

Host

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Gabriels Test Post Hoc Analysis

Gabriels Test Post Hoc Analysis
Import data

Gabriels Test Context

Gabriels Test Context
Group descriptives for G3 by studytime

Means

[GabrielsTestData] D:\DATA ANALYSIS\F Post Hoc Tests\Gabriels Test\SPSS_Output
\sav\Gabriels-Test-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

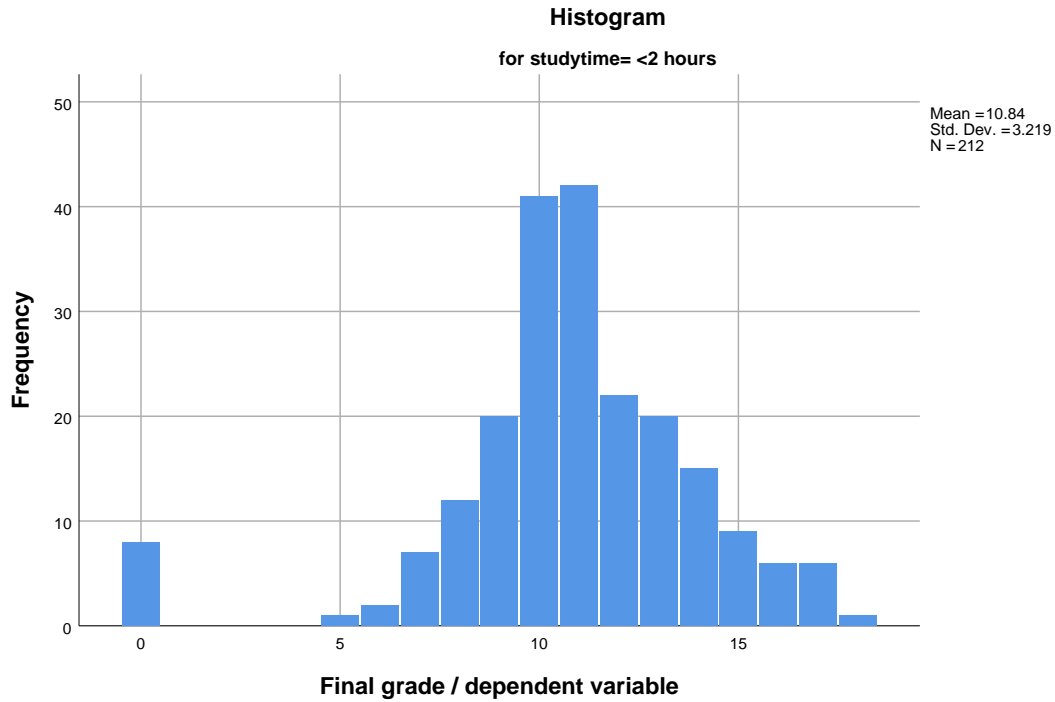
Tests of Normality

| studytime | Kolmogorov-Smirnov ^a | | | 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 |

