

Host

Notes

Output Created		12-JUL-2026 18:50:57
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression P Value\SPSS_Output\sav\regression_p_value_analysis_data_with_predictions.sav
	Active Dataset	RegressionPValueData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=["if not exist "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output" mkdir "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output""].
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.09

Host

Notes

Output Created		12-JUL-2026 18:50:57
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression P Value\SPSS_Output\sav\regression_p_value_analysis_data_with_predictions.sav
	Active Dataset	RegressionPValueData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=["if not exist "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sav" mkdir "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sav""].
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.07

Host

Notes

Output Created		12-JUL-2026 18:50:57
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression P Value\SPSS_Output\sav\regression_p_value_analysis_data_with_predictions.sav
	Active Dataset	RegressionPValueData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=["if not exist "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\spv" mkdir "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\spv""].
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.07

Host

Notes

Output Created		12-JUL-2026 18:50:57
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression P Value\SPSS_Output\sav\regression_p_value_analysis_data_with_predictions.sav
	Active Dataset	RegressionPValueData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=["if not exist "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\pdf " mkdir "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\pdf "].
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.07

Host

Notes

Output Created		12-JUL-2026 18:50:57
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression P Value\SPSS_Output\sav\r egression_p_value_analys is_data_with_predictions. sav
	Active Dataset	RegressionPValueData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=['del /Q "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sav v*.sav" 2>nul']. .
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.08

Host

Notes

Output Created		12-JUL-2026 18:50:57
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression P Value\SPSS_Output\sav\r egression_p_value_analys is_data_with_predictions. sav
	Active Dataset	RegressionPValueData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=['del /Q "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sp v*.spv" 2>nul']. .
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.21

Host

Notes

Output Created		12-JUL-2026 18:50:57
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression P Value\SPSS_Output\sav\r egression_p_value_analys is_data_with_predictions. sav
	Active Dataset	RegressionPValueData
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		HOST COMMAND=['del /Q "D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\pdf *.pdf" 2>nul']. .
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.09

Regression Residual Analysis

Regression Residual Analysis
Import dataset.csv

Regression Residual Analysis

Regression Residual Analysis

Descriptive statistics and correlations

Descriptives

Notes

Output Created		12-JUL-2026 18:50:58
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sav\regression_residual_analysis_data.sav
	Active Dataset	RegressionResidualAnalysisData
	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	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES= G3 G1 G2 studytime failures absences /STATISTICS=MEAN STDDEV MIN MAX SKEWNESS KURTOSIS.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01

[RegressionResidualAnalysisData] D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sav\regression_residual_analysis_data.sav

Regression Residual Analysis
Descriptive statistics and correlations

Descriptive Statistics

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Skewness Statistic
Final grade outcome	649	.00	19.00	11.9060	3.23066	-.913
First-period grade predictor	649	.00	19.00	11.3991	2.74527	-.003
Second-period grade predictor	649	.00	19.00	11.5701	2.91364	-.360
Weekly study-time predictor	649	1.00	4.00	1.9307	.82951	.700
Past class failures predictor	649	.00	3.00	.2219	.59324	3.093
School absences predictor	649	.00	32.00	3.6595	4.64076	2.021
Valid N (listwise)	649					

Descriptive Statistics

	Skewness	Kurtosis	
	Std. Error	Statistic	Std. Error
Final grade outcome	.096	2.712	.192
First-period grade predictor	.096	.037	.192
Second-period grade predictor	.096	1.662	.192
Weekly study-time predictor	.096	.038	.192
Past class failures predictor	.096	9.824	.192
School absences predictor	.096	5.781	.192
Valid N (listwise)			

Correlations

Regression Residual Analysis
Descriptive statistics and correlations

Notes

Output Created		12-JUL-2026 18:50:58
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	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 for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=G3 G1 G2 studytime failures absences /PRINT=TWOTAIL SIG /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.02

Regression Residual Analysis
Descriptive statistics and correlations

Correlations

		Final grade outcome	First-period grade predictor	Second-period grade predictor
Final grade outcome	Pearson Correlation	1	.826	.919
	Sig. (2-tailed)		.000	.000
	N	649	649	649
First-period grade predictor	Pearson Correlation	.826	1	.865
	Sig. (2-tailed)	.000		.000
	N	649	649	649
Second-period grade predictor	Pearson Correlation	.919	.865	1
	Sig. (2-tailed)	.000	.000	
	N	649	649	649
Weekly study-time predictor	Pearson Correlation	.250	.261	.240
	Sig. (2-tailed)	.000	.000	.000
	N	649	649	649
Past class failures predictor	Pearson Correlation	-.393	-.384	-.386
	Sig. (2-tailed)	.000	.000	.000
	N	649	649	649
School absences predictor	Pearson Correlation	-.091	-.147	-.125
	Sig. (2-tailed)	.020	.000	.001
	N	649	649	649

Regression Residual Analysis
Descriptive statistics and correlations

Correlations

		Weekly study- time predictor	Past class failures predictor	School absences predictor
Final grade outcome	Pearson Correlation	.250	-.393	-.091
	Sig. (2-tailed)	.000	.000	.020
	N	649	649	649
First-period grade predictor	Pearson Correlation	.261	-.384	-.147
	Sig. (2-tailed)	.000	.000	.000
	N	649	649	649
Second-period grade predictor	Pearson Correlation	.240	-.386	-.125
	Sig. (2-tailed)	.000	.000	.001
	N	649	649	649
Weekly study-time predictor	Pearson Correlation	1	-.147	-.118
	Sig. (2-tailed)		.000	.003
	N	649	649	649
Past class failures predictor	Pearson Correlation	-.147	1	.123
	Sig. (2-tailed)	.000		.002
	N	649	649	649
School absences predictor	Pearson Correlation	-.118	.123	1
	Sig. (2-tailed)	.003	.002	
	N	649	649	649

Regression Residual Analysis

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


Regression Residual Analysis
OLS model with residual, collinearity, and influence diagnos

Regression

Notes

Output Created		12-JUL-2026 18:50:58
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	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 cases with no missing values for any variable used.

Regression Residual Analysis
OLS model with residual, collinearity, and influence diagnos

Notes

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE CI(95) COLLIN TOL ZPP /CRITERIA=PIN(.05) POUT(.10) TOLERANCE(. 0001) /NOORIGIN /DEPENDENT G3 /METHOD=ENTER G1 G2 studytime failures absences /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT (ZRESID) OUTLIERS(3) /SAVE PRED(res_pred) RESID(res_raw) ZPRED(res_zpred) ZRESID(res_zresid) SRESID(res_sresid) COOK(res_cook)...
Resources	Processor Time	00:00:01.72
	Elapsed Time	00:00:02.26
	Memory Required	6048 bytes
	Additional Memory Required for Residual Plots	576 bytes
Variables Created or Modified	res_pred	Unstandardized Predicted Value
	res_raw	Unstandardized Residual
	res_zpred	Standardized Predicted Value
	res_zresid	Standardized Residual
	res_sresid	Studentized Residual
	res_cook	Cook's Distance
	res_lev	Centered Leverage Value

Regression Residual Analysis
OLS model with residual, collinearity, and influence diagnos

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	School absences predictor, Weekly study-time predictor, Past class failures predictor, Second-period grade predictor, First-period grade predictor ^b	.	Enter

a. Dependent Variable: Final grade outcome

b. All requested variables entered.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.922 ^a	.851	.849	1.25372	.851	731.966	5

Model Summary^b

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	643	.000	1.857

a. Predictors: (Constant), School absences predictor, Weekly study-time predictor, Past class failures predictor, Second-period grade predictor, First-period grade predictor

b. Dependent Variable: Final grade outcome

Regression Residual Analysis
OLS model with residual, collinearity, and influence diagnos

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5752.587	5	1150.517	731.966	.000 ^b
	Residual	1010.679	643	1.572		
	Total	6763.267	648			

a. Dependent Variable: Final grade outcome

b. Predictors: (Constant), School absences predictor, Weekly study-time predictor, Past class failures predictor, Second-period grade predictor, First-period grade predictor

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.155	.259		-.600	.549
	First-period grade predictor	.139	.036	.119	3.849	.000
	Second-period grade predictor	.886	.034	.799	26.107	.000
	Weekly study-time predictor	.097	.062	.025	1.564	.118
	Past class failures predictor	-.218	.091	-.040	-2.402	.017
	School absences predictor	.023	.011	.034	2.165	.031

Regression Residual Analysis
OLS model with residual, collinearity, and influence diagnos

Coefficients^a

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	-.663	.353			
	First-period grade predictor	.068	.211	.826	.150	.059
	Second-period grade predictor	.819	.952	.919	.717	.398
	Weekly study-time predictor	-.025	.218	.250	.062	.024
	Past class failures predictor	-.397	-.040	-.393	-.094	-.037
	School absences predictor	.002	.045	-.091	.085	.033

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	First-period grade predictor	.245	4.078
	Second-period grade predictor	.248	4.028
	Weekly study-time predictor	.923	1.084
	Past class failures predictor	.835	1.198
	School absences predictor	.967	1.034

a. Dependent Variable: Final grade outcome

Regression Residual Analysis
OLS model with residual, collinearity, and influence diagnos

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	(Constant)	Variance Proportions	
					First-period grade predictor	Second-period grade predictor
1	1	4.371	1.000	.00	.00	.00
	2	.920	2.180	.00	.00	.00
	3	.562	2.788	.00	.00	.00
	4	.112	6.250	.01	.01	.02
	5	.027	12.747	.97	.05	.09
	6	.008	23.890	.01	.94	.90

Collinearity Diagnostics^a

Model	Dimension	Variance Proportions		
		Weekly study-time predictor	Past class failures predictor	School absences predictor
1	1	.01	.01	.02
	2	.00	.69	.03
	3	.01	.12	.88
	4	.95	.00	.02
	5	.03	.18	.05
	6	.00	.00	.00

a. Dependent Variable: Final grade outcome

Regression Residual Analysis
OLS model with residual, collinearity, and influence diagnos

