

Host

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Multilevel Regression

Multilevel Regression
Import data

Dataset Name

Warnings

The active dataset will replace the existing dataset named
MultilevelData.

Multilevel Regression Variable Preparation

Multilevel Regression Variable Preparation
Create dummy variables and standardized predictors

Descriptives

[MultilevelData]

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
G1	649	0	19	11.40	2.745
G2	649	0	19	11.57	2.914
studytime	649	1	4	1.93	.830
failures	649	0	3	.22	.593
absences	649	0	32	3.66	4.641
age	649	15	22	16.74	1.218
Medu	649	0	4	2.51	1.135
Fedu	649	0	4	2.31	1.100
travelttime	649	1	4	1.57	.749
health	649	1	5	3.54	1.446
Valid N (listwise)	649				

Multilevel Regression Prepared Data Summary

Multilevel Regression Prepared Data Summary
Outcome, grouping variable, and predictors

Frequencies

[MultilevelData] D:\DATA ANALYSIS\H Regression Tests and Models\Multilevel Regression\SPSS_Output\sav\Multilevel-Regression-data.sav

Statistics

		Grouping variable / level-2 cluster	sex	address	famsize	Pstatus	higher	internet
N	Valid	649	649	649	649	649	649	649
	Missing	0	0	0	0	0	0	0

Statistics

		schoolsup	famsup	activities
N	Valid	649	649	649
	Missing	0	0	0

Frequency Table

Grouping variable / level-2 cluster

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	GP	423	65.2	65.2	65.2
	MS	226	34.8	34.8	100.0
	Total	649	100.0	100.0	

sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	F	383	59.0	59.0	59.0
	M	266	41.0	41.0	100.0
	Total	649	100.0	100.0	

Multilevel Regression Prepared Data Summary
Outcome, grouping variable, and predictors

address

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	R	197	30.4	30.4	30.4
	U	452	69.6	69.6	100.0
	Total	649	100.0	100.0	

famsize

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	GT3	457	70.4	70.4	70.4
	LE3	192	29.6	29.6	100.0
	Total	649	100.0	100.0	

Pstatus

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A	80	12.3	12.3	12.3
	T	569	87.7	87.7	100.0
	Total	649	100.0	100.0	

higher

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	69	10.6	10.6	10.6
	yes	580	89.4	89.4	100.0
	Total	649	100.0	100.0	

internet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	151	23.3	23.3	23.3
	yes	498	76.7	76.7	100.0
	Total	649	100.0	100.0	

Multilevel Regression Prepared Data Summary
Outcome, grouping variable, and predictors

schoolsup

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	581	89.5	89.5	89.5
	yes	68	10.5	10.5	100.0
	Total	649	100.0	100.0	

famsup

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	251	38.7	38.7	38.7
	yes	398	61.3	61.3	100.0
	Total	649	100.0	100.0	

activities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	334	51.5	51.5	51.5
	yes	315	48.5	48.5	100.0
	Total	649	100.0	100.0	

Descriptives

Multilevel Regression Prepared Data Summary
Outcome, grouping variable, and predictors

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Final grade outcome for multilevel regression	649	0	19	11.91	3.231
G1	649	0	19	11.40	2.745
G2	649	0	19	11.57	2.914
studytime	649	1	4	1.93	.830
failures	649	0	3	.22	.593
absences	649	0	32	3.66	4.641
age	649	15	22	16.74	1.218
Medu	649	0	4	2.51	1.135
Fedu	649	0	4	2.31	1.100
traveltime	649	1	4	1.57	.749
health	649	1	5	3.54	1.446
Standardized first period grade	649	-4.152	2.769	.00000	1.000000
Standardized second period grade	649	-3.971	2.550	.00000	1.000000
Standardized weekly study time	649	-1.122	2.495	.00000	1.000000
Standardized past class failures	649	-.374	4.683	.00000	1.000000
Standardized school absences	649	-.789	6.107	.00000	1.000000
Standardized age	649	-1.432	4.315	.00000	1.000000
Valid N (listwise)	649				

Multilevel Regression Group Context

Multilevel Regression Group Context
Final grade distribution by school

Explore

Grouping variable / level-2 cluster

Case Processing Summary

		Cases			
Grouping variable / level-2 cluster		Valid		Missing	
		N	Percent	N	Percent
Final grade outcome for multilevel regression	GP	423	100.0%	0	0.0%
	MS	226	100.0%	0	0.0%

