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

Mixed ANOVA

Importing dataset for mixed ANOVA: repeated measures G1, G2,

Frequencies

[MixedANOVAData] D:\DATA ANALYSIS\E ANOVA Family\Mixed ANOVA\SPSS_Output\sav\Mixed-ANOVA-data.sav

Statistics

studytime

N	Valid	649
	Missing	0

studytime

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	212	32.7	32.7	32.7
	2.00	305	47.0	47.0	79.7
	3.00	97	14.9	14.9	94.6
	4.00	35	5.4	5.4	100.0
	Total	649	100.0	100.0	

Descriptives

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				

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
G1 * studytime	649	100.0%	0	0.0%	649	100.0%
G2 * studytime	649	100.0%	0	0.0%	649	100.0%
G3 * studytime	649	100.0%	0	0.0%	649	100.0%

Report

studytime		G1	G2	G3
1.00	N	212	212	212
	Mean	10.5047	10.7028	10.8443
	Std. Deviation	2.56572	2.69656	3.21862
	Minimum	4.00	.00	.00
	Maximum	18.00	18.00	18.00
2.00	N	305	305	305
	Mean	11.5377	11.6623	12.0918
	Std. Deviation	2.73730	2.98252	3.24313
	Minimum	.00	.00	.00
	Maximum	18.00	18.00	19.00
3.00	N	97	97	97
	Mean	12.4227	12.7938	13.2268
	Std. Deviation	2.45728	2.46195	2.50210
	Minimum	7.00	7.00	8.00
	Maximum	19.00	18.00	18.00
4.00	N	35	35	35
	Mean	12.7714	12.6286	13.0571
	Std. Deviation	2.94145	3.13506	3.03841
	Minimum	5.00	6.00	6.00
	Maximum	18.00	19.00	19.00
Total	N	649	649	649
	Mean	11.3991	11.5701	11.9060
	Std. Deviation	2.74527	2.91364	3.23066

Mixed ANOVA: Means by Studytime

Report

studytime	G1	G2	G3
Minimum	.00	.00	.00
Maximum	19.00	19.00	19.00

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

Mixed ANOVA: Repeated Measures GLM
Within-subject factor Grade_Period has 3 levels: G1, G2, G3.

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Grade_Period	Dependent Variable
1	G1
2	G2
3	G3

Between-Subjects Factors

		Value Label	N
studytime	1.00	Studytime 1	212
	2.00	Studytime 2	305
	3.00	Studytime 3	97
	4.00	Studytime 4	35

Descriptive Statistics

	studytime	Mean	Std. Deviation	N
G1	1.00	10.5047	2.56572	212
	2.00	11.5377	2.73730	305
	3.00	12.4227	2.45728	97
	4.00	12.7714	2.94145	35
	Total	11.3991	2.74527	649
G2	1.00	10.7028	2.69656	212
	2.00	11.6623	2.98252	305
	3.00	12.7938	2.46195	97
	4.00	12.6286	3.13506	35
	Total	11.5701	2.91364	649
G3	1.00	10.8443	3.21862	212
	2.00	12.0918	3.24313	305
	3.00	13.2268	2.50210	97
	4.00	13.0571	3.03841	35
	Total	11.9060	3.23066	649

Mixed ANOVA: Repeated Measures GLM
Within-subject factor Grade_Period has 3 levels: G1, G2, G3.

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: Grade_Period

Mixed ANOVA: Repeated Measures GLM
Within-subject factor Grade_Period has 3 levels: G1, G2, G3.

Multivariate Tests[a]

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

Multivariate Tests[a]

Effect		Sig.	Partial Eta Squared
Grade_Period	Pillai's Trace	.000	.049
	Wilks' Lambda	.000	.049
	Hotelling's Trace	.000	.049
	Roy's Largest Root	.000	.049
Grade_Period * studytime	Pillai's Trace	.089	.008
	Wilks' Lambda	.089	.008
	Hotelling's Trace	.089	.008
	Roy's Largest Root	.063	.011

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

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Mixed ANOVA: Repeated Measures GLM
Within-subject factor Grade_Period has 3 levels: G1, G2, G3.