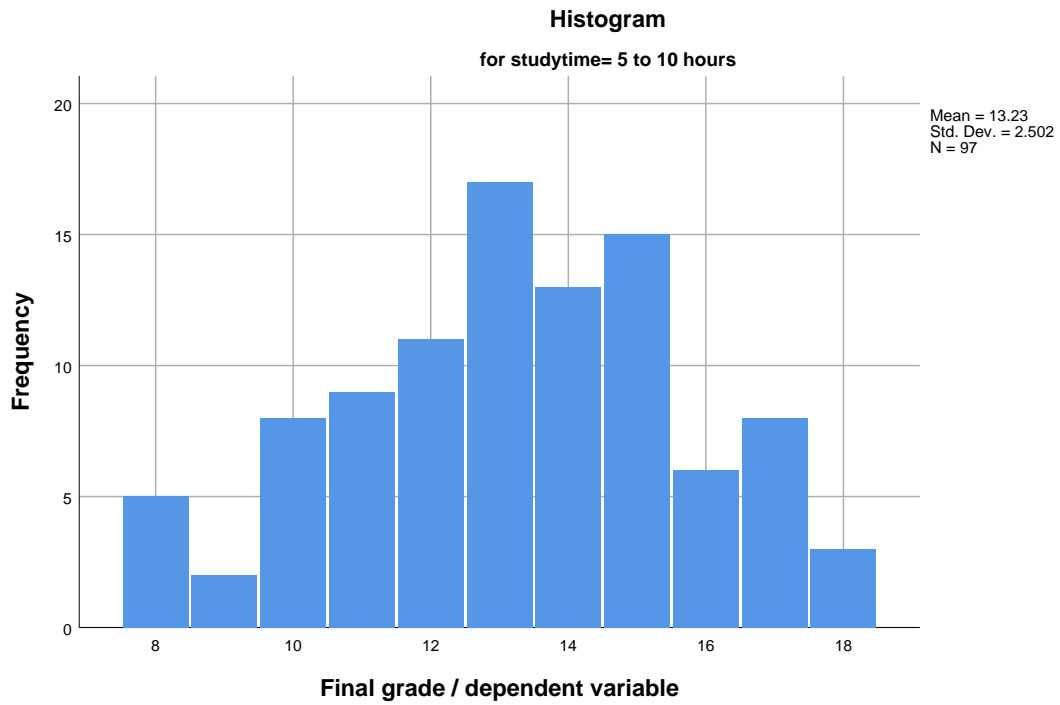
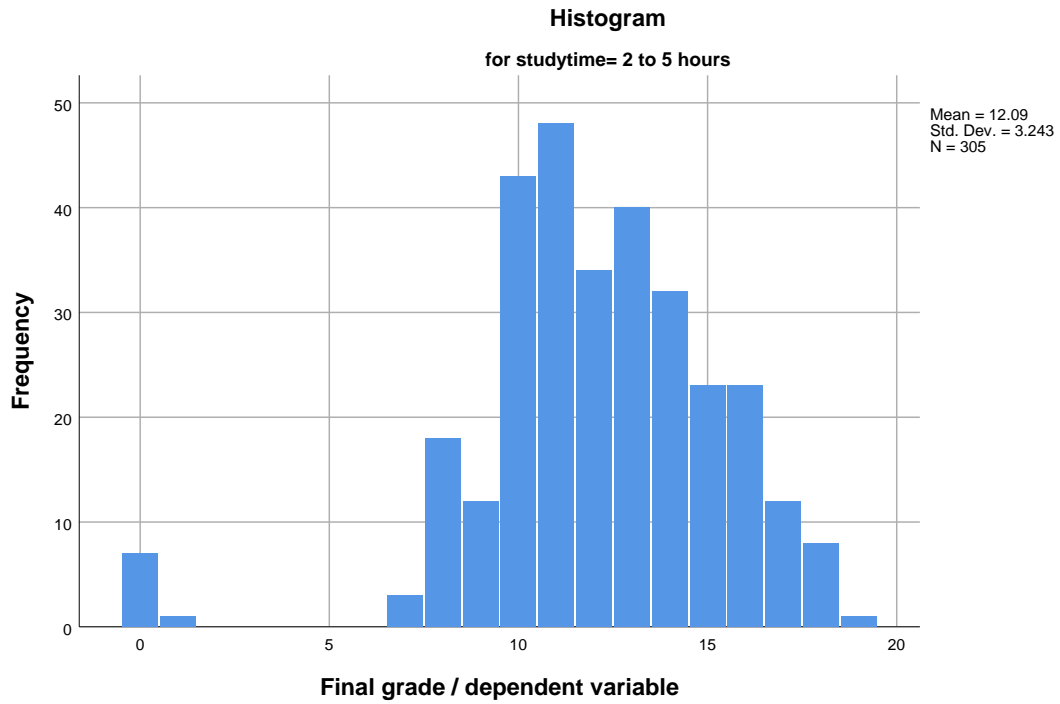
a. Lilliefors Significance Correction

