

**Host**

**Host**

**Host**

**Host**

## Reciprocal Transformation

Reciprocal Transformation  
Import data

Before reciprocal transformation

Before reciprocal transformation  
Original variable shape

## Explore

[ReciprocalTransformationData] D:\DATA ANALYSIS\B Normality and Assumption Tests\Reciprocal Transformation\SPSS\_Output\sav\Reciprocal-Transformation-data.sav

### Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
G3	649	100.0%	0	0.0%	649	100.0%
G2	649	100.0%	0	0.0%	649	100.0%
G1	649	100.0%	0	0.0%	649	100.0%
absences	649	100.0%	0	0.0%	649	100.0%
age	649	100.0%	0	0.0%	649	100.0%

### Descriptives

		Statistic	Std. Error	
G3	Mean	11.91	.127	
	95% Confidence Interval for Mean	Lower Bound	11.66	
		Upper Bound	12.16	
	5% Trimmed Mean	12.06		
	Median	12.00		
	Variance	10.437		
	Std. Deviation	3.231		
	Minimum	0		
	Maximum	19		
	Range	19		
	Interquartile Range	4		
	Skewness	-.913	.096	
Kurtosis	2.712	.192		
G2	Mean	11.57	.114	
	95% Confidence Interval for Mean	Lower Bound	11.35	
		Upper Bound	11.79	
	5% Trimmed Mean	11.60		

Before reciprocal transformation  
Original variable shape

**Descriptives**

		Statistic	Std. Error	
	Median	11.00		
	Variance	8.489		
	Std. Deviation	2.914		
	Minimum	0		
	Maximum	19		
	Range	19		
	Interquartile Range	3		
	Skewness	-.360	.096	
	Kurtosis	1.662	.192	
	G1	Mean	11.40	.108
95% Confidence Interval for Mean		Lower Bound	11.19	
		Upper Bound	11.61	
5% Trimmed Mean		11.39		
Median		11.00		
Variance		7.536		
Std. Deviation		2.745		
Minimum		0		
Maximum		19		
Range		19		
Interquartile Range		3		
Skewness		-.003	.096	
Kurtosis		.037	.192	
absences		Mean	3.66	.182
	95% Confidence Interval for Mean	Lower Bound	3.30	
		Upper Bound	4.02	
	5% Trimmed Mean	3.09		
	Median	2.00		
	Variance	21.537		
	Std. Deviation	4.641		
	Minimum	0		
	Maximum	32		
	Range	32		

Before reciprocal transformation  
Original variable shape

### Descriptives

		Statistic	Std. Error	
	Interquartile Range	6		
	Skewness	2.021	.096	
	Kurtosis	5.781	.192	
age	Mean	16.74	.048	
	95% Confidence Interval for Mean	Lower Bound	16.65	
		Upper Bound	16.84	
	5% Trimmed Mean	16.69		
	Median	17.00		
	Variance	1.484		
	Std. Deviation	1.218		
	Minimum	15		
	Maximum	22		
	Range	7		
	Interquartile Range	2		
	Skewness	.417	.096	
	Kurtosis	.072	.192	

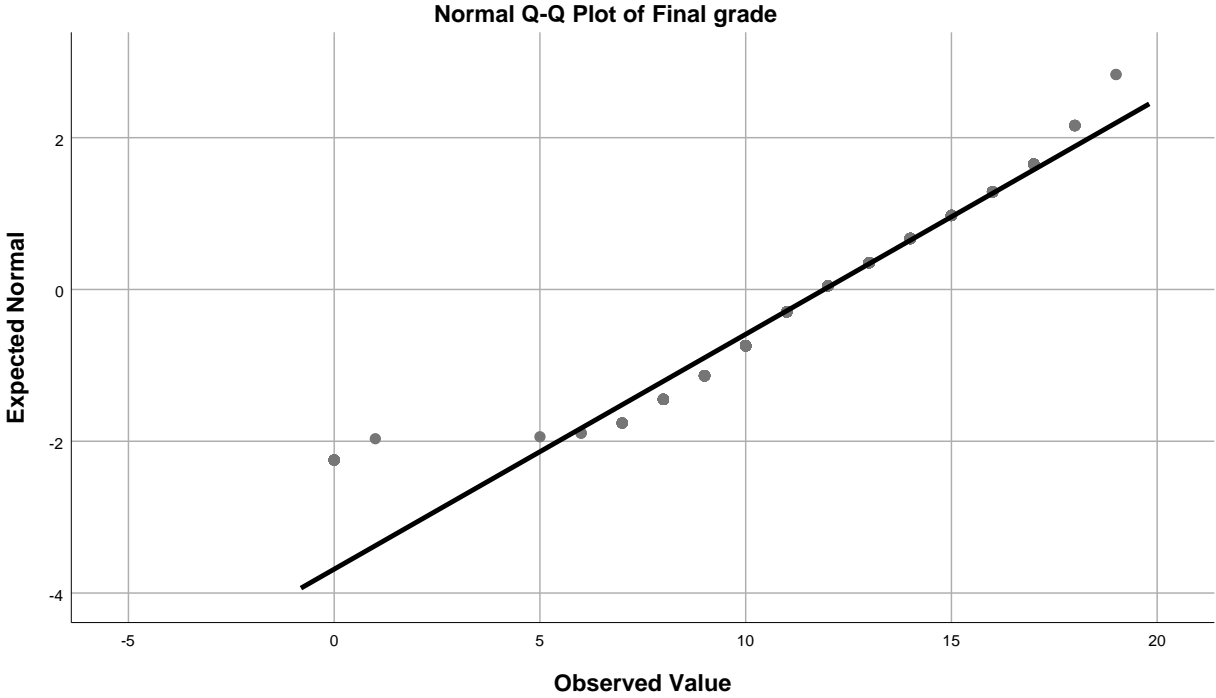
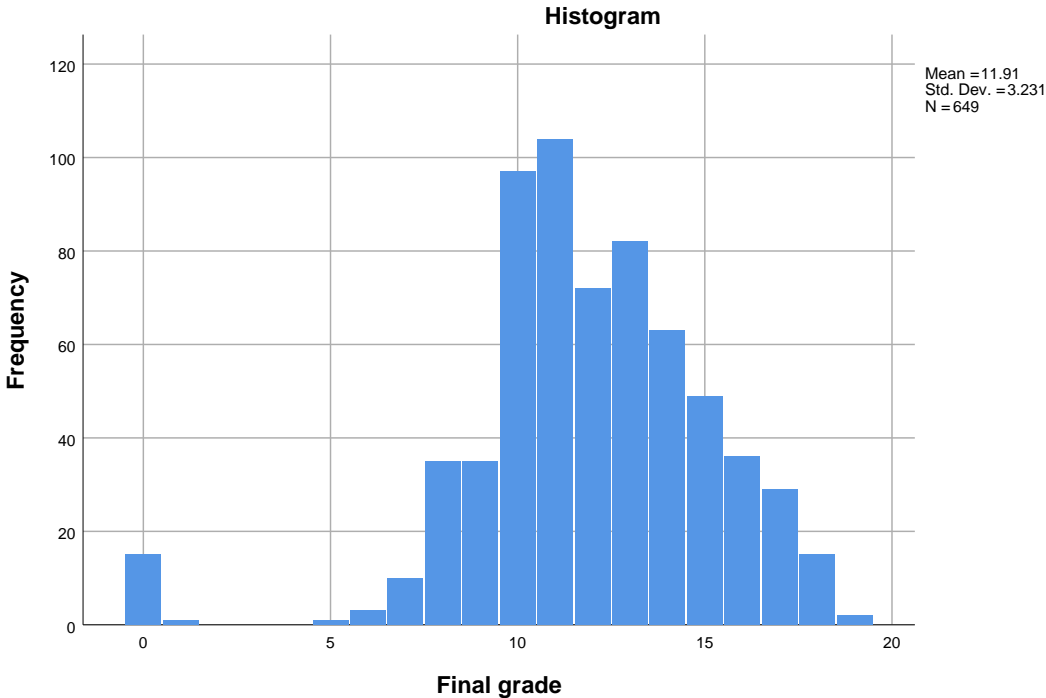
### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
G3	.124	649	.000	.926	649	.000
G2	.088	649	.000	.962	649	.000
G1	.086	649	.000	.986	649	.000
absences	.215	649	.000	.772	649	.000
age	.175	649	.000	.916	649	.000

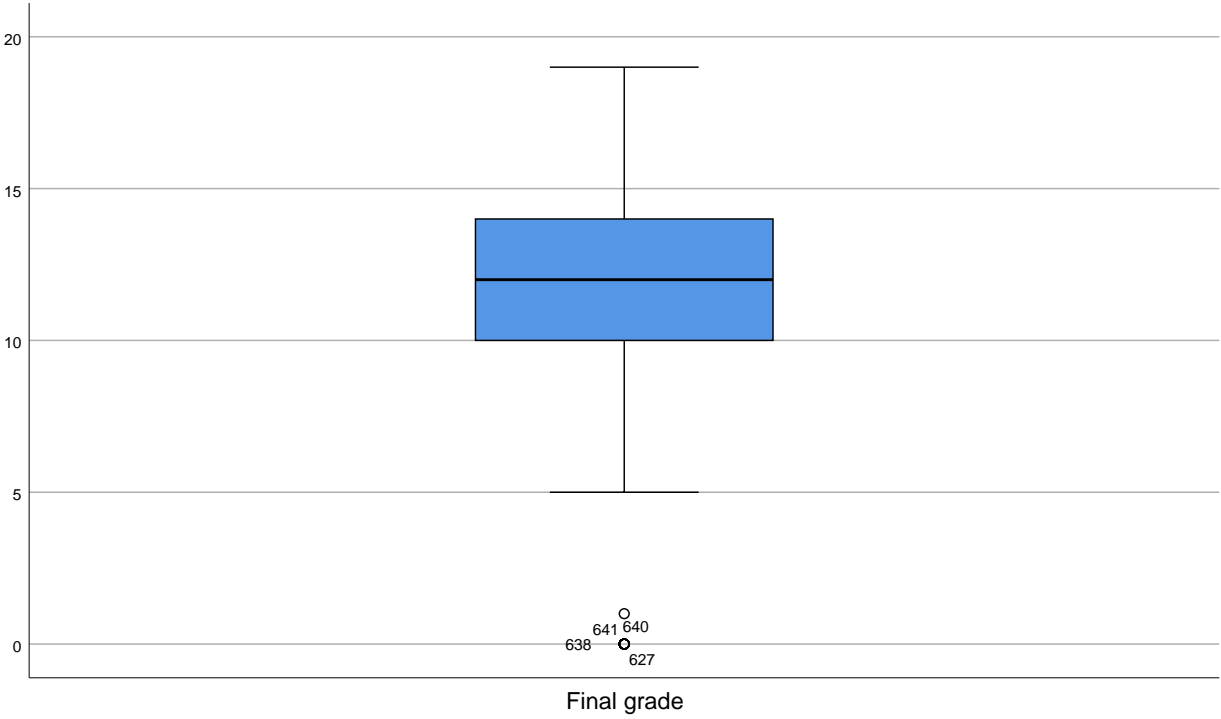
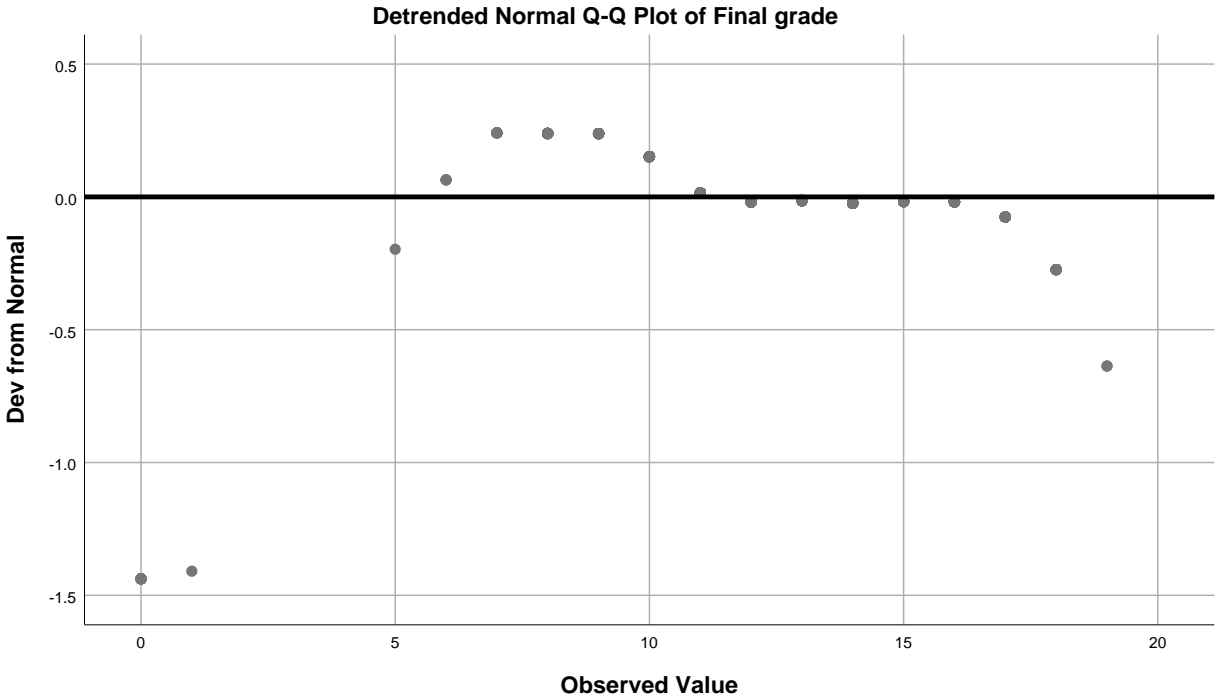
a. Lilliefors Significance Correction

