

Host

Notes

Output Created		23-JUN-2026 09:23:53
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Split Plot ANOVA\SPSS_Output\sav\split_plot_anova_spss_ready_data.sav
	Active Dataset	SplitPlotANOVADData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output"'
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.22

Host

Notes

Output Created		23-JUN-2026 09:23:53
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Split Plot ANOVA\SPSS_Output\sav\split_plot_anova_spss_ready_data.sav
	Active Dataset	SplitPlotANOVAData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\png" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\png"'
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.10

Host

Notes

Output Created		23-JUN-2026 09:23:53
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Split Plot ANOVA\SPSS_Output\sav\split_plot_anova_spss_ready_data.sav
	Active Dataset	SplitPlotANOVAData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\tables" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\tables"'
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.13

Host

Notes

Output Created		23-JUN-2026 09:23:53
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Split Plot ANOVA\SPSS_Output\sav\split_plot_anova_spss_ready_data.sav
	Active Dataset	SplitPlotANOVAData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\pdf" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\pdf"'
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.09

Host

Notes

Output Created		23-JUN-2026 09:23:54
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Split Plot ANOVA\SPSS_Output\sav\split_plot_anova_spss_ready_data.sav
	Active Dataset	SplitPlotANOVAData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\spv" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\spv"'
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.08

Host

Notes

Output Created		23-JUN-2026 09:23:54
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Split Plot ANOVA\SPSS_Output\sav\split_plot_anova_spss_ready_data.sav
	Active Dataset	SplitPlotANOVAData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND='cmd /c if not exist "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\sav" mkdir "D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\sav"'
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.09

```
File "<string>", line 134
  ax.text(value + 0.002, idx, f"{value:.3f}", va="center", fontweight="bold"
)
^
SyntaxError: invalid syntax
```

Three Way ANOVA: G3 by Studytime, School, and Sex

Three Way ANOVA: G3 by Studytime, School, and Sex
SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Means

Notes

Output Created		23-JUN-2026 09:23:54
Comments		
Input	Data	D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\sav\three_way_anova_spss_ready_data.sav
	Active Dataset	ThreeWayANOVADData
	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 BY sex_id /CELLS=COUNT MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03

[ThreeWayANOVADData] D:\DATA ANALYSIS\E ANOVA Family\Three Way ANOVA\SPSS_Output\sav\three_way_anova_spss_ready_data.sav

Three Way ANOVA: G3 by Studytime, School, and Sex
 SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Case Processing Summary

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

Report

G3

studytime	school_id	sex_id	N	Mean	Std. Deviation	Minimum	Maximum
1	1	1	42	12.1429	2.32244	7.00	17.00
		2	77	11.1948	2.92466	.00	18.00
		Total	119	11.5294	2.75504	.00	18.00
	2	1	47	10.3404	3.23887	.00	16.00
		2	46	9.5870	3.85040	.00	17.00
		Total	93	9.9677	3.55531	.00	17.00
	Total	1	89	11.1910	2.96907	.00	17.00
		2	123	10.5935	3.37745	.00	18.00
		Total	212	10.8443	3.21862	.00	18.00
2	1	1	125	12.9040	2.15311	8.00	18.00
		2	81	12.4691	2.85082	1.00	18.00
		Total	206	12.7330	2.45378	1.00	18.00
	2	1	73	10.9863	4.25406	.00	18.00
		2	26	10.1154	3.92252	.00	19.00
		Total	99	10.7576	4.16764	.00	19.00
	Total	1	198	12.1970	3.22374	.00	18.00
		2	107	11.8972	3.28500	.00	19.00
		Total	305	12.0918	3.24313	.00	19.00
3	1	1	53	13.5283	2.35832	8.00	18.00
		2	18	13.6667	1.90973	9.00	17.00
		Total	71	13.5634	2.24074	8.00	18.00
	2	1	22	12.1364	2.96480	8.00	18.00
		2	4	13.2500	3.20156	10.00	16.00
		Total	26	12.3077	2.96337	8.00	18.00

Three Way ANOVA: G3 by Studytime, School, and Sex
 SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Report

