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## Holm Bonferroni Method Post Hoc Analysis

Holm Bonferroni Method Post Hoc Analysis  
Import data

## Holm Bonferroni Method Context

Holm Bonferroni Method Context  
Group descriptives for G3 by studytime

**Means**

[HolmBonferroniData] D:\DATA ANALYSIS\F Post Hoc Tests\Holm Bonferroni Method\SPSS\_Output\sav\Holm-Bonferroni-Method-data.sav

**Case Processing Summary**

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

**Report**

G3

studytime	N	Mean	Std. Deviation	Variance	Minimum	Maximum
1	212	10.84	3.219	10.360	0	18
2	305	12.09	3.243	10.518	0	19
3	97	13.23	2.502	6.261	8	18
4	35	13.06	3.038	9.232	6	19
Total	649	11.91	3.231	10.437	0	19

Assumption and distribution context

Assumption and distribution context  
 Boxplot, histogram, normality, and descriptives

Explore

Weekly study time group / post hoc factor

Case Processing Summary

	studytime	Valid		Cases Missing		Total	
		N	Percent	N	Percent	N	Percent
G3	1	212	100.0%	0	0.0%	212	100.0%
	2	305	100.0%	0	0.0%	305	100.0%
	3	97	100.0%	0	0.0%	97	100.0%
	4	35	100.0%	0	0.0%	35	100.0%

Descriptives

studytime		Statistic	Std. Error		
G3	1	Mean	10.84	.221	
		95% Confidence Interval for Mean	Lower Bound	10.41	
			Upper Bound	11.28	
		5% Trimmed Mean	11.04		
		Median	11.00		
		Variance	10.360		
		Std. Deviation	3.219		
		Minimum	0		
		Maximum	18		
		Range	18		
		Interquartile Range	3		
		Skewness	-1.078	.167	
		Kurtosis	3.117	.333	
		2	2	Mean	12.09
95% Confidence Interval for Mean	Lower Bound			11.73	
	Upper Bound			12.46	
5% Trimmed Mean	12.25				
Median	12.00				
Variance	10.518				
Std. Deviation	3.243				

Assumption and distribution context  
Boxplot, histogram, normality, and descriptives

**Descriptives**

studytime		Statistic	Std. Error	
3	Minimum	0		
	Maximum	19		
	Range	19		
	Interquartile Range	4		
	Skewness	-1.028	.140	
	Kurtosis	3.044	.278	
	Mean	13.23	.254	
	95% Confidence Interval for Mean	Lower Bound	12.72	
		Upper Bound	13.73	
	5% Trimmed Mean	13.27		
	Median	13.00		
	Variance	6.261		
	Std. Deviation	2.502		
	Minimum	8		
Maximum	18			
Range	10			
Interquartile Range	4			
Skewness	-.190	.245		
Kurtosis	-.502	.485		
4	Mean	13.06	.514	
	95% Confidence Interval for Mean	Lower Bound	12.01	
		Upper Bound	14.10	
	5% Trimmed Mean	13.07		
	Median	13.00		
	Variance	9.232		
	Std. Deviation	3.038		
	Minimum	6		
	Maximum	19		
	Range	13		
	Interquartile Range	4		
	Skewness	.209	.398	
	Kurtosis	-.339	.778	

Assumption and distribution context  
 Boxplot, histogram, normality, and descriptives

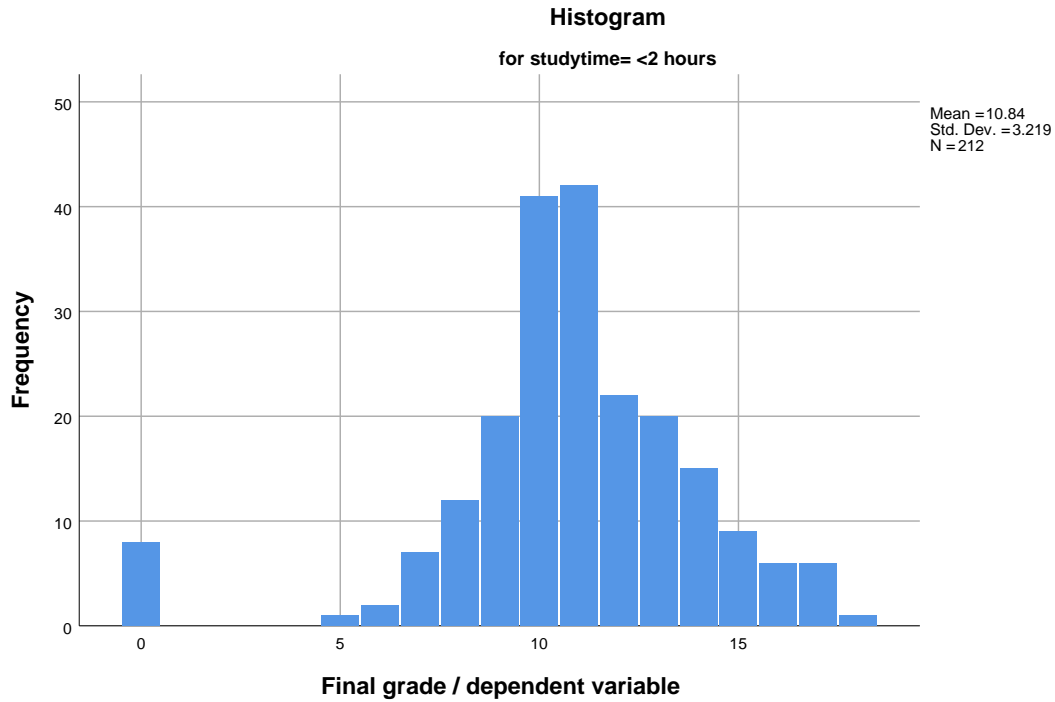
**Tests of Normality**

studytime	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
G3 1	.161	212	.000	.898	212	.000
2	.125	305	.000	.917	305	.000
3	.103	97	.013	.970	97	.025
4	.136	35	.099	.955	35	.166

