

Host

Notes

Output Created		23-JUN-2026 09:16:32
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\save\repeated_measures_manova_spss_ready_data.sav
	Active Dataset	RMManovaData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax	HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output".	
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.13

Host

Notes

Output Created		23-JUN-2026 09:16:32
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\sav\repeated_measures_manova_spss_ready_data.sav
	Active Dataset	RMManovaData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\png" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\png"'
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.10

Host

Notes

Output Created		23-JUN-2026 09:16:32
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\sav\repeated_measures_manova_spss_ready_data.sav
	Active Dataset	RMManovaData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\tables" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\tables"'
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.08

Host

Notes

Output Created		23-JUN-2026 09:16:32
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\sav\repeated_measures_manova_spss_ready_data.sav
	Active Dataset	RMManovaData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\txt" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\txt"'
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.08

Host

Notes

Output Created		23-JUN-2026 09:16:32
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\sav\repeated_measures_manova_spss_ready_data.sav
	Active Dataset	RMManovaData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\pdf" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\pdf"'
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.08

Host

Notes

Output Created		23-JUN-2026 09:16:32
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\sav\repeated_measures_manova_spss_ready_data.sav
	Active Dataset	RMManovaData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\pv" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\pv"'
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.08

Host

Notes

Output Created		23-JUN-2026 09:16:32
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\s av\repeated_measures_m anova_spss_ready_data. sav
	Active Dataset	RMManovaData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\s av" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\SPSS_Output\s av"'.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.08

```
File "<string>", line 17
  report_lines.append(f"Dataset: {DATASET}")
                                     ^
```

SyntaxError: invalid syntax

Dataset Name

Notes

Output Created		23-JUN-2026 09:16:33
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Repeated Measures MANOVA\dataset.csv
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Syntax		DATASET NAME RMManovaData WINDOW=FRONT.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

Warnings

The active dataset will replace the existing dataset named
RMManovaData.

Repeated Measures MANOVA- G1, G2, G3

```
>Warning # 2004. Command name: SUBTITLE  
>The subtitle given exceeds 60 characters in length. The first 60 characters  
>will be used.
```

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Descriptives

Notes

Output Created		23-JUN-2026 09:16:33
Comments		
Input	Data	D:\DATA ANALYSIS\IE ANOVA Family\Repeated Measures MANOVA\SPSS_Output\save\repeated_measures_manova_spss_ready_data.sav
	Active Dataset	RMManovaData
	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 /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
G1	649	.00	19.00	11.3991	2.74527
G2	649	.00	19.00	11.5701	2.91364
G3	649	.00	19.00	11.9060	3.23066
Valid N (listwise)	649				

General Linear Model

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Notes

Output Created		23-JUN-2026 09:16:33
Comments		
Input	Data	D:\DATA ANALYSIS\IE ANOVA Family\Repeated Measures MANOVA\SPSS_Output\save\repeated_measures_manova_spss_ready_data.sav
	Active Dataset	RMManovaData
	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 all cases with valid data for all variables in the model.
Syntax		GLM G1 G2 G3 BY studytime /WSFACTOR=Time 3 Polynomial /MEASURE=Grade /METHOD=SSTYPE(3) /PRINT=DESCRIPTIVE ETASQ HOMOGENEITY /CRITERIA=ALPHA(.05) /WSDESIGN=Time /DESIGN=studytime.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.04

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

**Within-Subjects
 Factors**

Measure: Grade

Time	Dependent Variable
1	G1
2	G2
3	G3

**Between-Subjects
 Factors**

		N
studytime	1	212
	2	305
	3	97
	4	35

Descriptive Statistics

	studytime	Mean	Std. Deviation	N
G1	1	10.5047	2.56572	212
	2	11.5377	2.73730	305
	3	12.4227	2.45728	97
	4	12.7714	2.94145	35
	Total	11.3991	2.74527	649
G2	1	10.7028	2.69656	212
	2	11.6623	2.98252	305
	3	12.7938	2.46195	97
	4	12.6286	3.13506	35
	Total	11.5701	2.91364	649
G3	1	10.8443	3.21862	212
	2	12.0918	3.24313	305
	3	13.2268	2.50210	97
	4	13.0571	3.03841	35
	Total	11.9060	3.23066	649

Repeated Measures MANOVA- G1, G2, G3
Within-subject factor: Time with 3 levels; between-subject f

**Box's Test of
Equality of
Covariance
Matrices^a**

Box's M	91.096
F	4.975
df1	18
df2	71839.592
Sig.	.000

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

- a. Design: Intercept + studytime
Within Subjects Design: Time

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Multivariate Tests^a

Effect		Value	F	Hypothesis df	Error df	Sig.
Time	Pillai's Trace	.049	16.435 ^b	2.000	644.000	.000
	Wilks' Lambda	.951	16.435 ^b	2.000	644.000	.000
	Hotelling's Trace	.051	16.435 ^b	2.000	644.000	.000
	Roy's Largest Root	.051	16.435 ^b	2.000	644.000	.000
Time * studytime	Pillai's Trace	.017	1.837	6.000	1290.000	.089
	Wilks' Lambda	.983	1.835 ^b	6.000	1288.000	.089
	Hotelling's Trace	.017	1.833	6.000	1286.000	.089
	Roy's Largest Root	.011	2.446 ^c	3.000	645.000	.063

