

```
439 0 OUTPUT ACTIVATE GuttmansLambdaOutput.  
439 0 M> OUTPUT ACTIVATE GuttmansLambdaOutput.  
440 0 TITLE 'Guttman''s Lambda-6'.  
440 0 M> TITLE 'Guttman''s Lambda-6'.
```

Guttman's Lambda-6

```

441 0
441 0 M>
442 0 GET DATA
442 0 M> GET DATA
443 0 /TYPE=TXT
443 0 M> /TYPE=TXT
444 0 /FILE='D:\DATA ANALYSIS\K Reliability and Agreement Tests\Guttmans
Lambda\dataset.csv'
444 0 M> /FILE='D:\DATA ANALYSIS\K Reliability and Agreement Tests\Guttmans
Lambda\dataset.csv'
445 0 /ENCODING='UTF8'
445 0 M> /ENCODING='UTF8'
446 0 /DELCASE=LINE
446 0 M> /DELCASE=LINE
447 0 /DELIMITERS=', '
447 0 M> /DELIMITERS=', '
448 0 /QUALIFIER='"'
448 0 M> /QUALIFIER='"'
449 0 /ARRANGEMENT=DELIMITED
449 0 M> /ARRANGEMENT=DELIMITED
450 0 /FIRSTCASE=2
450 0 M> /FIRSTCASE=2
451 0 /VARIABLES=
451 0 M> /VARIABLES=
452 0 school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8
452 0 M> school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8
453 0 Medu F8.0 Fedu F8.0 Mjob A16 Fjob A16 reason A16 guardian A16
453 0 M> Medu F8.0 Fedu F8.0 Mjob A16 Fjob A16 reason A16 guardian A16
454 0 traveltime F8.0 studytime F8.0 failures F8.0 schoolsup A8 famsup
A8
454 0 M> traveltime F8.0 studytime F8.0 failures F8.0 schoolsup A8 fams
up A8
455 0 paid A8 activities A8 nursery A8 higher A8 internet A8 romantic A
8
455 0 M> paid A8 activities A8 nursery A8 higher A8 internet A8 romanti
c A8
456 0 famrel F8.0 freetime F8.0 goout F8.0 Dalc F8.0 Walc F8.0 health F
8.0

```

Guttman's Lambda-6

```

456 0 M>      famrel F8.0 freetime F8.0 goout F8.0 Dalc F8.0 Walc F8.0 health F8.0
457 0      absences F8.0 G1 F8.0 G2 F8.0 G3 F8.0.
457 0 M>      absences F8.0 G1 F8.0 G2 F8.0 G3 F8.0.
458 0 DATASET NAME GuttmansLambdaData.
458 0 M> DATASET NAME GuttmansLambdaData.
459 0 EXECUTE.
459 0 M> EXECUTE.
460 0
460 0 M>
461 0 COMPUTE subject_id=$CASENUM.
461 0 M> COMPUTE subject_id=$CASENUM.
462 0 COMPUTE Dalc_R=6-Dalc.
462 0 M> COMPUTE Dalc_R=6-Dalc.
463 0 COMPUTE Walc_R=6-Walc.
463 0 M> COMPUTE Walc_R=6-Walc.
464 0 RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
464 0 M> RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
465 0 INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b.
465 0 M> INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b.
466 0 RECODE G1 G2 G3 (LO THRU 9=1) (10 THRU 13=2) (14 THRU HI=3)
466 0 M> RECODE G1 G2 G3 (LO THRU 9=1) (10 THRU 13=2) (14 THRU HI=3)
467 0 INTO G1_cat3 G2_cat3 G3_cat3.
467 0 M> INTO G1_cat3 G2_cat3 G3_cat3.
468 0 RECODE G1 G3 (LO THRU 8=1) (9 THRU 10=2) (11 THRU 12=3) (13 THRU 14=4) (15 THRU HI=5)
468 0 M> RECODE G1 G3 (LO THRU 8=1) (9 THRU 10=2) (11 THRU 12=3) (13 THRU 14=4) (15 THRU HI=5)
469 0 INTO G1_cat5 G3_cat5.
469 0 M> INTO G1_cat5 G3_cat5.
470 0 VARIABLE LEVEL schoolsup_b famsup_b paid_b activities_b higher_b internet_b G1_cat3 G2_cat3 G3_cat3 G1_cat5 G3_cat5 (NOMINAL).
470 0 M> VARIABLE LEVEL schoolsup_b famsup_b paid_b activities_b higher_b internet_b G1_cat3 G2_cat3 G3_cat3 G1_cat5 G3_cat5 (NOMINAL).