G3

studytime	school_id	sex_id	N	Mean	Std. Deviation	Minimum	Maximum
	Total	1	75	13.1200	2.60955	8.00	18.00
		2	22	13.5909	2.10801	9.00	17.00
		Total	97	13.2268	2.50210	8.00	18.00
4	1	1	17	14.2353	2.94808	10.00	19.00
		2	10	12.0000	1.94365	10.00	17.00
		Total	27	13.4074	2.80466	10.00	19.00
	2	1	4	14.0000	2.94392	11.00	18.00
		2	4	9.7500	3.30404	6.00	14.00
		Total	8	11.8750	3.68152	6.00	18.00
	Total	1	21	14.1905	2.87435	10.00	19.00
		2	14	11.3571	2.49945	6.00	17.00
		Total	35	13.0571	3.03841	6.00	19.00
Total	1	1	237	13.0042	2.34430	7.00	19.00
		2	186	12.0323	2.86055	.00	18.00
		Total	423	12.5768	2.62564	.00	19.00
	2	1	146	11.0342	3.78821	.00	18.00
		2	80	9.9500	3.84148	.00	19.00
		Total	226	10.6504	3.83399	.00	19.00
	Total	1	383	12.2533	3.12415	.00	19.00
		2	266	11.4060	3.32069	.00	19.00
		Total	649	11.9060	3.23066	.00	19.00

Univariate Analysis of Variance

Three Way ANOVA: G3 by Studytime, School, and Sex
 SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Notes

Output Created		23-JUN-2026 09:23:54
Comments		
Input	Data	D:\DATA ANALYSIS\IE ANOVA Family\Three Way ANOVA\SPSS_Output\sav\three_way_anova_spss_ready_data.sav
	Active Dataset	ThreeWayANOVAData
	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 sex_id /METHOD=SSTYPE(3) /INTERCEPT=INCLUDE /PRINT=DESCRIPTIVE ETASQ HOMOGENEITY PARAMETER /CRITERIA=ALPHA(.05) /DESIGN=studytime school_id sex_id studytime*school_id studytime*sex_id school_id*sex_id studytime*school_id*sex_id.
Resources	Processor Time	00:00:00.13
	Elapsed Time	00:00:00.14

Three Way ANOVA: G3 by Studytime, School, and Sex
 SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Between-Subjects Factors

		Value Label	N
studytime	1		212
	2		305
	3		97
	4		35
school_id	1	GP	423
	2	MS	226
sex_id	1	F	383
	2	M	266

Descriptive Statistics

Dependent Variable: G3

studytime	school_id	sex_id	Mean	Std. Deviation	N
1	1	1	12.1429	2.32244	42
		2	11.1948	2.92466	77
		Total	11.5294	2.75504	119
	2	1	10.3404	3.23887	47
		2	9.5870	3.85040	46
		Total	9.9677	3.55531	93
	Total	1	11.1910	2.96907	89
		2	10.5935	3.37745	123
		Total	10.8443	3.21862	212
2	1	1	12.9040	2.15311	125
		2	12.4691	2.85082	81
		Total	12.7330	2.45378	206
	2	1	10.9863	4.25406	73
		2	10.1154	3.92252	26
		Total	10.7576	4.16764	99
	Total	1	12.1970	3.22374	198
		2	11.8972	3.28500	107
		Total	12.0918	3.24313	305

Three Way ANOVA: G3 by Studytime, School, and Sex
 SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Descriptive Statistics

Dependent Variable: G3

studytime	school_id	sex_id	Mean	Std. Deviation	N
3	1	1	13.5283	2.35832	53
		2	13.6667	1.90973	18
		Total	13.5634	2.24074	71
	2	1	12.1364	2.96480	22
		2	13.2500	3.20156	4
		Total	12.3077	2.96337	26
	Total	1	13.1200	2.60955	75
		2	13.5909	2.10801	22
		Total	13.2268	2.50210	97
4	1	1	14.2353	2.94808	17
		2	12.0000	1.94365	10
		Total	13.4074	2.80466	27
	2	1	14.0000	2.94392	4
		2	9.7500	3.30404	4
		Total	11.8750	3.68152	8
	Total	1	14.1905	2.87435	21
		2	11.3571	2.49945	14
		Total	13.0571	3.03841	35
Total	1	1	13.0042	2.34430	237
		2	12.0323	2.86055	186
		Total	12.5768	2.62564	423
	2	1	11.0342	3.78821	146
		2	9.9500	3.84148	80
		Total	10.6504	3.83399	226
	Total	1	12.2533	3.12415	383
		2	11.4060	3.32069	266
		Total	11.9060	3.23066	649

Three Way ANOVA: G3 by Studytime, School, and Sex
 SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

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

		Levene Statistic	df1	df2	Sig.
G3	Based on Mean	2.236	15	633	.005
	Based on Median	2.113	15	633	.008
	Based on Median and with adjusted df	2.113	15	451.370	.009
	Based on trimmed mean	2.277	15	633	.004