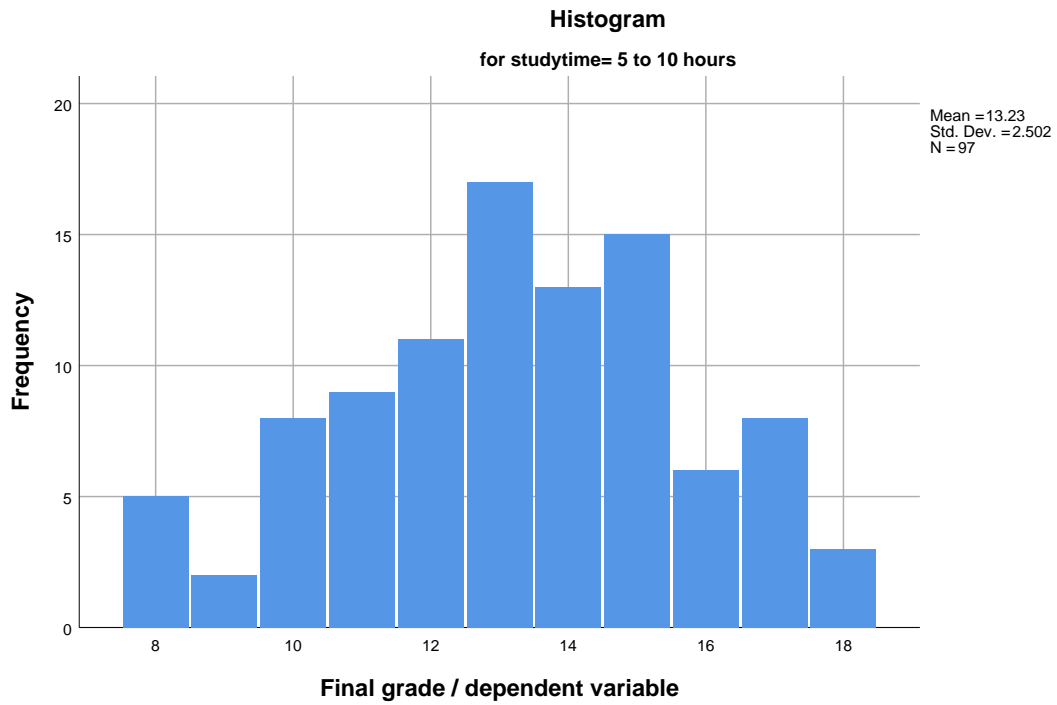
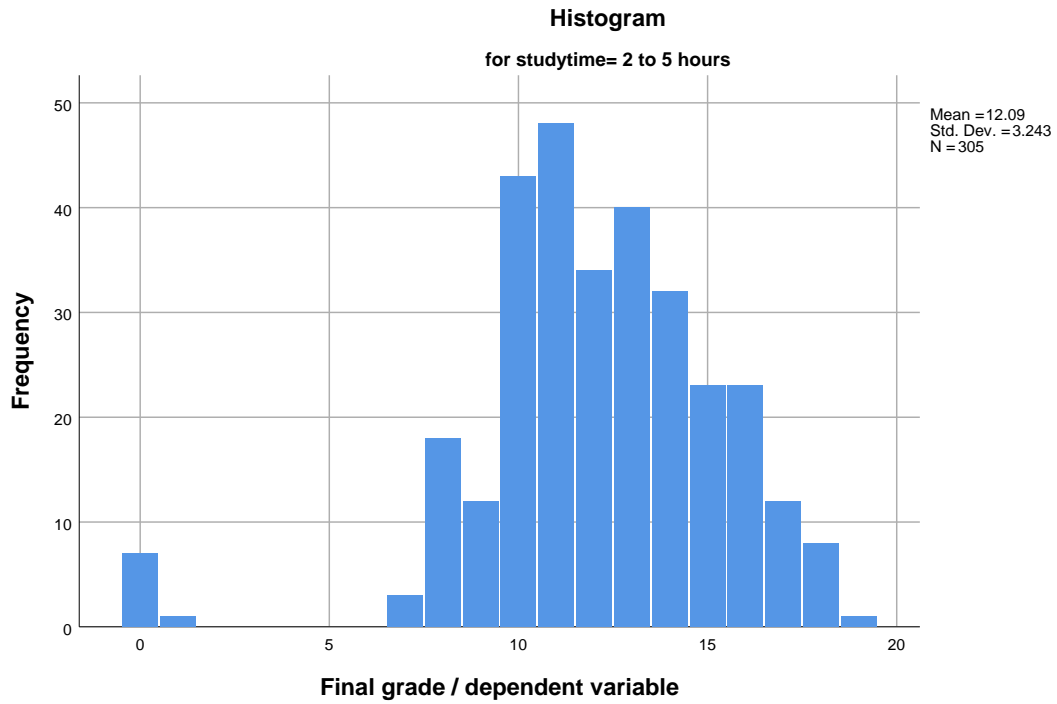
a. Lilliefors Significance Correction