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

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

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[b] Huynh-Feldt	Lower-bound
Grade_Period	.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: Grade_Period

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: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square
Grade_Period	Sphericity Assumed	44.730	2	22.365
	Greenhouse-Geisser	44.730	1.704	26.250
	Huynh-Feldt	44.730	1.716	26.066
	Lower-bound	44.730	1.000	44.730
Grade_Period * studytime	Sphericity Assumed	12.312	6	2.052
	Greenhouse-Geisser	12.312	5.112	2.409
	Huynh-Feldt	12.312	5.148	2.392
	Lower-bound	12.312	3.000	4.104
Error(Grade_Period)	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

Mixed ANOVA: Repeated Measures GLM
Within-subject factor Grade_Period has 3 levels: G1, G2, G3.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		F	Sig.	Partial Eta Squared
Grade_Period	Sphericity Assumed	18.865	.000	.028
	Greenhouse-Geisser	18.865	.000	.028
	Huynh-Feldt	18.865	.000	.028
	Lower-bound	18.865	.000	.028
Grade_Period * studytime	Sphericity Assumed	1.731	.110	.008
	Greenhouse-Geisser	1.731	.123	.008
	Huynh-Feldt	1.731	.122	.008
	Lower-bound	1.731	.159	.008
Error(Grade_Period)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

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

Mixed ANOVA: Repeated Measures GLM
Within-subject factor Grade_Period has 3 levels: G1, G2, G3.

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	Grade_Period	Sig.	Partial Eta Squared
Grade_Period	Linear	.000	.038
	Quadratic	.050	.006
Grade_Period * studytime	Linear	.165	.008
	Quadratic	.147	.008
Error(Grade_Period)	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: Grade_Period

Mixed ANOVA: Repeated Measures GLM
Within-subject factor Grade_Period has 3 levels: G1, G2, G3.

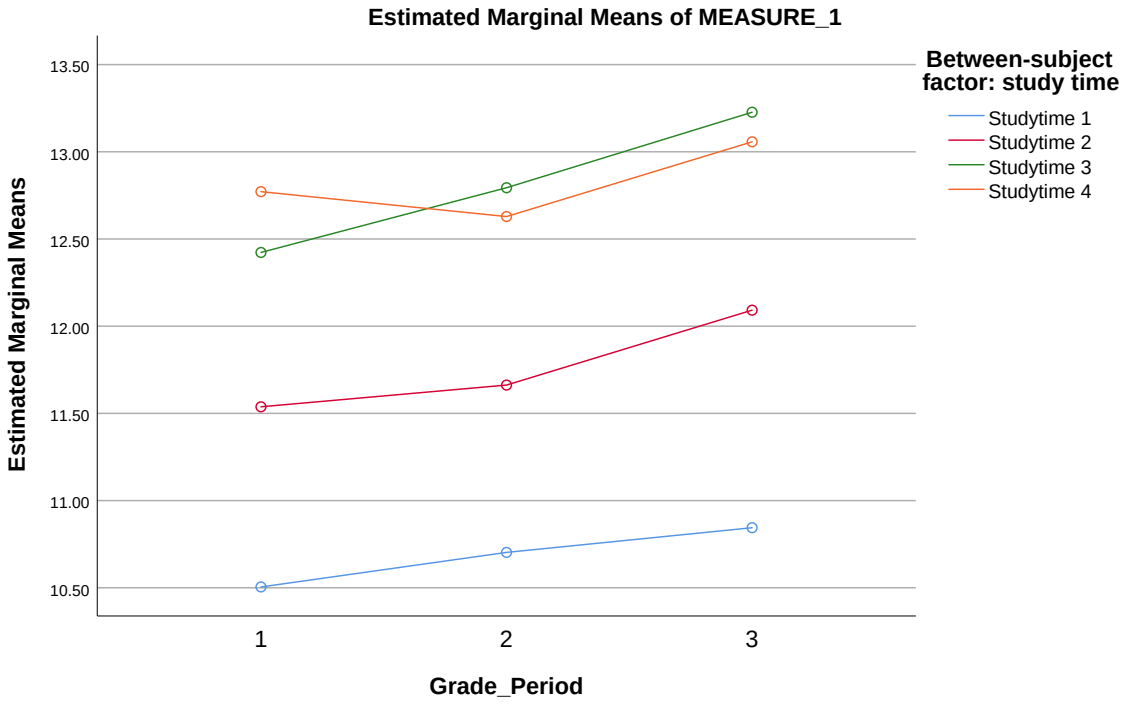
Tests of Between-Subjects Effects

Measure: MEASURE_1

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



General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Grade_Period	Dependent Variable
1	G1
2	G2
3	G3

Between-Subjects Factors

		Value Label	N
studytime	1.00	Studytime 1	212
	2.00	Studytime 2	305
	3.00	Studytime 3	97
	4.00	Studytime 4	35

Descriptive Statistics

	studytime	Mean	Std. Deviation	N
G1	1.00	10.5047	2.56572	212
	2.00	11.5377	2.73730	305
	3.00	12.4227	2.45728	97
	4.00	12.7714	2.94145	35
	Total	11.3991	2.74527	649
G2	1.00	10.7028	2.69656	212
	2.00	11.6623	2.98252	305
	3.00	12.7938	2.46195	97
	4.00	12.6286	3.13506	35
	Total	11.5701	2.91364	649
G3	1.00	10.8443	3.21862	212
	2.00	12.0918	3.24313	305
	3.00	13.2268	2.50210	97
	4.00	13.0571	3.03841	35
	Total	11.9060	3.23066	649