Case Processing Summary

		Cases	
Grouping variable / level-2 cluster		Total	
		N	Percent
Final grade outcome for multilevel regression	GP	423	100.0%
	MS	226	100.0%

Descriptives

Grouping variable / level-2 cluster			Statistic	Std. Error
Final grade outcome for multilevel regression	GP	Mean	12.58	.128
		95% Confidence Interval for Mean	Lower Bound	12.33
			Upper Bound	12.83
		5% Trimmed Mean	12.62	
		Median	13.00	
		Variance	6.894	
		Std. Deviation	2.626	
		Minimum	0	
		Maximum	19	
		Range	19	
		Interquartile Range	3	
		Skewness	-.336	.119
		Kurtosis	1.388	.237
	MS	Mean	10.65	.255

Multilevel Regression Group Context
Final grade distribution by school

Descriptives

Grouping variable / level-2 cluster		Statistic	Std. Error
	95% Confidence Interval for Mean	Lower Bound	10.15
		Upper Bound	11.15
	5% Trimmed Mean		10.85
	Median		11.00
	Variance		14.699
	Std. Deviation		3.834
	Minimum		0
	Maximum		19
	Range		19
	Interquartile Range		4
	Skewness		-.828
			.162
	Kurtosis		1.778
			.322

Tests of Normality

Grouping variable / level-2 cluster		Kolmogorov-Smirnov ^a			Shapiro-...
		Statistic	df	Sig.	Statistic
Final grade outcome for multilevel regression	GP	.092	423	.000	.965
	MS	.147	226	.000	.905

Tests of Normality

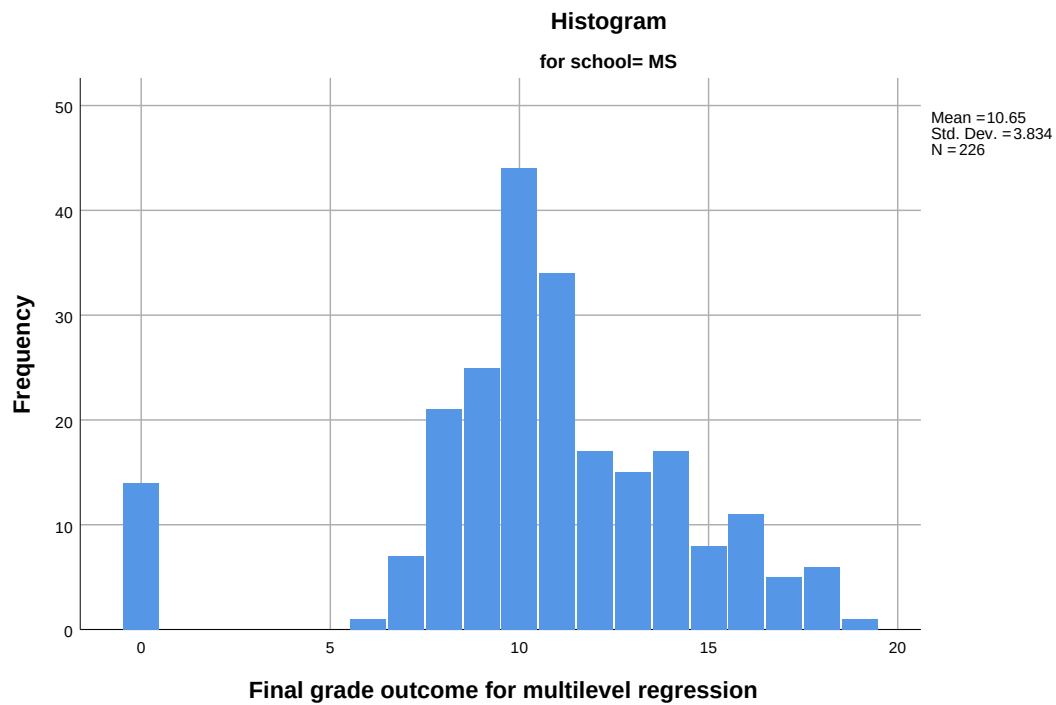
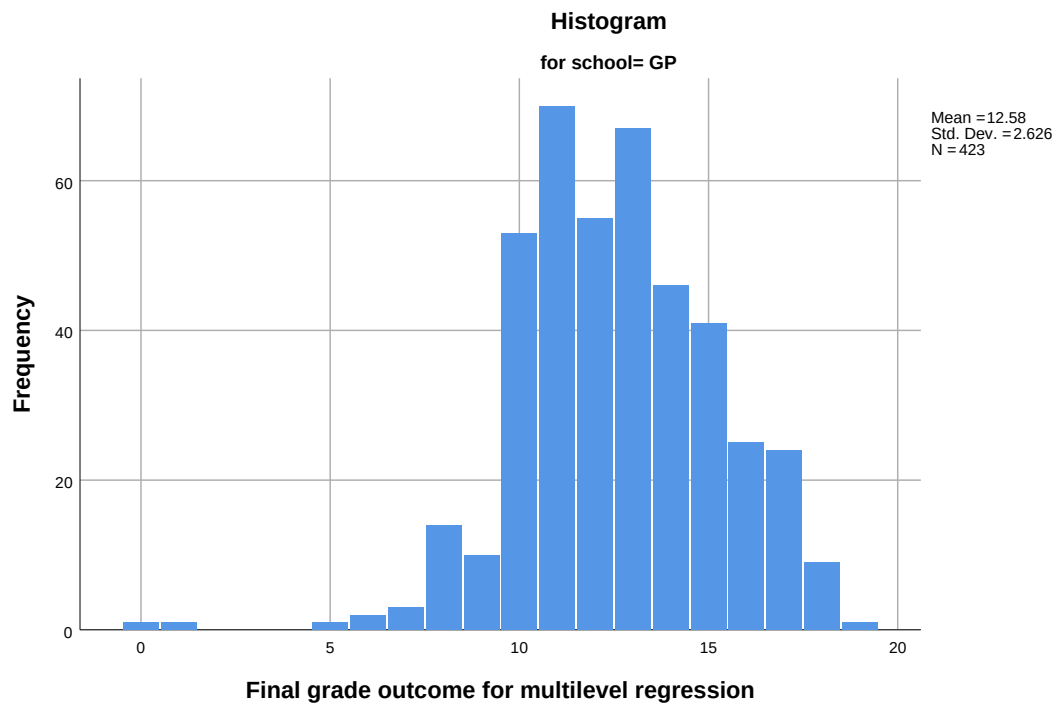
Grouping variable / level-2 cluster		Shapiro-Wilk	
		df	Sig.
Final grade outcome for multilevel regression	GP	423	.000
	MS	226	.000