**Final grade / dependent variable**

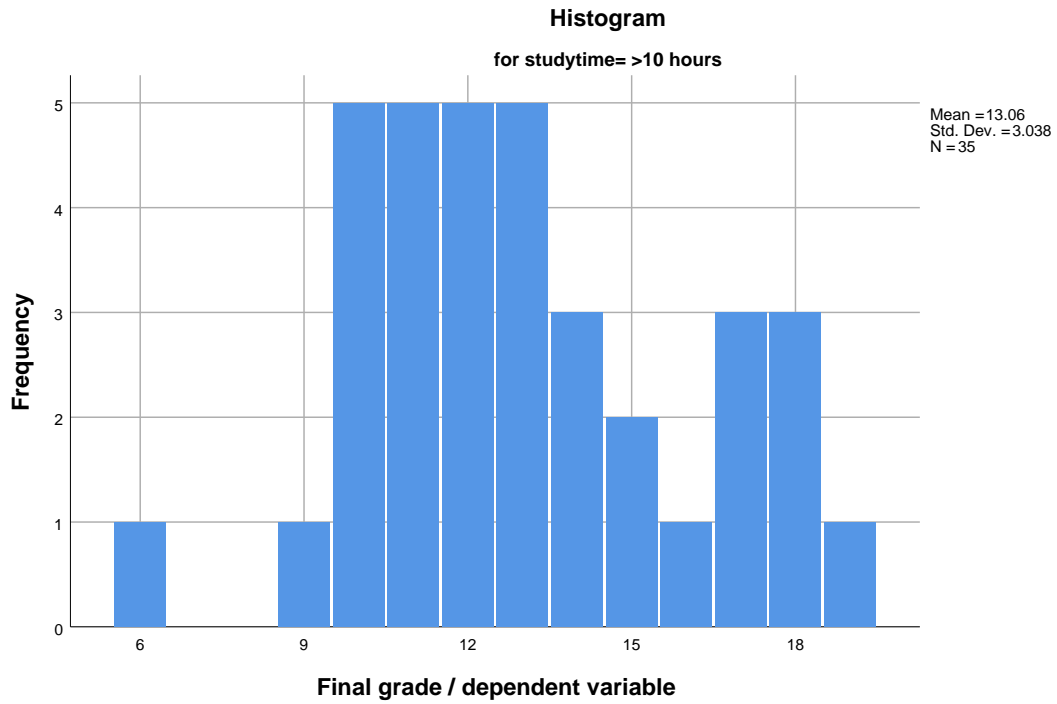
**Histograms**



Assumption and distribution context  
Boxplot, histogram, normality, and descriptives



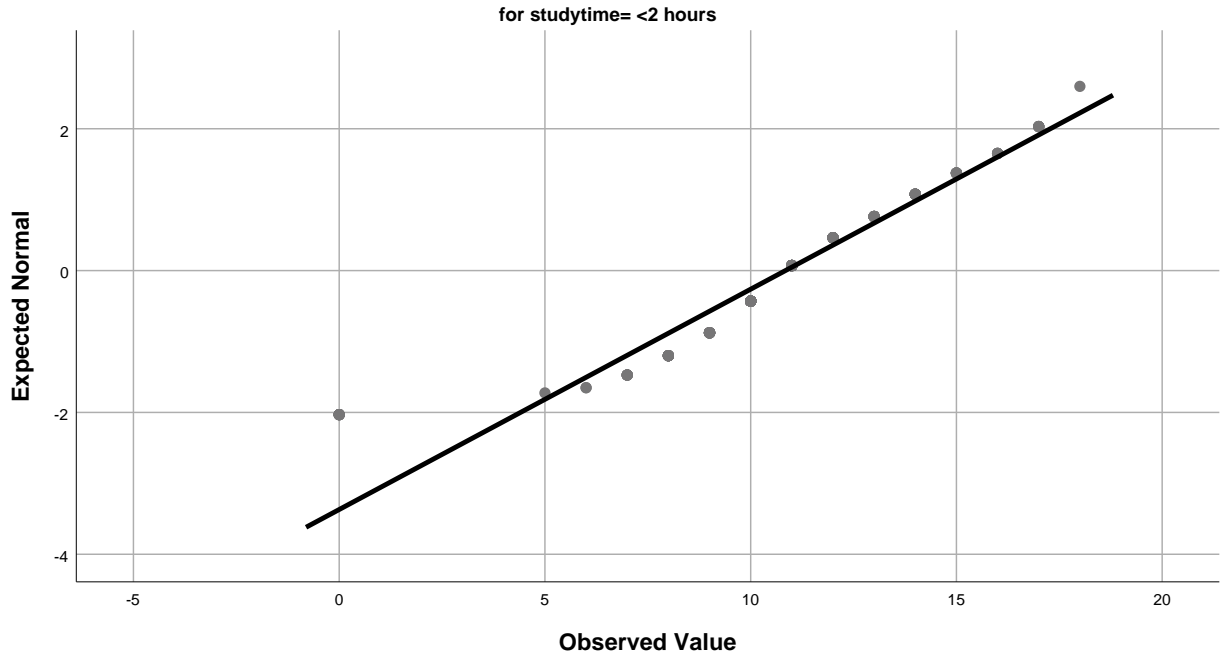
Assumption and distribution context  
Boxplot, histogram, normality, and descriptives