Multivariate Tests^a

Effect		Partial Eta Squared
Time	Pillai's Trace	.049
	Wilks' Lambda	.049
	Hotelling's Trace	.049
	Roy's Largest Root	.049
Time * studytime	Pillai's Trace	.008
	Wilks' Lambda	.008
	Hotelling's Trace	.008
	Roy's Largest Root	.011

- a. Design: Intercept + studytime
 Within Subjects Design: Time
- b. Exact statistic
- c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Mauchly's Test of Sphericity^a

Measure: Grade

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon ^b Greenhouse-Geisser
Time	.826	122.879	2	.000	.852

Mauchly's Test of Sphericity^a

Measure: Grade

Within Subjects Effect	Epsilon ^b	
	Huynh-Feldt	Lower-bound
Time	.858	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + studytime
 Within Subjects Design: Time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: Grade

Source		Type III Sum of Squares	df	Mean Square	F
Time	Sphericity Assumed	44.730	2	22.365	18.865
	Greenhouse-Geisser	44.730	1.704	26.250	18.865
	Huynh-Feldt	44.730	1.716	26.066	18.865
	Lower-bound	44.730	1.000	44.730	18.865
Time * studytime	Sphericity Assumed	12.312	6	2.052	1.731
	Greenhouse-Geisser	12.312	5.112	2.409	1.731
	Huynh-Feldt	12.312	5.148	2.392	1.731
	Lower-bound	12.312	3.000	4.104	1.731
Error(Time)	Sphericity Assumed	1529.357	1290	1.186	
	Greenhouse-Geisser	1529.357	1099.082	1.391	
	Huynh-Feldt	1529.357	1106.822	1.382	
	Lower-bound	1529.357	645.000	2.371	

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Tests of Within-Subjects Effects

Measure: Grade

Source		Sig.	Partial Eta Squared
Time	Sphericity Assumed	.000	.028
	Greenhouse-Geisser	.000	.028
	Huynh-Feldt	.000	.028
	Lower-bound	.000	.028
Time * studytime	Sphericity Assumed	.110	.008
	Greenhouse-Geisser	.123	.008
	Huynh-Feldt	.122	.008
	Lower-bound	.159	.008
Error(Time)	Sphericity Assumed		
	Greenhouse-Geisser		
	Huynh-Feldt		
	Lower-bound		

Tests of Within-Subjects Contrasts

Measure: Grade

Source	Time	Type III Sum of Squares	df	Mean Square	F	Sig.
Time	Linear	41.967	1	41.967	25.401	.000
	Quadratic	2.763	1	2.763	3.844	.050
Time * studytime	Linear	8.447	3	2.816	1.704	.165
	Quadratic	3.866	3	1.289	1.792	.147
Error(Time)	Linear	1065.663	645	1.652		
	Quadratic	463.694	645	.719		

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Tests of Within-Subjects Contrasts

Measure: Grade

Source	Time	Partial Eta Squared
Time	Linear	.038
	Quadratic	.006
Time * studytime	Linear	.008
	Quadratic	.008
Error(Time)	Linear	
	Quadratic	

Levene's Test of Equality of Error Variances^a

		Levene Statistic	df1	df2	Sig.
G1	Based on Mean	.542	3	645	.653
	Based on Median	.555	3	645	.645
	Based on Median and with adjusted df	.555	3	637.966	.645
	Based on trimmed mean	.547	3	645	.650
G2	Based on Mean	1.703	3	645	.165
	Based on Median	1.613	3	645	.185
	Based on Median and with adjusted df	1.613	3	626.977	.185
	Based on trimmed mean	1.688	3	645	.168
G3	Based on Mean	.985	3	645	.400
	Based on Median	1.026	3	645	.380
	Based on Median and with adjusted df	1.026	3	609.885	.380
	Based on trimmed mean	1.081	3	645	.356

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + studytime
 Within Subjects Design: Time

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Tests of Between-Subjects Effects

Measure: Grade

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	147952.061	1	147952.061	6597.684	.000	.911
studytime	1142.269	3	380.756	16.979	.000	.073
Error	14464.028	645	22.425			

General Linear Model

Notes

Output Created	23-JUN-2026 09:16:33	
Comments		
Input	Data	D:\DATA ANALYSIS\EANOVA Family\Repeated Measures MANOVA\SPSS_Output\sa\repeated_measures_manova_spss_ready_data.sav
	Active Dataset	RMManovaData
	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 all cases with valid data for all variables in the model.