Final grade / dependent variable

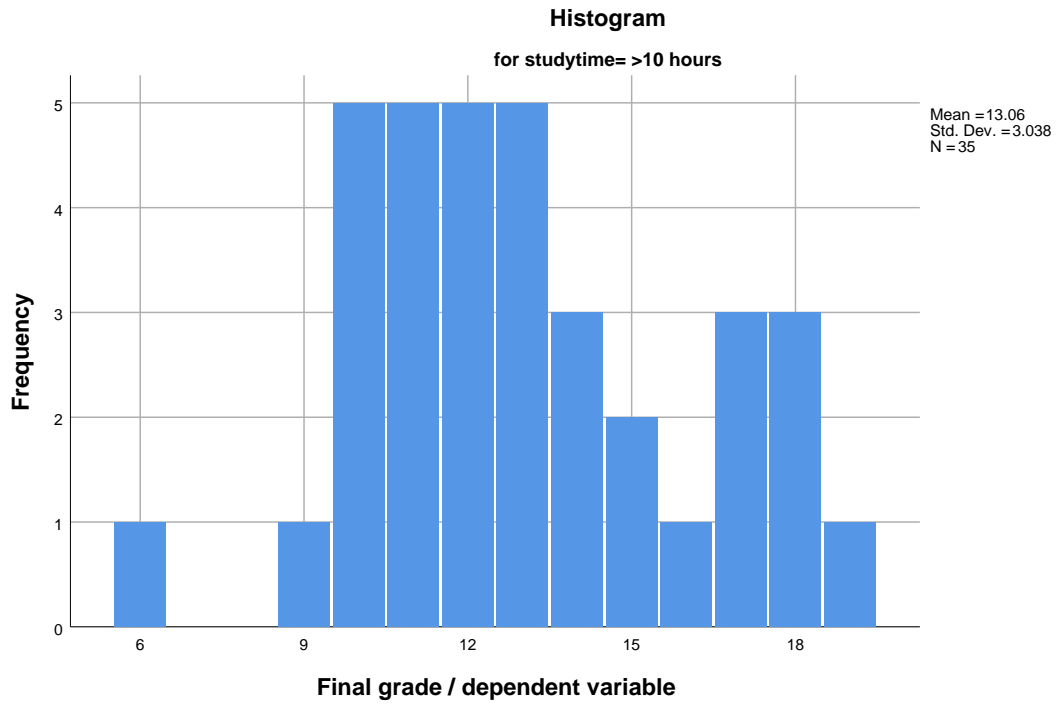
Histograms



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



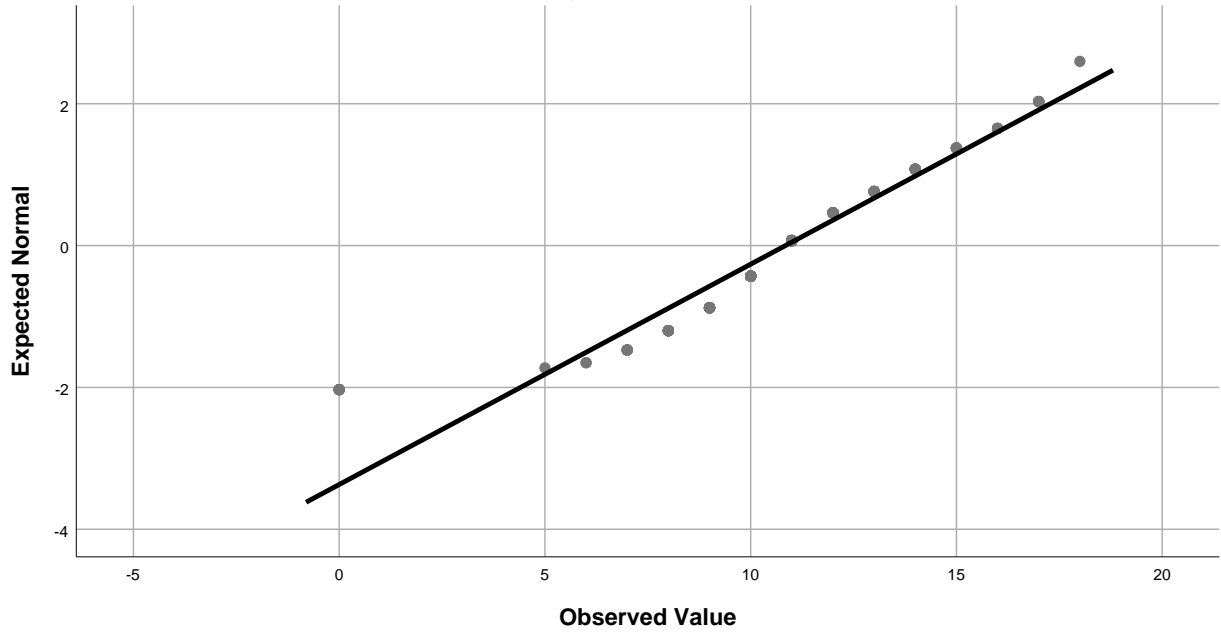
Assumption and distribution context
Boxplot, histogram, normality, and descriptives