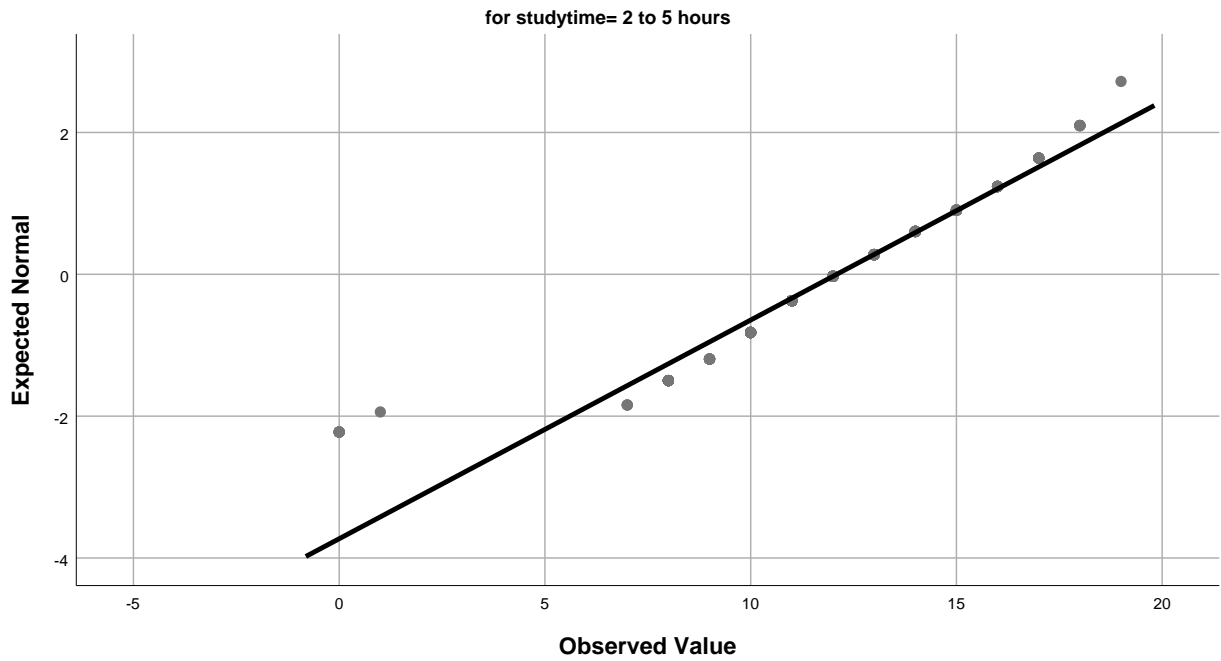
**Normal Q-Q Plots**

Assumption and distribution context  
Boxplot, histogram, normality, and descriptives