### Final grade

Before reciprocal transformation  
Original variable shape

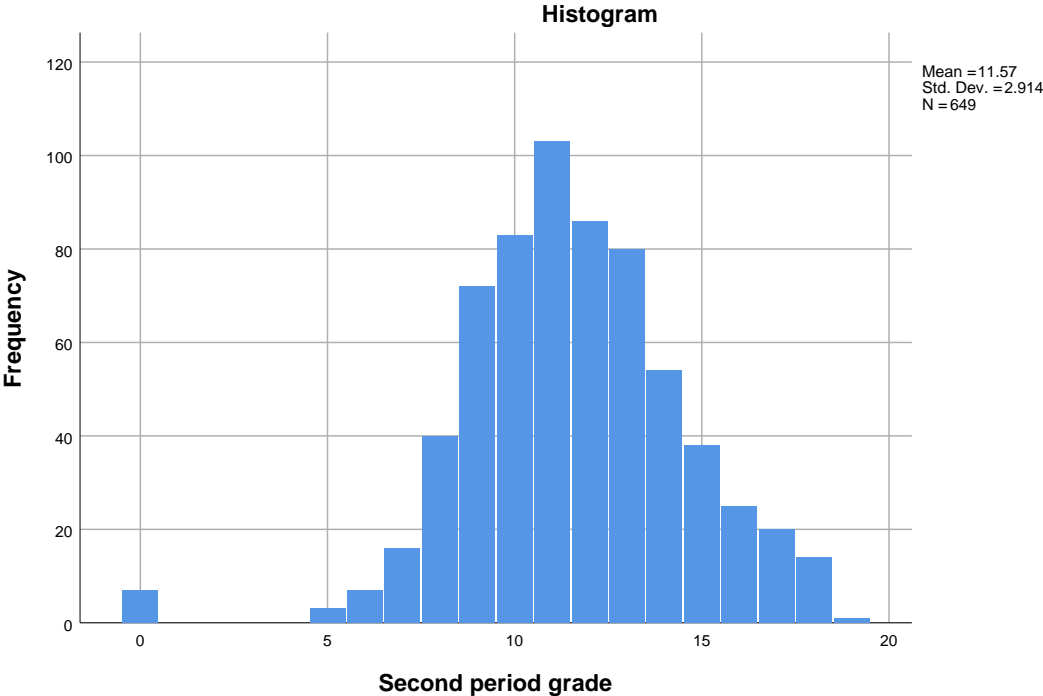


Before reciprocal transformation  
Original variable shape

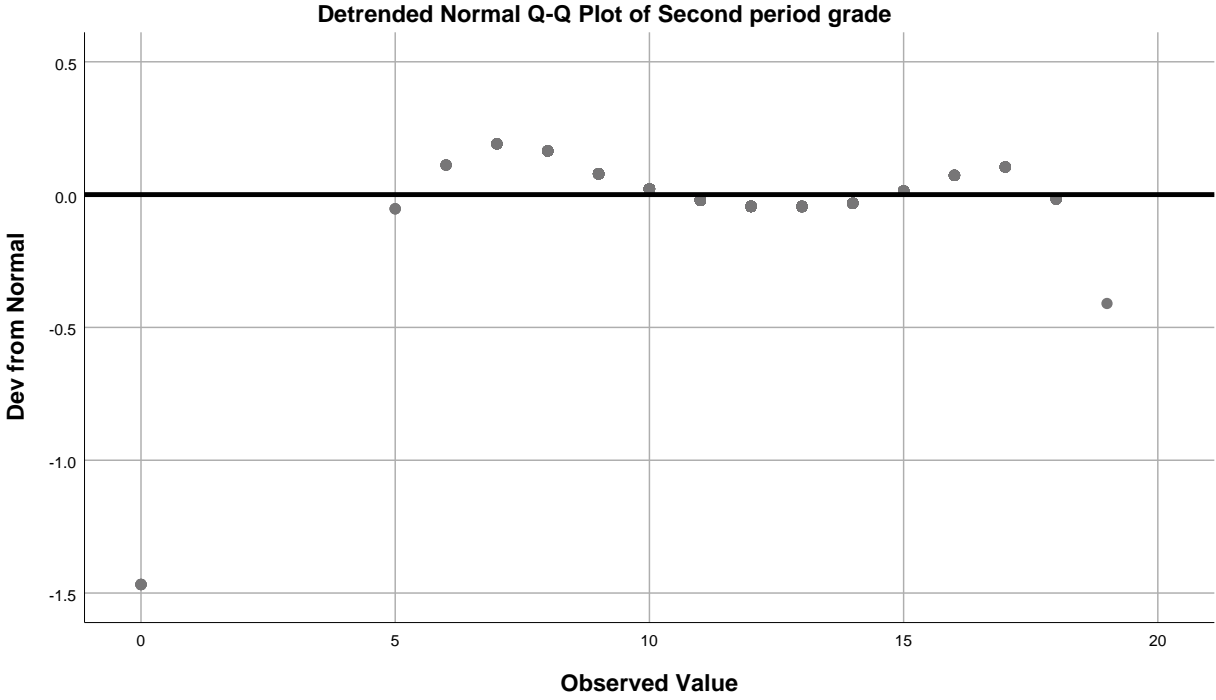
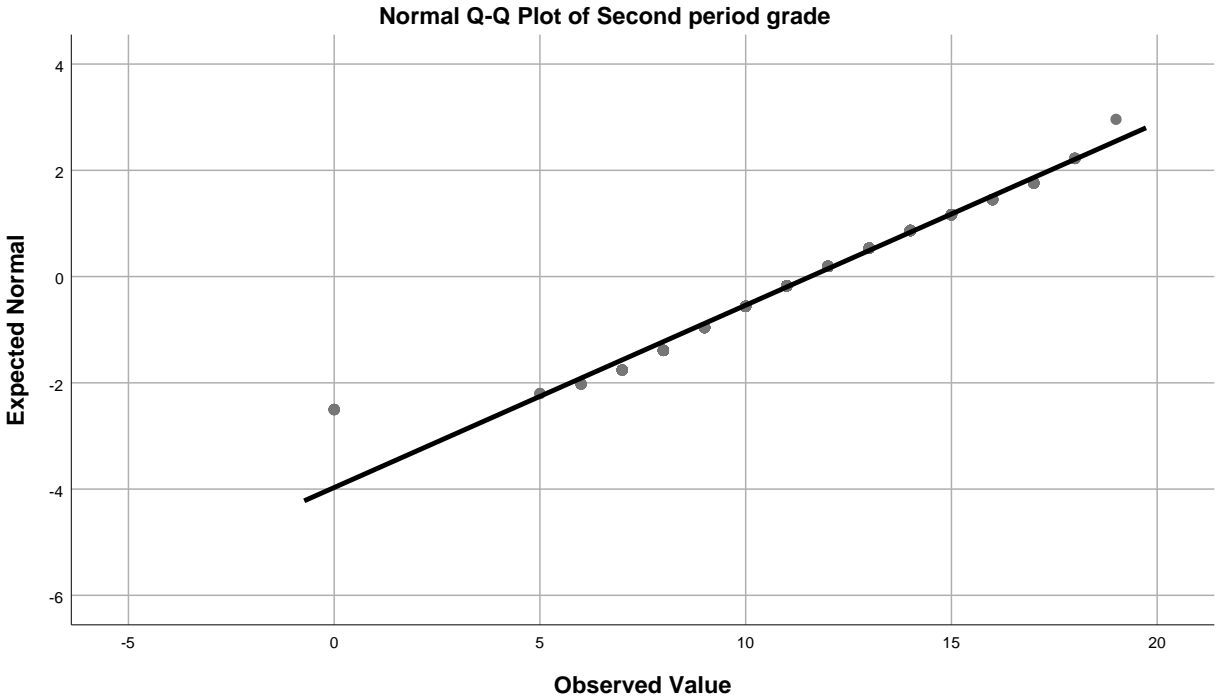


Before reciprocal transformation  
Original variable shape

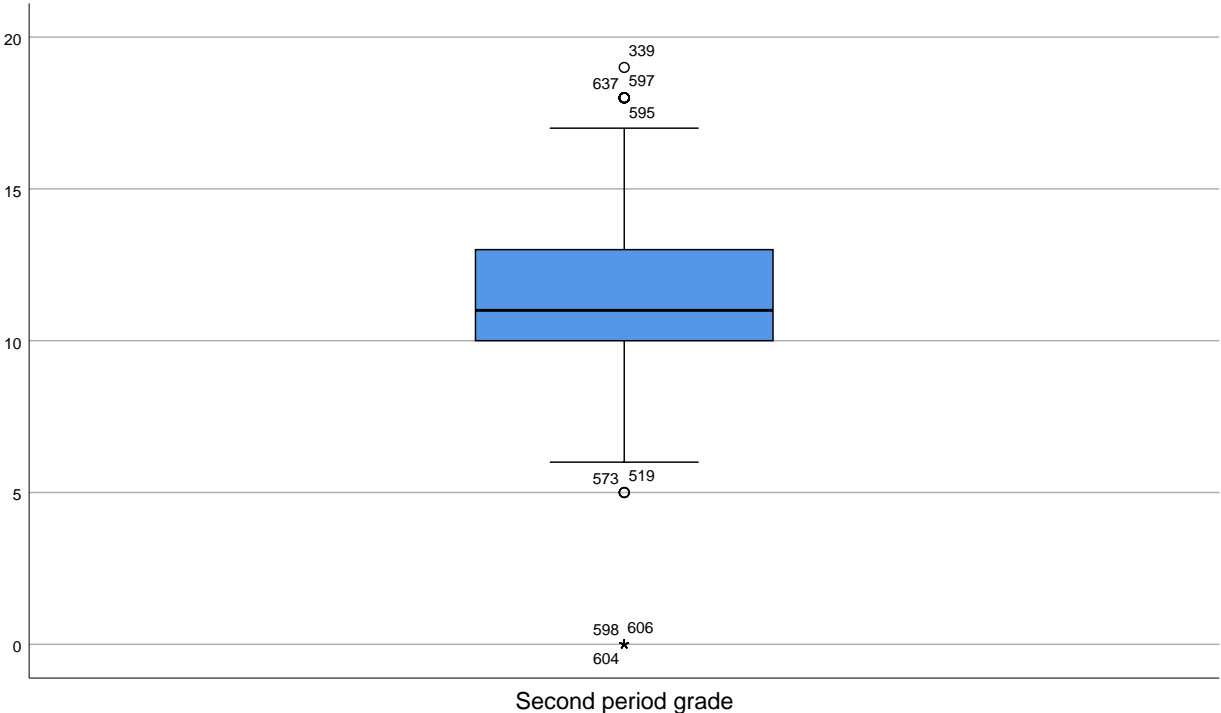
### Second period grade



Before reciprocal transformation  
Original variable shape

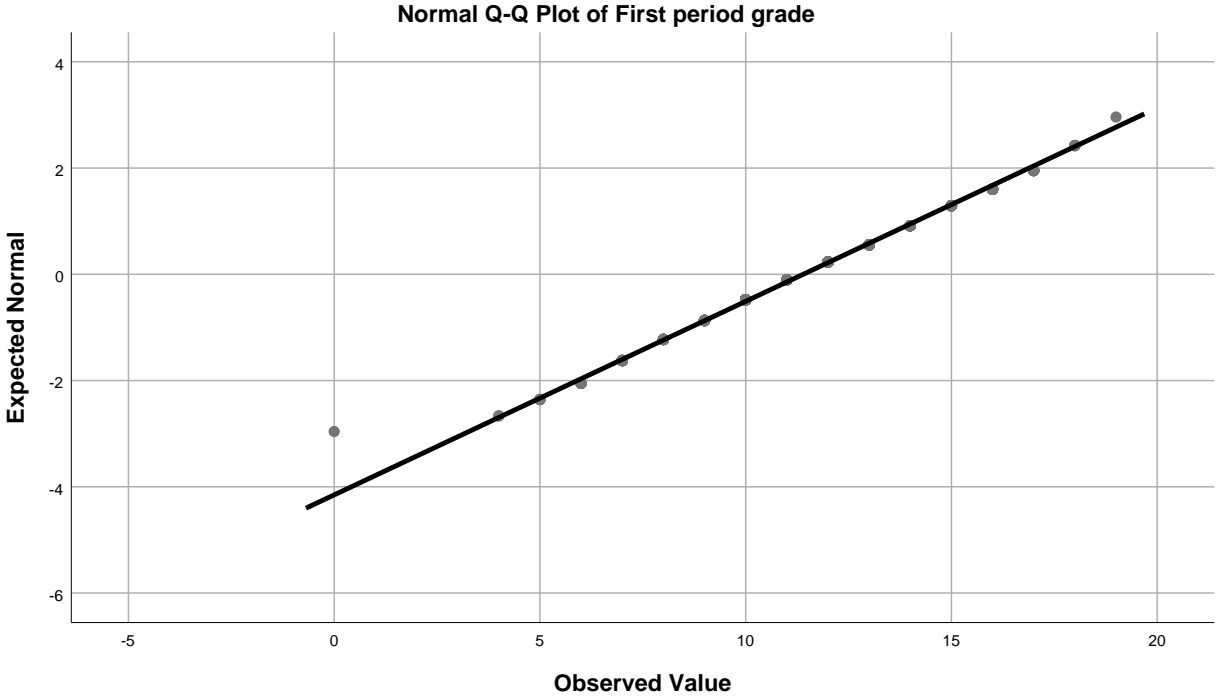
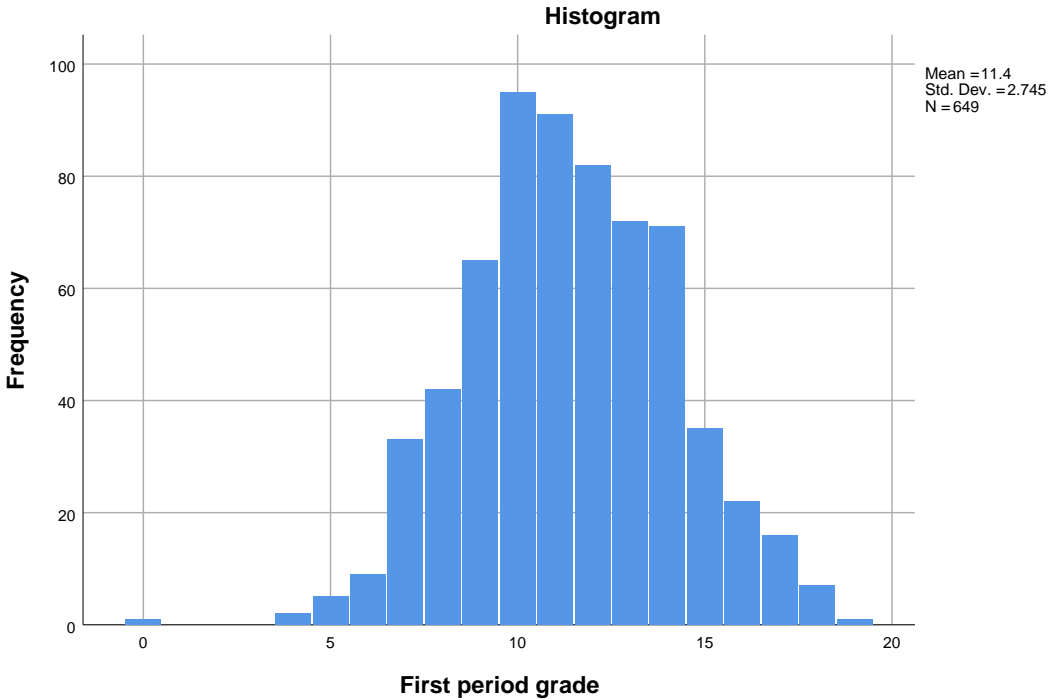