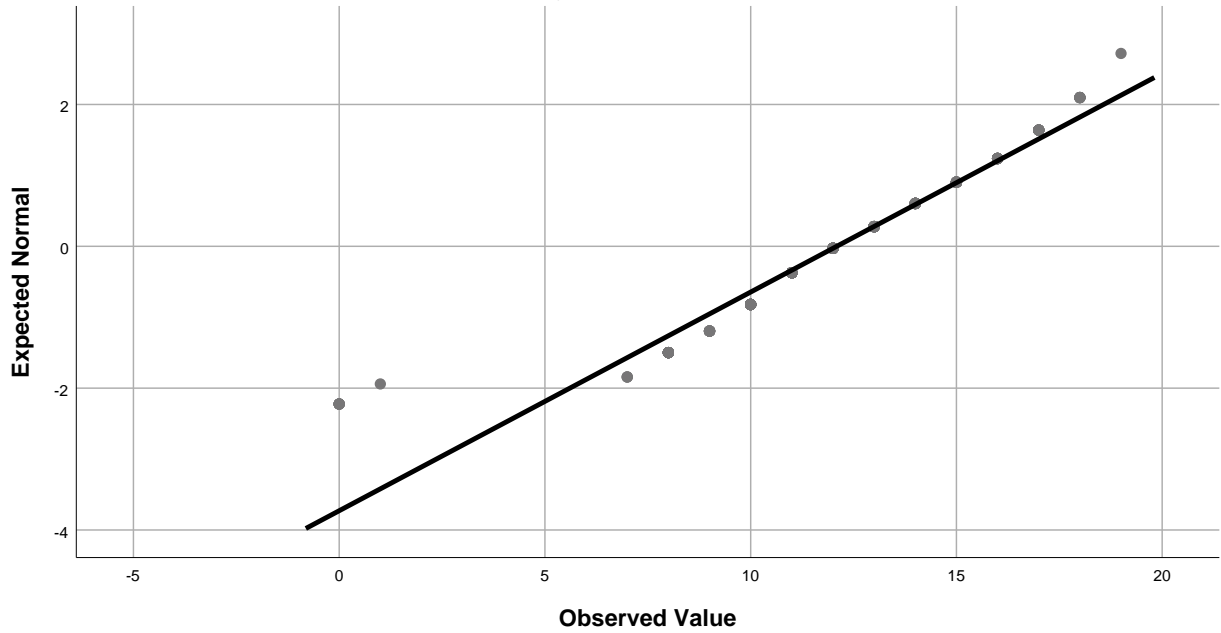
Normal Q-Q Plots

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

Normal Q-Q Plot of Final grade / dependent variable
for studytime= <2 hours

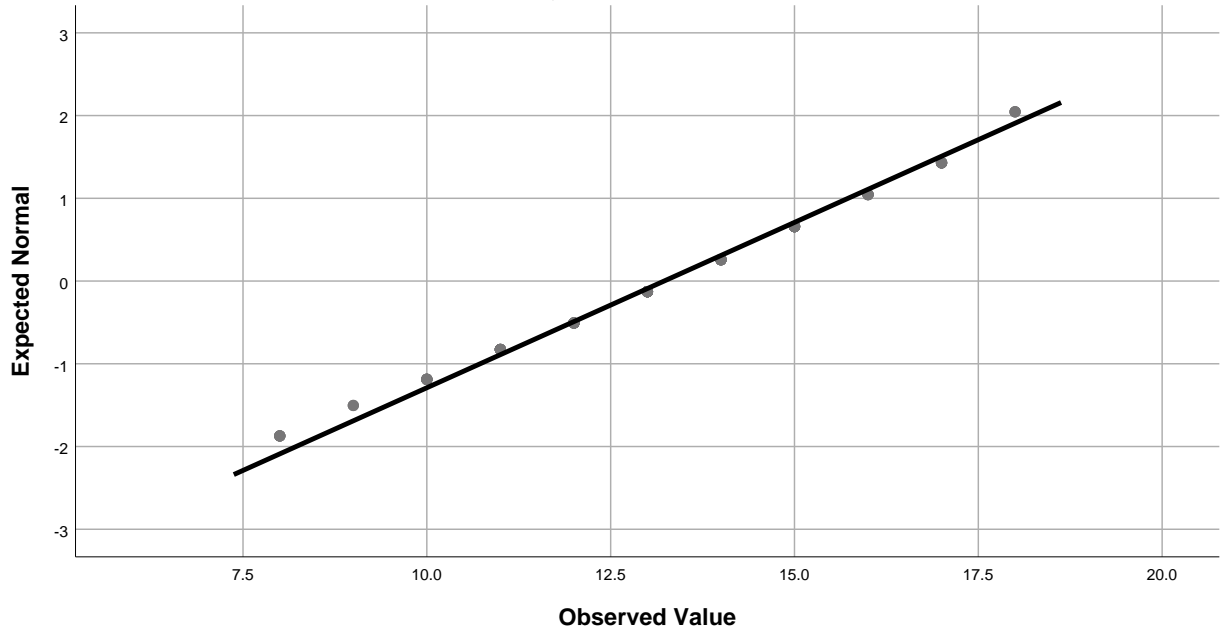


Normal Q-Q Plot of Final grade / dependent variable