a. Lilliefors Significance Correction

Final grade outcome for multilevel regression

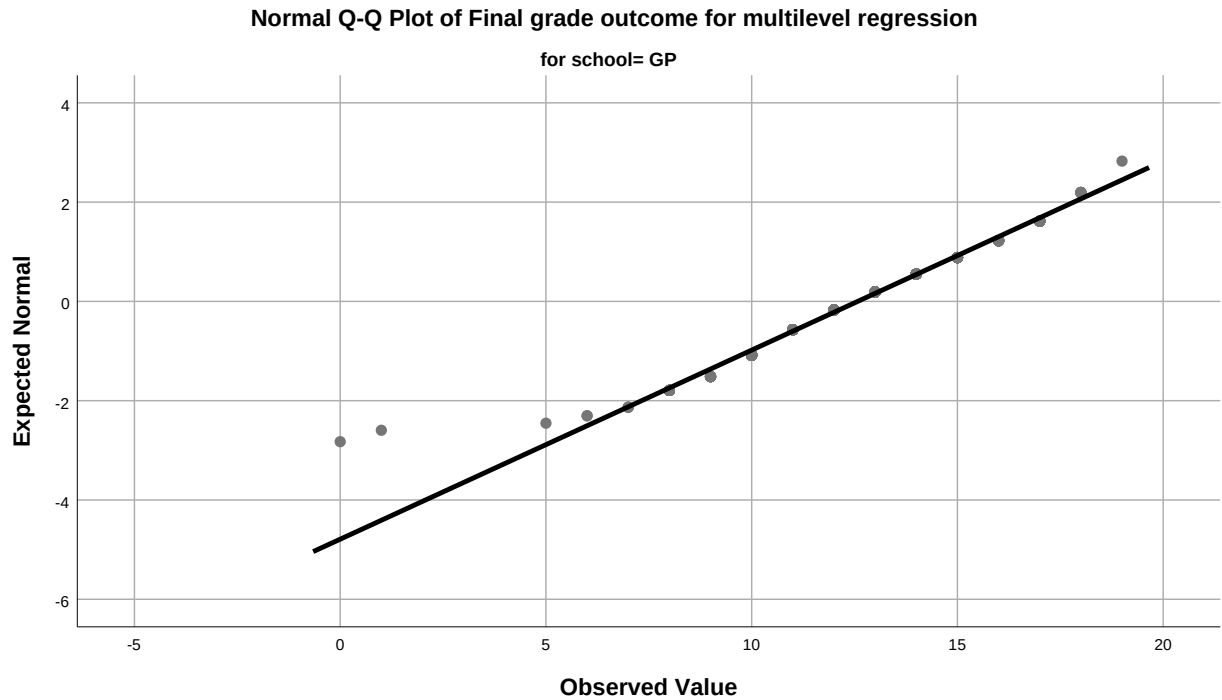
Histograms

