

Host

Notes

Output Created		23-JUN-2026 09:26:07
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Two Way ANCOVA\SPSS_Output\sa\two_way_ancova_spss_ready_data.sav
	Active Dataset	TwoWayANCOVADData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=['cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output"'].
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.23

Host

Notes

Output Created		23-JUN-2026 09:26:07
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Two Way ANCOVA\SPSS_Output\save\two_way_ancova_spss_ready_data.sav
	Active Dataset	TwoWayANCOVAData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=['cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\png" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\png"'].
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.16

Host

Notes

Output Created		23-JUN-2026 09:26:08
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Two Way ANCOVA\SPSS_Output\sav\two_way_ancova_spss_ready_data.sav
	Active Dataset	TwoWayANCOVADData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=['cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\csv" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\csv"'].
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.12

Host

Notes

Output Created		23-JUN-2026 09:26:08
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Two Way ANCOVA\SPSS_Output\sav\two_way_ancova_spss_ready_data.sav
	Active Dataset	TwoWayANCOVAData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=[cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\txt" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\txt"...
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.11

Host

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Output Created		23-JUN-2026 09:26:08
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Two Way ANCOVA\SPSS_Output\sav\two_way_ancova_spss_ready_data.sav
	Active Dataset	TwoWayANCOVAData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=['cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\pdf" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\pdf"'].
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.10

Host

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Output Created		23-JUN-2026 09:26:08
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Two Way ANCOVA\SPSS_Output\save\two_way_ancova_spss_ready_data.sav
	Active Dataset	TwoWayANCOVADData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=['cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\spv" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\spv"'].
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.11

Host

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Output Created		23-JUN-2026 09:26:08
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Two Way ANCOVA\SPSS_Output\sav\two_way_ancova_spss_ready_data.sav
	Active Dataset	TwoWayANCOVADData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=[cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\sav" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\sav"].
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.14

```
File "<string>", line 109
  ax.set_ylabel(f"Mean {outcome}")
                                     ^
```

SyntaxError: invalid syntax

Two Way ANOVA: G3 by Studytime and School

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

Two Way ANOVA: G3 by Studytime and School
Model includes main effects and interaction; Partial Eta Squ

Means

Notes

Output Created		23-JUN-2026 09:26:09
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\sav\two_way_anova_spss_ready_data.sav
	Active Dataset	TwoWayANOVADData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	For each dependent variable in a table, user-defined missing values for the dependent and all grouping variables are treated as missing.
	Cases Used	Cases used for each table have no missing values in any independent variable, and not all dependent variables have missing values.
Syntax		MEANS TABLES=G3 BY studytime BY school_id /CELLS=COUNT MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.03

[TwoWayANOVADData] D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\sav\two_way_anova_spss_ready_data.sav

Two Way ANOVA: G3 by Studytime and School
 Model includes main effects and interaction; Partial Eta Squ

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
G3 * studytime * school_id	649	100.0%	0	0.0%	649	100.0%

Report

G3

studytime	school_id	N	Mean	Std. Deviation	Minimum	Maximum
1	1	119	11.5294	2.75504	.00	18.00
	2	93	9.9677	3.55531	.00	17.00
	Total	212	10.8443	3.21862	.00	18.00
2	1	206	12.7330	2.45378	1.00	18.00
	2	99	10.7576	4.16764	.00	19.00
	Total	305	12.0918	3.24313	.00	19.00
3	1	71	13.5634	2.24074	8.00	18.00
	2	26	12.3077	2.96337	8.00	18.00
	Total	97	13.2268	2.50210	8.00	18.00
4	1	27	13.4074	2.80466	10.00	19.00
	2	8	11.8750	3.68152	6.00	18.00
	Total	35	13.0571	3.03841	6.00	19.00
Total	1	423	12.5768	2.62564	.00	19.00
	2	226	10.6504	3.83399	.00	19.00
	Total	649	11.9060	3.23066	.00	19.00

Univariate Analysis of Variance

Two Way ANOVA: G3 by Studytime and School
Model includes main effects and interaction; Partial Eta Squ