for studytime= 2 to 5 hours

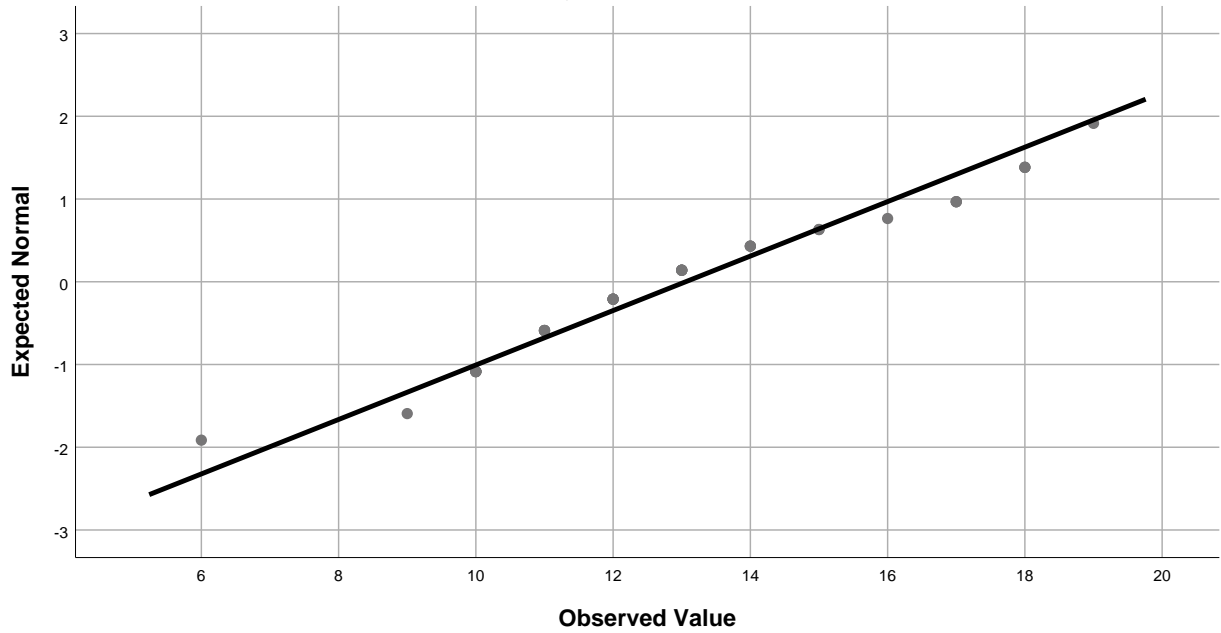


Assumption and distribution context
Boxplot, histogram, normality, and descriptives

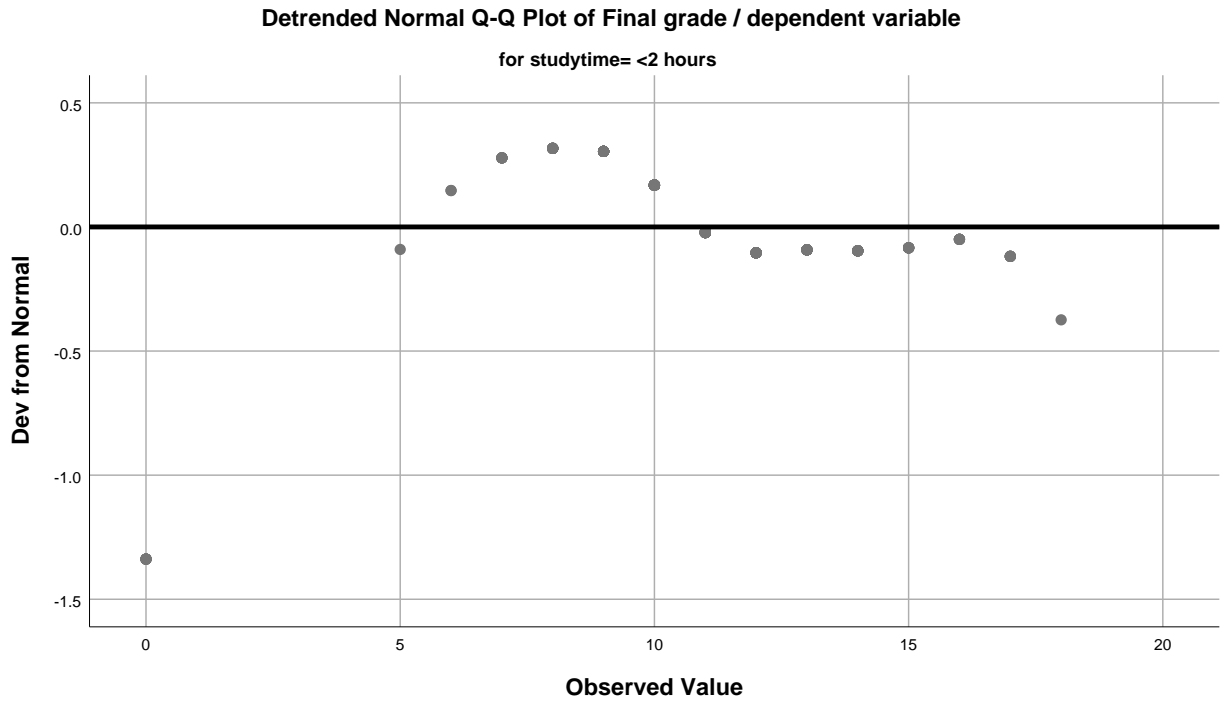
Normal Q-Q Plot of Final grade / dependent variable
for studytime= 5 to 10 hours



