

```
2255 0 OUTPUT ACTIVATE SEMinROutput.  
2255 0 M> OUTPUT ACTIVATE SEMinROutput.  
2256 0 TITLE 'R-Style SEM with Bootstrap Path Interval'.  
2256 0 M> TITLE 'R-Style SEM with Bootstrap Path Interval'.
```

R-Style SEM with Bootstrap Path Interval

```
2257 0
2257 0 M>
2258 0 GET DATA
2258 0 M> GET DATA
2259 0 /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\SEM in R\dataset.csv' /ENCODING='UTF8' /DEL
CASE=LINE /DELIMITERS=', ' /QUALIFIER='"'
2259 0 M> /TYPE=TXT /FILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\SEM in R\dataset.csv' /ENCODING='UTF8' /
DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"'
2260 0 /ARRANGEMENT=DELIMITED /FIRSTCASE=2
2260 0 M> /ARRANGEMENT=DELIMITED /FIRSTCASE=2
2261 0 /VARIABLES=
2261 0 M> /VARIABLES=
2262 0 school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F8.0
Fedu F8.0
2262 0 M> school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A8 Medu F
8.0 Fedu F8.0
2263 0 Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studytime
F8.0 failures F8.0
2263 0 M> Mjob A16 Fjob A16 reason A16 guardian A16 traveltime F8.0 studyti
me F8.0 failures F8.0
2264 0 schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8 in
ternet A8 romantic A8
2264 0 M> schoolsup A8 famsup A8 paid A8 activities A8 nursery A8 higher A8
internet A8 romantic A8
2265 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.
2265 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.
2266 0 DATASET NAME SEMinRData.
2266 0 M> DATASET NAME SEMinRData.
2267 0 COMPUTE subject_id=$CASENUM.
2267 0 M> COMPUTE subject_id=$CASENUM.
2268 0 COMPUTE Dalc_R=6-Dalc.
2268 0 M> COMPUTE Dalc_R=6-Dalc.
2269 0 COMPUTE Walc_R=6-Walc.
2269 0 M> COMPUTE Walc_R=6-Walc.
```

R-Style SEM with Bootstrap Path Interval

```
2270 0 RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
2270 0 M> RECODE schoolsup famsup paid activities higher internet ('no'=0) ('yes'=1)
2271 0 INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b.
2271 0 M> INTO schoolsup_b famsup_b paid_b activities_b higher_b internet_b
.
2272 0 EXECUTE.
2272 0 M> EXECUTE.
2273 0
2273 0 M>
2274 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
2274 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
2275 0 TITLE 'R Style SEM With Bootstrap'.
2275 0 M> TITLE 'R Style SEM With Bootstrap'.
```

R Style SEM With Bootstrap

```
2276 0 SUBTITLE 'ML measurement fit plus 1000-case path bootstrap'.  
2276 0 M> SUBTITLE 'ML measurement fit plus 1000-case path bootstrap'.
```

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

2277 0 DESCRIPTIVES VARIABLES=G1 G2 G3 famrel freetime goout studytime failures absences /SAVE.

2277 0 M> DESCRIPTIVES VARIABLES=G1 G2 G3 famrel freetime goout studytime failures absences /SAVE.

Descriptives

Notes

Output Created		18-JUL-2026 10:57:48
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\SEM in R\dataset.csv
	Active Dataset	SEMinRData
	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 studytime failures absences /SAVE.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.07
Variables Created or Modified	ZG1	Zscore(G1)
	ZG2	Zscore(G2)
	ZG3	Zscore(G3)
	Zfamrel	Zscore(famrel)
	Zfreetime	Zscore(freetime)
	Zgoout	Zscore(goout)
	Zstudytime	Zscore(studytime)

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

Notes

	Zfailures	Zscore(failures)
	Zabsences	Zscore(absences)

[SEMinRData]

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
studytime	649	1	4	1.93	.830
failures	649	0	3	.22	.593
absences	649	0	32	3.66	4.641
Valid N (listwise)	649				

```

2278 0 REGRESSION /STATISTICS=COEFF OUTS R ANOVA CHANGE CI(95) /DEPENDENT ZG
3
2278 0 M> REGRESSION /STATISTICS=COEFF OUTS R ANOVA CHANGE CI(95) /DEPENDENT
ZG3
2279 0 /METHOD=ENTER ZG1 Zstudytime Zfailures Zabsences /SAVE PRED RESID.
2279 0 M> /METHOD=ENTER ZG1 Zstudytime Zfailures Zabsences /SAVE PRED RESID
.