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 + sex_id + studytime * school_id + studytime * sex_id + school_id * sex_id + studytime * school_id * sex_id

Tests of Between-Subjects Effects

Dependent Variable: G3

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1031.322 ^a	15	68.755	7.593	.000
Intercept	31313.439	1	31313.439	3458.060	.000
studytime	237.548	3	79.183	8.744	.000
school_id	121.434	1	121.434	13.410	.000
sex_id	57.499	1	57.499	6.350	.012
studytime * school_id	17.227	3	5.742	.634	.593
studytime * sex_id	59.228	3	19.743	2.180	.089
school_id * sex_id	1.389	1	1.389	.153	.695
studytime * school_id * sex_id	11.306	3	3.769	.416	.741
Error	5731.944	633	9.055		
Total	98761.000	649			
Corrected Total	6763.267	648			

Three Way ANOVA: G3 by Studytime, School, and Sex
SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Tests of Between-Subjects Effects

Dependent Variable: G3

Source	Partial Eta Squared
Corrected Model	.152
Intercept	.845
studytime	.040
school_id	.021
sex_id	.010
studytime * school_id	.003
studytime * sex_id	.010
school_id * sex_id	.000
studytime * school_id * sex_id	.002
Error	
Total	
Corrected Total	

a. R Squared = .152 (Adjusted R Squared = .132)

Three Way ANOVA: G3 by Studytime, School, and Sex
SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Parameter Estimates

Dependent Variable: G3

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	9.750	1.505	6.480	.000	6.795	12.705
[studytime=1]	-.163	1.569	-.104	.917	-3.243	2.917
[studytime=2]	.365	1.616	.226	.821	-2.808	3.539
[studytime=3]	3.500	2.128	1.645	.100	-.678	7.678
[studytime=4]	0 ^a	.	.	.	.	.
[school_id=1]	2.250	1.780	1.264	.207	-1.246	5.746
[school_id=2]	0 ^a	.	.	.	.	.
[sex_id=1]	4.250	2.128	1.997	.046	.072	8.428
[sex_id=2]	0 ^a	.	.	.	.	.
[studytime=1] * [school_id=1]	-.642	1.866	-.344	.731	-4.307	3.023
[studytime=1] * [school_id=2]	0 ^a	.	.	.	.	.
[studytime=2] * [school_id=1]	.104	1.905	.054	.957	-3.637	3.845
[studytime=2] * [school_id=2]	0 ^a	.	.	.	.	.
[studytime=3] * [school_id=1]	-1.833	2.436	-.752	.452	-6.618	2.951
[studytime=3] * [school_id=2]	0 ^a	.	.	.	.	.
[studytime=4] * [school_id=1]	0 ^a	.	.	.	.	.
[studytime=4] * [school_id=2]	0 ^a	.	.	.	.	.
[studytime=1] * [sex_id=1]	-3.497	2.217	-1.577	.115	-7.851	.858
[studytime=1] * [sex_id=2]	0 ^a	.	.	.	.	.
[studytime=2] * [sex_id=1]	-3.379	2.236	-1.511	.131	-7.770	1.012
[studytime=2] * [sex_id=2]	0 ^a	.	.	.	.	.
[studytime=3] * [sex_id=1]	-5.364	2.684	-1.998	.046	-10.634	-.093
[studytime=3] * [sex_id=2]	0 ^a	.	.	.	.	.

Three Way ANOVA: G3 by Studytime, School, and Sex
 SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Parameter Estimates

Dependent Variable: G3

Parameter	Partial Eta Squared
Intercept	.062
[studytime=1]	.000
[studytime=2]	.000
[studytime=3]	.004
[studytime=4]	.
[school_id=1]	.003
[school_id=2]	.
[sex_id=1]	.006
[sex_id=2]	.
[studytime=1] * [school_id=1]	.000
[studytime=1] * [school_id=2]	.
[studytime=2] * [school_id=1]	.000
[studytime=2] * [school_id=2]	.
[studytime=3] * [school_id=1]	.001
[studytime=3] * [school_id=2]	.
[studytime=4] * [school_id=1]	.
[studytime=4] * [school_id=2]	.
[studytime=1] * [sex_id=1]	.004
[studytime=1] * [sex_id=2]	.
[studytime=2] * [sex_id=1]	.004
[studytime=2] * [sex_id=2]	.
[studytime=3] * [sex_id=1]	.006
[studytime=3] * [sex_id=2]	.