Casewise Diagnostics^a

Case Number	Std. Residual	Final grade outcome	Predicted Value	Residual
62	4.632	16.00	10.1932	5.80683
164	-7.187	.00	9.0103	-9.01034
173	-7.236	1.00	10.0716	-9.07158
520	-5.866	.00	7.3538	-7.35383
584	-4.908	.00	6.1531	-6.15313
587	-6.572	.00	8.2395	-8.23954
627	-4.341	.00	5.4430	-5.44295
638	-5.677	.00	7.1177	-7.11767
640	-5.987	.00	7.5062	-7.50618
641	-5.503	.00	6.8994	-6.89938

a. Dependent Variable: Final grade outcome

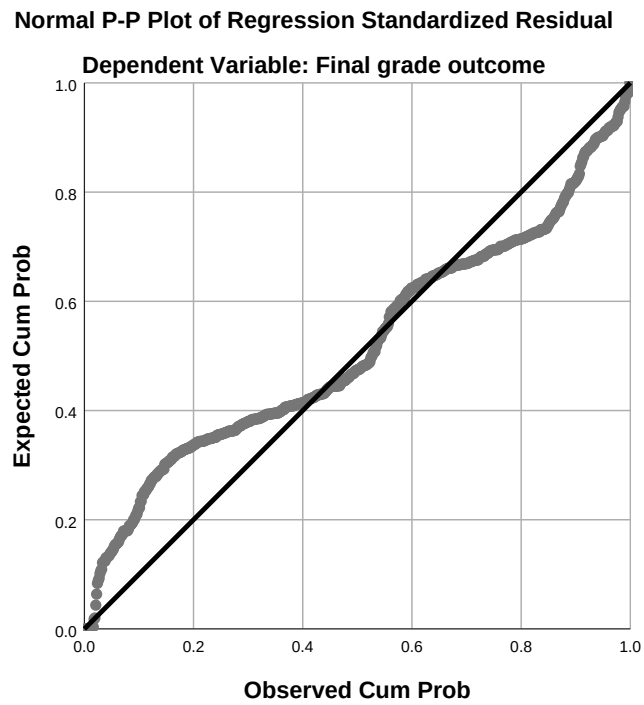
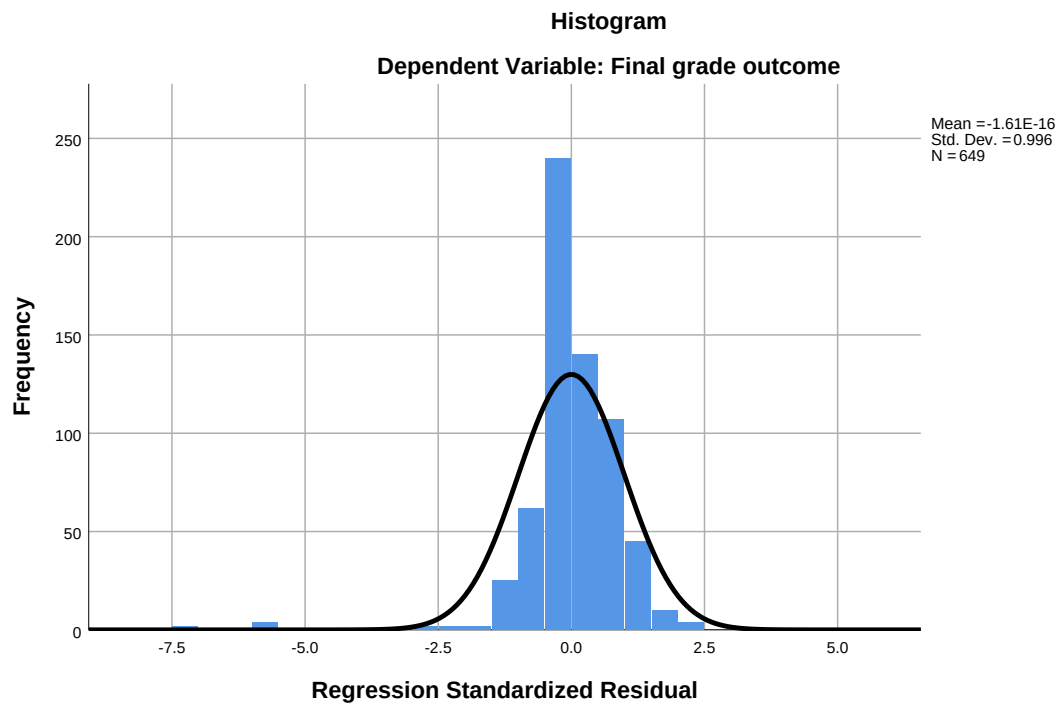
Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.2810	19.5703	11.9060	2.97950	649
Std. Predicted Value	-3.902	2.572	.000	1.000	649
Standard Error of Predicted Value	.055	.403	.112	.045	649
Adjusted Predicted Value	.2902	19.5811	11.9068	2.97857	649
Residual	-9.07158	5.80683	.00000	1.24888	649
Std. Residual	-7.236	4.632	.000	.996	649
Stud. Residual	-7.269	4.645	.000	1.002	649
Deleted Residual	-9.21790	5.83977	-.00082	1.26311	649
Stud. Deleted Residual	-7.582	4.721	-.003	1.019	649
Mahal. Distance	.254	65.933	4.992	6.273	649
Cook's Distance	.000	.203	.002	.011	649
Centered Leverage Value	.000	.102	.008	.010	649

a. Dependent Variable: Final grade outcome

Charts

Regression Residual Analysis
OLS model with residual, collinearity, and influence diagnos



Regression Residual Analysis

Regression Residual Analysis
Residual distribution and unusual cases

Explore

Notes

Output Created		12-JUL-2026 18:51:00
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	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 for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax		EXAMINE VARIABLES= res_raw res_zresid res_sresid /PLOT BOXPLOT HISTOGRAM NPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES EXTREME /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:03.42
	Elapsed Time	00:00:03.61

Regression Residual Analysis
Residual distribution and unusual cases

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Unstandardized Residual	649	100.0%	0	0.0%	649	100.0%
Standardized Residual	649	100.0%	0	0.0%	649	100.0%
Studentized Residual	649	100.0%	0	0.0%	649	100.0%

Descriptives

		Statistic	Std. Error
Unstandardized Residual	Mean	.0000000	.04902266
	95% Confidence Interval for Mean	Lower Bound	-.0962624
		Upper Bound	.0962624
	5% Trimmed Mean	.0694870	
	Median	-.0796204	
	Variance	1.560	
	Std. Deviation	1.24887559	
	Minimum	-9.07158	
	Maximum	5.80683	
	Range	14.87841	
	Interquartile Range	1.09849	
	Skewness	-2.844	.096
	Kurtosis	18.545	.192
Standardized Residual	Mean	.0000000	.03910170
	95% Confidence Interval for Mean	Lower Bound	-.0767813
		Upper Bound	.0767813
	5% Trimmed Mean	.0554246	
	Median	-.0635072	
	Variance	.992	
	Std. Deviation	.99613450	
	Minimum	-7.23572	
	Maximum	4.63167	
	Range	11.86739	
	Interquartile Range	.87619	

Regression Residual Analysis
Residual distribution and unusual cases

Descriptives

		Statistic	Std. Error
	Skewness	-2.844	.096
	Kurtosis	18.545	.192
Studentized Residual	Mean	-.0003262	.03932305
	95% Confidence Interval for Mean	Lower Bound	-.0775421
		Upper Bound	.0768898
	5% Trimmed Mean	.0555478	
	Median	-.0637304	
	Variance	1.004	
	Std. Deviation	1.00177357	
	Minimum	-7.26918	
	Maximum	4.64479	
	Range	11.91397	
	Interquartile Range	.87815	
	Skewness	-2.849	.096
	Kurtosis	18.567	.192

Regression Residual Analysis
Residual distribution and unusual cases

Extreme Values

			Case Number	Value
Unstandardized Residual	Highest	1	62	5.80683
		2	308	2.68496
		3	355	2.61307
		4	390	2.59584
		5	359	2.56957
	Lowest	1	173	-9.07158
		2	164	-9.01034
		3	587	-8.23954
		4	640	-7.50618
		5	520	-7.35383
Standardized Residual	Highest	1	62	4.63167
		2	308	2.14160
		3	355	2.08425
		4	390	2.07051
		5	359	2.04955
	Lowest	1	173	-7.23572
		2	164	-7.18687
		3	587	-6.57206
		4	640	-5.98711
		5	520	-5.86560
Studentized Residual	Highest	1	62	4.64479
		2	308	2.14473
		3	355	2.08626
		4	390	2.07571
		5	359	2.05513
	Lowest	1	164	-7.26918
		2	173	-7.25643
		3	587	-6.59490
		4	640	-6.03948
		5	520	-5.89075