Before reciprocal transformation  
Original variable shape

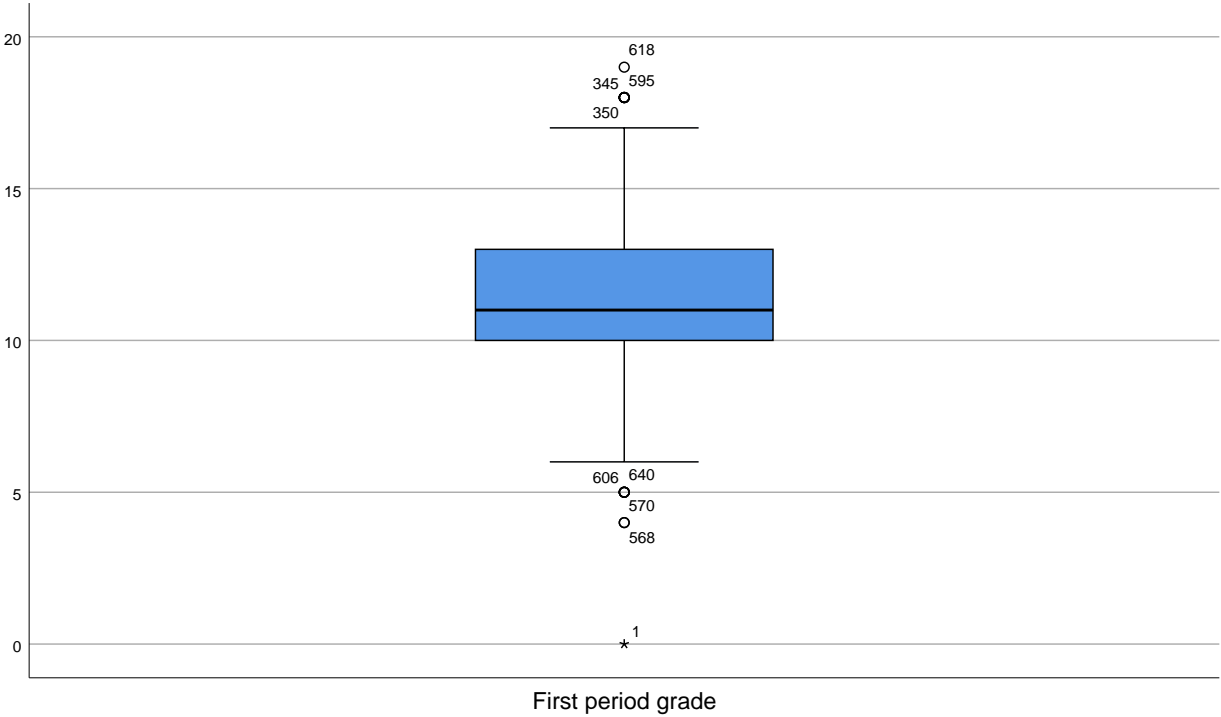
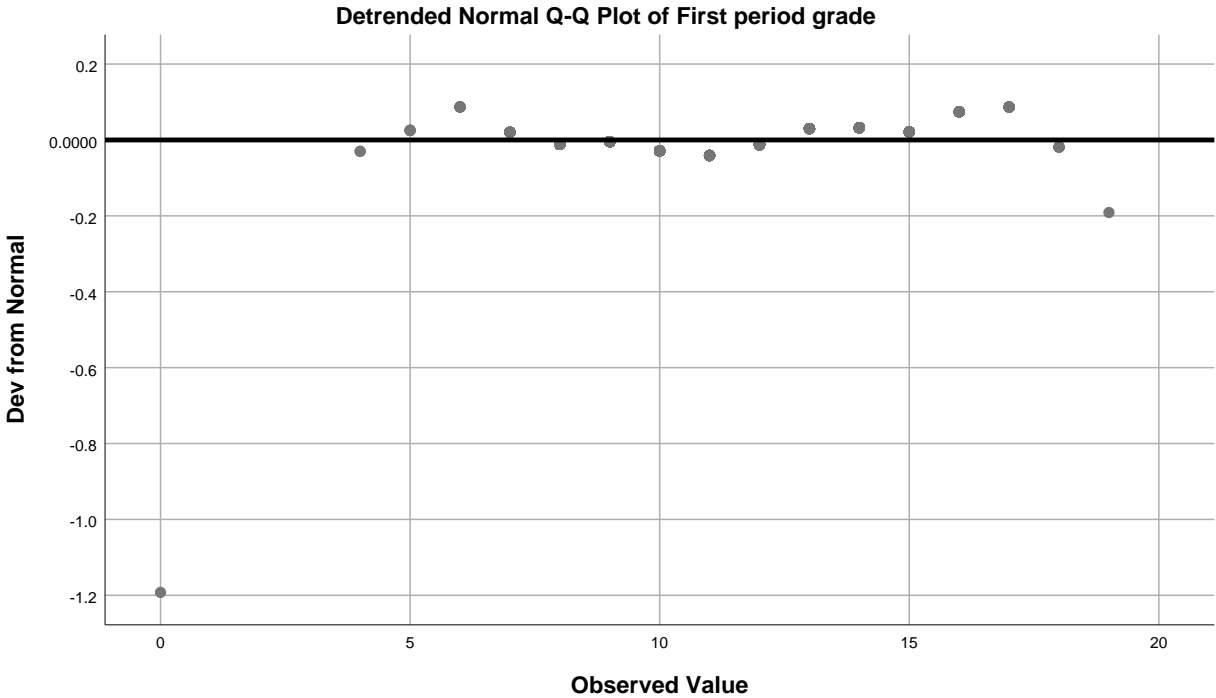


**First period grade**

Before reciprocal transformation  
Original variable shape

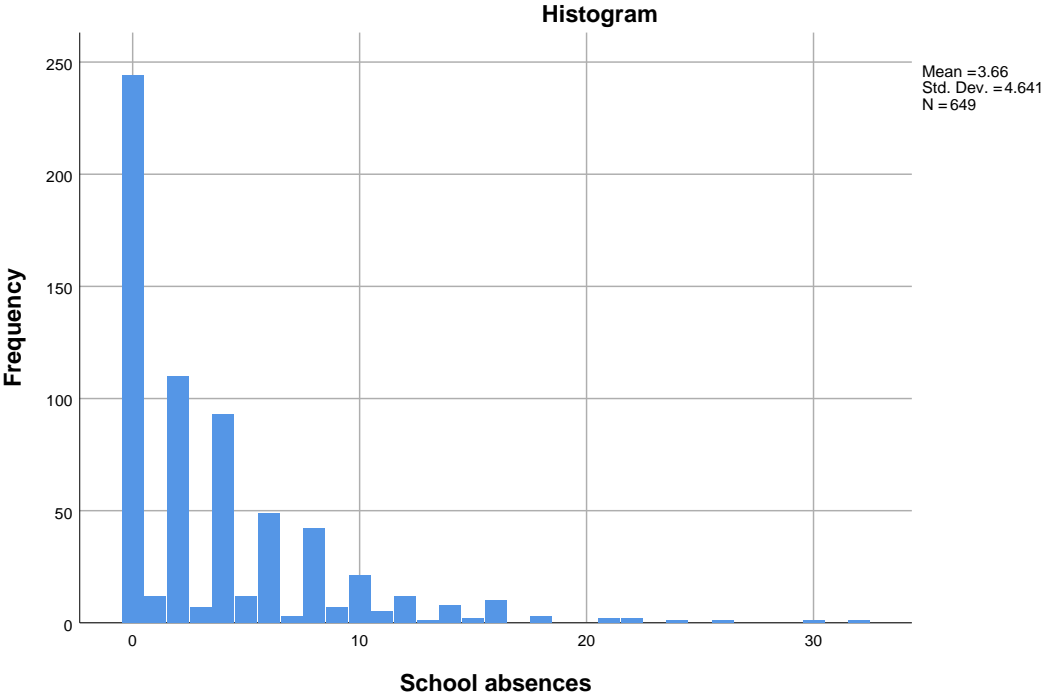


Before reciprocal transformation  
Original variable shape

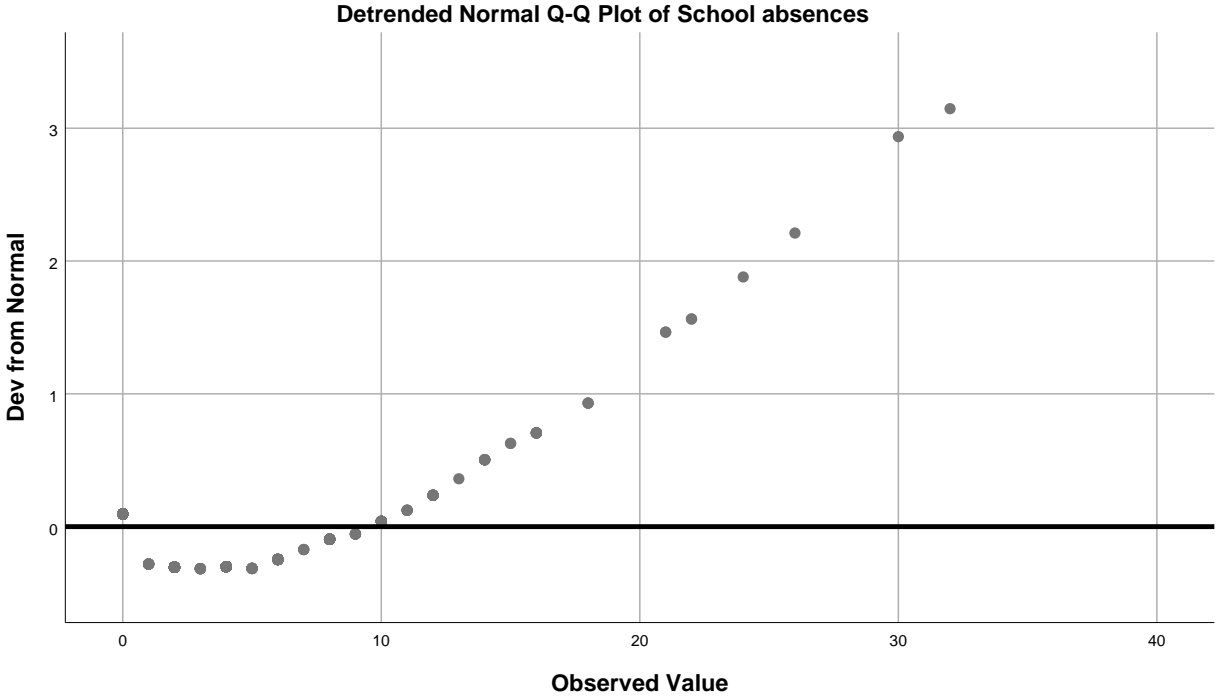
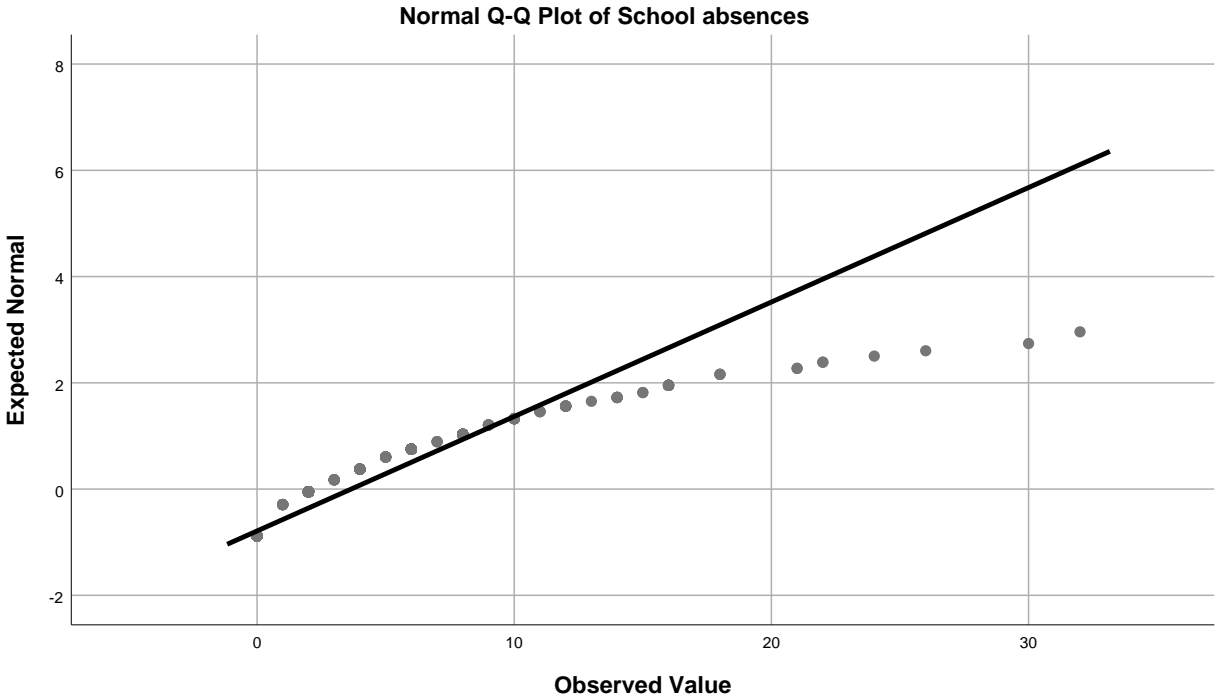