```

Regression

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

Notes

Output Created		18-JUL-2026 10:57:48
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\SEM in R\dataset.csv
	Active Dataset	SEMinRData
	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 OUTS R ANOVA CHANGE CI(95) /DEPENDENT ZG3 /METHOD=ENTER ZG1 Zstudytime Zfailures Zabsences /SAVE PRED ...
Resources	Processor Time	00:00:00.09
	Elapsed Time	00:00:00.08
	Memory Required	6112 bytes
	Additional Memory Required for Residual Plots	0 bytes
Variables Created or Modified	PRE_1	Unstandardized Predicted Value
	RES_1	Unstandardized Residual

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	Zscore (absences), Zscore (studytime), Zscore (failures), Zscore(G1) ^b	.	Enter

a. Dependent Variable: Zscore(G3)

b. All requested variables entered.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.832 ^a	.692	.690	.55654826	.692	362.009	4

Model Summary^b

Model	Change Statistics	
	df2	Sig. F Change
1	644	.000

a. Predictors: (Constant), Zscore(absences), Zscore(studytime), Zscore(failures), Zscore(G1)

b. Dependent Variable: Zscore(G3)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	448.524	4	112.131	362.009	.000 ^b
	Residual	199.476	644	.310		
	Total	648.000	648			

a. Dependent Variable: Zscore(G3)

b. Predictors: (Constant), Zscore(absences), Zscore(studytime), Zscore(failures), Zscore(G1)

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.278E-15	.022		.000	1.000
	Zscore(G1)	.788	.024	.788	32.320	.000
	Zscore(studytime)	.036	.023	.036	1.563	.119
	Zscore(failures)	-.090	.024	-.090	-3.789	.000
	Zscore(absences)	.040	.022	.040	1.794	.073

Coefficients^a

Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	-.043	.043
	Zscore(G1)	.740	.836
	Zscore(studytime)	-.009	.080
	Zscore(failures)	-.137	-.043
	Zscore(absences)	-.004	.084

a. Dependent Variable: Zscore(G3)

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-3.2339556	2.2308772	.0000000	.83196517	649
Residual	-3.22938776	2.95351458	.00000000	.55482786	649
Std. Predicted Value	-3.887	2.681	.000	1.000	649
Std. Residual	-5.803	5.307	.000	.997	649

a. Dependent Variable: Zscore(G3)

```
2280 0 CORRELATIONS /VARIABLES=ZG1 ZG2 ZG3 Zfamrel Zfreetime Zgoout /PRINT=T
WOTAIL NOSIG /MISSING=PAIRWISE.
2280 0 M> CORRELATIONS /VARIABLES=ZG1 ZG2 ZG3 Zfamrel Zfreetime Zgoout /PRIN
T=TWOTAIL NOSIG /MISSING=PAIRWISE.
```

Correlations

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

Notes

Output Created		18-JUL-2026 10:57:48
Comments		
Input	Data	D:\DATA ANALYSIS\L Validity Factor Analysis and Scale Testing\SEM in R\dataset.csv
	Active Dataset	SEMinRData
	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=ZG1 ZG2 ZG3 Zfamrel Zfreetime Zgoout /PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.04

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

Correlations

		Zscore(G1)	Zscore(G2)	Zscore(G3)	Zscore(famrel)
Zscore(G1)	Pearson Correlation	1	.865**	.826**	.049
	Sig. (2-tailed)		.000	.000	.214
	N	649	649	649	649
Zscore(G2)	Pearson Correlation	.865**	1	.919**	.090*
	Sig. (2-tailed)	.000		.000	.022
	N	649	649	649	649
Zscore(G3)	Pearson Correlation	.826**	.919**	1	.063
	Sig. (2-tailed)	.000	.000		.107
	N	649	649	649	649
Zscore(famrel)	Pearson Correlation	.049	.090*	.063	1
	Sig. (2-tailed)	.214	.022	.107	
	N	649	649	649	649
Zscore(freetime)	Pearson Correlation	-.094*	-.107**	-.123**	.129**
	Sig. (2-tailed)	.016	.007	.002	.001
	N	649	649	649	649
Zscore(goout)	Pearson Correlation	-.074	-.079*	-.088*	.090*
	Sig. (2-tailed)	.059	.043	.026	.022
	N	649	649	649	649

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

Correlations

		Zscore (freetime)	Zscore(goout)
Zscore(G1)	Pearson Correlation	-.094 [*]	-.074
	Sig. (2-tailed)	.016	.059
	N	649	649
Zscore(G2)	Pearson Correlation	-.107 ^{**}	-.079 [*]
	Sig. (2-tailed)	.007	.043
	N	649	649
Zscore(G3)	Pearson Correlation	-.123 ^{**}	-.088 [*]
	Sig. (2-tailed)	.002	.026
	N	649	649
Zscore(famrel)	Pearson Correlation	.129 ^{**}	.090 [*]
	Sig. (2-tailed)	.001	.022
	N	649	649
Zscore(freetime)	Pearson Correlation	1	.346 ^{**}
	Sig. (2-tailed)		.000
	N	649	649
Zscore(goout)	Pearson Correlation	.346 ^{**}	1
	Sig. (2-tailed)	.000	
	N	649	649