Regression Residual Analysis

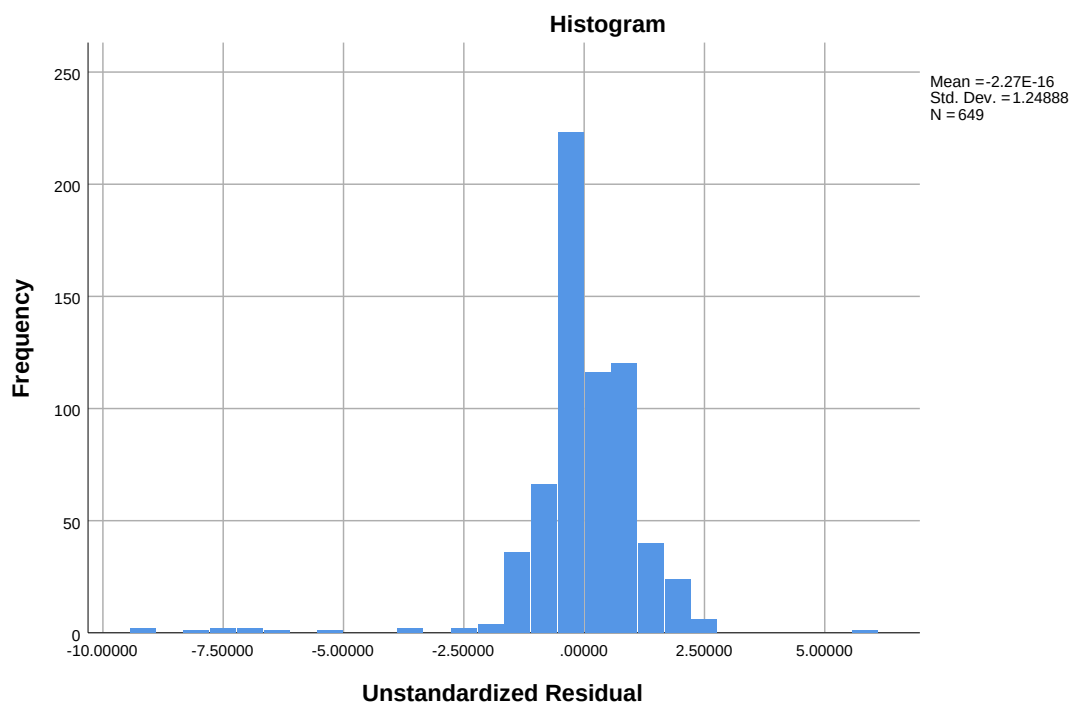
Residual distribution and unusual cases

Tests of Normality

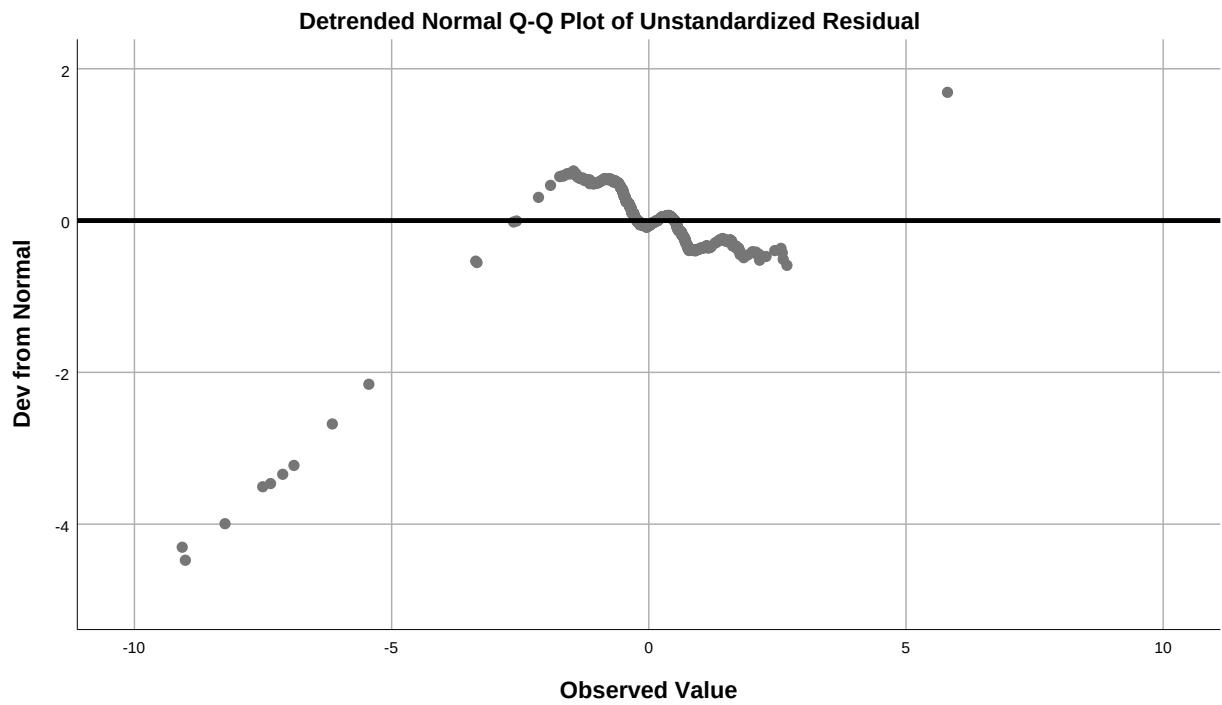
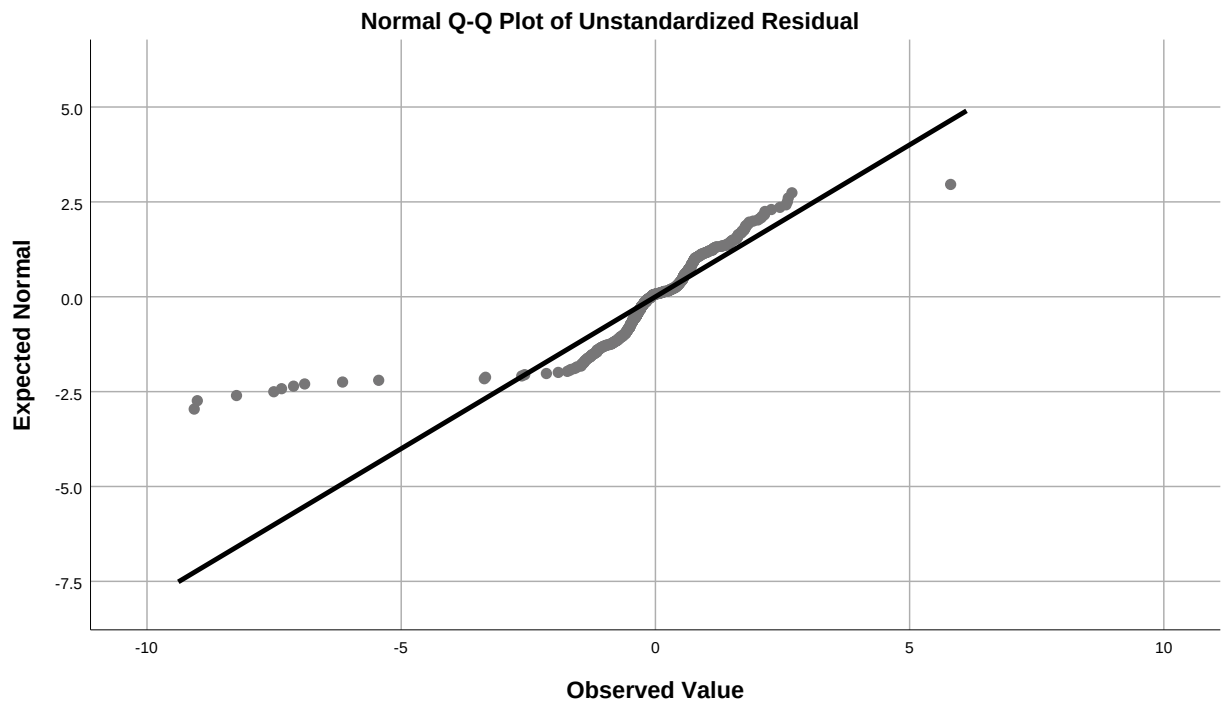
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Unstandardized Residual	.154	649	.000	.757	649	.000
Standardized Residual	.154	649	.000	.757	649	.000
Studentized Residual	.154	649	.000	.756	649	.000