Multivariate Tests[a]

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

Multivariate Tests[a]

Effect		Sig.	Partial Eta Squared
Grade_Period	Pillai's Trace	.000	.049
	Wilks' Lambda	.000	.049
	Hotelling's Trace	.000	.049
	Roy's Largest Root	.000	.049
Grade_Period * studytime	Pillai's Trace	.089	.008
	Wilks' Lambda	.089	.008
	Hotelling's Trace	.089	.008
	Roy's Largest Root	.063	.011

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

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: MEASURE_1

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

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[b] Huynh-Feldt	Lower-bound
Grade_Period	.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: Grade_Period

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: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square
Grade_Period	Sphericity Assumed	44.730	2	22.365
	Greenhouse-Geisser	44.730	1.704	26.250
	Huynh-Feldt	44.730	1.716	26.066
	Lower-bound	44.730	1.000	44.730
Grade_Period * studytime	Sphericity Assumed	12.312	6	2.052
	Greenhouse-Geisser	12.312	5.112	2.409
	Huynh-Feldt	12.312	5.148	2.392
	Lower-bound	12.312	3.000	4.104
Error(Grade_Period)	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: MEASURE_1

Source		F	Sig.	Partial Eta Squared
Grade_Period	Sphericity Assumed	18.865	.000	.028
	Greenhouse-Geisser	18.865	.000	.028
	Huynh-Feldt	18.865	.000	.028
	Lower-bound	18.865	.000	.028
Grade_Period * studytime	Sphericity Assumed	1.731	.110	.008
	Greenhouse-Geisser	1.731	.123	.008
	Huynh-Feldt	1.731	.122	.008
	Lower-bound	1.731	.159	.008
Error(Grade_Period)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

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

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	Grade_Period	Sig.	Partial Eta Squared
Grade_Period	Linear	.000	.038
	Quadratic	.050	.006
Grade_Period * studytime	Linear	.165	.008
	Quadratic	.147	.008
Error(Grade_Period)	Linear		
	Quadratic		

Tests of Between-Subjects Effects

Measure: MEASURE_1

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			

Estimated Marginal Means

1. Grade_Period

Estimates

Measure: MEASURE_1

Grade_Period	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	11.809	.144	11.527	12.091
2	11.947	.153	11.646	12.247
3	12.305	.169	11.973	12.637

Pairwise Comparisons

Measure: MEASURE_1

(I) Grade_Period	(J) Grade_Period	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence [b]... Lower Bound
1	2	-.138	.080	.086	-.295
	3	-.496*	.098	.000	-.689
2	1	.138	.080	.086	-.019
	3	-.358*	.069	.000	-.494
3	1	.496*	.098	.000	.303
	2	.358*	.069	.000	.223

Pairwise Comparisons

Measure: MEASURE_1

(I) Grade_Period	(J) Grade_Period	95% Confidence Interval for [b]... Upper Bound
1	2	.019
	3	-.303
2	1	.295
	3	-.223
3	1	.689
	2	.494

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.049	16.435[a]	2.000	644.000	.000	.049
Wilks' lambda	.951	16.435[a]	2.000	644.000	.000	.049
Hotelling's trace	.051	16.435[a]	2.000	644.000	.000	.049
Roy's largest root	.051	16.435[a]	2.000	644.000	.000	.049

Each F tests the multivariate effect of Grade_Period. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

2. Between-subject factor: study time

Estimates

Measure: MEASURE_1

Between-subject factor: study time	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1.00	10.684	.188	10.315	11.053
2.00	11.764	.157	11.457	12.071
3.00	12.814	.278	12.269	13.360
4.00	12.819	.462	11.912	13.727

Pairwise Comparisons

Measure: MEASURE_1

(I) Between-subject factor: study time	(J) Between-subject factor: study time	Mean Difference (I-J)	Std. Error	Sig.[b]
1.00	2.00	-1.080*	.244	.000
	3.00	-2.130*	.335	.000
	4.00	-2.135*	.499	.000
2.00	1.00	1.080*	.244	.000
	3.00	-1.050*	.319	.001
	4.00	-1.055*	.488	.031
3.00	1.00	2.130*	.335	.000
	2.00	1.050*	.319	.001
	4.00	-.005	.539	.993
4.00	1.00	2.135*	.499	.000
	2.00	1.055*	.488	.031
	3.00	.005	.539	.993