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

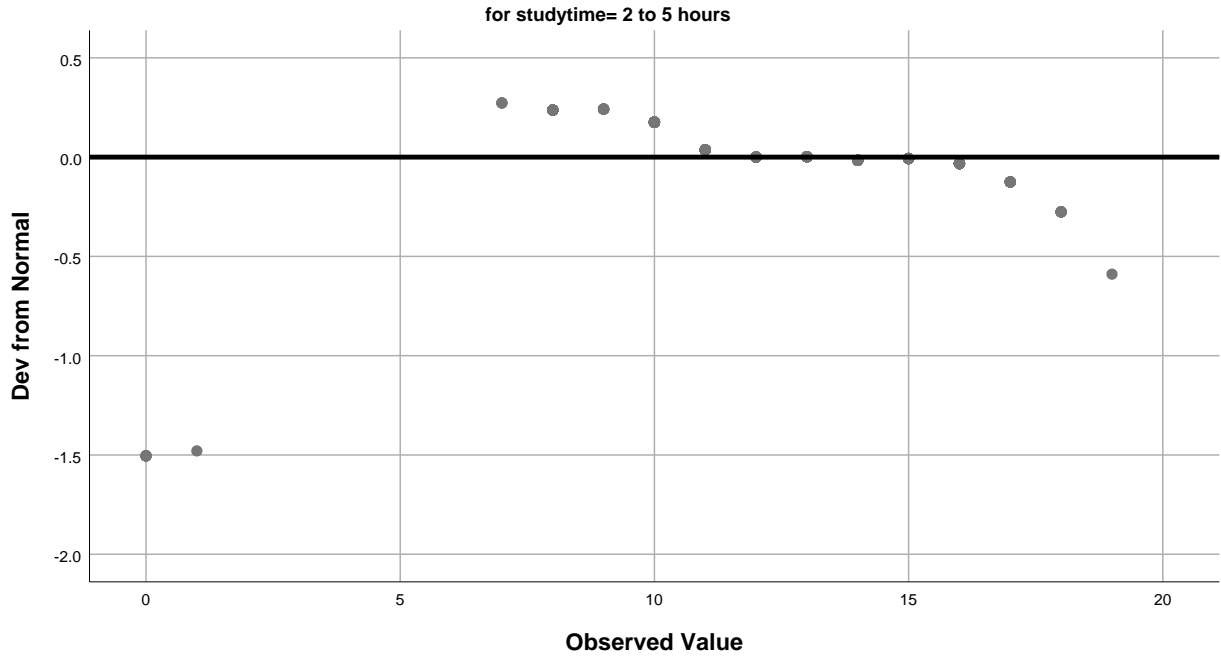


Detrended Normal Q-Q Plots

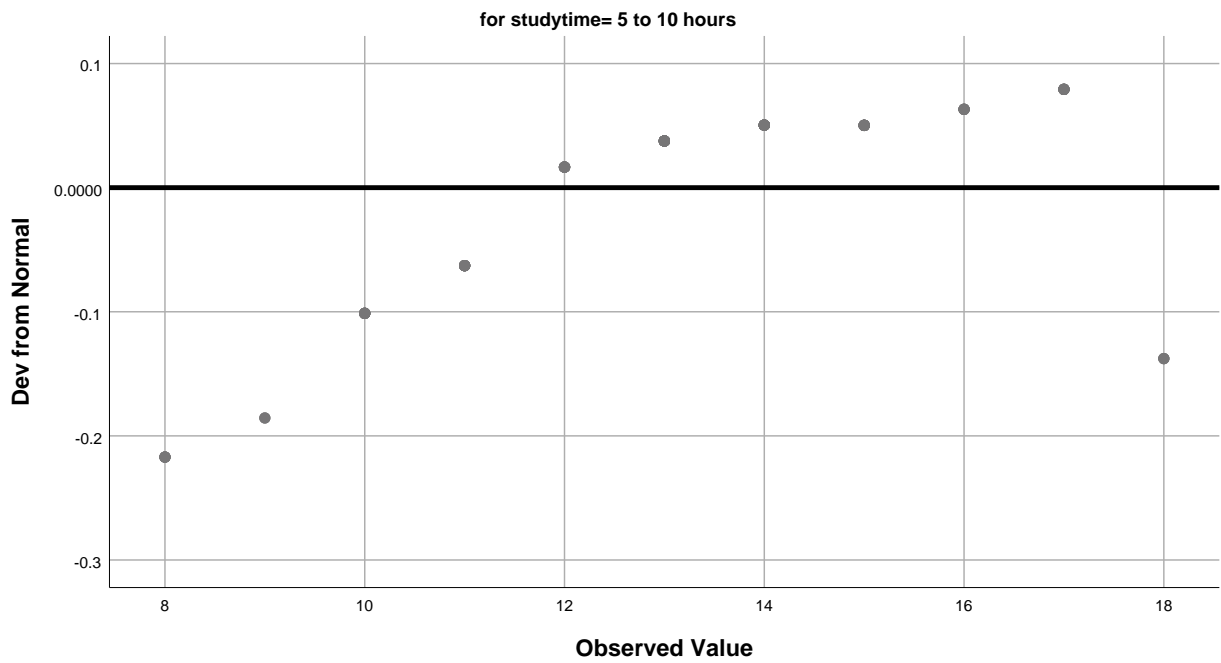


Assumption and distribution context