Before reciprocal transformation  
Original variable shape

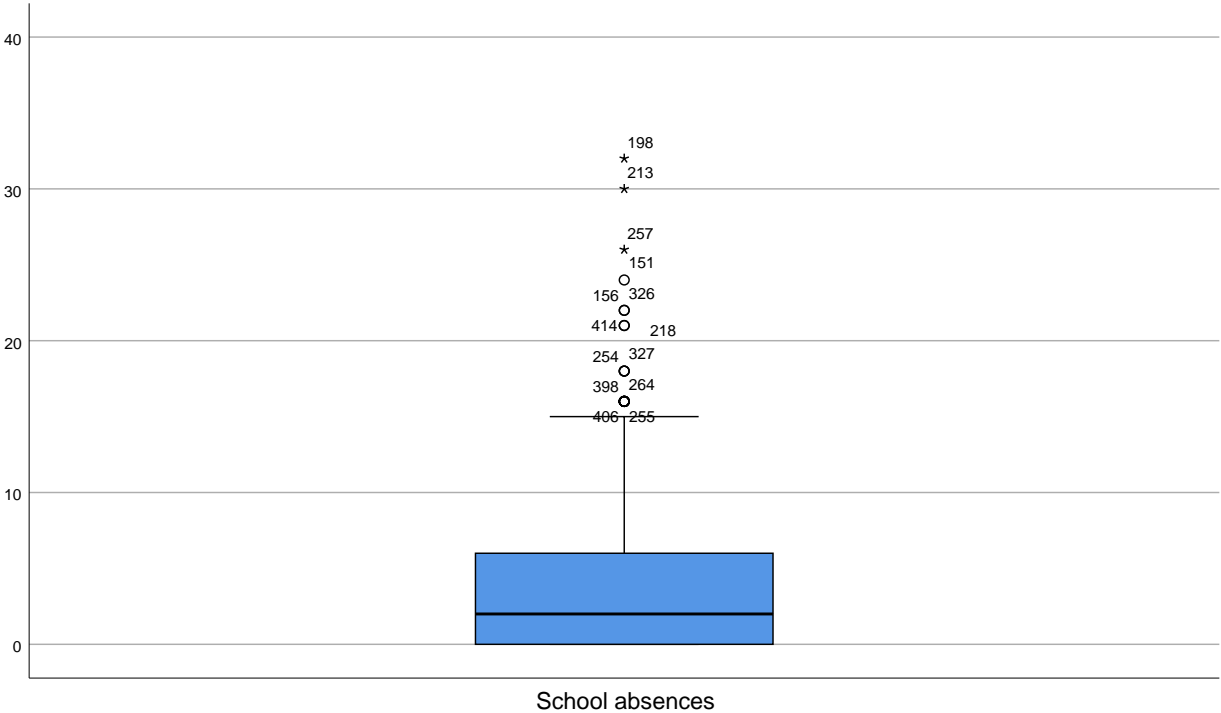
### School absences



Before reciprocal transformation  
Original variable shape

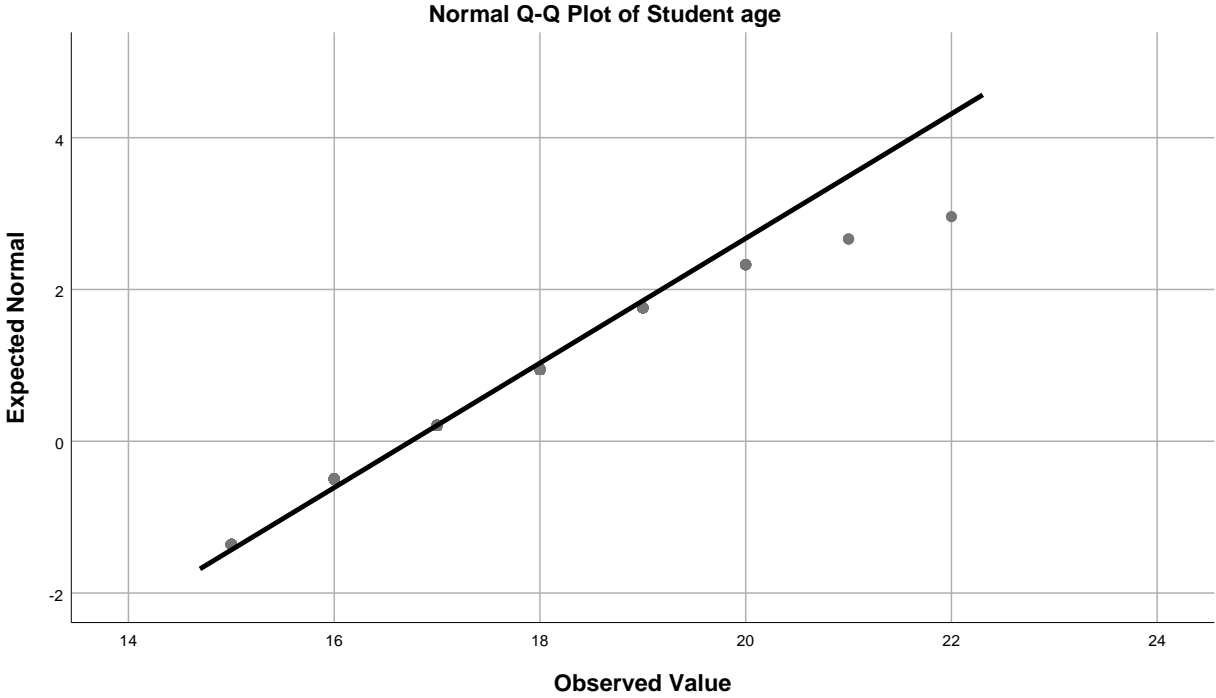
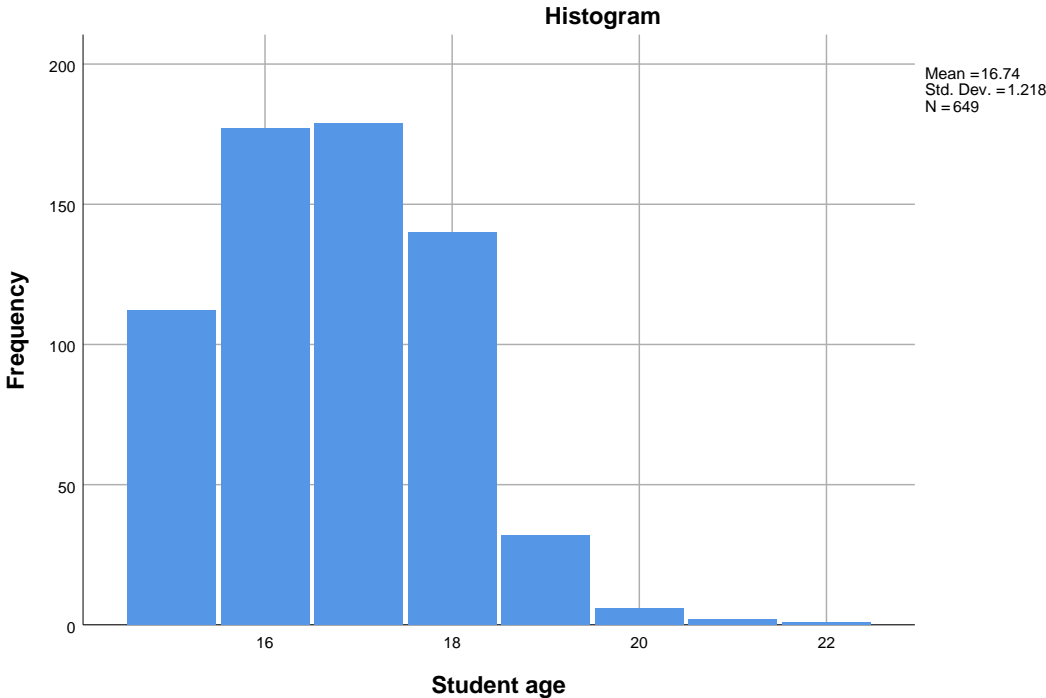


Before reciprocal transformation  
Original variable shape

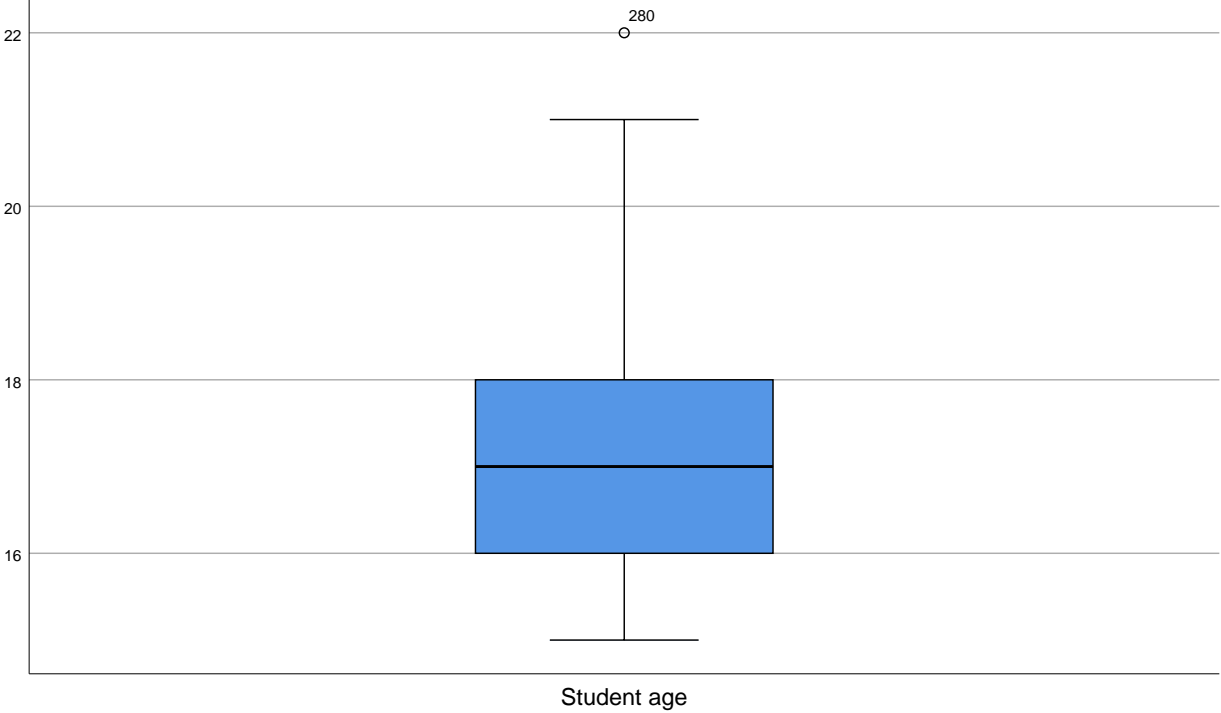
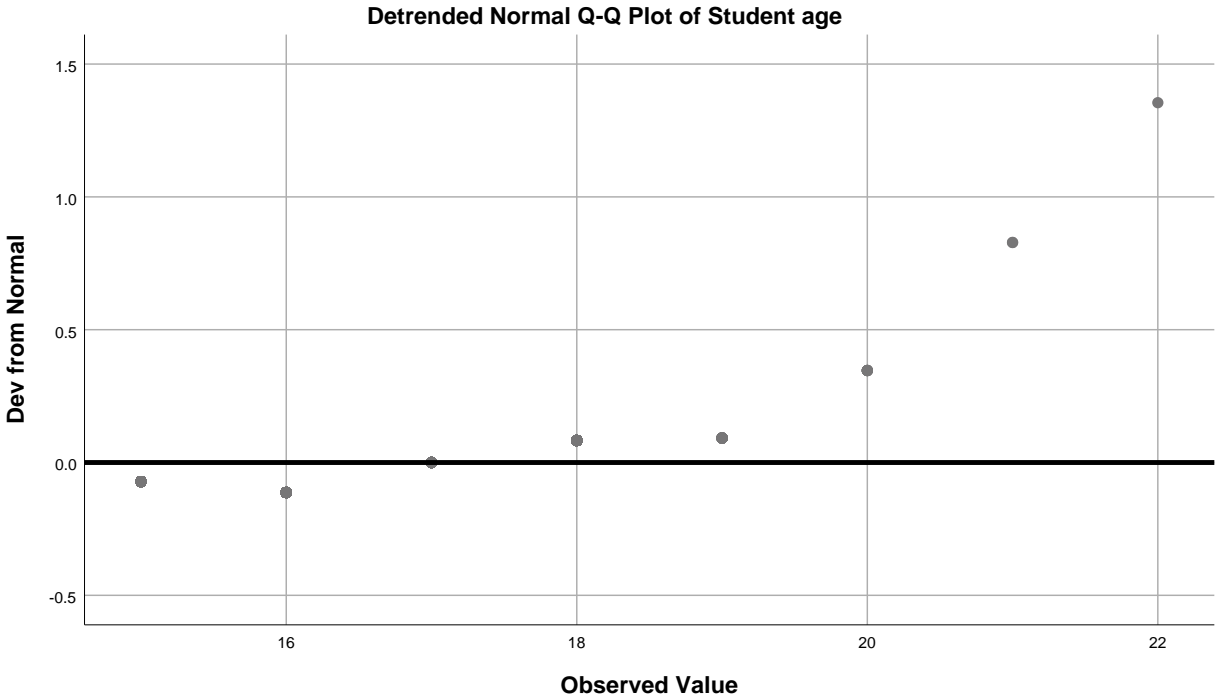


**Student age**

Before reciprocal transformation  
Original variable shape



Before reciprocal transformation  
Original variable shape



Reciprocal transformation shift values

Reciprocal transformation shift values  
Values added before reciprocal calculation

**List**

[ReciprocalTransformationData] D:\DATA ANALYSIS\B Normality and Assumption Tests\Reciprocal Transformation\SPSS\_Output\sav\Reciprocal-Transformation-with-reciprocal-variables.sav

Reciprocal transformation shift values  
Values added before reciprocal calculation

shift_G3	shift_G2	shift_G1	shift_absences	shift_age
1.00000	1.00000	1.00000	1.00000	.00000

Number of cases read: 1      Number of cases listed: 1

After reciprocal transformation

After reciprocal transformation  
Transformed variable shape

## Explore

### Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
reciprocal_G3	649	100.0%	0	0.0%	649	100.0%
reciprocal_G2	649	100.0%	0	0.0%	649	100.0%
reciprocal_G1	649	100.0%	0	0.0%	649	100.0%
reciprocal_absences	649	100.0%	0	0.0%	649	100.0%
reciprocal_age	649	100.0%	0	0.0%	649	100.0%

### Descriptives

		Statistic	Std. Error	
reciprocal_G3	Mean	.1009173	.00551001	
	95% Confidence Interval for Mean	Lower Bound	.0900976	
		Upper Bound	.1117369	
	5% Trimmed Mean	.0789763		
	Median	.0769231		
	Variance	.020		
	Std. Deviation	.14037017		
	Minimum	.05000		
	Maximum	1.00000		
	Range	.95000		
	Interquartile Range	.02424		
	Skewness	6.128	.096	
Kurtosis	36.413	.192		
reciprocal_G2	Mean	.0923674	.00379260	
	95% Confidence Interval for Mean	Lower Bound	.0849201	
		Upper Bound	.0998147	
	5% Trimmed Mean	.0817650		
	Median	.0833333		
	Variance	.009		
	Std. Deviation	.09661828		
	Minimum	.05000		