Normal Q-Q Plot of Final grade / dependent variable

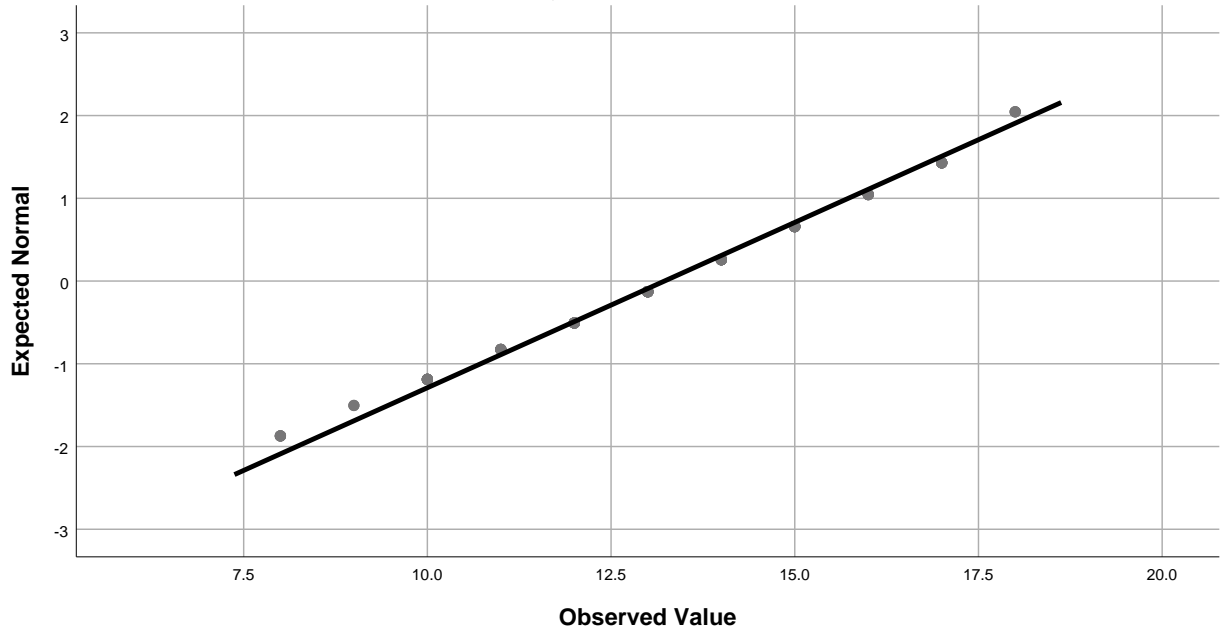


Normal Q-Q Plot of Final grade / dependent variable

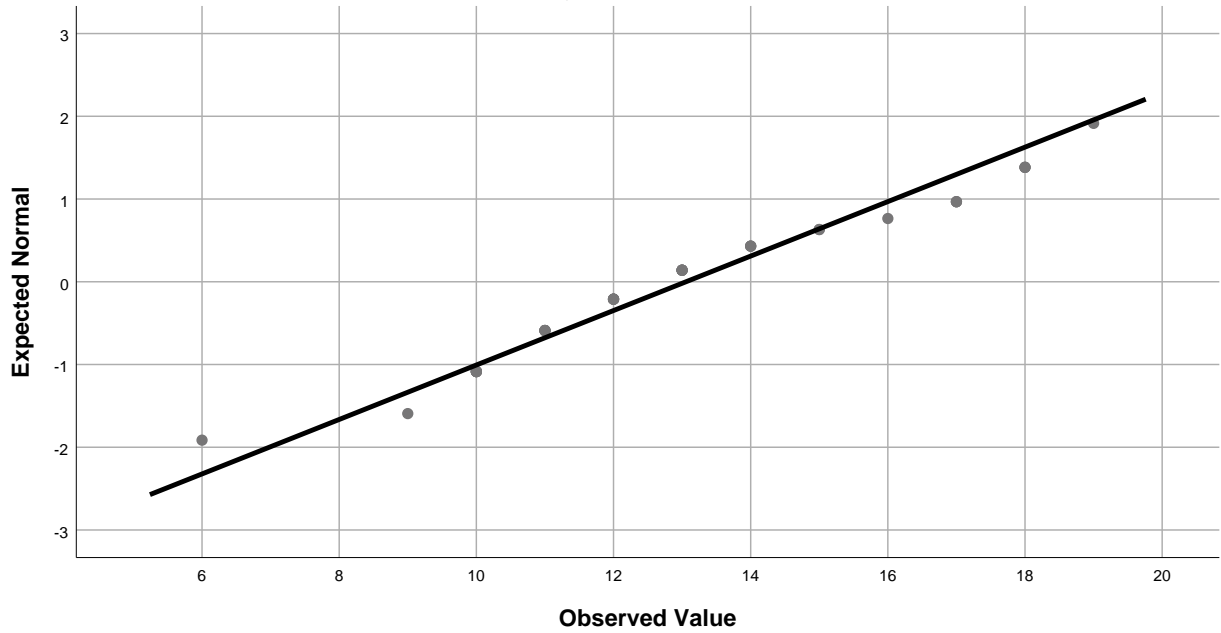


Assumption and distribution context  
Boxplot, histogram, normality, and descriptives

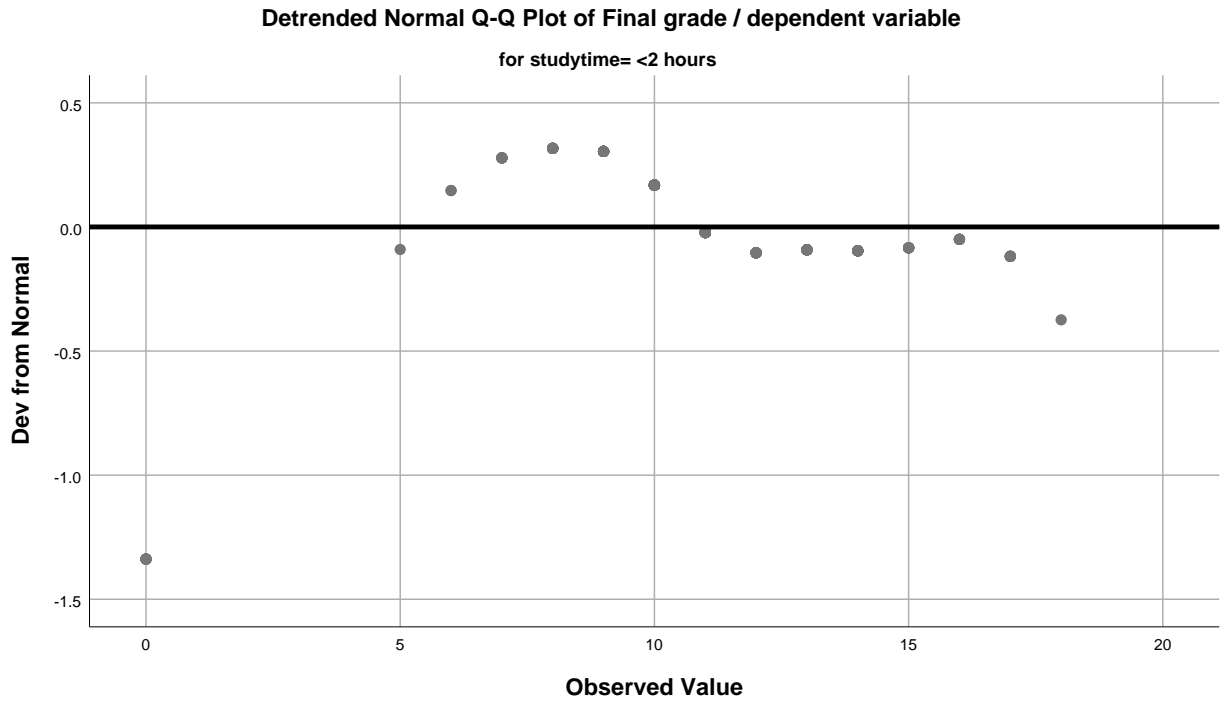
Normal Q-Q Plot of Final grade / dependent variable  
for studytime= 5 to 10 hours