Pairwise Comparisons

Measure: MEASURE_1

(I) Between-subject factor: study time	(J) Between-subject factor: study time	95% Confidence Interval for Difference[b]	
		Lower Bound	Upper Bound
1.00	2.00	-1.560	-.600
	3.00	-2.789	-1.472
	4.00	-3.115	-1.156
2.00	1.00	.600	1.560
	3.00	-1.676	-.425
	4.00	-2.013	-.097
3.00	1.00	1.472	2.789
	2.00	.425	1.676
	4.00	-1.063	1.054
4.00	1.00	1.156	3.115
	2.00	.097	2.013
	3.00	-1.054	1.063

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Measure: MEASURE_1

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	380.756	3	126.919	16.979	.000	.073
Error	4821.343	645	7.475			

The F tests the effect of Between-subject factor: study time. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

3. Grade_Period * Between-subject factor: study time

Measure: MEASURE_1

Grade_Period	Between-subject factor: study time	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
1	1.00	10.505	.182	10.147	10.863
	2.00	11.538	.152	11.239	11.836
	3.00	12.423	.269	11.894	12.952
	4.00	12.771	.448	11.891	13.652
2	1.00	10.703	.194	10.322	11.084
	2.00	11.662	.162	11.344	11.980
	3.00	12.794	.287	12.230	13.357
	4.00	12.629	.478	11.690	13.567
3	1.00	10.844	.215	10.423	11.266
	2.00	12.092	.179	11.740	12.443
	3.00	13.227	.317	12.604	13.850
	4.00	13.057	.528	12.020	14.094

Explore

Between-subject factor: study time

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	studytime	N	Percent	N	Percent	N	Percent
G1	1.00	212	100.0%	0	0.0%	212	100.0%
	2.00	305	100.0%	0	0.0%	305	100.0%
	3.00	97	100.0%	0	0.0%	97	100.0%
	4.00	35	100.0%	0	0.0%	35	100.0%

Descriptives

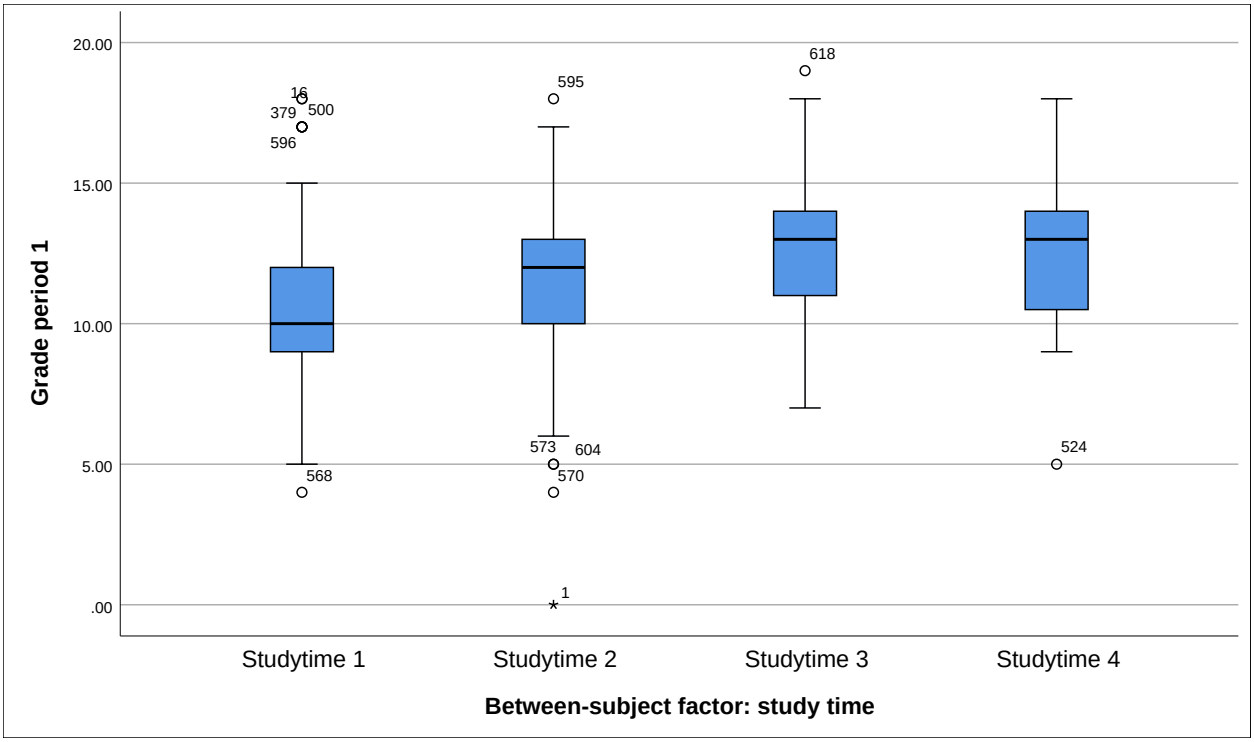
	studytime			Statistic	Std. Error
G1	1.00	Mean		10.5047	.17621
		95% Confidence Interval for Mean	Lower Bound	10.1574	
			Upper Bound	10.8521	
		5% Trimmed Mean		10.4476	
		Median		10.0000	
		Variance		6.583	
		Std. Deviation		2.56572	
		Minimum		4.00	
		Maximum		18.00	
		Range		14.00	
		Interquartile Range		3.00	
		Skewness		.338	.167
		Kurtosis		.121	.333
	2.00	Mean		11.5377	.15674
		95% Confidence Interval for Mean	Lower Bound	11.2293	
			Upper Bound	11.8461	
		5% Trimmed Mean		11.5674	
		Median		12.0000	
		Variance		7.493	
		Std. Deviation		2.73730	
		Minimum		.00	