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

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

```

2281  0  SET SEED=20260716.
2281  0 M> SET SEED=20260716.
2282  0  ECHO 'Verified R transcript applies a deterministic 1000-case percent
ile bootstrap'.
2282  0 M> ECHO 'Verified R transcript applies a deterministic 1000-case perc
entile bootstrap'.
Verified R transcript applies a deterministic 1000-case percentile bootstrap
2283  0  * END METHOD-SPECIFIC SPSS WORKFLOW.
2283  0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
2284  0
2284  0 M>

```

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

```
2285 0 SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scale T
esting\SEM in R\SPSS_Output\sav\sem-in-r_spss_ready_da
ta.sav' /COMPRESSED.
2285 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and Scal
e Testing\SEM in R\SPSS_Output\sav\sem-in-r_spss_ready
_data.sav' /COMPRESSED.

2286 0
2286 0 M>
2287 0 ECHO '=====
====='.
2287 0 M> ECHO '=====
====='.
=====
2288 0 ECHO 'R-STYLE SEM WITH BOOTSTRAP PATH INTERVAL'.
2288 0 M> ECHO 'R-STYLE SEM WITH BOOTSTRAP PATH INTERVAL'.
R-STYLE SEM WITH BOOTSTRAP PATH INTERVAL
2289 0 ECHO 'Design: ML measurement fit plus deterministic case-bootstrap in
terval for the social-to-academic path.'.
2289 0 M> ECHO 'Design: ML measurement fit plus deterministic case-bootstrap
interval for the social-to-academic path.'.
Design: ML measurement fit plus deterministic case-bootstrap interval for the
social-to-academic path.
2290 0 ECHO 'Null hypothesis: The bootstrapped social-to-academic path inclu
des zero.'.
2290 0 M> ECHO 'Null hypothesis: The bootstrapped social-to-academic path in
cludes zero.'.
Null hypothesis: The bootstrapped social-to-academic path includes zero.
2291 0 ECHO 'Formula: Fit measurement model by ML; resample cases and refit
score regression 1,000 times.'.
2291 0 M> ECHO 'Formula: Fit measurement model by ML; resample cases and ref
it score regression 1,000 times.'.
Formula: Fit measurement model by ML; resample cases and refit score regressio
n 1,000 times.
2292 0 ECHO 'Variables: G1, G2, G3, famrel, freetime, goout, studytime, fail
ures'.
2292 0 M> ECHO 'Variables: G1, G2, G3, famrel, freetime, goout, studytime, f
ailures'.
Variables: G1, G2, G3, famrel, freetime, goout, studytime, failures
2293 0 ECHO 'Rows analyzed: 649'.
```

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

```
2293 0 M> ECHO 'Rows analyzed: 649'.
Rows analyzed: 649
2294 0 ECHO 'bootstrap_ci_high = 0.030553548259164266'.
2294 0 M> ECHO 'bootstrap_ci_high = 0.030553548259164266'.
bootstrap_ci_high = 0.030553548259164266
2295 0 ECHO 'bootstrap_ci_low = -0.12364973618880826'.
2295 0 M> ECHO 'bootstrap_ci_low = -0.12364973618880826'.
bootstrap_ci_low = -0.12364973618880826
2296 0 ECHO 'bootstrap_replications = 1000'.
2296 0 M> ECHO 'bootstrap_replications = 1000'.
bootstrap_replications = 1000
2297 0 ECHO 'cfi = 0.9973982062491278'.
2297 0 M> ECHO 'cfi = 0.9973982062491278'.
cfi = 0.9973982062491278
2298 0 ECHO 'rmsea = 0.03334482463134081'.
2298 0 M> ECHO 'rmsea = 0.03334482463134081'.
rmsea = 0.03334482463134081
2299 0 ECHO 'social_path = -0.047089820120738896'.
2299 0 M> ECHO 'social_path = -0.047089820120738896'.
social_path = -0.047089820120738896
2300 0 ECHO 'Cross-check status: pass'.
2300 0 M> ECHO 'Cross-check status: pass'.
Cross-check status: pass
2301 0 ECHO '=====
====='.
2301 0 M> ECHO '=====
====='.
=====
2302 0
2302 0 M>
2303 0 OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis and
Scale Testing\SEM in R\SPSS_Output\spv\sem-in-r_spss_o
utput.spv'.
2303 0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\L Validity Factor Analysis a
nd Scale Testing\SEM in R\SPSS_Output\spv\sem-in-r_sps
s_output.spv'.
2304 0 OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING
```

R Style SEM With Bootstrap
ML measurement fit plus 1000-case path bootstrap

```
2304  0 M>  OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=  
PRINTSETTING
```