Normal Q-Q Plot of Final grade / dependent variable  
for studytime= >10 hours

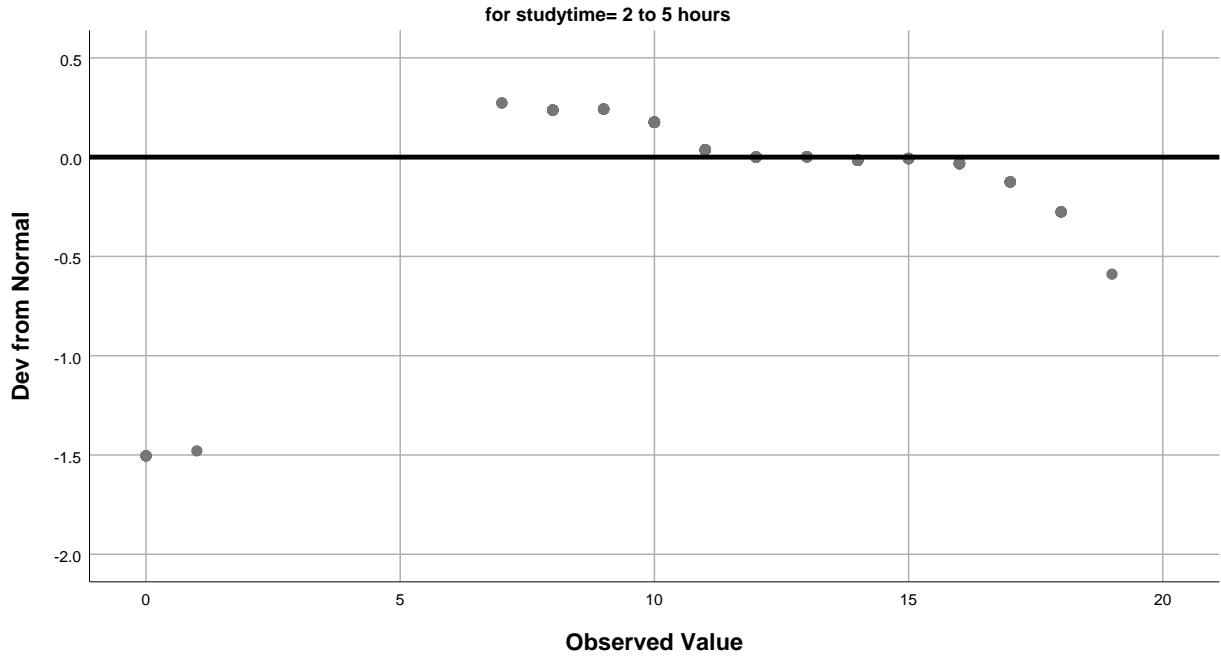


## Detrended Normal Q-Q Plots

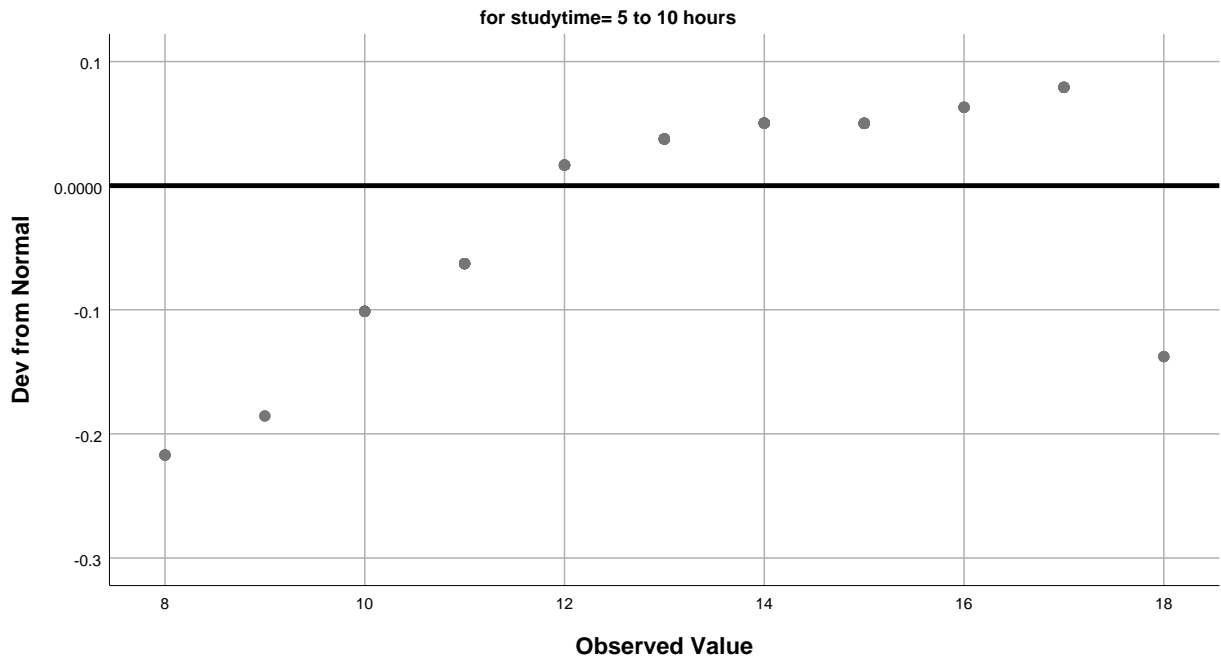


Assumption and distribution context  
Boxplot, histogram, normality, and descriptives