After reciprocal transformation  
Transformed variable shape

**Descriptives**

		Statistic	Std. Error	
	Maximum	1.00000		
	Range	.95000		
	Interquartile Range	.01948		
	Skewness	8.978	.096	
	Kurtosis	81.900	.192	
reciprocal_G1	Mean	.0862916	.00163439	
	95% Confidence Interval for Mean	Lower Bound	.0830822	
		Upper Bound	.0895009	
	5% Trimmed Mean	.0834593		
	Median	.0833333		
	Variance	.002		
	Std. Deviation	.04163694		
	Minimum	.05000		
	Maximum	1.00000		
	Range	.95000		
	Interquartile Range	.01948		
	Skewness	16.516	.096	
	Kurtosis	358.608	.192	
reciprocal_absences	Mean	.5035447	.01551040	
	95% Confidence Interval for Mean	Lower Bound	.4730880	
		Upper Bound	.5340014	
	5% Trimmed Mean	.5008090		
	Median	.3333333		
	Variance	.156		
	Std. Deviation	.39513492		
	Minimum	.03030		
	Maximum	1.00000		
	Range	.96970		
	Interquartile Range	.85714		
	Skewness	.377	.096	
	Kurtosis	-1.710	.192	
reciprocal_age	Mean	.0600328	.00016858	

After reciprocal transformation  
Transformed variable shape

**Descriptives**

		Statistic	Std. Error
95% Confidence Interval for Mean	Lower Bound	.0597017	
	Upper Bound	.0603638	
5% Trimmed Mean		.0601319	
Median		.0588235	
Variance		.000	
Std. Deviation		.00429471	
Minimum		.04545	
Maximum		.06667	
Range		.02121	
Interquartile Range		.00694	
Skewness		-.068	.096
Kurtosis		-.589	.192

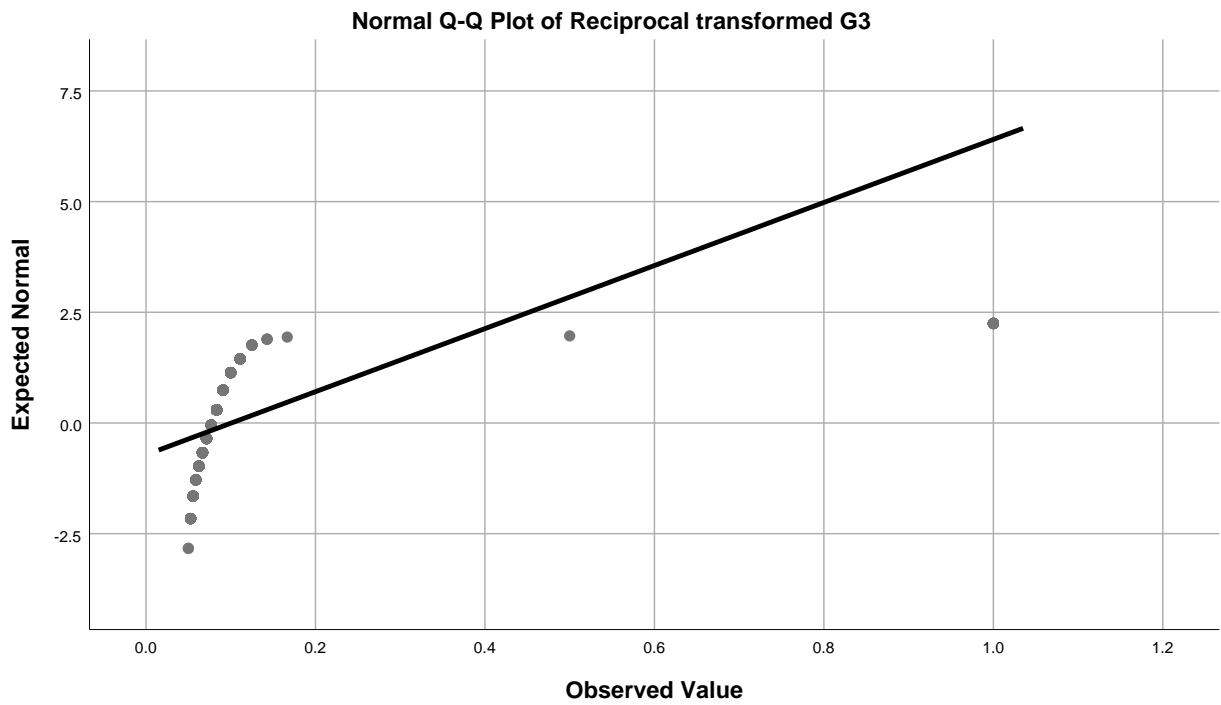
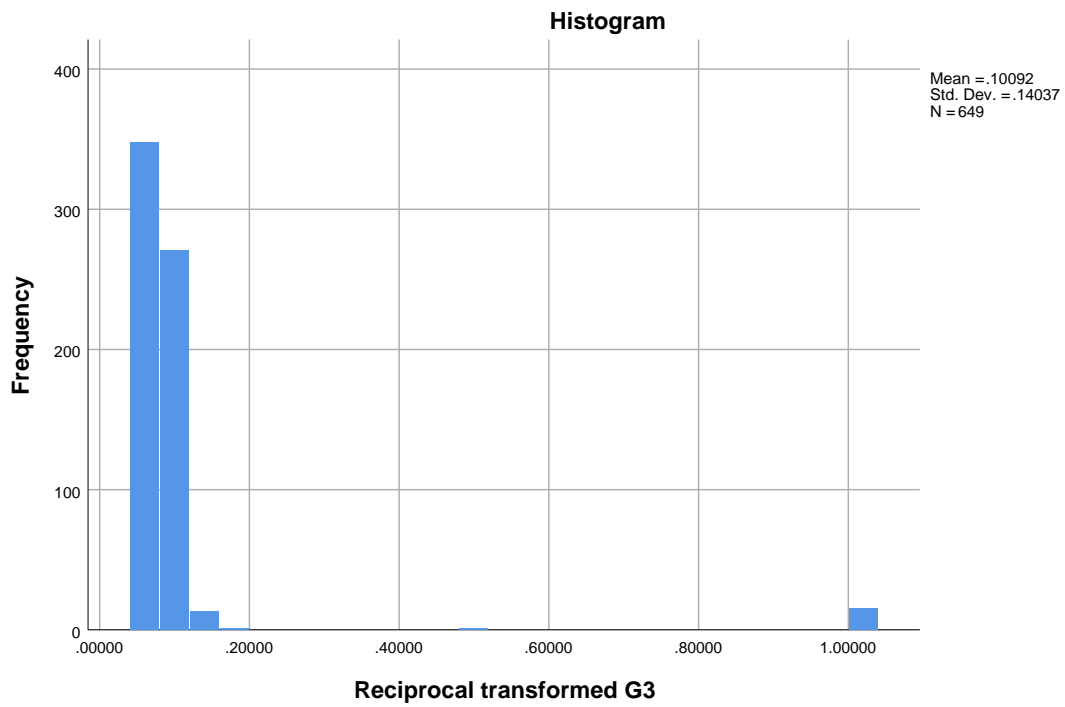
**Tests of Normality**

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
reciprocal_G3	.425	649	.000	.224	649	.000
reciprocal_G2	.372	649	.000	.199	649	.000
reciprocal_G1	.229	649	.000	.344	649	.000
reciprocal_absences	.272	649	.000	.750	649	.000
reciprocal_age	.166	649	.000	.919	649	.000

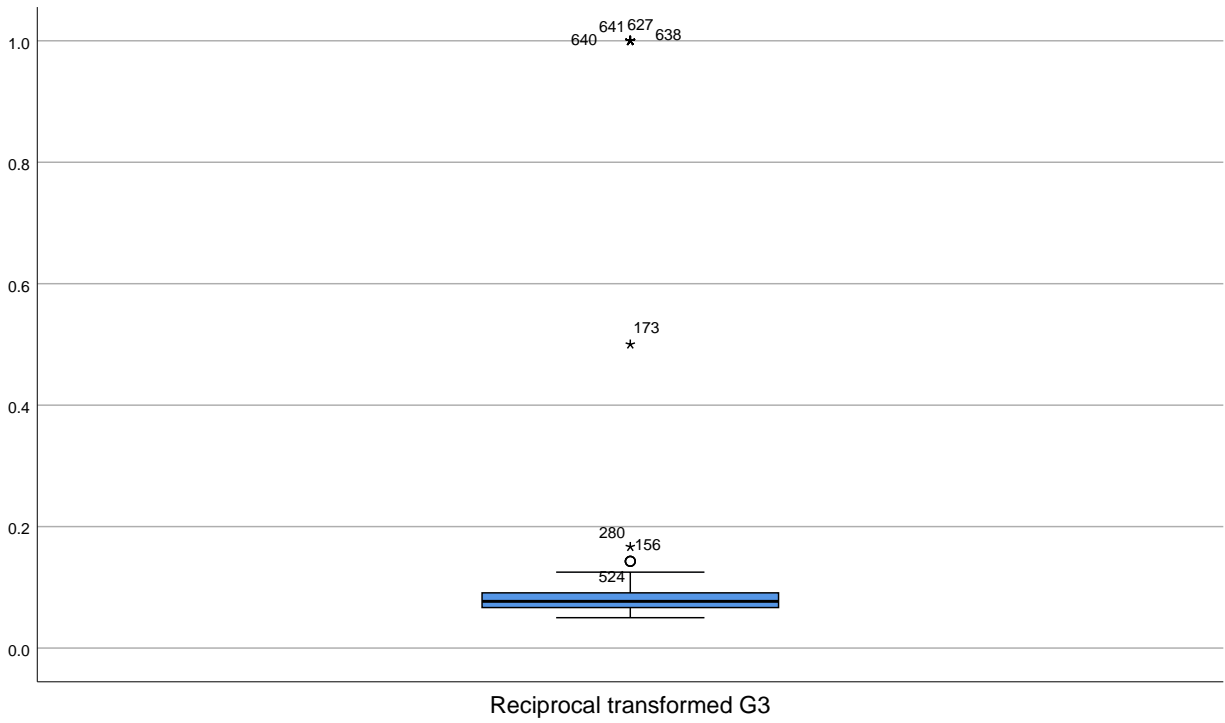
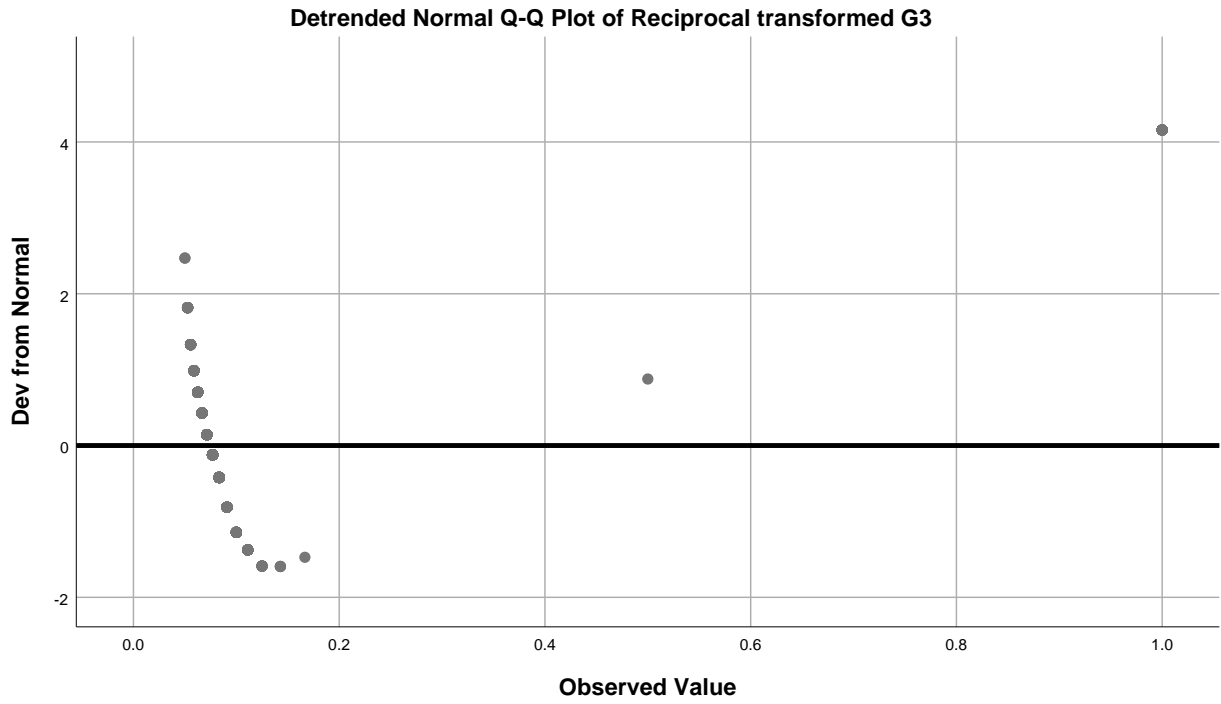
a. Lilliefors Significance Correction