```

Guttman's Lambda-6

```
471 0 FORMATS subject_id schoolsup_b famsup_b paid_b activities_b higher_b
internet_b G1_cat3 G2_cat3 G3_cat3 G1_cat5 G3_cat5 (F5
      .0).
471 0 M> FORMATS subject_id schoolsup_b famsup_b paid_b activities_b higher
_b internet_b G1_cat3 G2_cat3 G3_cat3 G1_cat5 G3_cat5
      (F5.0).
472 0 EXECUTE.
472 0 M> EXECUTE.
473 0
473 0 M>
474 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
474 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
475 0 TITLE 'Guttmans Lambda Six'.
475 0 M> TITLE 'Guttmans Lambda Six'.
```

Guttman's Lambda Six

```
476 0 SUBTITLE 'Squared multiple correlations supply item error variances'.  
476 0 M> SUBTITLE 'Squared multiple correlations supply item error variance  
s'.
```

Guttman's Lambda Six
Squared multiple correlations supply item error variances

```

477  0  RELIABILITY /VARIABLES=famrel freetime goout Dalc_R Walc_R health
477  0 M> RELIABILITY /VARIABLES=famrel freetime goout Dalc_R Walc_R health
478  0  /SCALE('Guttman reliability') ALL /MODEL=GUTTMAN
478  0 M> /SCALE('Guttman reliability') ALL /MODEL=GUTTMAN
479  0  /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS VARIANCE COR
R.
479  0 M> /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS VARIANCE
CORR.

```

Reliability

Notes

Output Created		16-JUL-2026 21:09:10
Comments		
Input	Data	D:\DATA ANALYSIS\K Reliability and Agreement Tests\Guttman's Lambda\dataset.csv
	Active Dataset	Guttman'sLambdaData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
	Matrix Input	D:\DATA ANALYSIS\K Reliability and Agreement Tests\Guttman's Lambda\guttman's_lambda _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.

Guttman's Lambda Six
Squared multiple correlations supply item error variances

Notes

Syntax		RELIABILITY /VARIABLES=famrel freetime goout Dalc_R Walc_R health /SCALE('Guttman reliability') ALL /MODEL=GUTTMAN /STATISTICS=DESCRIPT IVE SCALE CORR /SUMMARY=TOTAL MEANS VARIANCE CORR.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.06

[Guttman's Lambda Data]

Scale: Guttman reliability

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

Lambda	1	.093
	2	.294
	3	.112
	4	-.312
	5	.316
	6	.289
N of Items		6

Guttman's Lambda Six
Squared multiple correlations supply item error variances

Item Statistics

	Mean	Std. Deviation	N
famrel	3.9307	.95572	649
freetime	3.1803	1.05109	649
goout	3.1849	1.17577	649
Dalc_R	4.4977	.92483	649
Walc_R	3.7196	1.28438	649
health	3.5362	1.44626	649

Inter-Item Correlation Matrix

	famrel	freetime	goout	Dalc_R	Walc_R	health
famrel	1.000	.129	.090	.076	.094	.110
freetime	.129	1.000	.346	-.110	-.120	.085
goout	.090	.346	1.000	-.245	-.389	-.016
Dalc_R	.076	-.110	-.245	1.000	.617	-.059
Walc_R	.094	-.120	-.389	.617	1.000	-.115
health	.110	.085	-.016	-.059	-.115	1.000