a. Lilliefors Significance Correction

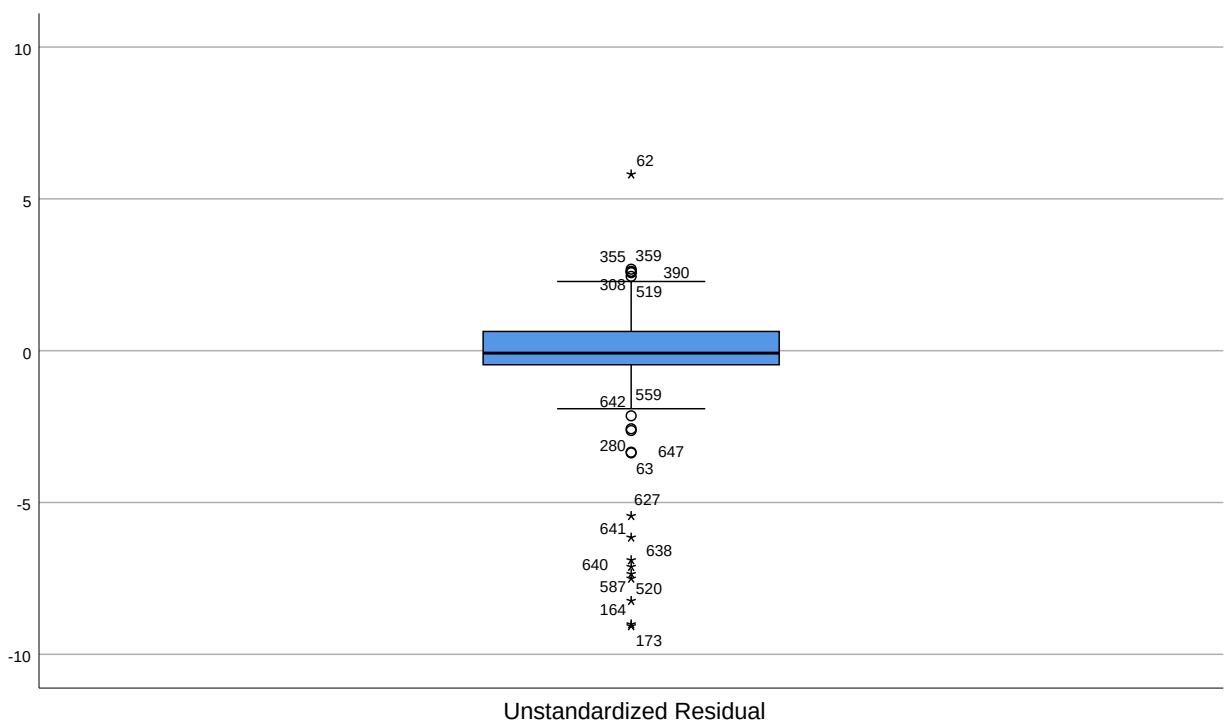
Unstandardized Residual



Regression Residual Analysis
Residual distribution and unusual cases

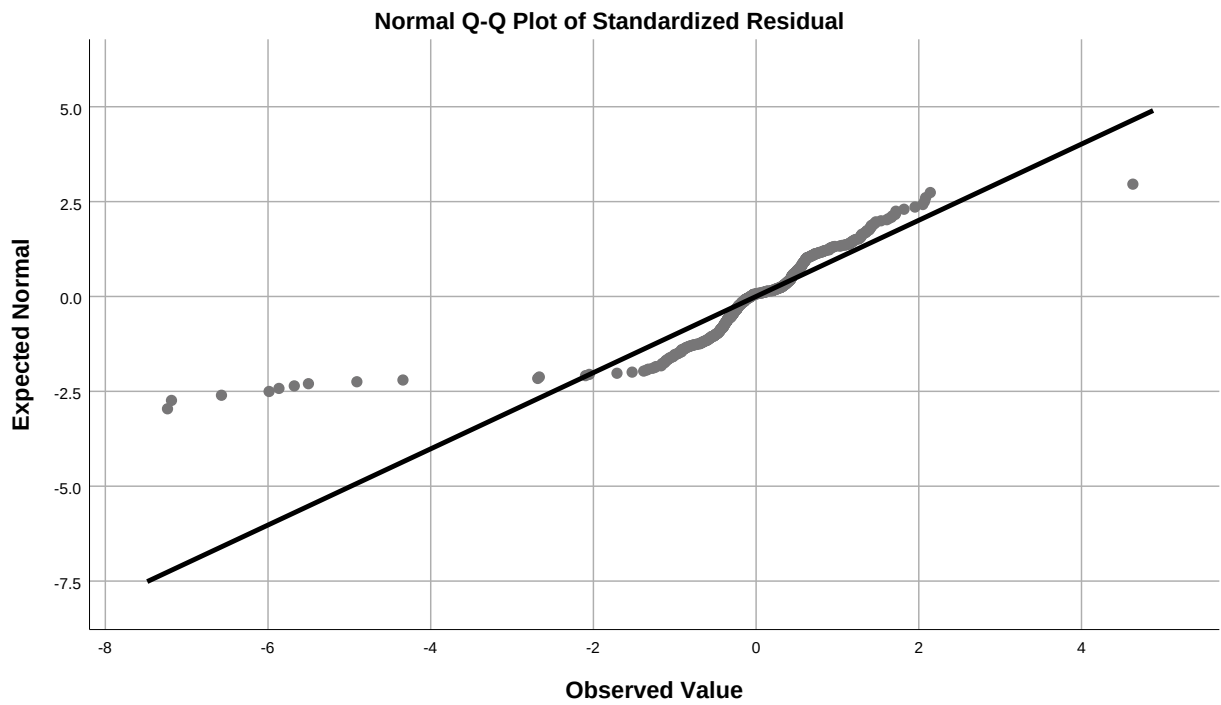
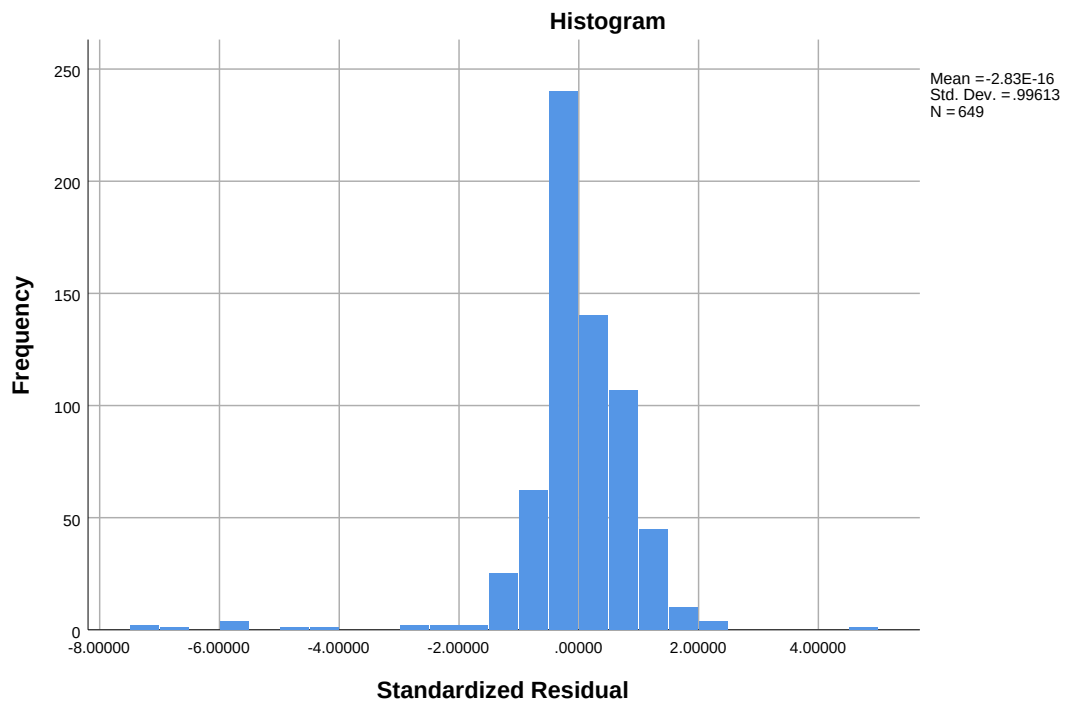


Regression Residual Analysis
Residual distribution and unusual cases

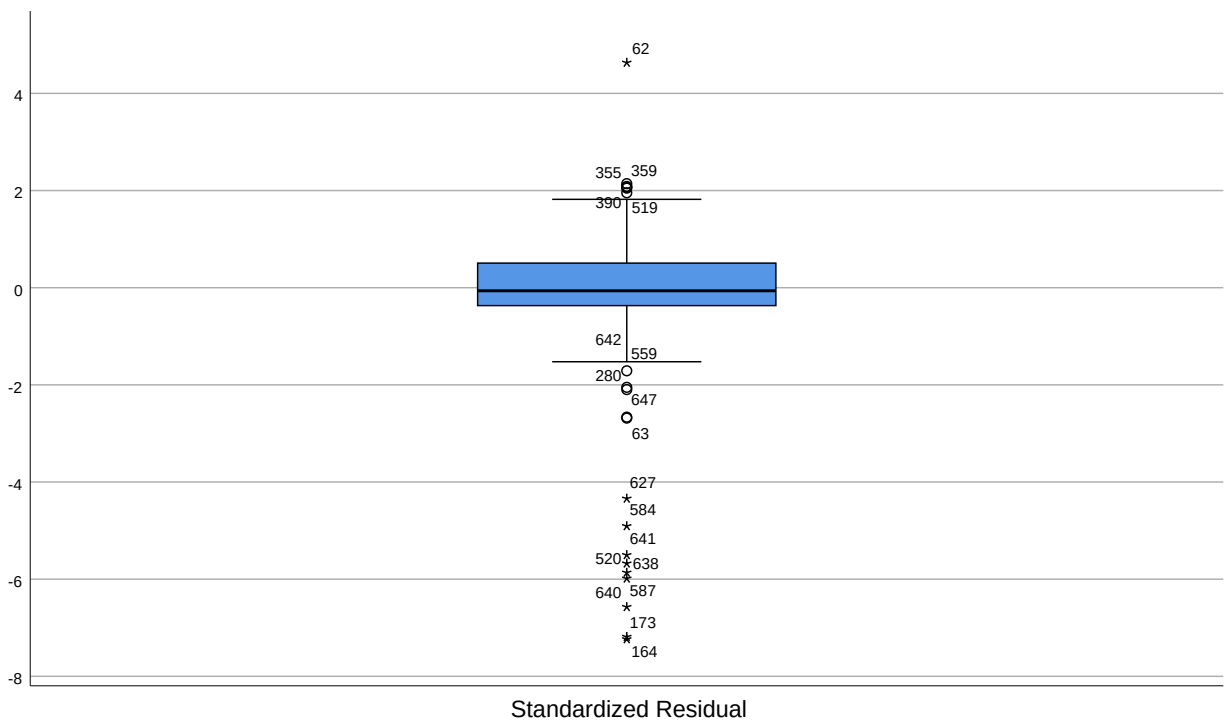
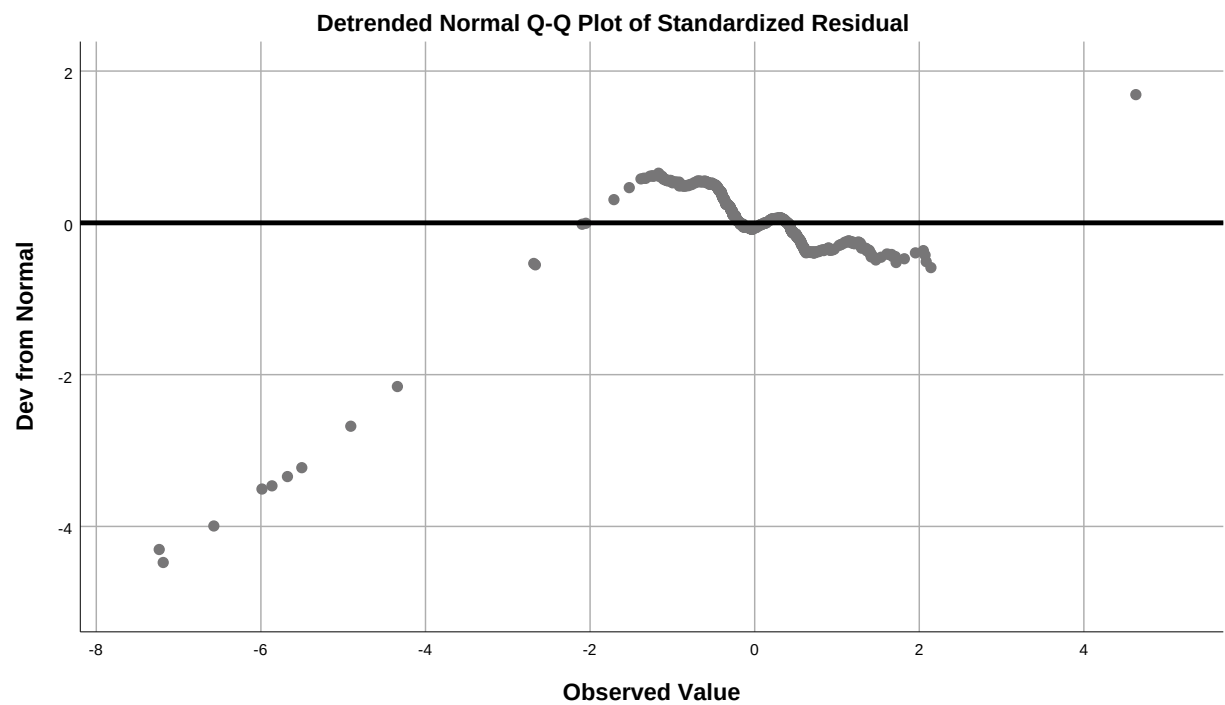