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Notes

Syntax	GLM G1 G2 G3 BY studytime /WSFACTOR=Time 3 Polynomial /MEASURE=Grade /PLOT=PROFILE (Time*studytime) /PRINT=DESCRIPTIVE ETASQ /CRITERIA=ALPHA(.05) /WSDESIGN=Time /DESIGN=studytime.	
Resources	Processor Time	00:00:00.44
	Elapsed Time	00:00:00.39

**Within-Subjects
Factors**

Measure: Grade

Time	Dependent Variable
1	G1
2	G2
3	G3

**Between-Subjects
Factors**

		N
studytime	1	212
	2	305
	3	97
	4	35

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Descriptive Statistics

	studytime	Mean	Std. Deviation	N
G1	1	10.5047	2.56572	212
	2	11.5377	2.73730	305
	3	12.4227	2.45728	97
	4	12.7714	2.94145	35
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	Total	11.5701	2.91364	649
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	3	13.2268	2.50210	97
	4	13.0571	3.03841	35
	Total	11.9060	3.23066	649

Multivariate Tests^a

Effect		Value	F	Hypothesis df	Error df	Sig.
Time	Pillai's Trace	.049	16.435 ^b	2.000	644.000	.000
	Wilks' Lambda	.951	16.435 ^b	2.000	644.000	.000
	Hotelling's Trace	.051	16.435 ^b	2.000	644.000	.000
	Roy's Largest Root	.051	16.435 ^b	2.000	644.000	.000
Time * studytime	Pillai's Trace	.017	1.837	6.000	1290.000	.089
	Wilks' Lambda	.983	1.835 ^b	6.000	1288.000	.089
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Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Multivariate Tests^a

Effect		Partial Eta Squared
Time	Pillai's Trace	.049
	Wilks' Lambda	.049
	Hotelling's Trace	.049
	Roy's Largest Root	.049
Time * studytime	Pillai's Trace	.008
	Wilks' Lambda	.008
	Hotelling's Trace	.008
	Roy's Largest Root	.011

- a. Design: Intercept + studytime
 Within Subjects Design: Time
- b. Exact statistic
- c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Mauchly's Test of Sphericity^a

Measure: Grade

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon ^b Greenhouse-Geisser
Time	.826	122.879	2	.000	.852

Mauchly's Test of Sphericity^a

Measure: Grade

Within Subjects Effect	Epsilon ^b	
	Huynh-Feldt	Lower-bound
Time	.858	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

- a. Design: Intercept + studytime
 Within Subjects Design: Time
- b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Tests of Within-Subjects Effects

Measure: Grade

Source		Type III Sum of Squares	df	Mean Square	F
Time	Sphericity Assumed	44.730	2	22.365	18.865
	Greenhouse-Geisser	44.730	1.704	26.250	18.865
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	Lower-bound	44.730	1.000	44.730	18.865
Time * studytime	Sphericity Assumed	12.312	6	2.052	1.731
	Greenhouse-Geisser	12.312	5.112	2.409	1.731
	Huynh-Feldt	12.312	5.148	2.392	1.731
	Lower-bound	12.312	3.000	4.104	1.731
Error(Time)	Sphericity Assumed	1529.357	1290	1.186	
	Greenhouse-Geisser	1529.357	1099.082	1.391	
	Huynh-Feldt	1529.357	1106.822	1.382	
	Lower-bound	1529.357	645.000	2.371	

Tests of Within-Subjects Effects

Measure: Grade

Source		Sig.	Partial Eta Squared
Time	Sphericity Assumed	.000	.028
	Greenhouse-Geisser	.000	.028
	Huynh-Feldt	.000	.028
	Lower-bound	.000	.028
Time * studytime	Sphericity Assumed	.110	.008
	Greenhouse-Geisser	.123	.008
	Huynh-Feldt	.122	.008
	Lower-bound	.159	.008
Error(Time)	Sphericity Assumed		
	Greenhouse-Geisser		
	Huynh-Feldt		
	Lower-bound		

Repeated Measures MANOVA- G1, G2, G3
 Within-subject factor: Time with 3 levels; between-subject f

Tests of Within-Subjects Contrasts

Measure: Grade

Source	Time	Type III Sum of Squares	df	Mean Square	F	Sig.
Time	Linear	41.967	1	41.967	25.401	.000
	Quadratic	2.763	1	2.763	3.844	.050
Time * studytime	Linear	8.447	3	2.816	1.704	.165
	Quadratic	3.866	3	1.289	1.792	.147
Error(Time)	Linear	1065.663	645	1.652		
	Quadratic	463.694	645	.719		

Tests of Within-Subjects Contrasts

Measure: Grade

Source	Time	Partial Eta Squared
Time	Linear	.038
	Quadratic	.006
Time * studytime	Linear	.008
	Quadratic	.008
Error(Time)	Linear	
	Quadratic	

Tests of Between-Subjects Effects

Measure: Grade

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	147952.061	1	147952.061	6597.684	.000	.911
studytime	1142.269	3	380.756	16.979	.000	.073
Error	14464.028	645	22.425			

Profile Plots

Repeated Measures MANOVA- G1, G2, G3
Within-subject factor: Time with 3 levels; between-subject f