Descriptives

studytime			Statistic	Std. Error
	Maximum		18.00	
	Range		18.00	
	Interquartile Range		3.00	
	Skewness		-.240	.140
	Kurtosis		.386	.278
3.00	Mean		12.4227	.24950
	95% Confidence Interval for Mean	Lower Bound	11.9274	
		Upper Bound	12.9179	
	5% Trimmed Mean		12.4238	
	Median		13.0000	
	Variance		6.038	
	Std. Deviation		2.45728	
	Minimum		7.00	
	Maximum		19.00	
	Range		12.00	
	Interquartile Range		3.00	
	Skewness		.022	.245
	Kurtosis		-.244	.485
4.00	Mean		12.7714	.49720
	95% Confidence Interval for Mean	Lower Bound	11.7610	
		Upper Bound	13.7819	
	5% Trimmed Mean		12.8175	
	Median		13.0000	
	Variance		8.652	
	Std. Deviation		2.94145	
	Minimum		5.00	
	Maximum		18.00	
	Range		13.00	
	Interquartile Range		4.00	
	Skewness		-.034	.398
	Kurtosis		.203	.778

Grade period 1

Mixed ANOVA: Boxplots by Studytime for G1



Explore

Between-subject factor: study time

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	studytime	N	Percent	N	Percent	N	Percent
G2	1.00	212	100.0%	0	0.0%	212	100.0%
	2.00	305	100.0%	0	0.0%	305	100.0%
	3.00	97	100.0%	0	0.0%	97	100.0%
	4.00	35	100.0%	0	0.0%	35	100.0%

Descriptives

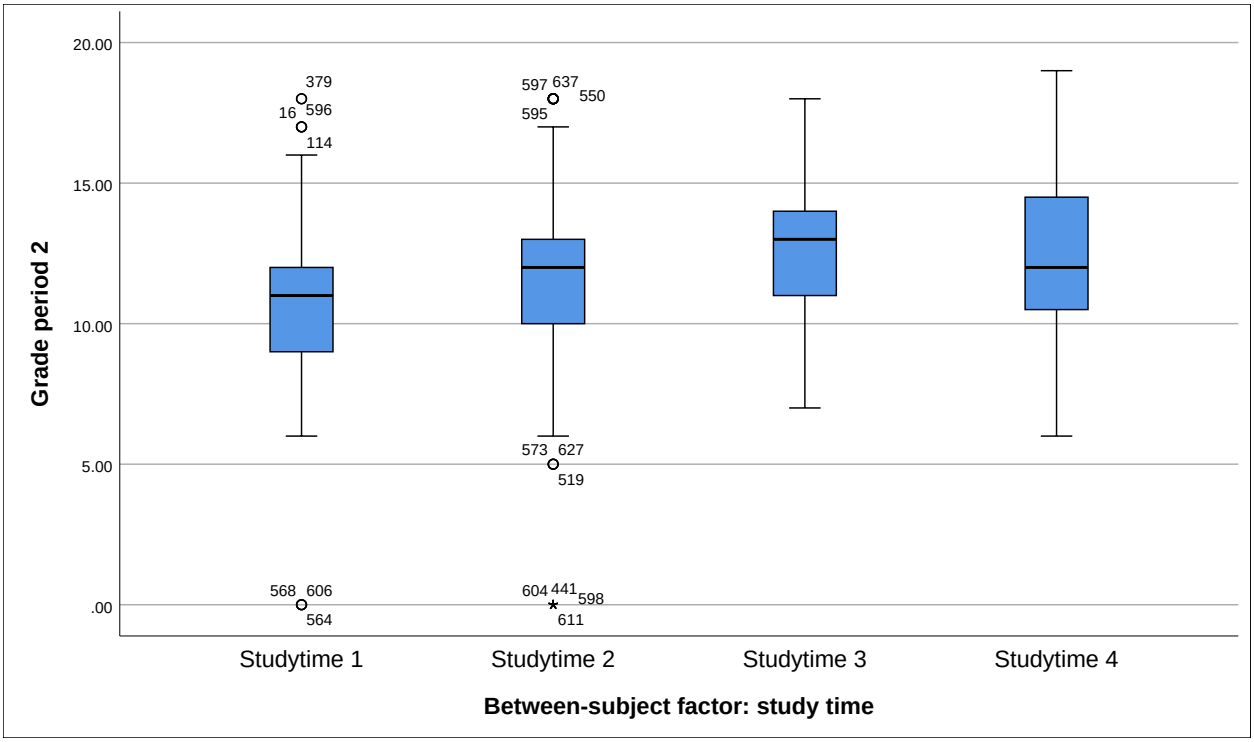
	studytime			Statistic	Std. Error
G2	1.00	Mean		10.7028	.18520
		95% Confidence Interval for Mean	Lower Bound	10.3377	
			Upper Bound	11.0679	
		5% Trimmed Mean		10.7170	
		Median		11.0000	
		Variance		7.271	
		Std. Deviation		2.69656	
		Minimum		.00	
		Maximum		18.00	
		Range		18.00	
		Interquartile Range		3.00	
		Skewness		-.437	.167
		Kurtosis		2.648	.333
	2.00	Mean		11.6623	.17078
		95% Confidence Interval for Mean	Lower Bound	11.3262	
			Upper Bound	11.9984	
		5% Trimmed Mean		11.7259	
		Median		12.0000	
		Variance		8.895	
		Std. Deviation		2.98252	
		Minimum		.00	