Standardized Residual

Regression Residual Analysis
Residual distribution and unusual cases

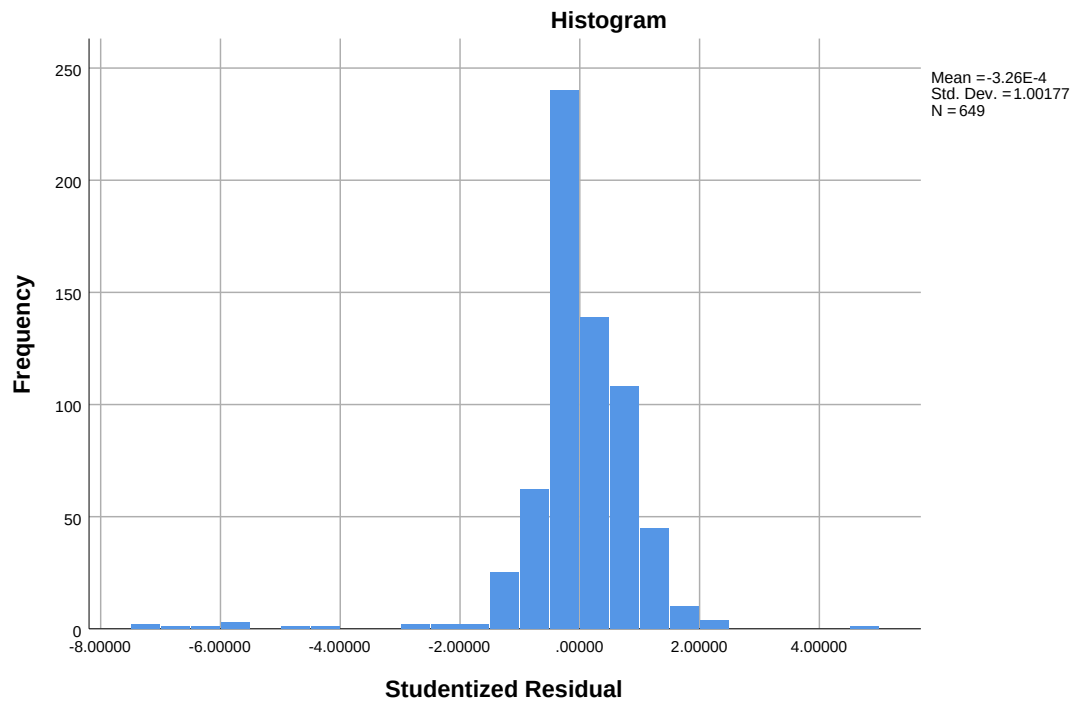


Regression Residual Analysis
Residual distribution and unusual cases

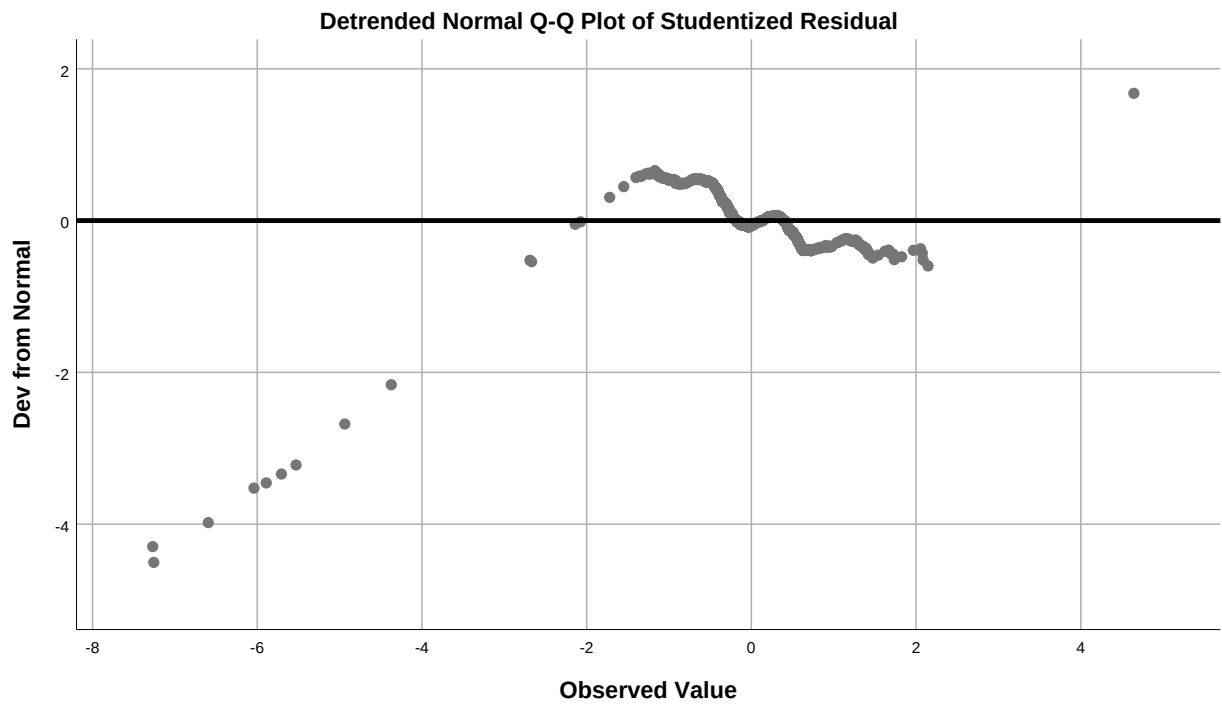
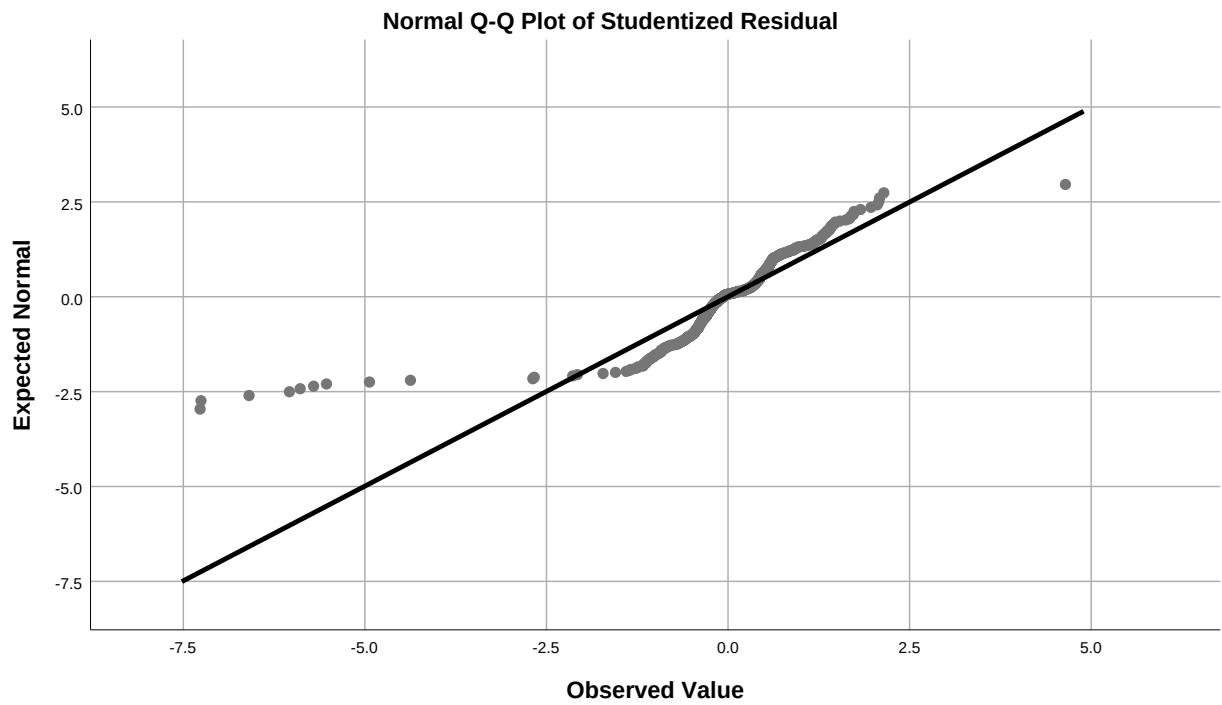