**Reciprocal transformed G3**

After reciprocal transformation  
Transformed variable shape

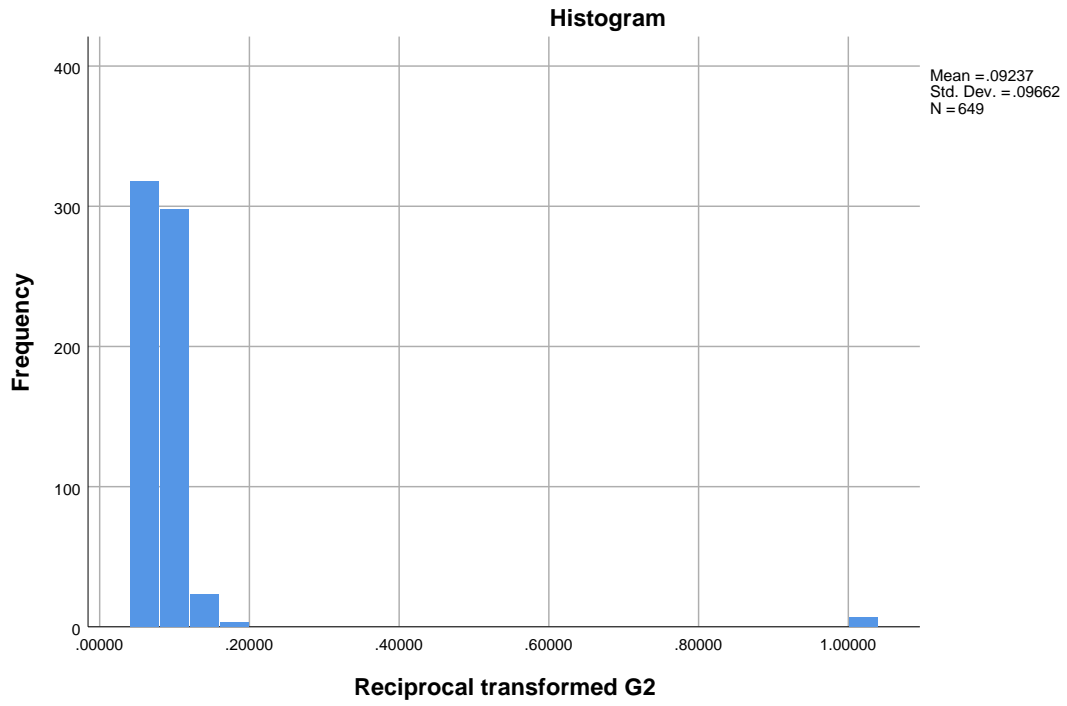


After reciprocal transformation  
Transformed variable shape

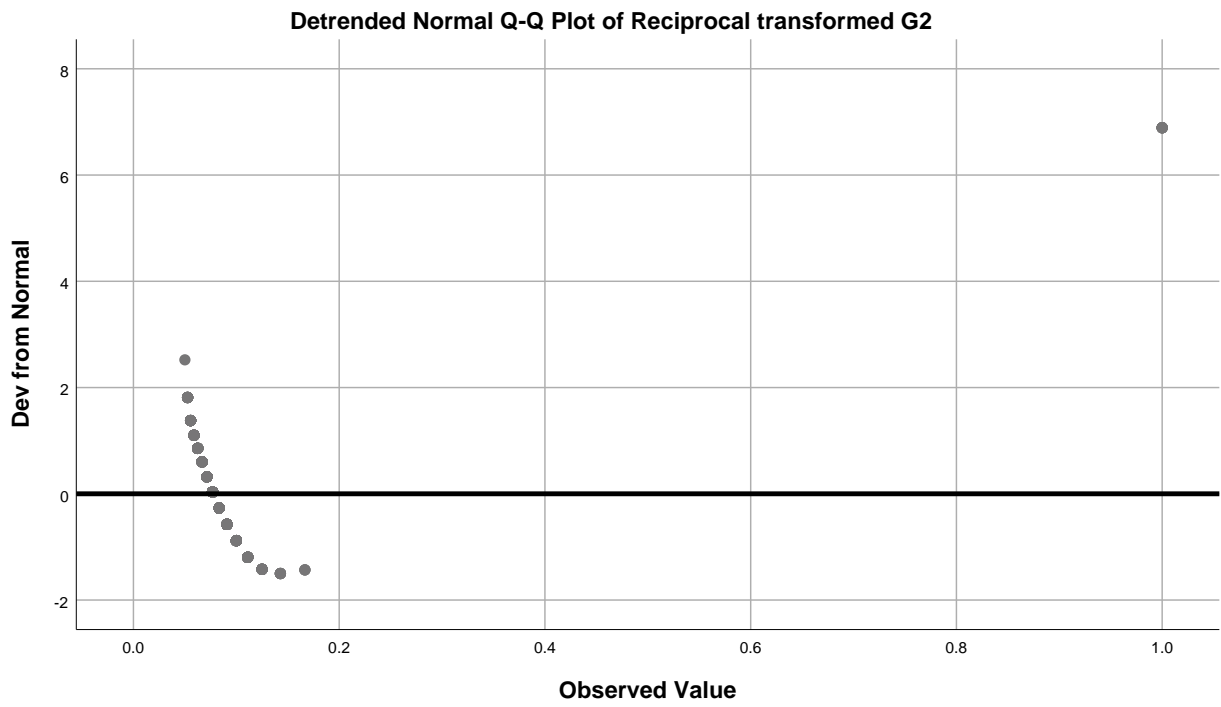
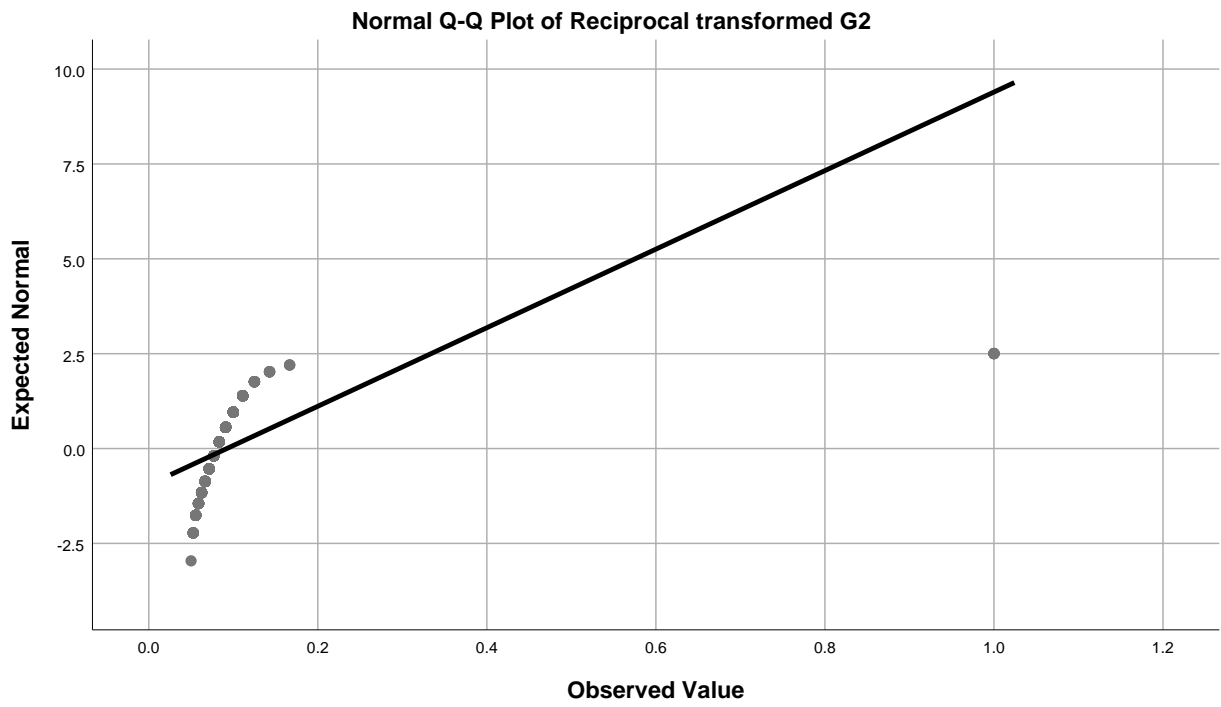


After reciprocal transformation  
Transformed variable shape

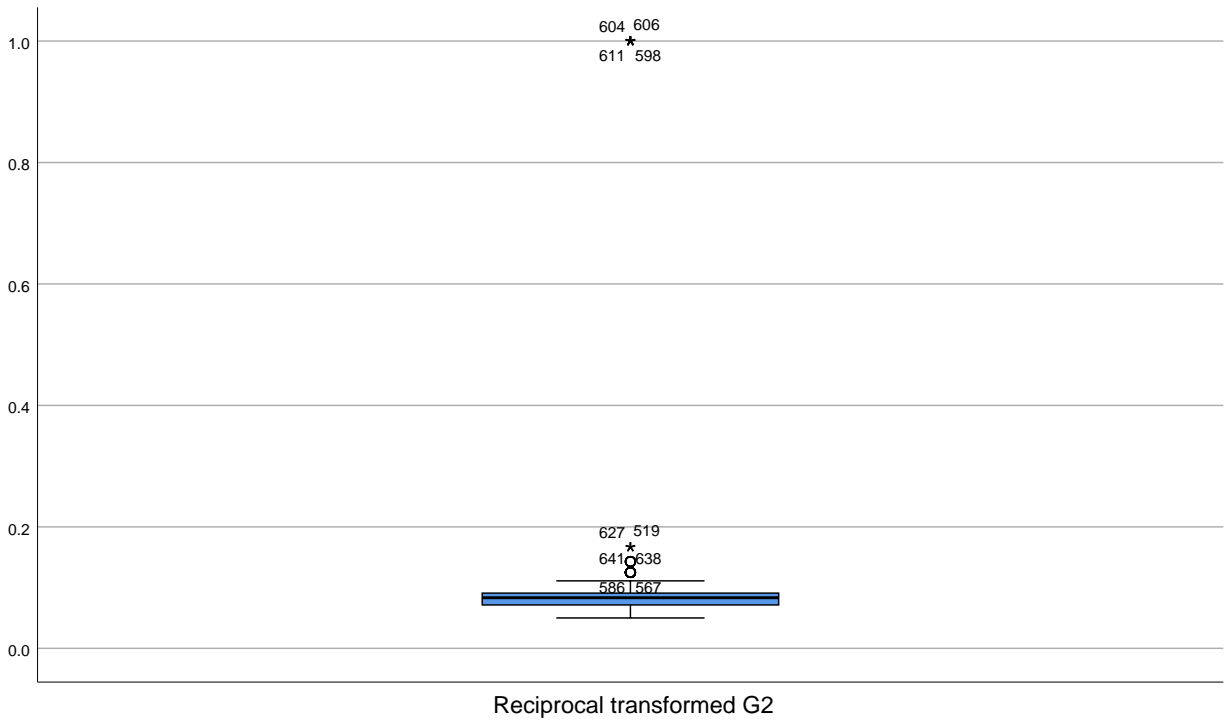
## Reciprocal transformed G2



After reciprocal transformation  
Transformed variable shape

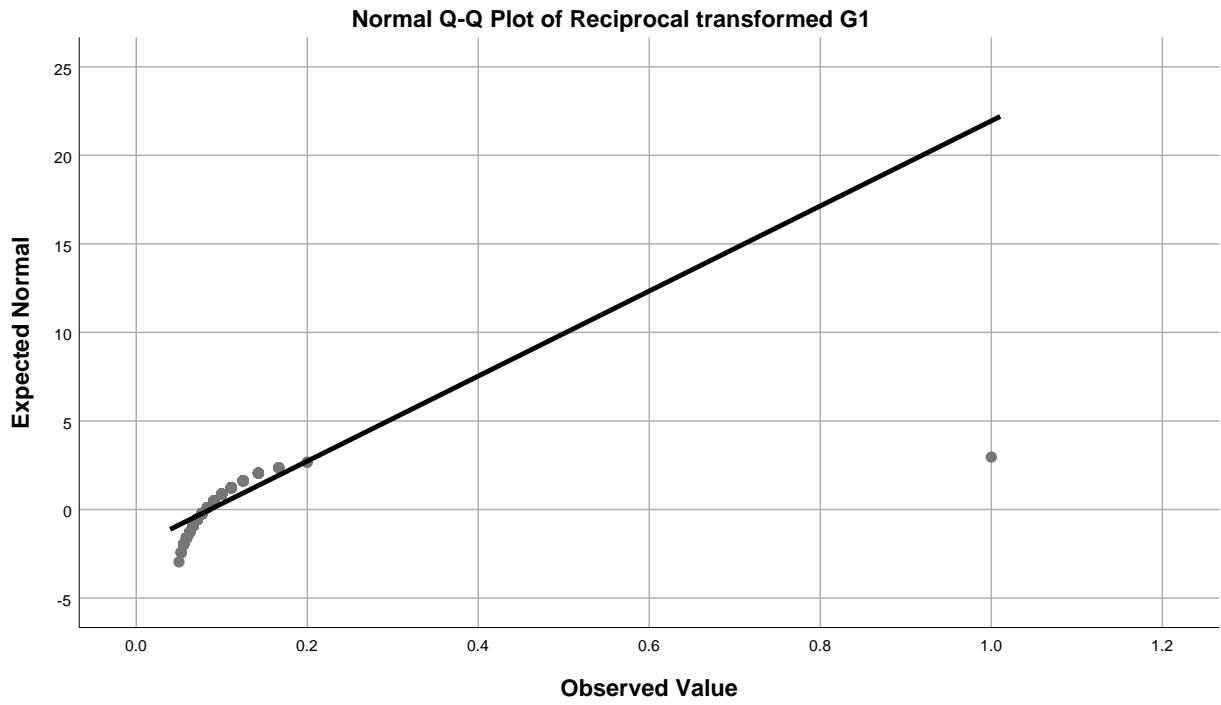
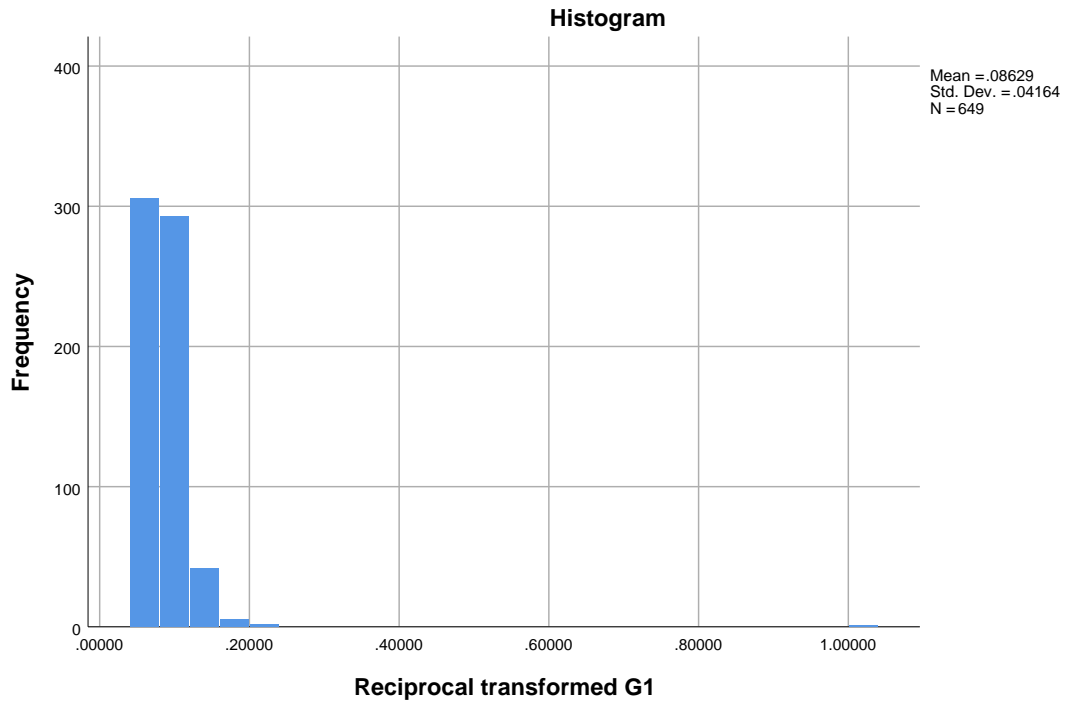