Multilevel Regression Group Context
Final grade distribution by school

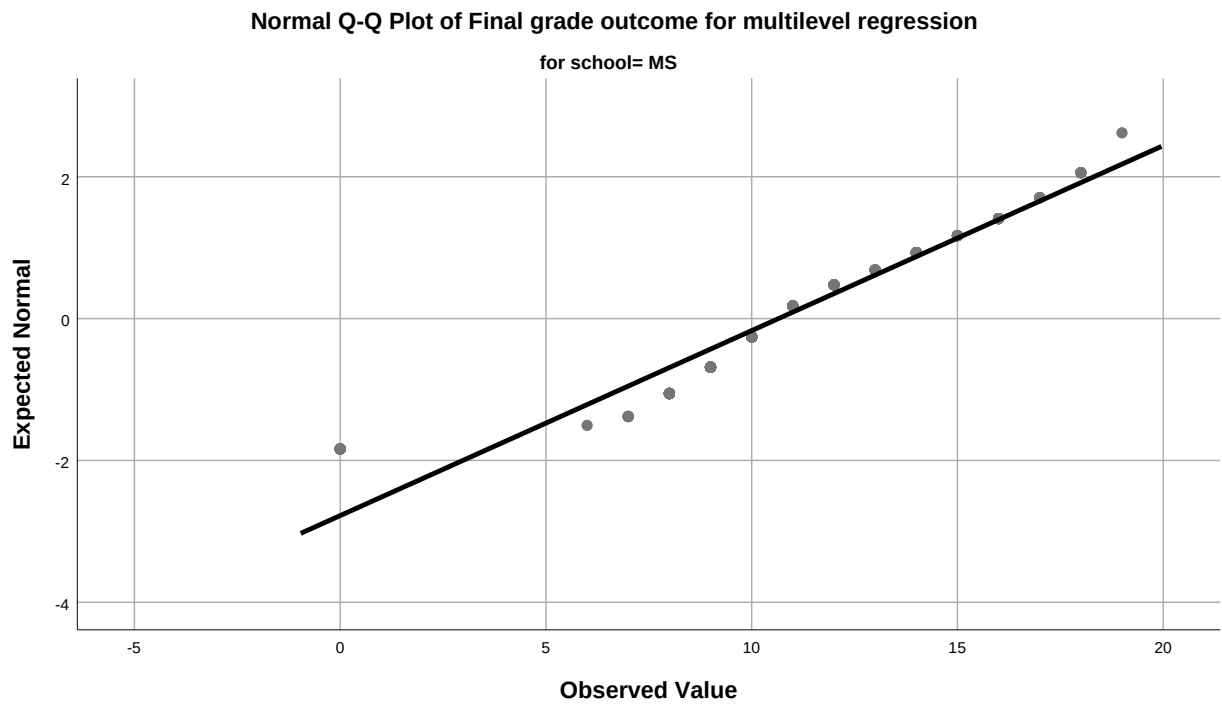


Multilevel Regression Group Context