Summary Item Statistics

		Mean	Minimum	Maximum	Range	Maximum / Minimum
Item Means	Part 1	3.432	3.180	3.931	.750	1.236
	Part 2	3.918	3.536	4.498	.961	1.272
	Both Parts	3.675	3.180	4.498	1.317	1.414
Item Variances	Part 1	1.134	.913	1.382	.469	1.514
	Part 2	1.532	.855	2.092	1.236	2.445
	Both Parts	1.333	.855	2.092	1.236	2.445
Inter-Item Correlations	Part 1	.188	.090	.346	.257	3.861
	Part 2	.148	-.115	.617	.732	-5.362
	Both Parts	.033	-.389	.617	1.005	-1.586

Guttman's Lambda Six
Squared multiple correlations supply item error variances

Summary Item Statistics

		Variance	N of Items
Item Means	Part 1	.187	3 ^a
	Part 2	.261	3 ^b
	Both Parts	.250	6
Item Variances	Part 1	.056	3 ^a
	Part 2	.392	3 ^b
	Both Parts	.227	6
Inter-Item Correlations	Part 1	.015	3 ^a
	Part 2	.133	3 ^b
	Both Parts	.055	6

a. The items are: famrel, freetime, goout.

b. The items are: Dalc_R, Walc_R, health.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
famrel	18.1186	6.778	.227	.053	-.056 ^a
freetime	18.8690	6.879	.151	.138	-.002 ^a
goout	18.8644	8.139	-.105	.258	.234
Dalc_R	17.5516	7.269	.139	.382	.022
Walc_R	18.3297	7.400	-.033	.456	.178
health	18.5131	6.806	-.010	.042	.165

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Guttman's Lambda Six
Squared multiple correlations supply item error variances

Scale Statistics

	Mean	Variance	Std. Deviation	N of Items
Part 1	10.2958	4.718	2.17207	3 ^a
Part 2	11.7535	5.476	2.34012	3 ^b
Both Parts	22.0493	8.819	2.96960	6

a. The items are: famrel, freetime, goout.

b. The items are: Dalc_R, Walc_R, health.

```
480 0 REGRESSION /STATISTICS=COEFF R ANOVA /DEPENDENT famrel /METHOD=ENTER
freetime goout Dalc_R Walc_R health.
```

```
480 0 M> REGRESSION /STATISTICS=COEFF R ANOVA /DEPENDENT famrel /METHOD=ENTER
freetime goout Dalc_R Walc_R health.
```

Regression

Notes

Output Created		16-JUL-2026 21:09:10
Comments		
Input	Data	D:\DATA ANALYSIS\K Reliability and Agreement Tests\Guttman's Lambda\dataset.csv
	Active Dataset	Guttman's Lambda Data
	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 are based on cases with no missing values for any variable used.

Guttman's Lambda Six
Squared multiple correlations supply item error variances

Notes

Syntax		REGRESSION /STATISTICS=COEFF R ANOVA /DEPENDENT famrel /METHOD=ENTER freetime goout Dalc_R Walc_R health.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.06
	Memory Required	6576 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	health, goout, Dalc_R, freetime, Walc_R ^b	.	Enter

a. Dependent Variable: famrel

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.231 ^a	.053	.046	.934

a. Predictors: (Constant), health, goout, Dalc_R, freetime, Walc_R

Guttman's Lambda Six
Squared multiple correlations supply item error variances

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.515	5	6.303	7.232	.000 ^b
	Residual	560.365	643	.871		
	Total	591.880	648			

a. Dependent Variable: famrel

b. Predictors: (Constant), health, goout, Dalc_R, freetime, Walc_R

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.484	.273		9.087	.000
	freetime	.089	.037	.098	2.372	.018
	goout	.100	.036	.123	2.776	.006
	Dalc_R	.035	.050	.034	.689	.491
	Walc_R	.109	.038	.146	2.831	.005
	health	.081	.026	.122	3.137	.002

a. Dependent Variable: famrel

```
481 0 REGRESSION /STATISTICS=COEFF R ANOVA /DEPENDENT freetime /METHOD=ENTER famrel goout Dalc_R Walc_R health.
```

```
481 0 M> REGRESSION /STATISTICS=COEFF R ANOVA /DEPENDENT freetime /METHOD=ENTER famrel goout Dalc_R Walc_R health.
```