After reciprocal transformation  
Transformed variable shape

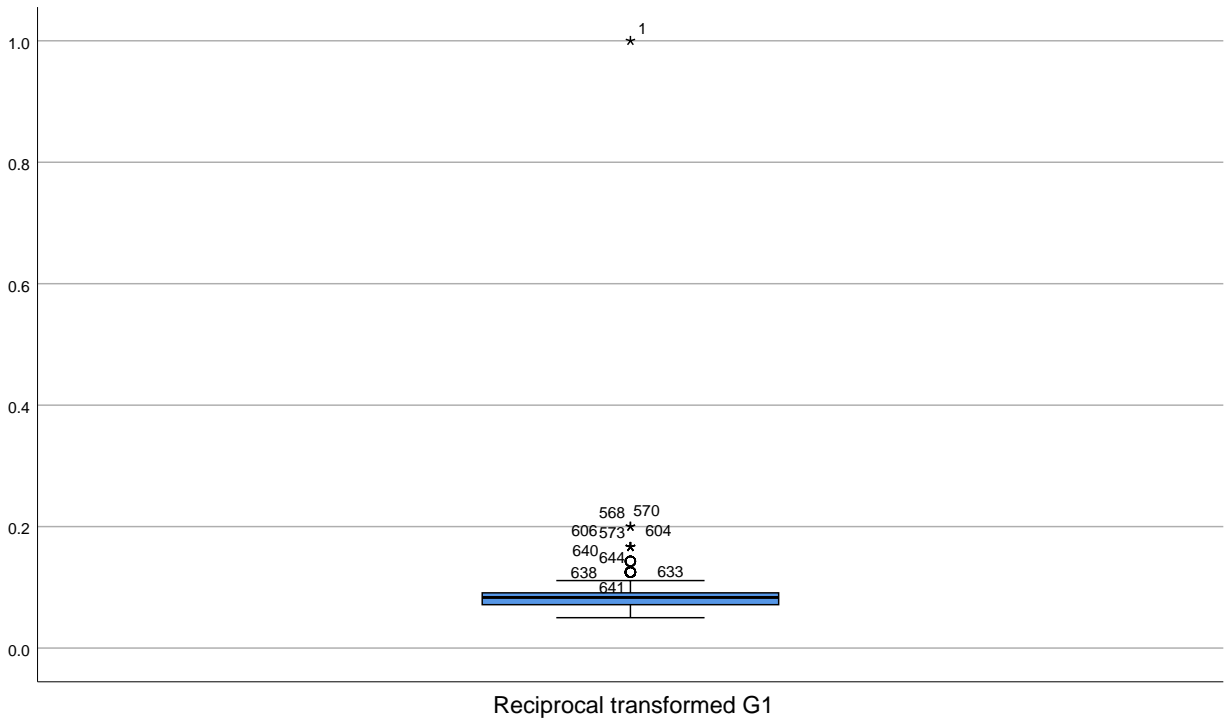
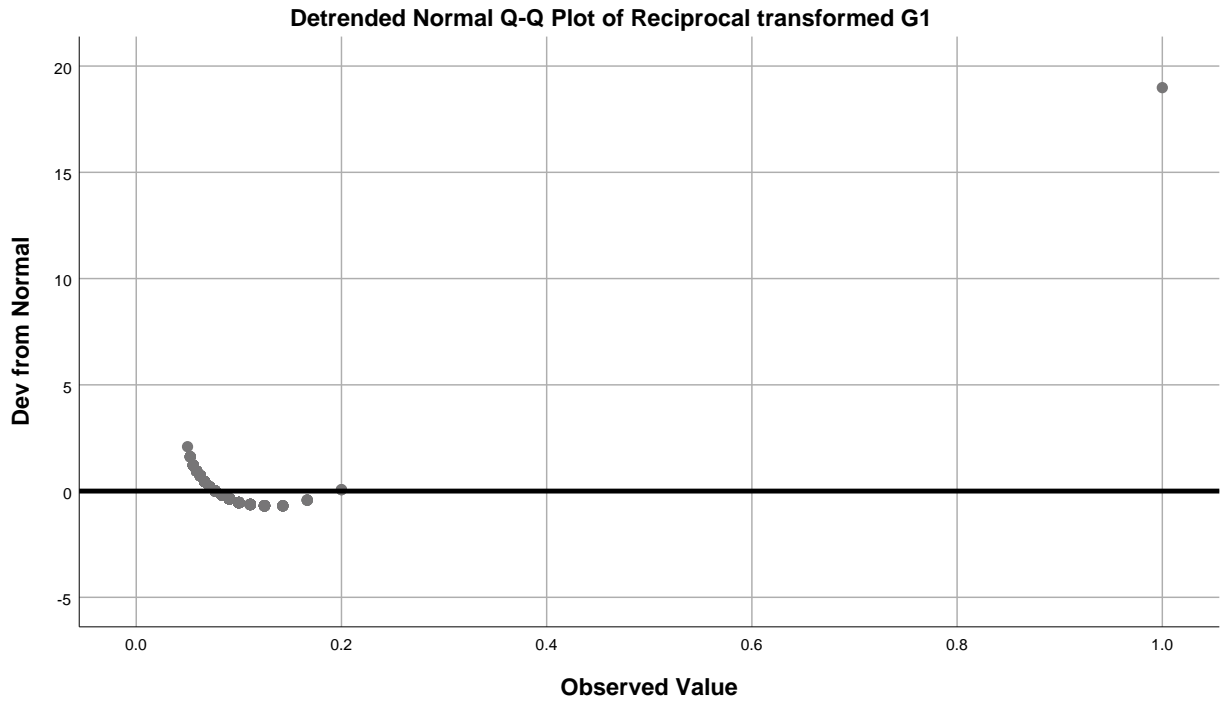


**Reciprocal transformed G1**

After reciprocal transformation  
Transformed variable shape

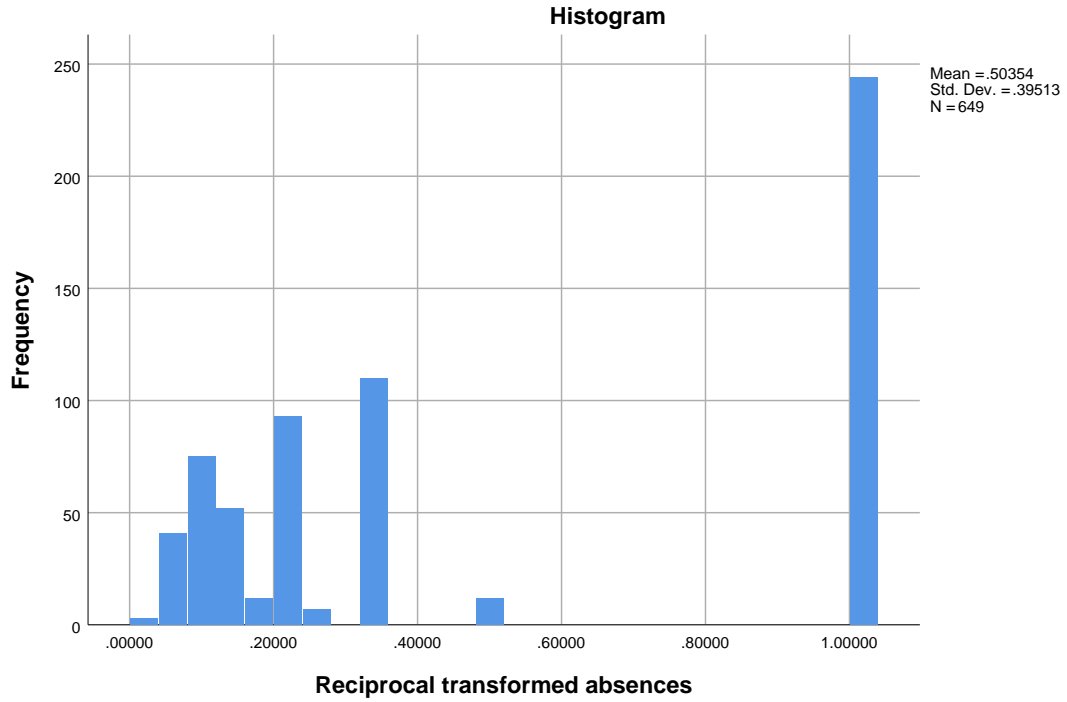


After reciprocal transformation  
Transformed variable shape

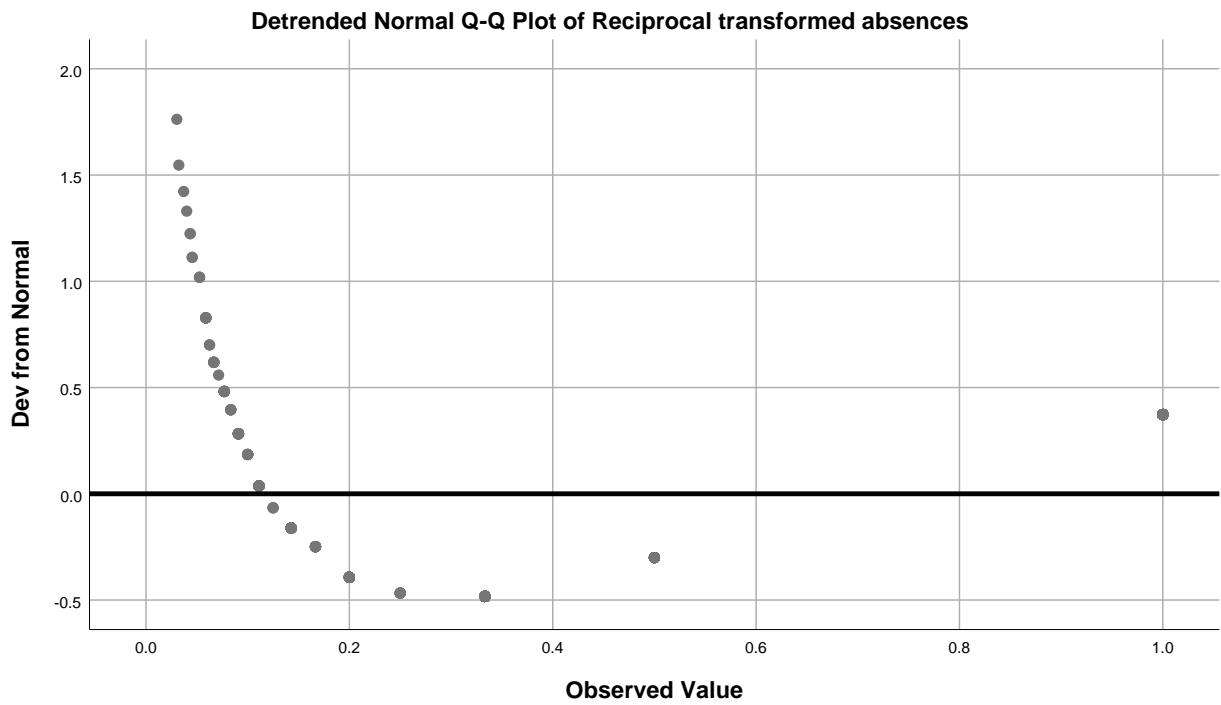
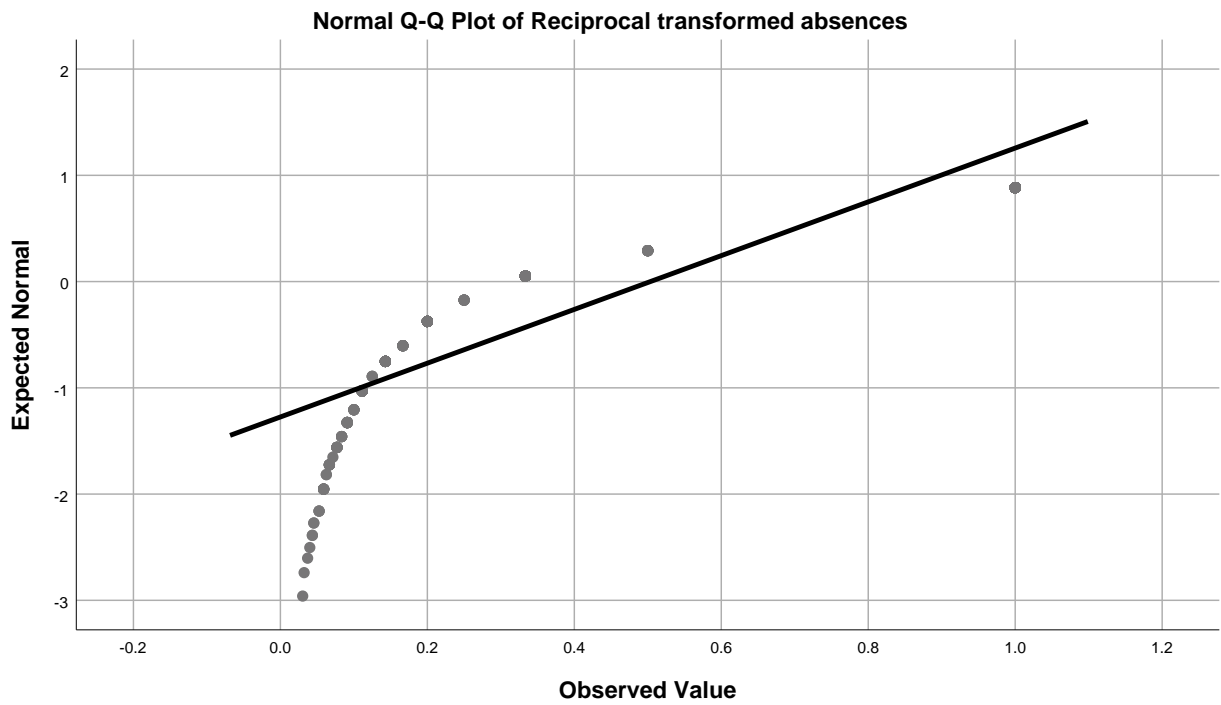