Final grade distribution by school

Normal Q-Q Plots

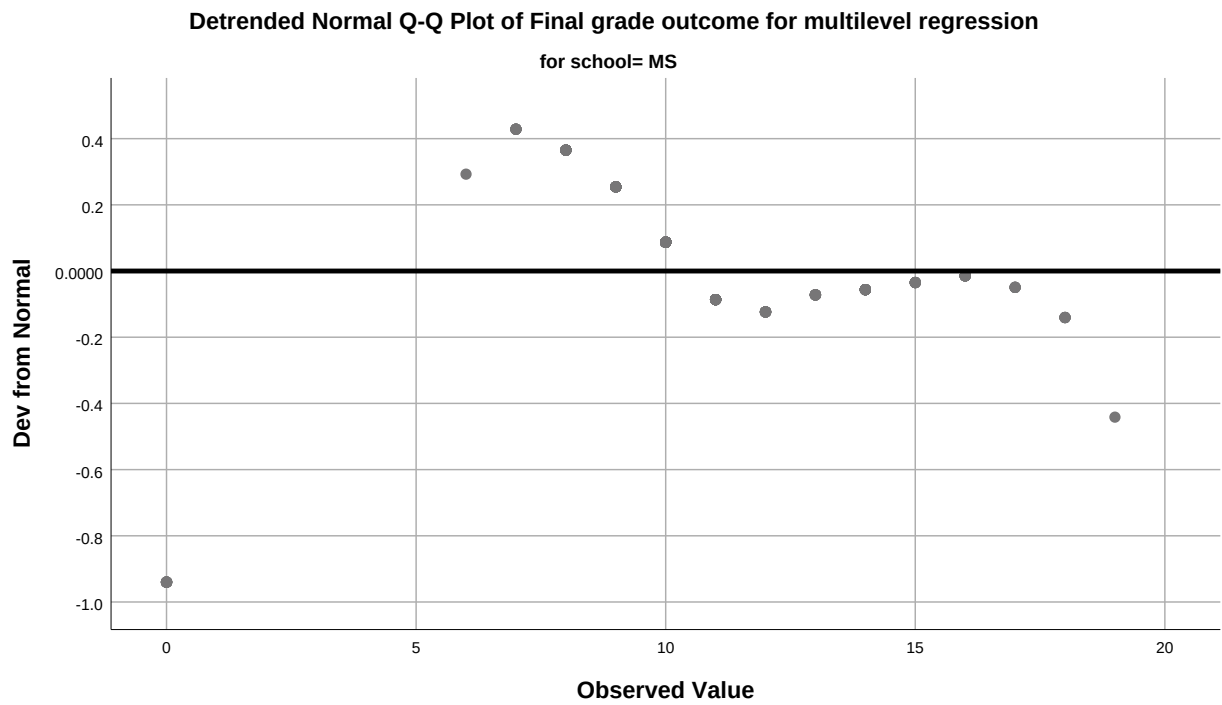
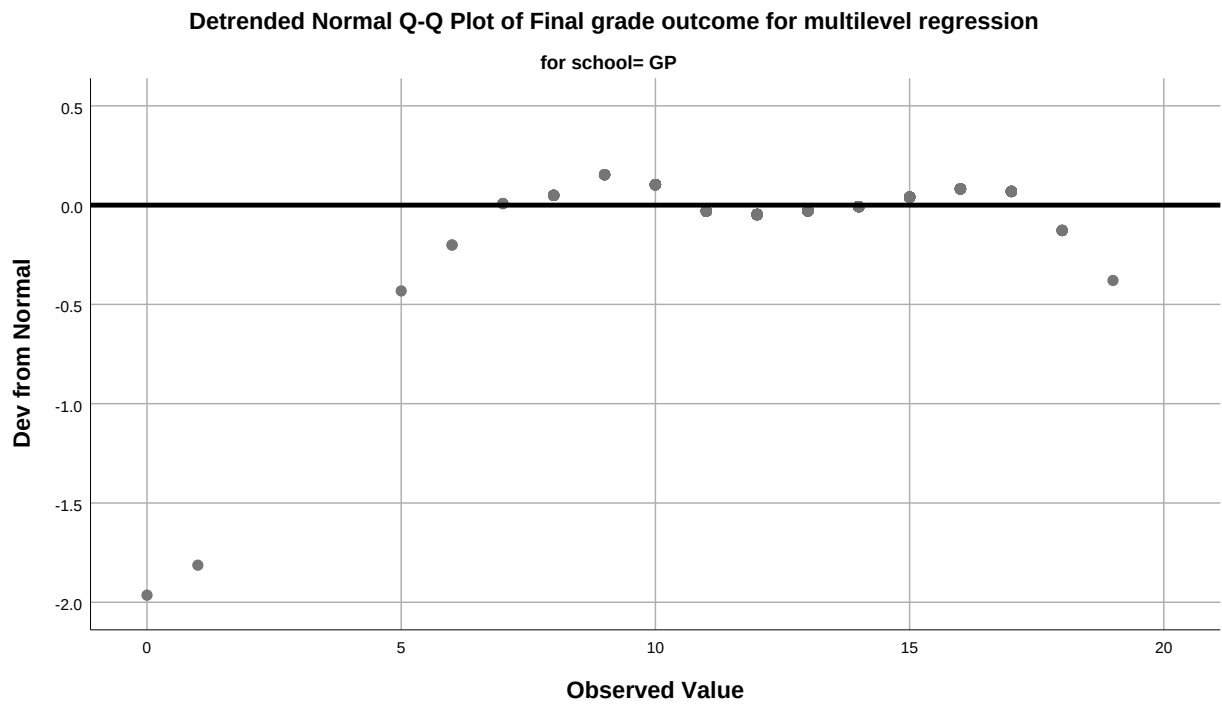