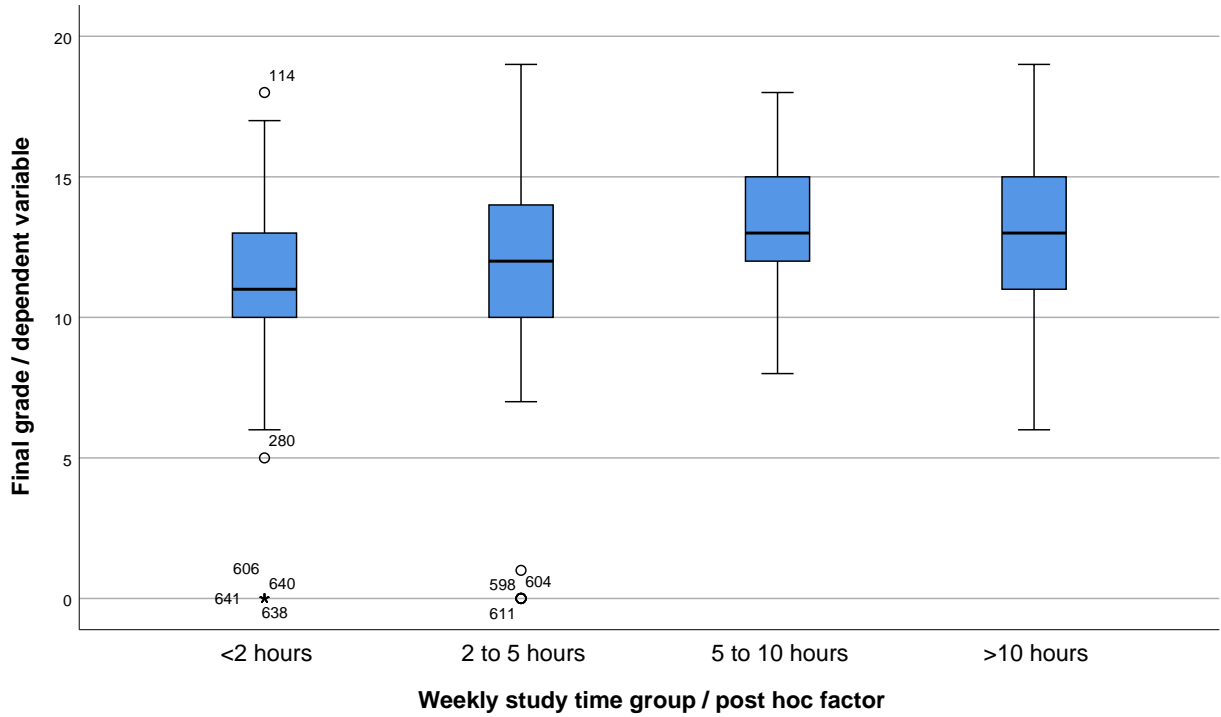
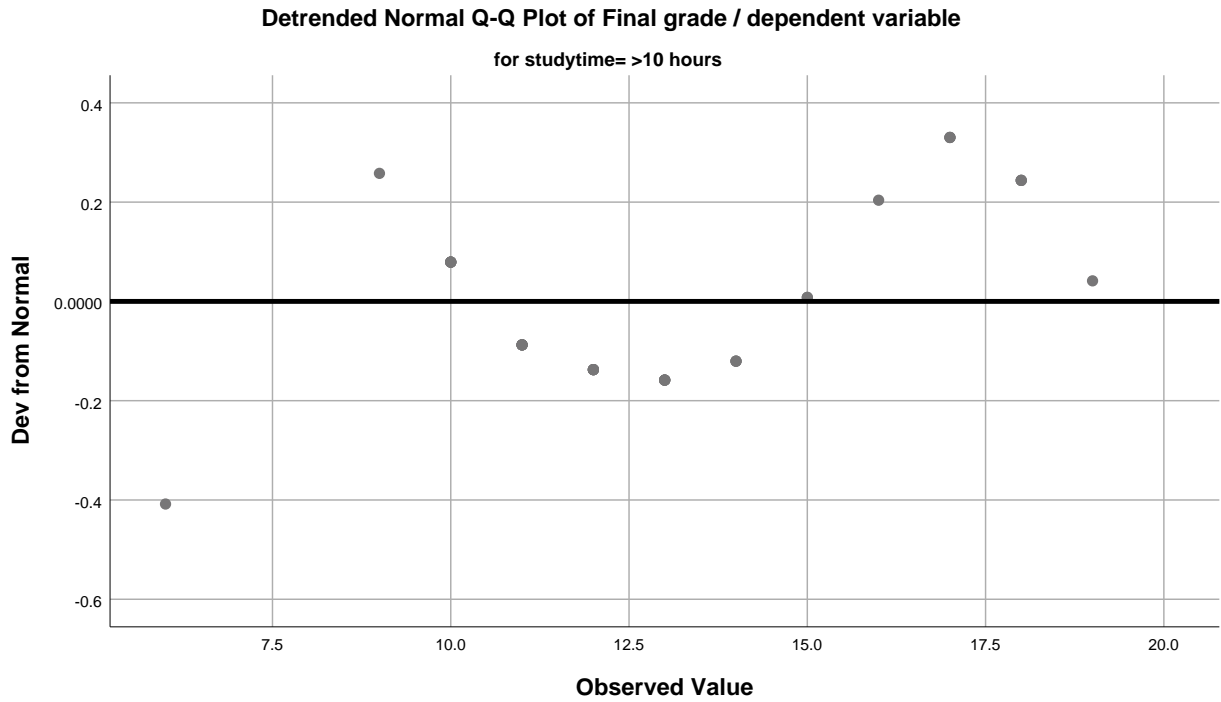
**Detrended Normal Q-Q Plot of Final grade / dependent variable**



**Detrended Normal Q-Q Plot of Final grade / dependent variable**



Assumption and distribution context  
Boxplot, histogram, normality, and descriptives