Regression

Guttman's Lambda Six
Squared multiple correlations supply item error variances

Notes

Output Created		16-JUL-2026 21:09:10
Comments		
Input	Data	D:\DATA ANALYSIS\K Reliability and Agreement Tests\Guttman's Lambda\dataset.csv
	Active Dataset	Guttman's Lambda Data
	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 are based on cases with no missing values for any variable used.
Syntax		REGRESSION /STATISTICS=COEFF R ANOVA /DEPENDENT freetime /METHOD=ENTER famrel goout Dalc_R Walc_R health.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.08
	Memory Required	6576 bytes
	Additional Memory Required for Residual Plots	0 bytes

Guttman's Lambda Six
Squared multiple correlations supply item error variances

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	health, goout, famrel, Dalc_R, Walc_R ^b	.	Enter

a. Dependent Variable: freetime

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.372 ^a	.138	.132	.979

a. Predictors: (Constant), health, goout, famrel, Dalc_R, Walc_R

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	99.029	5	19.806	20.644	.000 ^b
	Residual	616.879	643	.959		
	Total	715.908	648			

a. Dependent Variable: freetime

b. Predictors: (Constant), health, goout, famrel, Dalc_R, Walc_R

Guttman's Lambda Six
 Squared multiple correlations supply item error variances

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.745	.297		5.880	.000
	famrel	.098	.041	.089	2.372	.018
	goout	.309	.036	.345	8.576	.000
	Dalc_R	-.067	.053	-.059	-1.265	.206
	Walc_R	.042	.041	.051	1.037	.300
	health	.060	.027	.083	2.218	.027

a. Dependent Variable: freetime

```
482 0 CORRELATIONS /VARIABLES=famrel freetime goout Dalc_R Walc_R health /P
RINT=TWOTAIL NOSIG /MISSING=PAIRWISE.
```

```
482 0 M> CORRELATIONS /VARIABLES=famrel freetime goout Dalc_R Walc_R health
/PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE.
```

Correlations

Guttmans Lambda Six
Squared multiple correlations supply item error variances

Notes

Output Created		16-JUL-2026 21:09:11
Comments		
Input	Data	D:\DATA ANALYSIS\K Reliability and Agreement Tests\Guttmans Lambda\dataset.csv
	Active Dataset	GuttmansLambdaData
	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=famrel freetime goout Dalc_R Walc_R health /PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.07

Guttman's Lambda Six
Squared multiple correlations supply item error variances

Correlations

		famrel	freetime	goout	Dalc_R	Walc_R	health
famrel	Pearson Correlation	1	.129**	.090*	.076	.094*	.110**
	Sig. (2-tailed)		.001	.022	.054	.017	.005
	N	649	649	649	649	649	649
freetime	Pearson Correlation	.129**	1	.346**	-.110**	-.120**	.085*
	Sig. (2-tailed)	.001		.000	.005	.002	.031
	N	649	649	649	649	649	649
goout	Pearson Correlation	.090*	.346**	1	-.245**	-.389**	-.016
	Sig. (2-tailed)	.022	.000		.000	.000	.689
	N	649	649	649	649	649	649
Dalc_R	Pearson Correlation	.076	-.110**	-.245**	1	.617**	-.059
	Sig. (2-tailed)	.054	.005	.000		.000	.133
	N	649	649	649	649	649	649
Walc_R	Pearson Correlation	.094*	-.120**	-.389**	.617**	1	-.115**
	Sig. (2-tailed)	.017	.002	.000	.000		.003
	N	649	649	649	649	649	649
health	Pearson Correlation	.110**	.085*	-.016	-.059	-.115**	1
	Sig. (2-tailed)	.005	.031	.689	.133	.003	
	N	649	649	649	649	649	649