Multilevel Regression Group Context
Final grade distribution by school

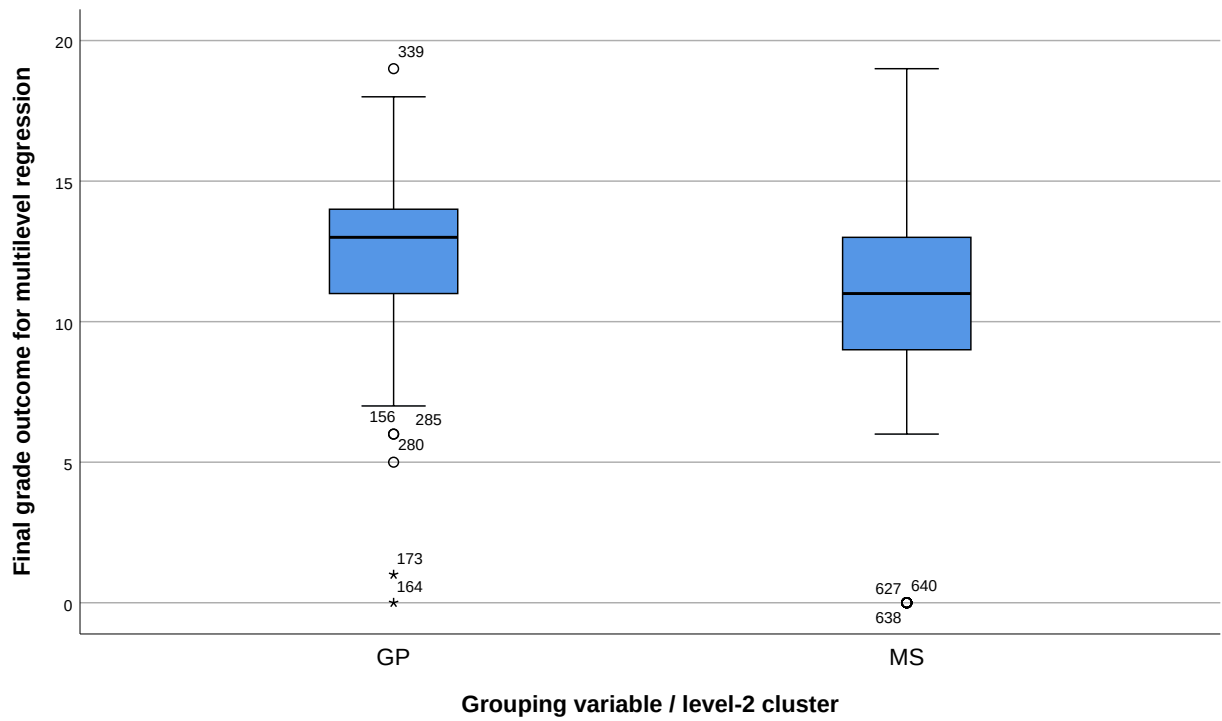


Detrended Normal Q-Q Plots

Multilevel Regression Group Context
Final grade distribution by school



Multilevel Regression Group Context
Final grade distribution by school



OLS Comparison Model

OLS Comparison Model
Single-level regression for comparison with multilevel model

Regression

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
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OLS Comparison Model
Single-level regression for comparison with multilevel model

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	Activities dummy: yes, Standardized past class failures, Family support dummy: yes, Standardized health, Address dummy: 1 = urban, 0 = rural, School support dummy: yes, Standardized school absences, Internet access dummy: yes, Standardized weekly study time, Standardized father education, Sex dummy: 1 = male, 0 = female, Higher education intention dummy: yes, Standardized travel time, Standardized age, Standardized second period grade, Standardized mother education, Standardized first period grade ^b	.	Enter

OLS Comparison Model
Single-level regression for comparison with multilevel model

- a. Dependent Variable: Final grade outcome for multilevel regression
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.924 ^a	.854	.850	1.251