## One-way ANOVA context

One-way ANOVA context  
 Dependent variable: G3; factor: studytime

**Oneway**

**Descriptives**

G3

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum
					Lower Bound	Upper Bound	
1	212	10.84	3.219	.221	10.41	11.28	0
2	305	12.09	3.243	.186	11.73	12.46	0
3	97	13.23	2.502	.254	12.72	13.73	8
4	35	13.06	3.038	.514	12.01	14.10	6
Total	649	11.91	3.231	.127	11.66	12.16	0

**Descriptives**

G3

	Maximum
1	18
2	19
3	18
4	19
Total	19

**Test of Homogeneity of Variances**

		Levene Statistic	df1	df2	Sig.
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

One-way ANOVA context  
Dependent variable: G3; factor: studytime

### ANOVA

G3

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	465.078	3	155.026	15.876	.000
Within Groups	6298.189	645	9.765		
Total	6763.267	648			

## Bonferroni comparison context

>Warning # 2004. Command name: SUBTITLE

>The subtitle given exceeds 60 characters in length. The first 60 characters  
>will be used.

Bonferroni comparison context  
 SPSS Bonferroni table is shown for reference ; exact Holm-Bon

## Oneway

### Descriptives

G3

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum
					Lower Bound	Upper Bound	
1	212	10.84	3.219	.221	10.41	11.28	0
2	305	12.09	3.243	.186	11.73	12.46	0
3	97	13.23	2.502	.254	12.72	13.73	8
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Total	649	11.91	3.231	.127	11.66	12.16	0

### Descriptives

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	Maximum
1	18
2	19
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### Test of Homogeneity of Variances

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	Based on Median	1.026	3	645	.380
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Bonferroni comparison context  
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### ANOVA

G3

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	465.078	3	155.026	15.876	.000
Within Groups	6298.189	645	9.765		
Total	6763.267	648			

### Post Hoc Tests

#### Multiple Comparisons

Dependent Variable: G3

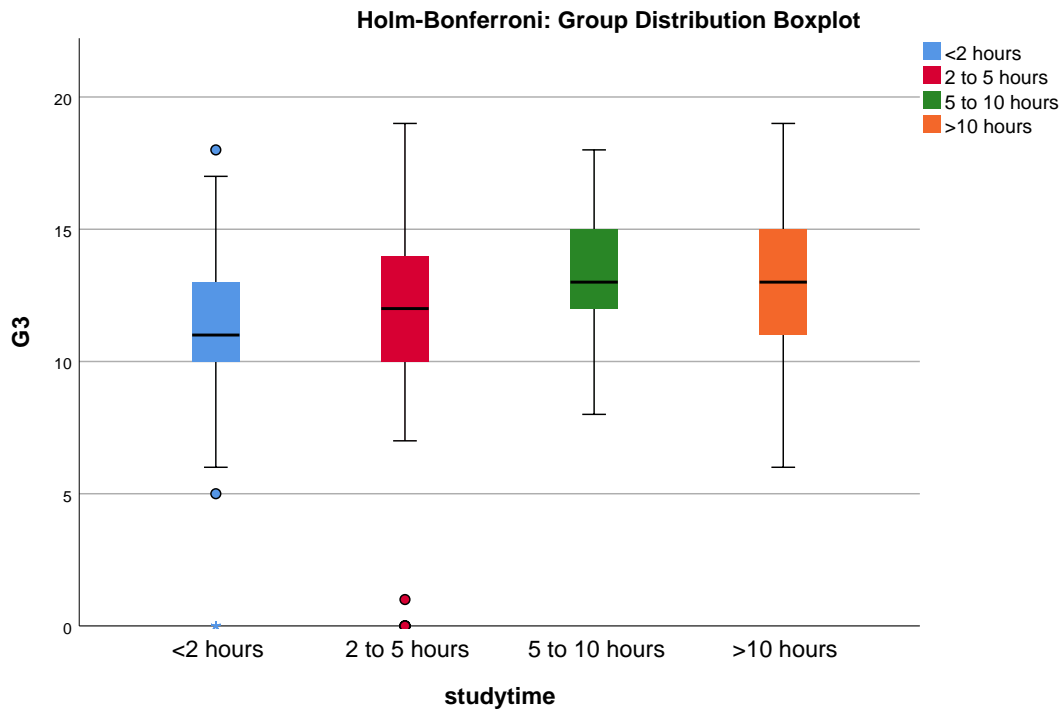
Bonferroni

(I) studytime	(J) studytime	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-1.247 <sup>*</sup>	.279	.000	-1.99	-.51
	3	-2.382 <sup>*</sup>	.383	.000	-3.40	-1.37
	4	-2.213 <sup>*</sup>	.570	.001	-3.72	-.70
2	1	1.247 <sup>*</sup>	.279	.000	.51	1.99
	3	-1.135 <sup>*</sup>	.364	.011	-2.10	-.17
	4	-.965	.558	.504	-2.44	.51
3	1	2.382 <sup>*</sup>	.383	.000	1.37	3.40
	2	1.135 <sup>*</sup>	.364	.011	.17	2.10
	4	.170	.616	1.000	-1.46	1.80
4	1	2.213 <sup>*</sup>	.570	.001	.70	3.72
	2	.965	.558	.504	-.51	2.44
	3	-.170	.616	1.000	-1.80	1.46

\*. The mean difference is significant at the 0.05 level.

### GGraph

Bonferroni comparison context  
SPSS Bonferroni table is shown for reference ; exact Holm-Bon



```
File "<string>", line 73  
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                ^
```

SyntaxError: invalid syntax