Notes

Output Created		23-JUN-2026 09:26:09
Comments		
Input	Data	D:\DATA ANALYSIS\IE ANOVA Family\Two Way ANOVA\SPSS_Output\sav\two_way_anova_spss_ready_data.sav
	Active Dataset	TwoWayANOVADData
	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		UNIANOVA G3 BY studytime school_id /METHOD=SSTYPE(3) /INTERCEPT=INCLUDE /PRINT=DESCRIPTIVE ETASQ HOMOGENEITY PARAMETER /CRITERIA=ALPHA(.05) /DESIGN=studytime school_id studytime*school_id.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.08

Two Way ANOVA: G3 by Studytime and School
 Model includes main effects and interaction; Partial Eta Squ

Between-Subjects Factors

		Value Label	N
studytime	1		212
	2		305
	3		97
	4		35
school_id	1	GP	423
	2	MS	226

Descriptive Statistics

Dependent Variable: G3

studytime	school_id	Mean	Std. Deviation	N
1	1	11.5294	2.75504	119
	2	9.9677	3.55531	93
	Total	10.8443	3.21862	212
2	1	12.7330	2.45378	206
	2	10.7576	4.16764	99
	Total	12.0918	3.24313	305
3	1	13.5634	2.24074	71
	2	12.3077	2.96337	26
	Total	13.2268	2.50210	97
4	1	13.4074	2.80466	27
	2	11.8750	3.68152	8
	Total	13.0571	3.03841	35
Total	1	12.5768	2.62564	423
	2	10.6504	3.83399	226
	Total	11.9060	3.23066	649

Two Way ANOVA: G3 by Studytime and School
 Model includes main effects and interaction; Partial Eta Squ

Levene's Test of Equality of Error Variances^{a,b}

		Levene Statistic	df1	df2	Sig.
G3	Based on Mean	3.420	7	641	.001
	Based on Median	3.304	7	641	.002
	Based on Median and with adjusted df	3.304	7	483.824	.002
	Based on trimmed mean	3.376	7	641	.002

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

a. Dependent variable: G3

b. Design: Intercept + studytime + school_id + studytime * school_id

Tests of Between-Subjects Effects

Dependent Variable: G3

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	897.822 ^a	7	128.260	14.017	.000
Intercept	37166.619	1	37166.619	4061.722	.000
studytime	319.327	3	106.442	11.632	.000
school_id	160.873	1	160.873	17.581	.000
studytime * school_id	9.982	3	3.327	.364	.779
Error	5865.444	641	9.150		
Total	98761.000	649			
Corrected Total	6763.267	648			

Two Way ANOVA: G3 by Studytime and School
 Model includes main effects and interaction; Partial Eta Squ

Tests of Between-Subjects Effects

Dependent Variable: G3

Source	Partial Eta Squared
Corrected Model	.133
Intercept	.864
studytime	.052
school_id	.027
studytime * school_id	.002
Error	
Total	
Corrected Total	

a. R Squared = .133 (Adjusted R Squared = .123)

Parameter Estimates

Dependent Variable: G3

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	11.875	1.069	11.103	.000	9.775	13.975
[studytime=1]	-1.907	1.115	-1.711	.088	-4.096	.281
[studytime=2]	-1.117	1.112	-1.005	.315	-3.301	1.066
[studytime=3]	.433	1.223	.354	.724	-1.969	2.834
[studytime=4]	0 ^a	.	.	.	.	.
[school_id=1]	1.532	1.218	1.258	.209	-.859	3.924
[school_id=2]	0 ^a	.	.	.	.	.
[studytime=1] * [school_id=1]	.029	1.288	.023	.982	-2.499	2.558
[studytime=1] * [school_id=2]	0 ^a	.	.	.	.	.
[studytime=2] * [school_id=1]	.443	1.273	.348	.728	-2.056	2.942
[studytime=2] * [school_id=2]	0 ^a	.	.	.	.	.

Two Way ANOVA: G3 by Studytime and School
 Model includes main effects and interaction; Partial Eta Squ

Parameter Estimates

Dependent Variable: G3

Parameter	Partial Eta Squared
Intercept	.161
[studytime=1]	.005
[studytime=2]	.002
[studytime=3]	.000
[studytime=4]	.
[school_id=1]	.002
[school_id=2]	.
[studytime=1] * [school_id=1]	.000
[studytime=1] * [school_id=2]	.
[studytime=2] * [school_id=1]	.000
[studytime=2] * [school_id=2]	.