- a. Predictors: (Constant), Activities dummy: yes, Standardized past class failures, Family support dummy: yes, Standardized health, Address dummy: 1 = urban, 0 = rural, School support dummy: yes, Standardized school absences, Internet access dummy: yes, Standardized weekly study time, Standardized father education, Sex dummy: 1 = male, 0 = female, Higher education intention dummy: yes, Standardized travel time, Standardized age, Standardized second period grade, Standardized mother education, Standardized first period grade

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5776.146	17	339.773	217.194	.000 ^b
	Residual	987.121	631	1.564		
	Total	6763.267	648			

- a. Dependent Variable: Final grade outcome for multilevel regression
b. Predictors: (Constant), Activities dummy: yes, Standardized past class failures, Family support dummy: yes, Standardized health, Address dummy: 1 = urban, 0 = rural, School support dummy: yes, Standardized school absences, Internet access dummy: yes, Standardized weekly study time, Standardized father education, Sex dummy: 1 = male, 0 = female, Higher education intention dummy: yes, Standardized travel time, Standardized age, Standardized second period grade, Standardized mother education, Standardized first period grade

OLS Comparison Model
Single-level regression for comparison with multilevel model

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.513	.222		51.835	.000
	Standardized first period grade	.375	.101	.116	3.706	.000
	Standardized second period grade	2.557	.100	.791	25.491	.000
	Standardized weekly study time	.051	.053	.016	.961	.337
	Standardized past class failures	-.129	.057	-.040	-2.261	.024
	Standardized school absences	.088	.051	.027	1.719	.086
	Standardized age	.030	.055	.009	.542	.588
	Standardized mother education	-.055	.068	-.017	-.801	.423
	Standardized father education	.029	.065	.009	.441	.659
	Standardized travel time	.096	.054	.030	1.764	.078
	Standardized health	-.065	.050	-.020	-1.294	.196
	Sex dummy: 1 = male, 0 = female	-.168	.108	-.026	-1.564	.118
	Address dummy: 1 = urban, 0 = rural	.221	.116	.031	1.897	.058
	Higher education intention dummy: yes	.198	.180	.019	1.102	.271
	Internet access dummy: yes	.087	.124	.011	.701	.484
	School support dummy: yes	-.174	.167	-.017	-1.041	.298
	Family support dummy: yes	.129	.105	.020	1.232	.218
	Activities dummy: yes	.007	.101	.001	.069	.945

OLS Comparison Model
Single-level regression for comparison with multilevel model

Coefficients^a

Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	11.077	11.949
	Standardized first period grade	.176	.574
	Standardized second period grade	2.360	2.753
	Standardized weekly study time	-.053	.156
	Standardized past class failures	-.242	-.017
	Standardized school absences	-.012	.188
	Standardized age	-.079	.139
	Standardized mother education	-.189	.079
	Standardized father education	-.100	.157
	Standardized travel time	-.011	.203
	Standardized health	-.163	.034
	Sex dummy: 1 = male, 0 = female	-.380	.043
	Address dummy: 1 = urban, 0 = rural	-.008	.449
	Higher education intention dummy: yes	-.155	.552
	Internet access dummy: yes	-.156	.329
	School support dummy: yes	-.502	.154
	Family support dummy: yes	-.077	.336
	Activities dummy: yes	-.191	.204

a. Dependent Variable: Final grade outcome for multilevel regression

OLS Comparison Model
Single-level regression for comparison with multilevel model

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	(Constant)	Variance Proportions	
					Standardized first period grade	Standardized second period grade
1	1	5.331	1.000	.00	.00	.00
	2	2.757	1.391	.00	.02	.02
	3	1.491	1.891	.00	.01	.01
	4	1.216	2.094	.00	.01	.01
	5	1.051	2.252	.00	.01	.01
	6	.998	2.311	.00	.00	.00
	7	.902	2.432	.00	.00	.00
	8	.838	2.522	.00	.00	.00
	9	.720	2.721	.00	.03	.04
	10	.605	2.970	.00	.01	.00
	11	.503	3.255	.00	.00	.00
	12	.440	3.481	.00	.00	.00
	13	.341	3.957	.00	.00	.00
	14	.297	4.236	.00	.00	.00
	15	.203	5.120	.00	.00	.00
	16	.144	6.095	.04	.00	.01
	17	.130	6.408	.00	.90	.89
	18	.034	12.444	.96	.00	.00

OLS Comparison Model
Single-level regression for comparison with multilevel model