Regression Residual Analysis
Residual distribution and unusual cases

Studentized Residual

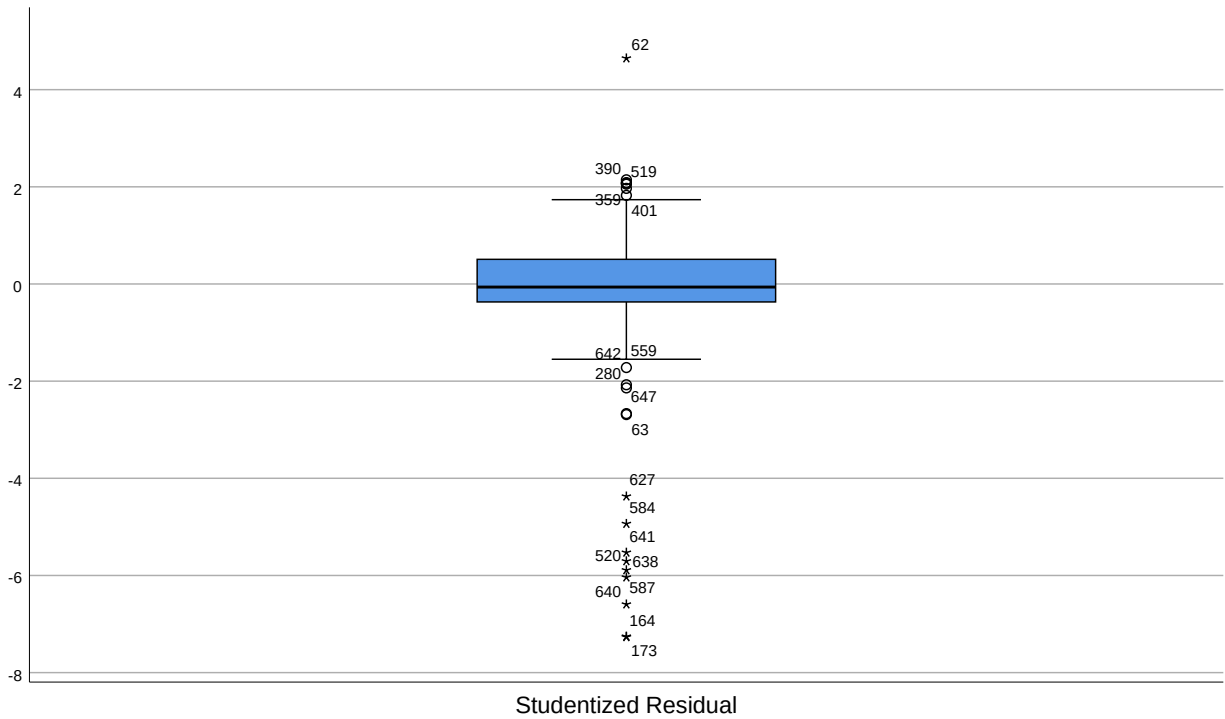


Regression Residual Analysis
Residual distribution and unusual cases



Regression Residual Analysis

Residual distribution and unusual cases



Regression Residual Analysis

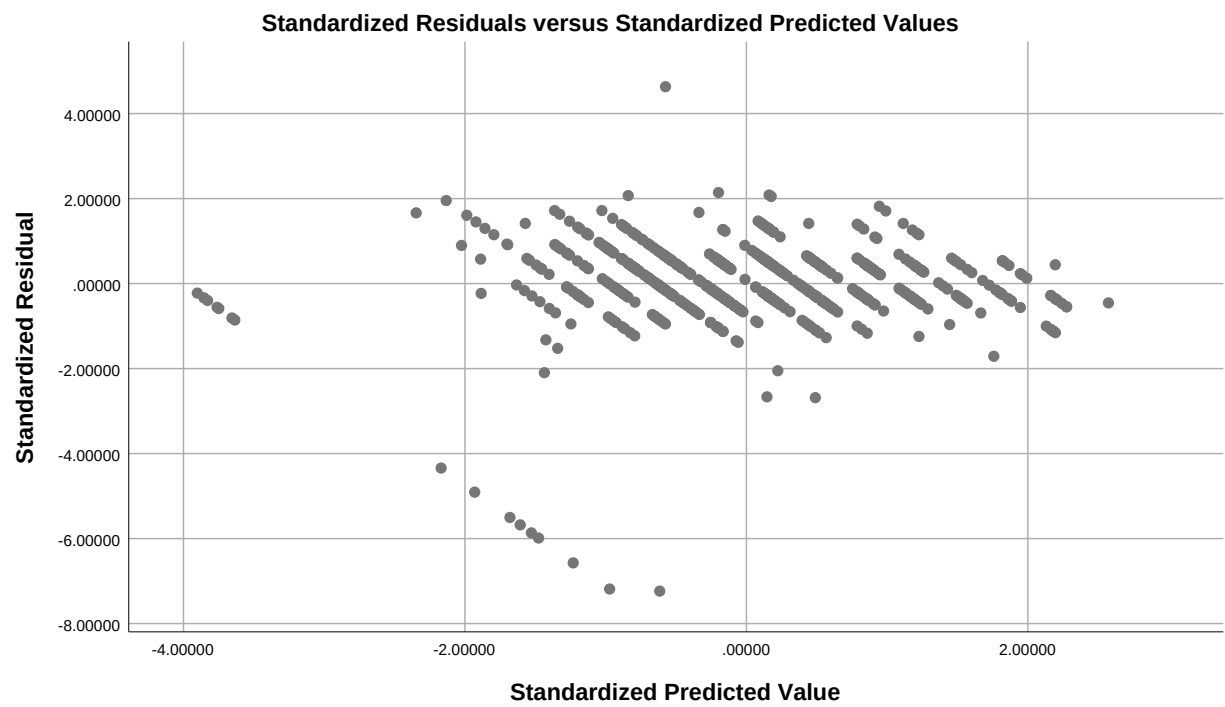
Regression Residual Analysis Residual and influence charts

Graph

Notes

Output Created		12-JUL-2026 18:51:04
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Syntax		GRAPH /SCATTERPLOT(BIVAR) =res_zpred WITH res_zresid /TITLE='Standardized Residuals versus Standardized Predicted Values' /MISSING=LISTWISE.
Resources	Processor Time	00:00:00.30
	Elapsed Time	00:00:00.27

Regression Residual Analysis
Residual and influence charts



Graph

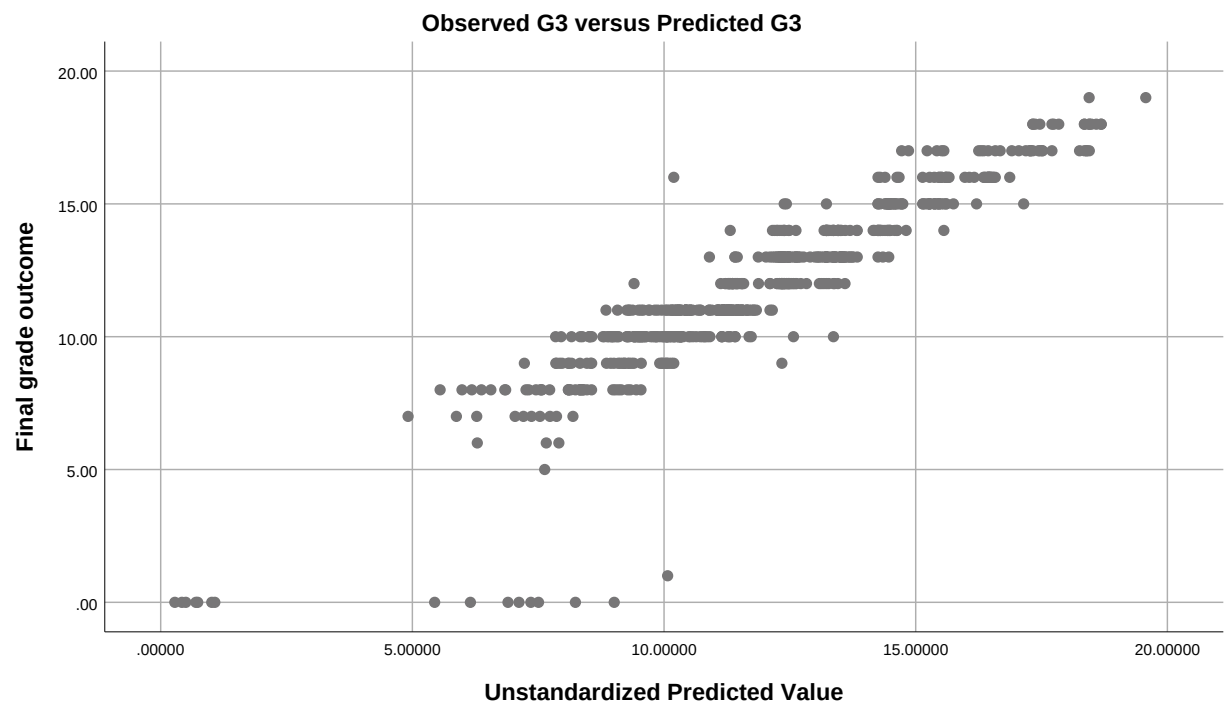
Regression Residual Analysis

Residual and influence charts

Notes

Output Created		12-JUL-2026 18:51:04
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Syntax		GRAPH /SCATTERPLOT(BIVAR) =res_pred WITH G3 /TITLE='Observed G3 versus Predicted G3' /MISSING=LISTWISE.
Resources	Processor Time	00:00:00.23
	Elapsed Time	00:00:00.22

Regression Residual Analysis
Residual and influence charts



Graph

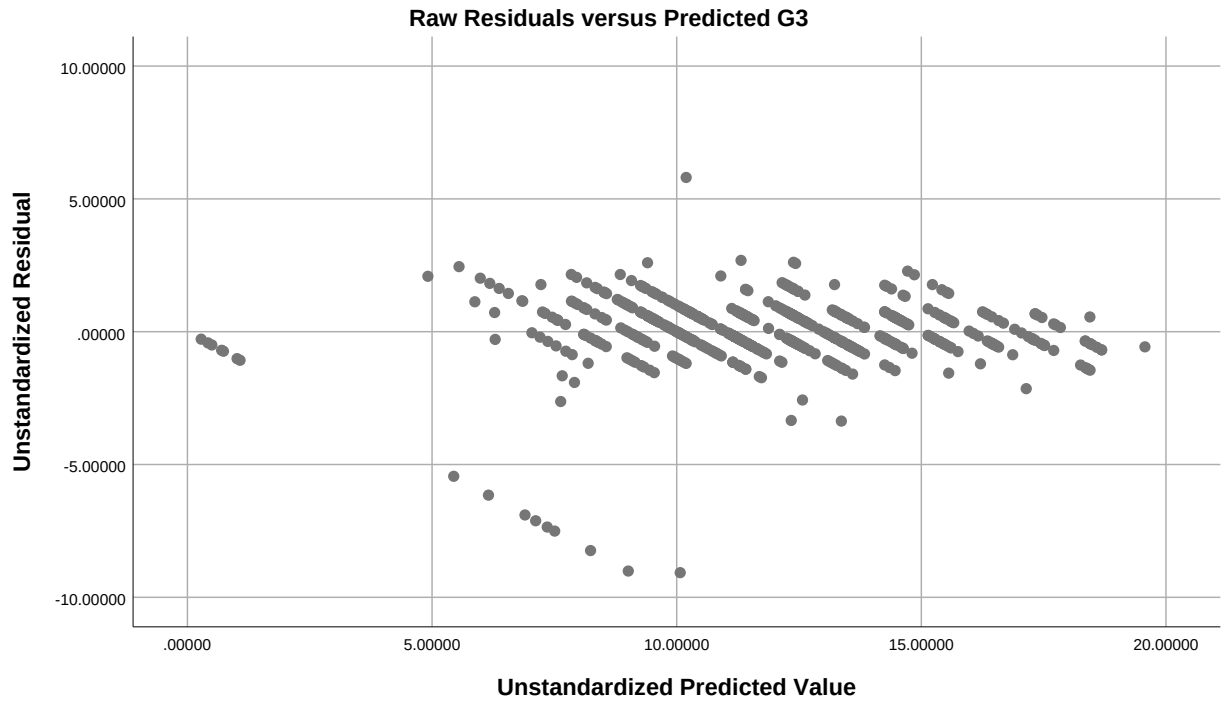
Regression Residual Analysis

Residual and influence charts

Notes

Output Created		12-JUL-2026 18:51:04
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Syntax		GRAPH /SCATTERPLOT(BIVAR) =res_pred WITH res_raw /TITLE='Raw Residuals versus Predicted G3' /MISSING=LISTWISE.
Resources	Processor Time	00:00:00.20
	Elapsed Time	00:00:00.23