Descriptives

studytime			Statistic	Std. Error
	Maximum		18.00	
	Range		18.00	
	Interquartile Range		3.00	
	Skewness		-.524	.140
	Kurtosis		1.938	.278
3.00	Mean		12.7938	.24997
	95% Confidence Interval for Mean	Lower Bound	12.2976	
		Upper Bound	13.2900	
	5% Trimmed Mean		12.8053	
	Median		13.0000	
	Variance		6.061	
	Std. Deviation		2.46195	
	Minimum		7.00	
	Maximum		18.00	
	Range		11.00	
	Interquartile Range		3.50	
	Skewness		-.044	.245
	Kurtosis		-.274	.485
4.00	Mean		12.6286	.52992
	95% Confidence Interval for Mean	Lower Bound	11.5516	
		Upper Bound	13.7055	
	5% Trimmed Mean		12.6190	
	Median		12.0000	
	Variance		9.829	
	Std. Deviation		3.13506	
	Minimum		6.00	
	Maximum		19.00	
	Range		13.00	
	Interquartile Range		5.00	
	Skewness		.262	.398
	Kurtosis		-.467	.778

Grade period 2

Mixed ANOVA: Boxplots by Studytime for G2



Explore

Between-subject factor: study time

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	studytime	N	Percent	N	Percent	N	Percent
G3	1.00	212	100.0%	0	0.0%	212	100.0%
	2.00	305	100.0%	0	0.0%	305	100.0%
	3.00	97	100.0%	0	0.0%	97	100.0%
	4.00	35	100.0%	0	0.0%	35	100.0%