Collinearity Diagnostics^a

Model	Dimension	Variance Proportions				
		Standardized weekly study time	Standardized past class failures	Standardized school absences	Standardized age	Standardized mother education
1	1	.00	.00	.00	.00	.00
	2	.02	.03	.01	.01	.02
	3	.04	.02	.06	.01	.09
	4	.01	.03	.10	.27	.00
	5	.27	.03	.00	.01	.00
	6	.03	.02	.10	.08	.00
	7	.07	.04	.25	.02	.05
	8	.09	.01	.41	.00	.00
	9	.26	.18	.00	.02	.00
	10	.05	.53	.03	.43	.00
	11	.04	.04	.02	.03	.00
	12	.08	.01	.00	.01	.00
	13	.01	.00	.00	.00	.76
	14	.00	.02	.00	.03	.00
	15	.01	.02	.00	.01	.01
	16	.00	.01	.02	.01	.03
	17	.00	.01	.00	.03	.00
	18	.01	.01	.00	.03	.03

OLS Comparison Model
Single-level regression for comparison with multilevel model

Collinearity Diagnostics^a

Model	Dimension	Variance Proportions				
		Standardized father education	Standardized travel time	Standardized health	Sex dummy: 1 = male, 0 = female	Address dummy: 1 = urban, 0 = rural
1	1	.00	.00	.00	.01	.01
	2	.02	.01	.00	.00	.00
	3	.11	.05	.02	.01	.00
	4	.00	.00	.08	.00	.00
	5	.00	.09	.03	.05	.00
	6	.01	.04	.60	.00	.00
	7	.05	.30	.02	.01	.01
	8	.01	.26	.20	.00	.00
	9	.01	.03	.00	.00	.00
	10	.01	.02	.00	.01	.00
	11	.02	.01	.01	.30	.01
	12	.01	.00	.01	.34	.02
	13	.73	.02	.01	.03	.00
	14	.02	.08	.01	.19	.25
	15	.00	.03	.00	.01	.47
	16	.00	.05	.00	.01	.17
	17	.00	.00	.01	.00	.00
	18	.00	.01	.00	.02	.06

OLS Comparison Model
Single-level regression for comparison with multilevel model

Collinearity Diagnostics^a

Model	Dimension	Variance Proportions				
		Higher education intention dummy: yes	Internet access dummy: yes	School support dummy: yes	Family support dummy: yes	Activities dummy: yes
1	1	.00	.01	.00	.01	.01
	2	.00	.00	.00	.00	.00
	3	.00	.00	.01	.00	.00
	4	.00	.00	.10	.00	.00
	5	.00	.00	.22	.00	.00
	6	.00	.00	.01	.00	.00
	7	.00	.00	.01	.00	.01
	8	.00	.00	.03	.01	.00
	9	.00	.00	.40	.00	.01
	10	.00	.00	.05	.00	.05
	11	.00	.00	.13	.20	.17
	12	.00	.00	.00	.00	.67
	13	.00	.01	.01	.00	.00
	14	.00	.02	.01	.55	.00
	15	.01	.52	.00	.09	.03
	16	.28	.35	.01	.08	.02
	17	.00	.00	.01	.00	.00
	18	.70	.08	.00	.04	.02

a. Dependent Variable: Final grade outcome for multilevel regression

Multilevel Regression Null Random-Intercept Model

Multilevel Regression Null Random-Intercept Model
Unconditional means model for ICC context

Mixed Model Analysis

Warnings

An unrecognized symbol FIT was found in the PRINT subcommand. The valid keywords are: CORB, COVB, CPS, DESCRIPTIVES, G, HISTORY, LMATRIX, R, SOLUTION, and TESTCOV.

Execution of this command stops.

Multilevel Regression Full Random-Intercept Model

Multilevel Regression Full Random-Intercept Model
Fixed predictors with random intercept by school

Mixed Model Analysis

Warnings

An unrecognized symbol FIT was found in the PRINT subcommand. The valid keywords are: CORB, COVB, CPS, DESCRIPTIVES, G, HISTORY, LMATRIX, R, SOLUTION, and TESTCOV.

Execution of this command stops.

Multilevel Regression Saved Predictions

Multilevel Regression Saved Predictions
Predicted values and residuals saved by MIXED

Descriptives

Warnings

Text: FXPRED_1 Command: DESCRIPTIVES

An undefined variable name, or a scratch or system variable was specified in a variable list which accepts only standard variables. Check spelling and verify the existence of this variable.

Execution of this command stops.