Regression Residual Analysis
Residual and influence charts



Graph

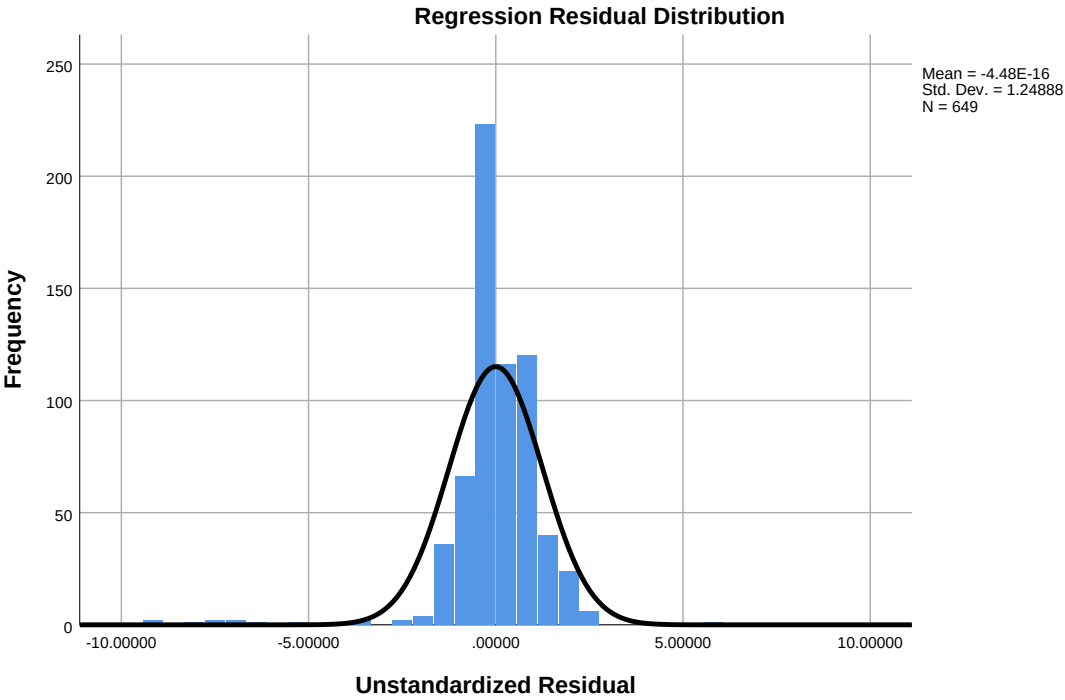
Regression Residual Analysis

Residual and influence charts

Notes

Output Created		12-JUL-2026 18:51:05
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Syntax		GRAPH /HISTOGRAM(NORMAL) =res_raw /TITLE='Regression Residual Distribution'.
Resources	Processor Time	00:00:00.56
	Elapsed Time	00:00:00.66

Regression Residual Analysis
Residual and influence charts



Regression Residual Analysis

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

Regression Residual Analysis
Breusch-Pagan-style auxiliary regression of squared residual

Regression

Notes

Output Created		12-JUL-2026 18:51:05
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	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 cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF R ANOVA CI(95) /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT res_sq /METHOD=ENTER G1 G2 studytime failures absences.
Resources	Processor Time	00:00:00.08
	Elapsed Time	00:00:00.06
	Memory Required	6336 bytes
	Additional Memory Required for Residual Plots	0 bytes

Regression Residual Analysis
Breusch-Pagan-style auxiliary regression of squared residual

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	School absences predictor, Weekly study-time predictor, Past class failures predictor, Second-period grade predictor, First-period grade predictor ^b	.	Enter

a. Dependent Variable: Squared OLS residual for heteroscedasticity auxiliary regression

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.215 ^a	.046	.039	6.89933034

a. Predictors: (Constant), School absences predictor, Weekly study-time predictor, Past class failures predictor, Second-period grade predictor, First-period grade predictor

Regression Residual Analysis
Breusch-Pagan-style auxiliary regression of squared residual

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1490.081	5	298.016	6.261	.000 ^b
	Residual	30607.288	643	47.601		
	Total	32097.369	648			

a. Dependent Variable: Squared OLS residual for heteroscedasticity auxiliary regression

b. Predictors: (Constant), School absences predictor, Weekly study-time predictor, Past class failures predictor, Second-period grade predictor, First-period grade predictor

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.836	1.423		4.803	.000
	First-period grade predictor	-.098	.199	-.038	-.491	.624
	Second-period grade predictor	-.254	.187	-.105	-1.362	.174
	Weekly study-time predictor	-.390	.340	-.046	-1.148	.251
	Past class failures predictor	.901	.500	.076	1.802	.072
	School absences predictor	-.182	.059	-.120	-3.064	.002

Regression Residual Analysis
Breusch-Pagan-style auxiliary regression of squared residual

Coefficients^a

Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	4.041	9.631
	First-period grade predictor	-.489	.294
	Second-period grade predictor	-.621	.112
	Weekly study-time predictor	-1.058	.277
	Past class failures predictor	-.081	1.883
	School absences predictor	-.299	-.065

a. Dependent Variable: Squared OLS residual for heteroscedasticity auxiliary regression

Regression Residual Analysis

Regression Residual Analysis
Influence thresholds and flagged cases

Frequencies

Notes		
Output Created		12-JUL-2026 18:51:06
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	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.
Syntax		FREQUENCIES VARIABLES= residual_outlier_flag residual_review_flag high_leverage_flag high_cooks_flag any_residual_flag /ORDER=ANALYSIS.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02

Regression Residual Analysis
Influence thresholds and flagged cases

Statistics

		1 when absolute studentized residual exceeds 3	1 when absolute studentized residual exceeds 2	1 when leverage exceeds threshold	1 when Cook distance exceeds threshold	1 when at least one residual or influence rule is flagged
N	Valid	649	649	649	649	649
	Missing	0	0	0	0	0

Frequency Table

1 when absolute studentized residual exceeds 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not flagged	639	98.5	98.5	98.5
	Flagged	10	1.5	1.5	100.0
	Total	649	100.0	100.0	

1 when absolute studentized residual exceeds 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not flagged	631	97.2	97.2	97.2
	Flagged	18	2.8	2.8	100.0
	Total	649	100.0	100.0	

1 when leverage exceeds threshold

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not flagged	612	94.3	94.3	94.3
	Flagged	37	5.7	5.7	100.0
	Total	649	100.0	100.0	

Regression Residual Analysis
Influence thresholds and flagged cases

1 when Cook distance exceeds threshold

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not flagged	620	95.5	95.5	95.5
	Flagged	29	4.5	4.5	100.0
	Total	649	100.0	100.0	

1 when at least one residual or influence rule is flagged

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not flagged	590	90.9	90.9	90.9
	Flagged	59	9.1	9.1	100.0
	Total	649	100.0	100.0	

Descriptives

Notes

Output Created		12-JUL-2026 18:51:06
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	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	All non-missing data are used.

Regression Residual Analysis

Influence thresholds and flagged cases

Notes

Syntax		DESCRIPTIVES VARIABLES= res_raw res_zresid res_sresid res_lev res_cook /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Unstandardized Residual	649	-9.07158	5.80683	.0000000	1.24887559
Standardized Residual	649	-7.23572	4.63167	.0000000	.99613450
Studentized Residual	649	-7.26918	4.64479	-.0003262	1.00177357
Centered Leverage Value	649	.000393	.101748	.00770416	.009679916
Cook's Distance	649	.000000	.202878	.00191028	.010539850
Valid N (listwise)	649				

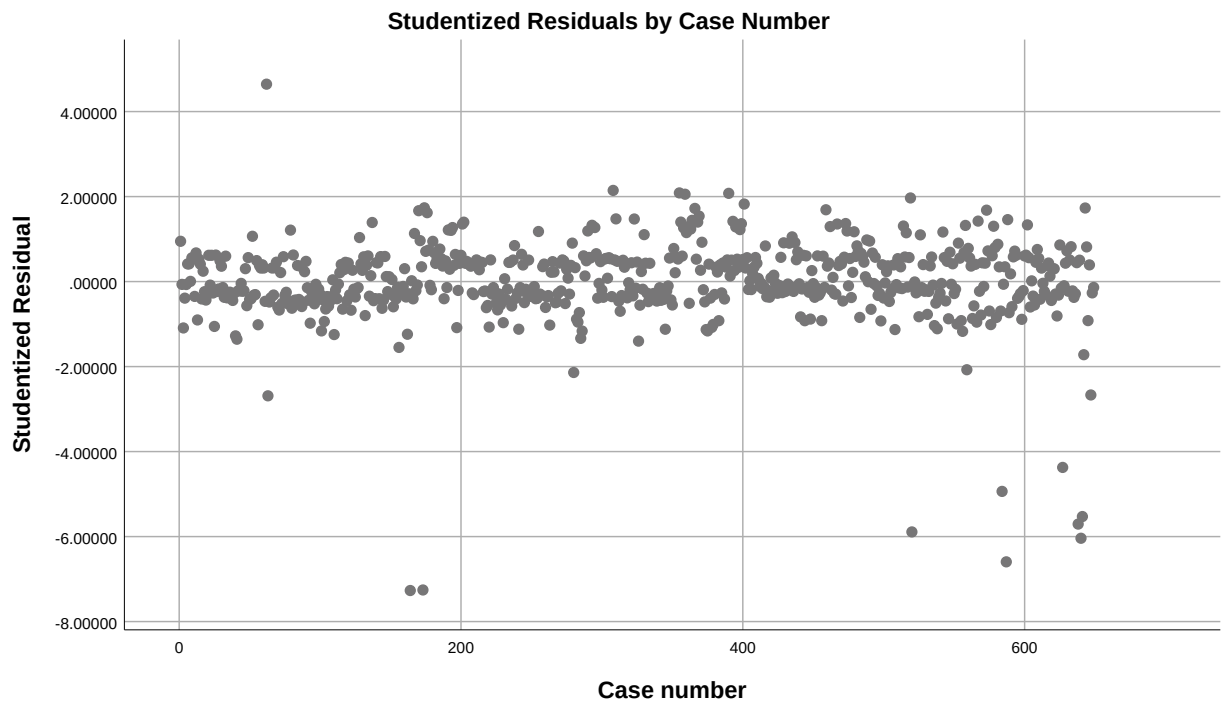
Graph

Regression Residual Analysis
Influence thresholds and flagged cases

Notes

Output Created		12-JUL-2026 18:51:06
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Syntax		GRAPH /SCATTERPLOT(BIVAR) =case_number WITH res_sresid /TITLE='Studentized Residuals by Case Number' /MISSING=LISTWISE.
Resources	Processor Time	00:00:00.50
	Elapsed Time	00:00:00.54