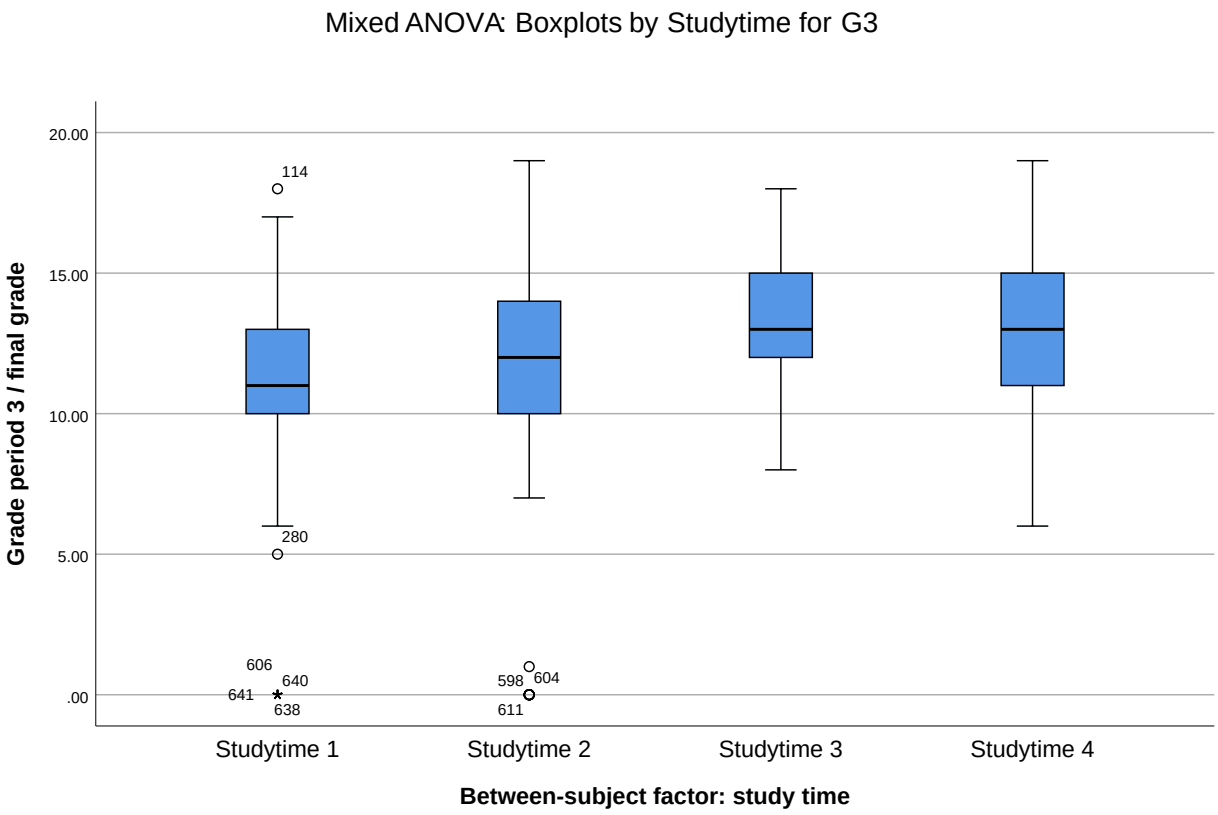
Descriptives

	studytime			Statistic	Std. Error
G3	1.00	Mean		10.8443	.22106
		95% Confidence Interval for Mean	Lower Bound	10.4086	
			Upper Bound	11.2801	
		5% Trimmed Mean		11.0419	
		Median		11.0000	
		Variance		10.360	
		Std. Deviation		3.21862	
		Minimum		.00	
		Maximum		18.00	
		Range		18.00	
		Interquartile Range		3.00	
		Skewness		-1.078	.167
		Kurtosis		3.117	.333
	2.00	Mean		12.0918	.18570
		95% Confidence Interval for Mean	Lower Bound	11.7264	
			Upper Bound	12.4572	
		5% Trimmed Mean		12.2505	
		Median		12.0000	
		Variance		10.518	
		Std. Deviation		3.24313	
		Minimum		.00	

Descriptives

studytime			Statistic	Std. Error
	Maximum		19.00	
	Range		19.00	
	Interquartile Range		4.00	
	Skewness		-1.028	.140
	Kurtosis		3.044	.278
3.00	Mean		13.2268	.25405
	95% Confidence Interval for Mean	Lower Bound	12.7225	
		Upper Bound	13.7311	
	5% Trimmed Mean		13.2732	
	Median		13.0000	
	Variance		6.261	
	Std. Deviation		2.50210	
	Minimum		8.00	
	Maximum		18.00	
	Range		10.00	
	Interquartile Range		3.50	
	Skewness		-.190	.245
	Kurtosis		-.502	.485
4.00	Mean		13.0571	.51358
	95% Confidence Interval for Mean	Lower Bound	12.0134	
		Upper Bound	14.1009	
	5% Trimmed Mean		13.0714	
	Median		13.0000	
	Variance		9.232	
	Std. Deviation		3.03841	
	Minimum		6.00	
	Maximum		19.00	
	Range		13.00	
	Interquartile Range		4.00	
	Skewness		.209	.398
	Kurtosis		-.339	.778