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

```

483 0 * END METHOD-SPECIFIC SPSS WORKFLOW.
483 0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
484 0
484 0 M>
485 0 SAVE OUTFILE='D:\DATA ANALYSIS\K Reliability and Agreement Tests\Gutt
mans Lambda\SPSS_Output\sav\guttman's-lambda_spss_ready
_data.sav' /COMPRESSED.
485 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\K Reliability and Agreement Tests\G
uttman's Lambda\SPSS_Output\sav\guttman's-lambda_spss_re
ady_data.sav' /COMPRESSED.
486 0
486 0 M>

```

Guttman's Lambda Six
Squared multiple correlations supply item error variances

```

487  0  ECHO '=====
====='.
487  0  M>  ECHO '=====
====='.
=====
488  0  ECHO 'GUTTMAN'S LAMBDA-6'.
488  0  M>  ECHO 'GUTTMAN'S LAMBDA-6'.
GUTTMAN'S LAMBDA-6
489  0  ECHO 'Design: Regression-error lower-bound reliability for the six-it
em transformed scale.'.
489  0  M>  ECHO 'Design: Regression-error lower-bound reliability for the six
-item transformed scale.'.
Design: Regression-error lower-bound reliability for the six-item transformed
scale.
490  0  ECHO 'Null hypothesis: The composite's reliable variance is no large
r than the variance predicted among items.'.
490  0  M>  ECHO 'Null hypothesis: The composite's reliable variance is no la
rger than the variance predicted among items.'.
Null hypothesis: The composite's reliable variance is no larger than the varia
nce predicted among items.
491  0  ECHO 'Formula: lambda_6=1-sum[s_i^2(1-R_i^2)]/s_total^2.'.
491  0  M>  ECHO 'Formula: lambda_6=1-sum[s_i^2(1-R_i^2)]/s_total^2.'.
Formula: lambda_6=1-sum[s_i^2(1-R_i^2)]/s_total^2.
492  0  ECHO 'Variables: famrel, freetime, goout, Dalc_R, Walc_R, health'.
492  0  M>  ECHO 'Variables: famrel, freetime, goout, Dalc_R, Walc_R, health'.
Variables: famrel, freetime, goout, Dalc_R, Walc_R, health
493  0  ECHO 'Rows analyzed: 649'.
493  0  M>  ECHO 'Rows analyzed: 649'.
Rows analyzed: 649
494  0  ECHO 'items = 6'.
494  0  M>  ECHO 'items = 6'.
items = 6
495  0  ECHO 'lambda_6 = 0.28877212602212743'.
495  0  M>  ECHO 'lambda_6 = 0.28877212602212743'.
lambda_6 = 0.28877212602212743
496  0  ECHO 'n_cases = 649'.
496  0  M>  ECHO 'n_cases = 649'.
n_cases = 649
497  0  ECHO 'total_score_variance = 8.818552759230725'.

```

Guttman's Lambda Six
Squared multiple correlations supply item error variances

```
497  0 M> ECHO 'total_score_variance = 8.818552759230725'.
total_score_variance = 8.818552759230725
498  0 ECHO 'items = 6'.
498  0 M> ECHO 'items = 6'.
items = 6
499  0 ECHO 'lambda_6 = 0.28877212602212743'.
499  0 M> ECHO 'lambda_6 = 0.28877212602212743'.
lambda_6 = 0.28877212602212743
500  0 ECHO 'n_cases = 649'.
500  0 M> ECHO 'n_cases = 649'.
n_cases = 649
501  0 ECHO 'total_score_variance = 8.818552759230725'.
501  0 M> ECHO 'total_score_variance = 8.818552759230725'.
total_score_variance = 8.818552759230725
502  0 ECHO 'Cross-check status: pass'.
502  0 M> ECHO 'Cross-check status: pass'.
Cross-check status: pass
503  0 ECHO '=====
====='.
503  0 M> ECHO '=====
====='.
=====
504  0
504  0 M>
505  0 OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\K Reliability and Agreement Tests\Guttman's Lambda\SPSS_Output\spv\guttman's-lambda_sps
      s_output.spv'.
505  0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\K Reliability and Agreement Tests\Guttman's Lambda\SPSS_Output\spv\guttman's-lambda_
      spss_output.spv'.
506  0 OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRINTSETTING
506  0 M> OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRINTSETTING
```