After reciprocal transformation  
Transformed variable shape

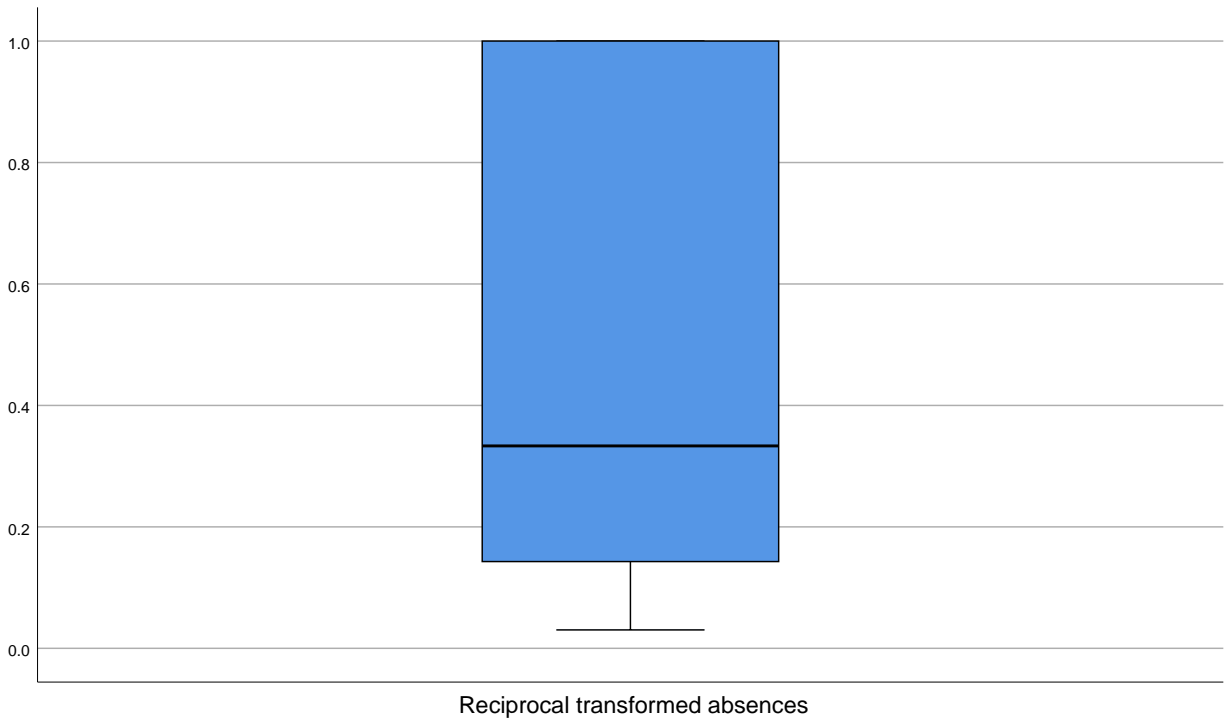
## Reciprocal transformed absences



After reciprocal transformation  
Transformed variable shape

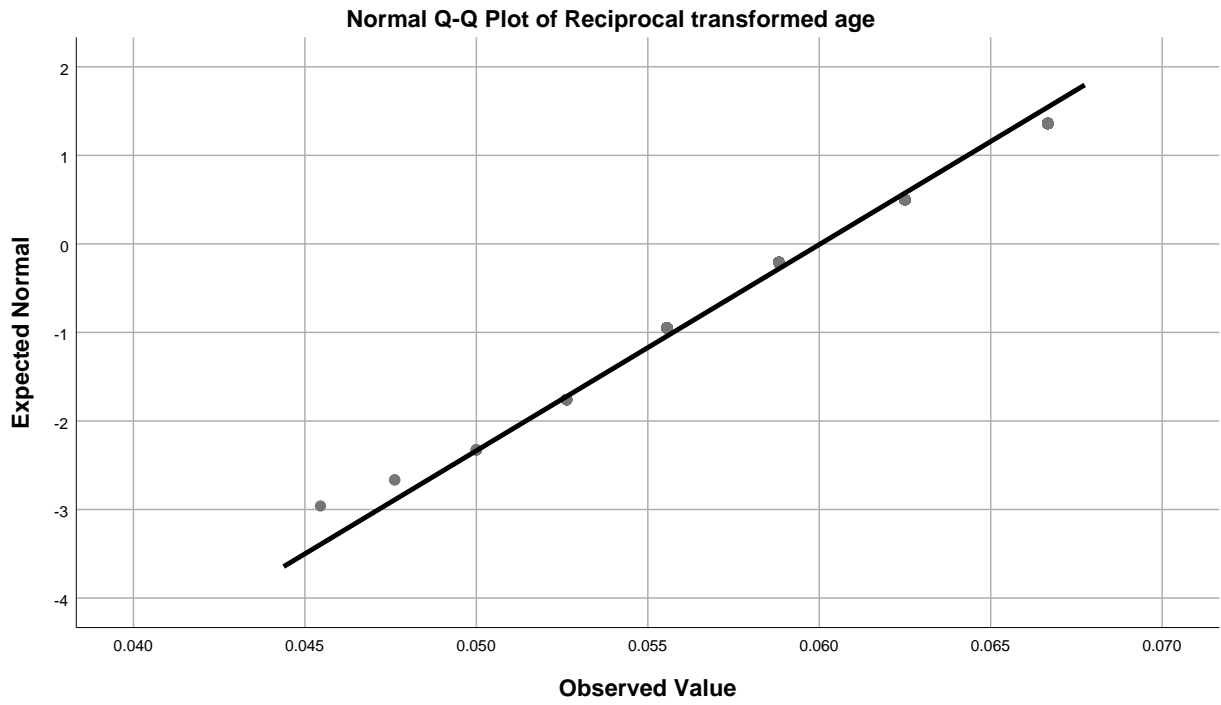
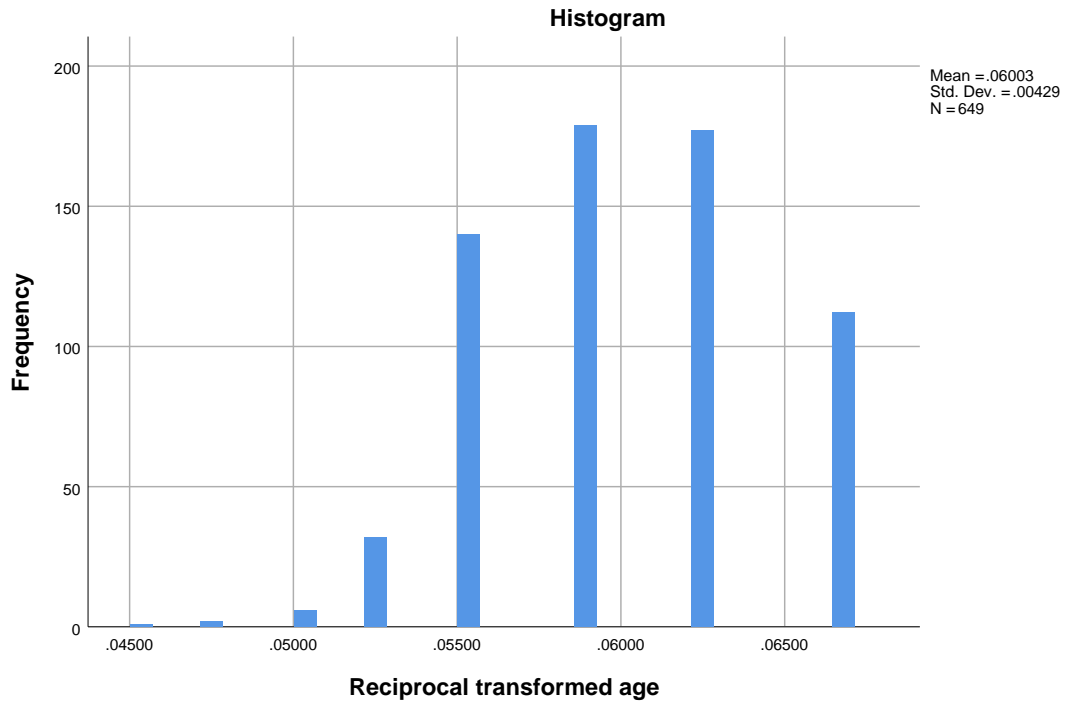


After reciprocal transformation  
Transformed variable shape

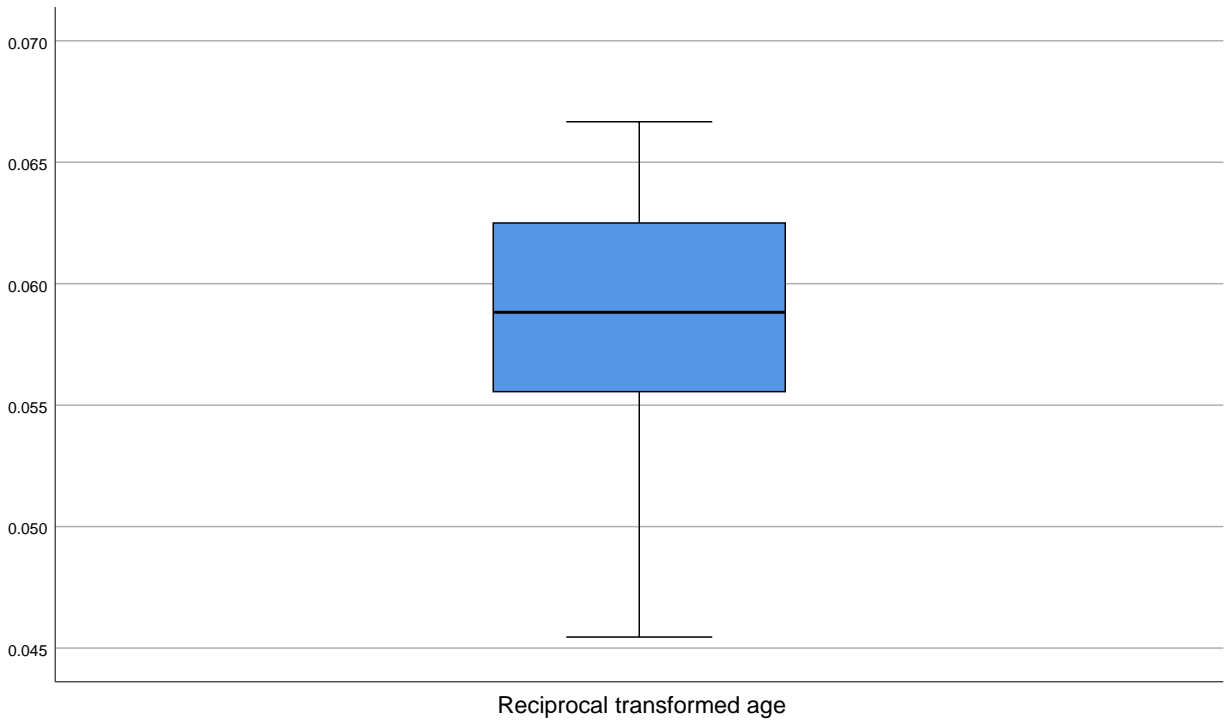


**Reciprocal transformed age**

After reciprocal transformation  
Transformed variable shape



After reciprocal transformation  
Transformed variable shape



Before and after descriptives

Before and after descriptives  
Skewness and kurtosis comparison

## Descriptives

### Descriptive Statistics

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Skewness Statistic
G3	649	0	19	11.91	3.231	-.913
reciprocal_G3	649	.05000	1.00000	.1009173	.14037017	6.128
G2	649	0	19	11.57	2.914	-.360
reciprocal_G2	649	.05000	1.00000	.0923674	.09661828	8.978
G1	649	0	19	11.40	2.745	-.003
reciprocal_G1	649	.05000	1.00000	.0862916	.04163694	16.516
absences	649	0	32	3.66	4.641	2.021
reciprocal_absences	649	.03030	1.00000	.5035447	.39513492	.377
age	649	15	22	16.74	1.218	.417
reciprocal_age	649	.04545	.06667	.0600328	.00429471	-.068
Valid N (listwise)	649					

### Descriptive Statistics

	Skewness	Kurtosis	
	Std. Error	Statistic	Std. Error
G3	.096	2.712	.192
reciprocal_G3	.096	36.413	.192
G2	.096	1.662	.192
reciprocal_G2	.096	81.900	.192
G1	.096	.037	.192
reciprocal_G1	.096	358.608	.192
absences	.096	5.781	.192
reciprocal_absences	.096	-1.710	.192
age	.096	.072	.192
reciprocal_age	.096	-.589	.192
Valid N (listwise)			

Relationship between original and transformed values

Relationship between original and transformed values  
Correlation

## Correlations

### Correlations

		G3	reciprocal_G3	G2	reciprocal_G2
G3	Pearson Correlation	1	-.668**	.919**	-.532**
	Sig. (2-tailed)		.000	.000	.000
	N	649	649	649	649
reciprocal_G3	Pearson Correlation	-.668**	1	-.502**	.713**
	Sig. (2-tailed)	.000		.000	.000
	N	649	649	649	649
G2	Pearson Correlation	.919**	-.502**	1	-.573**
	Sig. (2-tailed)	.000	.000		.000
	N	649	649	649	649
reciprocal_G2	Pearson Correlation	-.532**	.713**	-.573**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	649	649	649	649
G1	Pearson Correlation	.826**	-.338**	.865**	-.342**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	649	649	649	649
reciprocal_G1	Pearson Correlation	-.417**	.208**	-.424**	.214**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	649	649	649	649
absences	Pearson Correlation	-.091*	-.098*	-.125**	-.050
	Sig. (2-tailed)	.020	.013	.001	.203
	N	649	649	649	649
reciprocal_absences	Pearson Correlation	.050	.172**	.108**	.099*
	Sig. (2-tailed)	.206	.000	.006	.011
	N	649	649	649	649

Relationship between original and transformed values  
Correlation

**Correlations**

		G1	reciprocal_G1	absences	reciprocal_absences
G3	Pearson Correlation	.826**	-.417**	-.091*	.050
	Sig. (2-tailed)	.000	.000	.020	.206
	N	649	649	649	649
reciprocal_G3	Pearson Correlation	-.338**	.208**	-.098*	.172**
	Sig. (2-tailed)	.000	.000	.013	.000
	N	649	649	649	649
G2	Pearson Correlation	.865**	-.424**	-.125**	.108**
	Sig. (2-tailed)	.000	.000	.001	.006
	N	649	649	649	649
reciprocal_G2	Pearson Correlation	-.342**	.214**	-.050	.099*
	Sig. (2-tailed)	.000	.000	.203	.011
	N	649	649	649	649
G1	Pearson Correlation	1	-.613**	-.147**	.157**
	Sig. (2-tailed)		.000	.000	.000
	N	649	649	649	649
reciprocal_G1	Pearson Correlation	-.613**	1	.064	-.086*
	Sig. (2-tailed)	.000		.105	.029
	N	649	649	649	649
absences	Pearson Correlation	-.147**	.064	1	-.735**
	Sig. (2-tailed)	.000	.105		.000
	N	649	649	649	649
reciprocal_absences	Pearson Correlation	.157**	-.086*	-.735**	1
	Sig. (2-tailed)	.000	.029	.000	
	N	649	649	649	649

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Group context after transformation

Group context after transformation  
G3 and reciprocal\_G3 by sex

**Means**

**Case Processing Summary**

	Included		Cases Excluded		Total	
	N	Percent	N	Percent	N	Percent
	G3 * sex	649	100.0%	0	0.0%	649
reciprocal_G3 * sex	649	100.0%	0	0.0%	649	100.0%

**Report**

sex		G3	reciprocal_G3
F	N	383	383
	Mean	12.25	.0941205
	Std. Deviation	3.124	.12478915
	Variance	9.760	.016
M	N	266	266
	Mean	11.41	.1107036
	Std. Deviation	3.321	.15990861
	Variance	11.027	.026
Total	N	649	649
	Mean	11.91	.1009173
	Std. Deviation	3.231	.14037017
	Variance	10.437	.020