Boxplot, histogram, normality, and descriptives

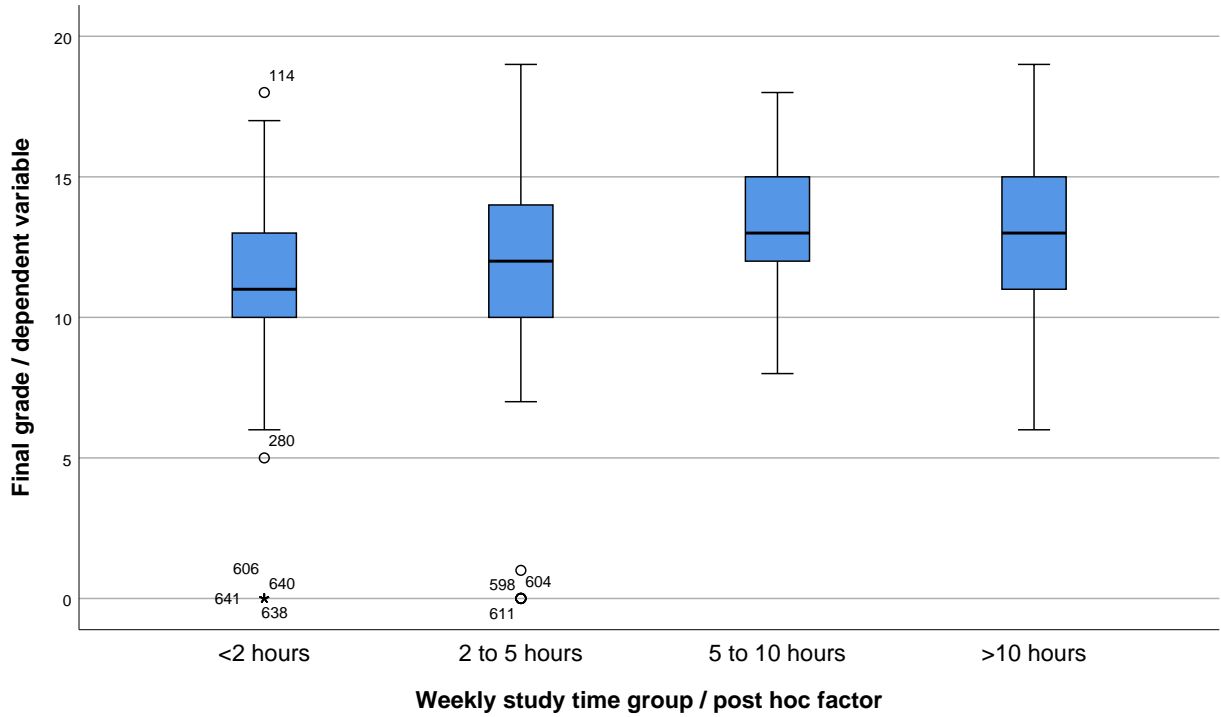
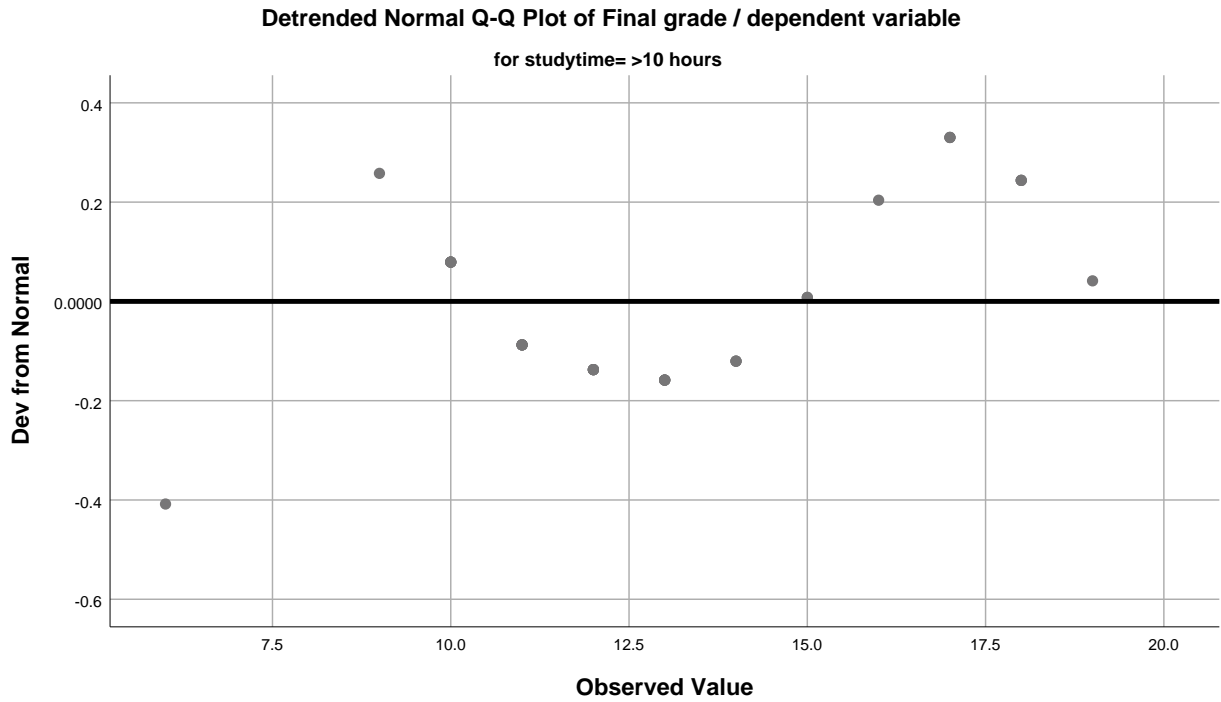
Detrended Normal Q-Q Plot of Final grade / dependent variable