Parameter Estimates

Dependent Variable: G3

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
[studytime=3] * [school_id=1]	-.277	1.401	-.197	.844	-3.028	2.475
[studytime=3] * [school_id=2]	0 ^a	.	.	.	.	.
[studytime=4] * [school_id=1]	0 ^a	.	.	.	.	.
[studytime=4] * [school_id=2]	0 ^a	.	.	.	.	.

Two Way ANOVA: G3 by Studytime and School
Model includes main effects and interaction; Partial Eta Squ

Parameter Estimates

Dependent Variable: G3

Parameter	Partial Eta Squared
[studytime=3] * [school_id=1]	.000
[studytime=3] * [school_id=2]	.
[studytime=4] * [school_id=1]	.
[studytime=4] * [school_id=2]	.

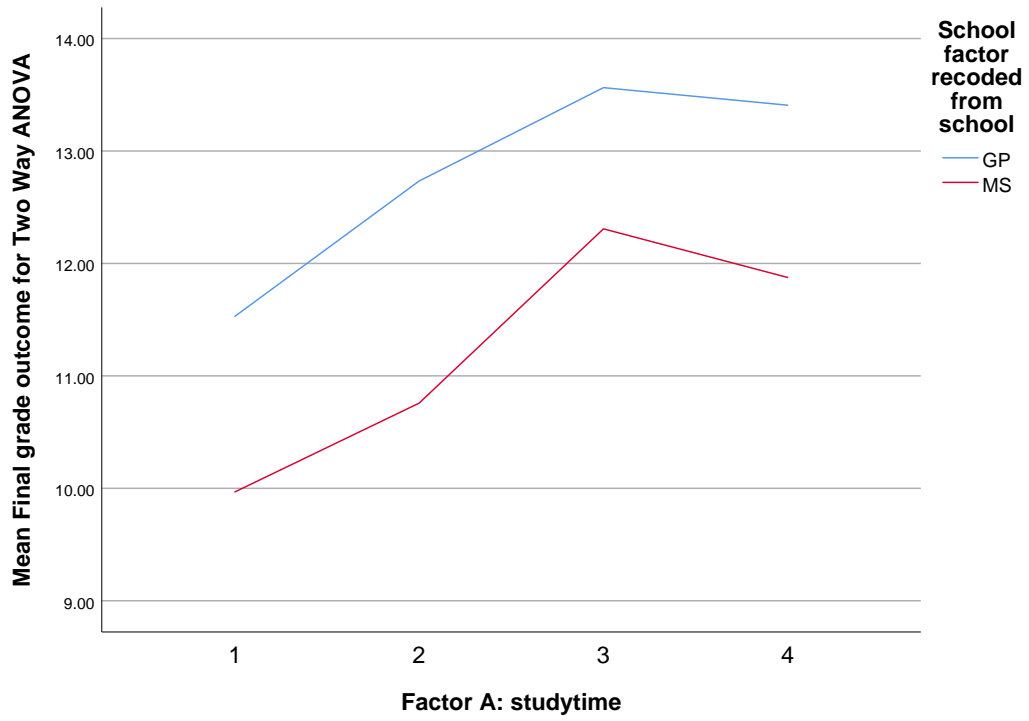
a. This parameter is set to zero because it is redundant.

Graph

Notes

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Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Two Way ANOVA\SPSS_Output\sav\two_way_anova_spss_ready_data.sav
	Active Dataset	TwoWayANOVAData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Syntax		GRAPH /LINE(MULTIPLE) =MEAN(G3) BY studytime BY school_id.
Resources	Processor Time	00:00:00.66
	Elapsed Time	00:00:00.55

Two Way ANOVA: G3 by Studytime and School
Model includes main effects and interaction; Partial Eta Squ



Graph

Two Way ANOVA: G3 by Studytime and School
 Model includes main effects and interaction; Partial Eta Squ

Notes

Output Created		23-JUN-2026 09:26:10
Comments		
Input	Data	D:\DATA ANALYSIS\EANOVA Family\Two Way ANOVA\SPSS_Output\sav\two_way_anova_spss_ready_data.sav
	Active Dataset	TwoWayANOVAData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Syntax		GRAPH /BAR(GROUPED) =MEAN(G3) BY studytime BY school_id.
Resources	Processor Time	00:00:00.52
	Elapsed Time	00:00:00.48

Two Way ANOVA: G3 by Studytime and School
Model includes main effects and interaction; Partial Eta Squ