Regression Residual Analysis
Influence thresholds and flagged cases



Graph

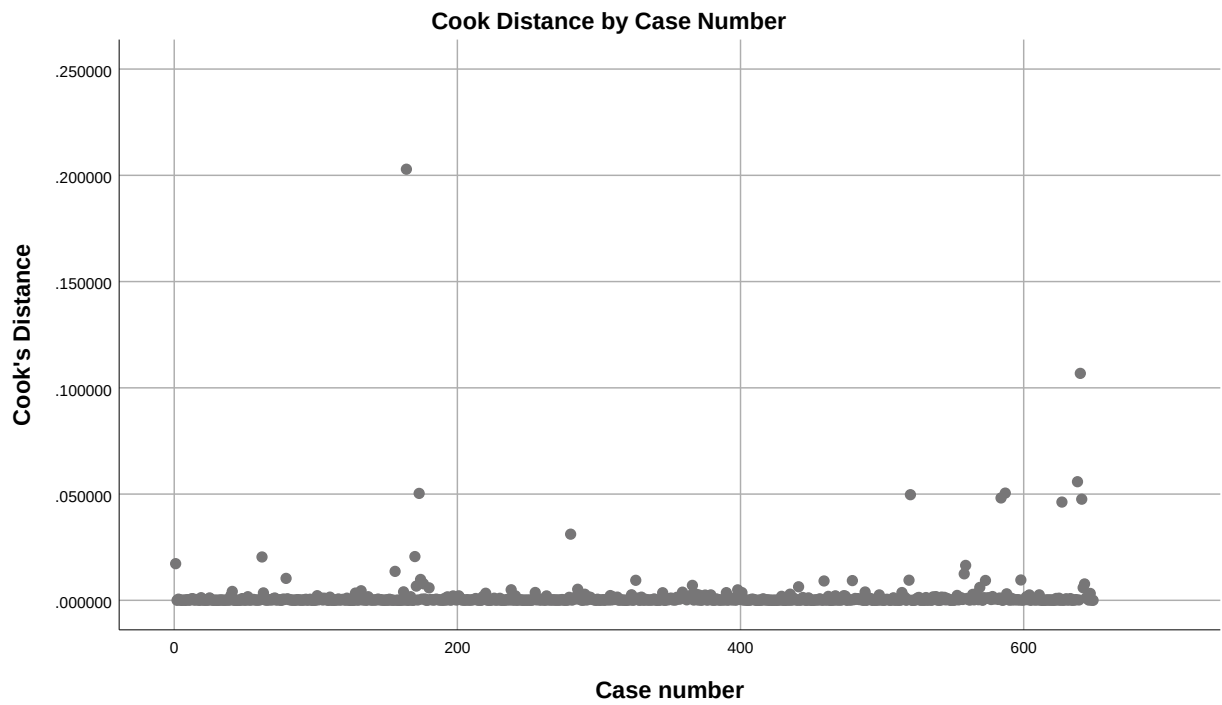
Regression Residual Analysis

Influence thresholds and flagged cases

Notes

Output Created		12-JUL-2026 18:51:07
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Syntax		GRAPH /SCATTERPLOT(BIVAR) =case_number WITH res_cook /TITLE='Cook Distance by Case Number' /MISSING=LISTWISE.
Resources	Processor Time	00:00:00.44
	Elapsed Time	00:00:00.41

Regression Residual Analysis
Influence thresholds and flagged cases



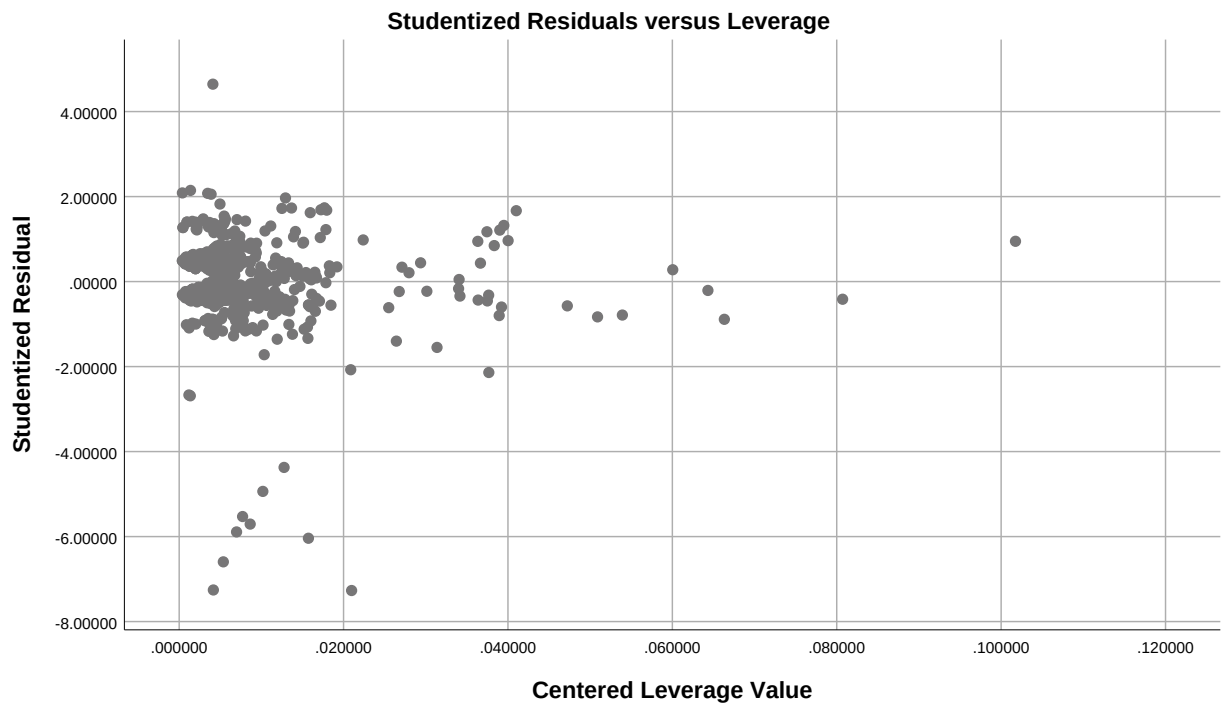
Graph

Regression Residual Analysis
Influence thresholds and flagged cases

Notes

Output Created		12-JUL-2026 18:51:07
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Syntax		GRAPH /SCATTERPLOT(BIVAR) =res_lev WITH res_sresid /TITLE='Studentized Residuals versus Leverage' /MISSING=LISTWISE.
Resources	Processor Time	00:00:00.42
	Elapsed Time	00:00:00.40

Regression Residual Analysis
Influence thresholds and flagged cases



List

Regression Residual Analysis

Influence thresholds and flagged cases

Notes

Output Created		12-JUL-2026 18:51:08
Comments		
Input	Data	D:\DATA ANALYSIS\H Regression Tests and Models\Regression Residual Analysis\SPSS_Output\sa v\regression_residual_ana lysis_data.sav
	Active Dataset	RegressionResidualAnaly sisData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	20
Syntax		LIST VARIABLES= case_number G3 G1 G2 studytime failures absences res_pred res_raw res_zresid res_sresid res_lev res_cook residual_outlier_flag residual_review_flag high_leverage_flag high_cooks_flag /CASES=FROM 1 TO ...
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

The variables are listed in the following order:

LINE 1: case_number G3 G1 G2 studytime failures absences res_pred res_raw re
s_zresid res_sresid

LINE 2: res_lev res_cook residual_outlier_flag residual_review_flag high_lev
erage_flag high_cooks_flag

Regression Residual Analysis
Influence thresholds and flagged cases

case_number:	164	.00	11.00	9.00	1.00	2.00	.00
9.01034	-9.01034	-7.18687	-7.26918				
res_lev:	.020977	.202878	1 1 1 1				
case_number:	640	.00	5.00	8.00	1.00	1.00	.00
7.50618	-7.50618	-5.98711	-6.03948				
res_lev:	.015724	.106803	1 1 0 1				
case_number:	638	.00	7.00	7.00	1.00	.00	.00
7.11767	-7.11767	-5.67723	-5.70635				
res_lev:	.008639	.055814	1 1 0 1				
case_number:	587	.00	8.00	8.00	2.00	.00	.00
8.23954	-8.23954	-6.57206	-6.59490				
res_lev:	.005372	.050459	1 1 0 1				
case_number:	173	1.00	10.00	10.00	2.00	1.00	.00
10.07158	-9.07158	-7.23572	-7.25643				
res_lev:	.004160	.050318	1 1 0 1				
case_number:	520	.00	8.00	7.00	2.00	.00	.00
7.35383	-7.35383	-5.86560	-5.89075				
res_lev:	.006980	.049705	1 1 0 1				
case_number:	584	.00	8.00	6.00	1.00	1.00	.00
6.15313	-6.15313	-4.90789	-4.93691				
res_lev:	.010180	.048177	1 1 0 1				
case_number:	641	.00	7.00	7.00	1.00	1.00	.00
6.89938	-6.89938	-5.50312	-5.52877				
res_lev:	.007715	.047596	1 1 0 1				
case_number:	627	.00	7.00	5.00	2.00	.00	.00
5.44295	-5.44295	-4.34144	-4.37282				
res_lev:	.012761	.046241	1 1 0 1				

Regression Residual Analysis
Influence thresholds and flagged cases

case_number:	280	5.00	7.00	8.00	1.00	3.00	12.00
7.62891	-2.62891	-2.09688	-2.13925				
res_lev:	.037672	.031130	0	1	1	1	
case_number:	170	10.00	9.00	8.00	1.00	3.00	14.00
7.95456	2.04544	1.63150	1.66736				
res_lev:	.041012	.020593	0	0	1	1	
case_number:	62	16.00	10.00	10.00	1.00	.00	.00
10.19317	5.80683	4.63167	4.64479				
res_lev:	.004100	.020398	1	1	0	1	
case_number:	1	11.00	.00	11.00	2.00	.00	4.00
9.87447	1.12553	.89775	.94805				
res_lev:	.101748	.017255	0	0	1	1	
case_number:	559	10.00	8.00	13.00	1.00	.00	.00
12.57138	-2.57138	-2.05100	-2.07438				
res_lev:	.020872	.016442	0	1	1	1	
case_number:	156	6.00	9.00	7.00	1.00	.00	22.00
7.91065	-1.91065	-1.52398	-1.54970				
res_lev:	.031370	.013621	0	0	1	1	
case_number:	558	10.00	7.00	9.00	2.00	3.00	2.00
8.37765	1.62235	1.29403	1.32143				
res_lev:	.039501	.012455	0	0	1	1	
case_number:	79	10.00	9.00	9.00	1.00	3.00	.00
8.51313	1.48687	1.18596	1.21076				
res_lev:	.039005	.010325	0	0	1	1	
case_number:	174	10.00	9.00	8.00	1.00	2.00	.00
7.84571	2.15429	1.71831	1.73506				
res_lev:	.017671	.009828	0	0	0	1	
case_number:	598	.00	9.00	.00	2.00	1.00	.00
1.07504	-1.07504	-.85748	-.88814				
res_lev:	.066326	.009572	0	0	1	1	

Regression Residual Analysis
Influence thresholds and flagged cases

case_number:	519	8.00	8.00	5.00	2.00	1.00	8.00
	5.55105	2.44895	1.95334	1.96763			
res_lev:	.012934	.009477	0	0	0	1	

Number of cases read: 20 Number of cases listed: 20