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



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



One-way ANOVA with Gabriels Post Hoc Test

One-way ANOVA with Gabriels Post Hoc Test
 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 with Gabriels Post Hoc Test
 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 | | | |

Post Hoc Tests

Multiple Comparisons

Dependent Variable: G3

Gabriel

| (I) studytime | (J) studytime | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---------------|---------------|-----------------------|------------|-------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| 1 | 2 | -1.247 [*] | .279 | .000 | -1.98 | -.51 |
| | 3 | -2.382 [*] | .383 | .000 | -3.37 | -1.39 |
| | 4 | -2.213 [*] | .570 | .000 | -3.60 | -.83 |
| 2 | 1 | 1.247 [*] | .279 | .000 | .51 | 1.98 |
| | 3 | -1.135 [*] | .364 | .008 | -2.06 | -.21 |
| | 4 | -.965 | .558 | .283 | -2.28 | .35 |
| 3 | 1 | 2.382 [*] | .383 | .000 | 1.39 | 3.37 |
| | 2 | 1.135 [*] | .364 | .008 | .21 | 2.06 |
| | 4 | .170 | .616 | 1.000 | -1.41 | 1.75 |
| 4 | 1 | 2.213 [*] | .570 | .000 | .83 | 3.60 |
| | 2 | .965 | .558 | .283 | -.35 | 2.28 |
| | 3 | -.170 | .616 | 1.000 | -1.75 | 1.41 |

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

Homogeneous Subsets

One-way ANOVA with Gabriels Post Hoc Test
 Dependent variable: G3; factor: studytime

G3

Gabriel^{a,b}

| studytime | N | Subset for alpha = 0.05 | |
|-----------|-----|-------------------------|-------|
| | | 1 | 2 |
| 1 | 212 | 10.84 | |
| 2 | 305 | 12.09 | 12.09 |
| 4 | 35 | | 13.06 |
| 3 | 97 | | 13.23 |
| Sig. | | .055 | .103 |

Means for groups in homogeneous subsets are displayed.

- a. Uses Harmonic Mean Sample Size = 85.331.
- b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.