Three Way ANOVA: G3 by Studytime, School, and Sex
SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Parameter Estimates

Dependent Variable: G3

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
[studytime=4] * [sex_id=1]	0 ^a	.	.	.	.	.
[studytime=4] * [sex_id=2]	0 ^a	.	.	.	.	.
[school_id=1] * [sex_id=1]	-2.015	2.442	-.825	.410	-6.811	2.782
[school_id=1] * [sex_id=2]	0 ^a	.	.	.	.	.
[school_id=2] * [sex_id=1]	0 ^a	.	.	.	.	.
[school_id=2] * [sex_id=2]	0 ^a	.	.	.	.	.
[studytime=1] * [school_id=1] * [sex_id=1]	2.209	2.586	.854	.393	-2.869	7.288
[studytime=1] * [school_id=1] * [sex_id=2]	0 ^a	.	.	.	.	.
[studytime=1] * [school_id=2] * [sex_id=1]	0 ^a	.	.	.	.	.
[studytime=1] * [school_id=2] * [sex_id=2]	0 ^a	.	.	.	.	.
[studytime=2] * [school_id=1] * [sex_id=1]	1.579	2.573	.613	.540	-3.475	6.632
[studytime=2] * [school_id=1] * [sex_id=2]	0 ^a	.	.	.	.	.
[studytime=2] * [school_id=2] * [sex_id=1]	0 ^a	.	.	.	.	.
[studytime=2] * [school_id=2] * [sex_id=2]	0 ^a	.	.	.	.	.
[studytime=3] * [school_id=1] * [sex_id=1]	2.990	3.052	.980	.328	-3.003	8.983
[studytime=3] * [school_id=1] * [sex_id=2]	0 ^a	.	.	.	.	.
[studytime=3] * [school_id=2] * [sex_id=1]	0 ^a	.	.	.	.	.
[studytime=3] * [school_id=2] * [sex_id=2]	0 ^a	.	.	.	.	.
[studytime=4] * [school_id=1] * [sex_id=1]	0 ^a	.	.	.	.	.

Three Way ANOVA: G3 by Studytime, School, and Sex
SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Parameter Estimates

Dependent Variable: G3

Parameter	Partial Eta Squared
[studytime=4] * [sex_id=1]	.
[studytime=4] * [sex_id=2]	.
[school_id=1] * [sex_id=1]	.001
[school_id=1] * [sex_id=2]	.
[school_id=2] * [sex_id=1]	.
[school_id=2] * [sex_id=2]	.
[studytime=1] * [school_id=1] * [sex_id=1]	.001
[studytime=1] * [school_id=1] * [sex_id=2]	.
[studytime=1] * [school_id=2] * [sex_id=1]	.
[studytime=1] * [school_id=2] * [sex_id=2]	.
[studytime=2] * [school_id=1] * [sex_id=1]	.001
[studytime=2] * [school_id=1] * [sex_id=2]	.
[studytime=2] * [school_id=2] * [sex_id=1]	.
[studytime=2] * [school_id=2] * [sex_id=2]	.
[studytime=3] * [school_id=1] * [sex_id=1]	.002
[studytime=3] * [school_id=1] * [sex_id=2]	.
[studytime=3] * [school_id=2] * [sex_id=1]	.
[studytime=3] * [school_id=2] * [sex_id=2]	.
[studytime=4] * [school_id=1] * [sex_id=1]	.

Three Way ANOVA: G3 by Studytime, School, and Sex
 SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Parameter Estimates

Dependent Variable: G3

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
[studytime=4] * [school_id=1] * [sex_id=2]	0 ^a	.	.	.	.	.
[studytime=4] * [school_id=2] * [sex_id=1]	0 ^a	.	.	.	.	.
[studytime=4] * [school_id=2] * [sex_id=2]	0 ^a	.	.	.	.	.

Parameter Estimates

Dependent Variable: G3

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

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

Graph

Three Way ANOVA: G3 by Studytime, School, and Sex
 SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

Notes

Output Created		23-JUN-2026 09:23:54
Comments		
Input	Data	D:\DATA ANALYSIS\EANOVA Family\Three Way ANOVA\SPSS_Output\sav\three_way_anova_spss_ready_data.sav
	Active Dataset	ThreeWayANOVAData
	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	00:00:00.55
	Elapsed Time	00:00:00.53

Three Way ANOVA: G3 by Studytime, School, and Sex
SPSS UNIANOVAprints Partial Eta Squared with /PRINT=ETASQ.

