G2 G3 famrel freetime goout /STATISTICS=MEAN STDDEV MIN MAX.

```

Correlation Matrix Eigenvalues
Ordered PCA roots and explained variance

967 0 M> DESCRIPTIVES VARIABLES=G1 G2 G3 famrel freetime goout /STATISTICS=
MEAN STDDEV MIN MAX.

Descriptives

Notes

Output Created		18-JUL-2026 10:55:34
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\Eigenvalues\datas et.csv
	Active Dataset	EigenvaluesData
	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	00:00:00.05
	Elapsed Time	00:00:00.13

Correlation Matrix Eigenvalues
Ordered PCA roots and explained variance

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				

```

968 0 * END METHOD-SPECIFIC SPSS WORKFLOW.
968 0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
969 0
969 0 M>
970 0 SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale T
esting\Eigenvalues\SPSS_Output\sav\eigenvalues_spss_re
ady_data.sav' /COMPRESSED.
970 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scal
e Testing\Eigenvalues\SPSS_Output\sav\eigenvalues_spss
_ready_data.sav' /COMPRESSED.

971 0
971 0 M>
972 0 ECHO '=====
====='.
972 0 M> ECHO '=====
====='.

=====

973 0 ECHO 'CORRELATION-MATRIX EIGENVALUES'.
973 0 M> ECHO 'CORRELATION-MATRIX EIGENVALUES'.
CORRELATION-MATRIX EIGENVALUES
974 0 ECHO 'Design: Ordered PCA eigenvalues and variance proportions of the
six-item correlation matrix.'.
974 0 M> ECHO 'Design: Ordered PCA eigenvalues and variance proportions of
the six-item correlation matrix.'.
Design: Ordered PCA eigenvalues and variance proportions of the six-item corre
lation matrix.

```

Correlation Matrix Eigenvalues
Ordered PCA roots and explained variance

```
975 0 ECHO 'Null hypothesis: No component eigenvalue exceeds the unit-eigen
value benchmark.'.
975 0 M> ECHO 'Null hypothesis: No component eigenvalue exceeds the unit-ei
genvalue benchmark.'.
Null hypothesis: No component eigenvalue exceeds the unit-eigenvalue benchmark
.
976 0 ECHO 'Formula: R v_j=lambda_j v_j; proportion_j=lambda_j/p.'.
976 0 M> ECHO 'Formula: R v_j=lambda_j v_j; proportion_j=lambda_j/p.'.
Formula: R v_j=lambda_j v_j; proportion_j=lambda_j/p.
977 0 ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
977 0 M> ECHO 'Variables: G1, G2, G3, famrel, freetime, goout'.
Variables: G1, G2, G3, famrel, freetime, goout
978 0 ECHO 'Rows analyzed: 649'.
978 0 M> ECHO 'Rows analyzed: 649'.
Rows analyzed: 649
979 0 ECHO 'eigenvalues_above_one = 2'.
979 0 M> ECHO 'eigenvalues_above_one = 2'.
eigenvalues_above_one = 2
980 0 ECHO 'first_two_variance = 0.694612262636963'.
980 0 M> ECHO 'first_two_variance = 0.694612262636963'.
first_two_variance = 0.694612262636963
981 0 ECHO 'largest_eigenvalue = 2.7828698961540006'.
981 0 M> ECHO 'largest_eigenvalue = 2.7828698961540006'.
largest_eigenvalue = 2.7828698961540006
982 0 ECHO 'second_eigenvalue = 1.3848036796677767'.
982 0 M> ECHO 'second_eigenvalue = 1.3848036796677767'.
second_eigenvalue = 1.3848036796677767
983 0 ECHO 'variables = 6'.
983 0 M> ECHO 'variables = 6'.
variables = 6
984 0 ECHO 'Cross-check status: pass'.
984 0 M> ECHO 'Cross-check status: pass'.
Cross-check status: pass
985 0 ECHO '=====
====='.
985 0 M> ECHO '=====
====='.
=====
986 0
```

Correlation Matrix Eigenvalues
Ordered PCA roots and explained variance

```
986  0 M>
987  0  OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and
Scale Testing\Eigenvalues\SPSS_Output\spv\eigenvalues_
      spss_output.spv'.
987  0 M>  OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis a
nd Scale Testing\Eigenvalues\SPSS_Output\spv\eigenvalu
      es_spss_output.spv'.
988  0  OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING
988  0 M>  OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING
```