Grade period 3 / final grade

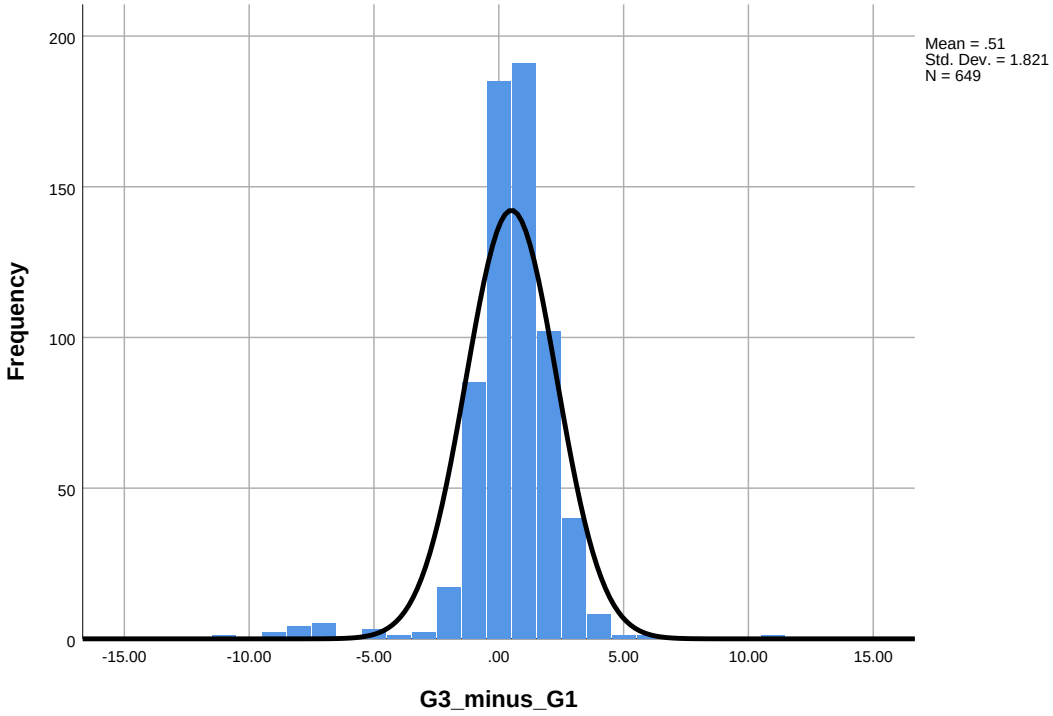

Mixed ANOVA: Boxplots by Studytime for G3
Grade period 3 / final grade
20.00
15.00
10.00
5.00
.00
114
280
606
640
641
638
598
604
611
Studytime 1
Studytime 2
Studytime 3
Studytime 4
Between-subject factor: study time

Descriptives

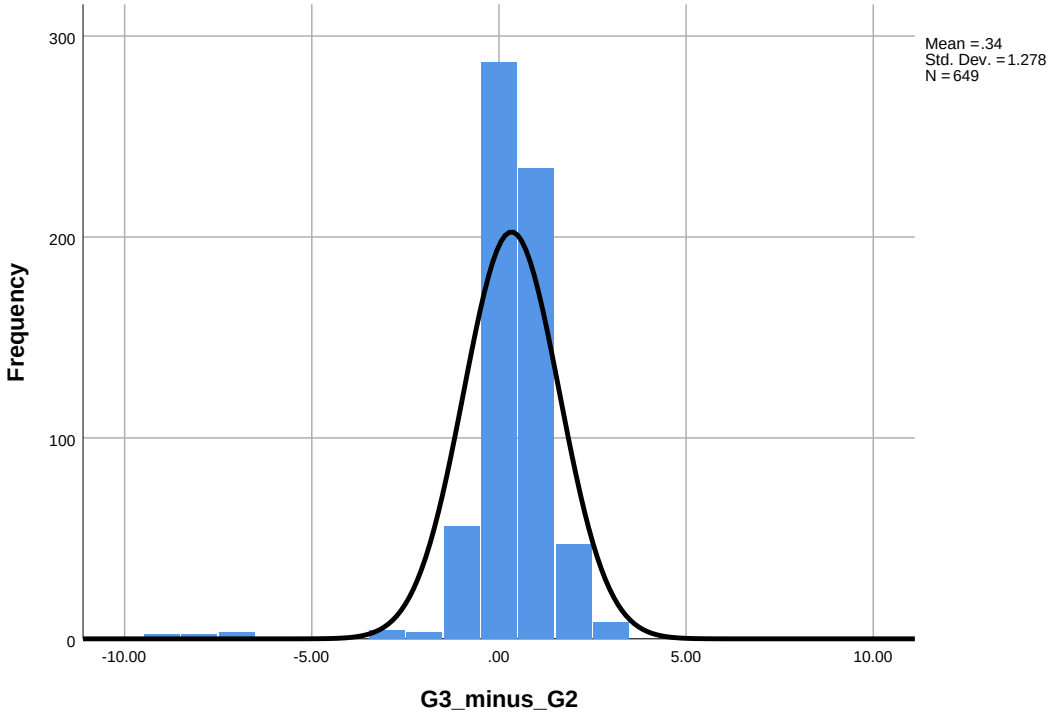
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
G2_minus_G1	649	-9.00	11.00	.1710	1.47929
G3_minus_G2	649	-9.00	6.00	.3359	1.27824
G3_minus_G1	649	-11.00	11.00	.5069	1.82076
Valid N (listwise)	649				

Graph


Mean = .51
Std. Dev. = 1.821
N = 649
Frequency
200
150
100
50
0
-15.00
-10.00
-5.00
.00
5.00
10.00
15.00
G3_minus_G1

Graph


Mean = .34
Std. Dev. = 1.278
N = 649
Frequency
300
200
100
0
-10.00
-5.00
.00
5.00
10.00
G3_minus_G2

Mixed ANOVA: Mean G3 by Studytime Bar Chart

Graph