

Correlation Heatmap Report

Variables included: age, Medu, Fedu, traveltime, studytime, failures, famrel, freetime, goout, Dalc, Walc, health, absences, G1, G2, G3

Target variable used for ranking: G3

Descriptive statistics:

variable	n_valid	n_missing	mean	standard_deviation	minimum	maximum
age	649	0	16.744222	1.218138	15.0	22.0
Medu	649	0	2.514638	1.134552	0.0	4.0
Fedu	649	0	2.306626	1.099931	0.0	4.0
traveltime	649	0	1.568567	0.748660	1.0	4.0
studytime	649	0	1.930663	0.829510	1.0	4.0
failures	649	0	0.221880	0.593235	0.0	3.0
famrel	649	0	3.930663	0.955717	1.0	5.0
freetime	649	0	3.180277	1.051093	1.0	5.0
goout	649	0	3.184900	1.175766	1.0	5.0
Dalc	649	0	1.502311	0.924834	1.0	5.0
Walc	649	0	2.280431	1.284380	1.0	5.0
health	649	0	3.536210	1.446259	1.0	5.0
absences	649	0	3.659476	4.640759	0.0	32.0
G1	649	0	11.399076	2.745265	0.0	19.0
G2	649	0	11.570108	2.913639	0.0	19.0
G3	649	0	11.906009	3.230656	0.0	19.0

Top Pearson correlations:

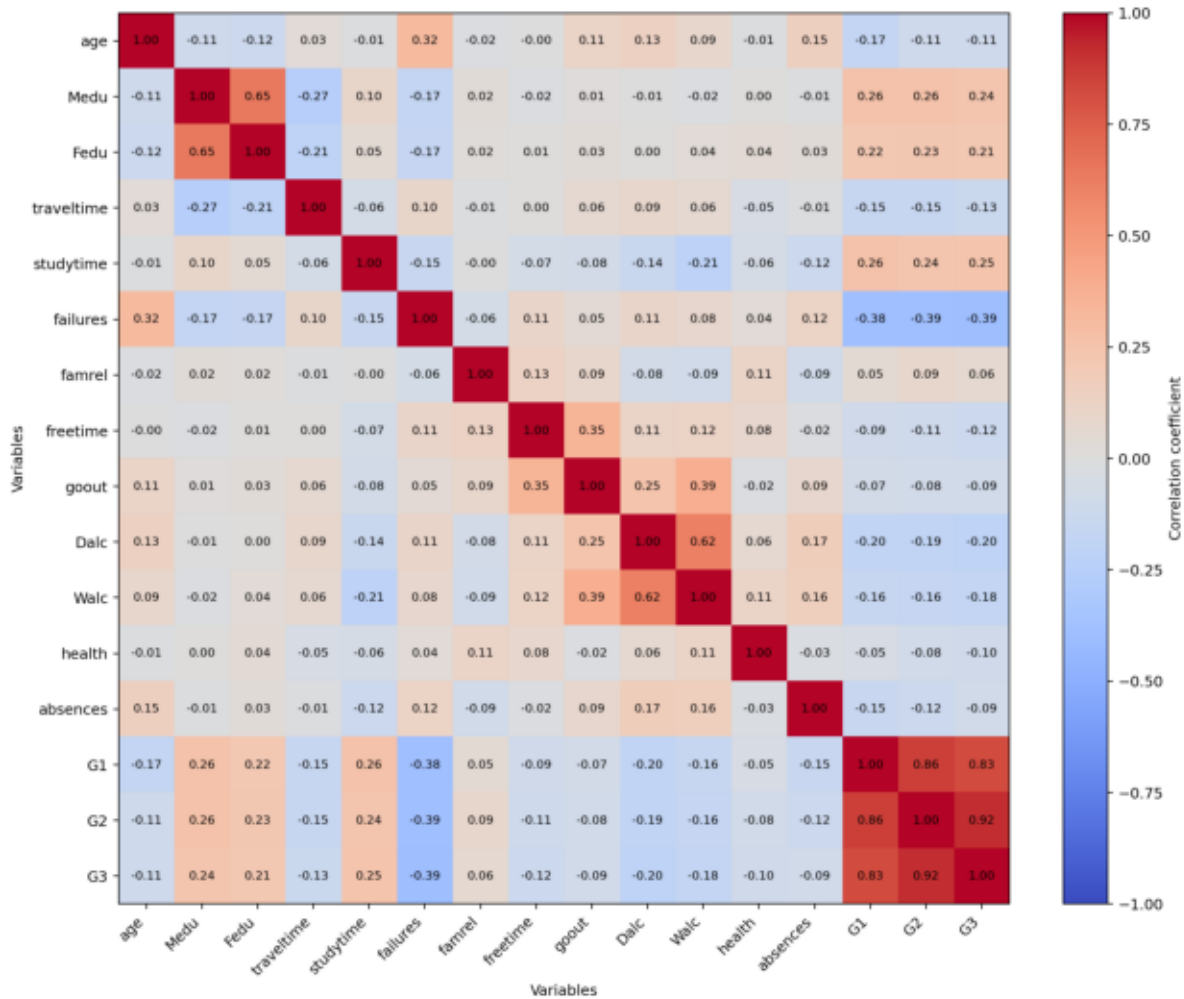
method	variable_1	variable_2	n_pairwise	correlation	absolute_correlation	p_value	decision	alpha_0_05	strength_label	direction
Pearson	G2	G3	649	0.918548	0.918548	5.642401e-263	Significant		Very strong	Positive
Pearson	G1	G2	649	0.864982	0.864982	6.373795e-196	Significant		Very strong	Positive
Pearson	G1	G3	649	0.826387	0.826387	1.617571e-163	Significant		Very strong	Positive
Pearson	Medu	Fedu	649	0.647477	0.647477	2.190291e-78	Significant		Strong	Positive
Pearson	Dalc	Walc	649	0.616561	0.616561	3.239244e-69	Significant		Strong	Positive
Pearson	failures	G3	649	-0.393316	0.393316	1.934153e-25	Significant		Moderate	Negative
Pearson	goout	Walc	649	0.388680	0.388680	7.812237e-25	Significant		Moderate	Positive
Pearson	failures	G2	649	-0.385782	0.385782	1.848633e-24	Significant		Moderate	Negative
Pearson	failures	G1	649	-0.384210	0.384210	2.939047e-24	Significant		Moderate	Negative
Pearson	freetime	goout	649	0.346352	0.346352	9.968392e-20	Significant		Moderate	Positive
Pearson	age	failures	649	0.319968	0.319968	6.472062e-17	Significant		Moderate	Positive
Pearson	Medu	traveltime	649	-0.265079	0.265079	6.736153e-12	Significant		Weak	Negative

Top correlations with G3:

target_variable	predictor_variable	pearson_correlation	absolute_correlation	p_value	decision	alpha_0_05	direction
G3	G2	0.918548	0.918548	5.642401e-263	Significant		Positive
G3	G1	0.826387	0.826387	1.617571e-163	Significant		Positive
G3	failures	-0.393316	0.393316	1.934153e-25	Significant		Negative
G3	studytime	0.249789	0.249789	1.090809e-10	Significant		Positive
G3	Medu	0.240151	0.240151	5.752229e-10	Significant		Positive
G3	Fedu	0.211800	0.211800	5.116520e-08	Significant		Positive
G3	Dalc	-0.204719	0.204719	1.432036e-07	Significant		Negative
G3	Walc	-0.176619	0.176619	5.999493e-06	Significant		Negative
G3	traveltime	-0.127173	0.127173	1.167357e-03	Significant		Negative
G3	freetime	-0.122705	0.122705	1.737484e-03	Significant		Negative
G3	age	-0.106505	0.106505	6.612115e-03	Significant		Negative
G3	health	-0.098851	0.098851	1.174877e-02	Significant		Negative

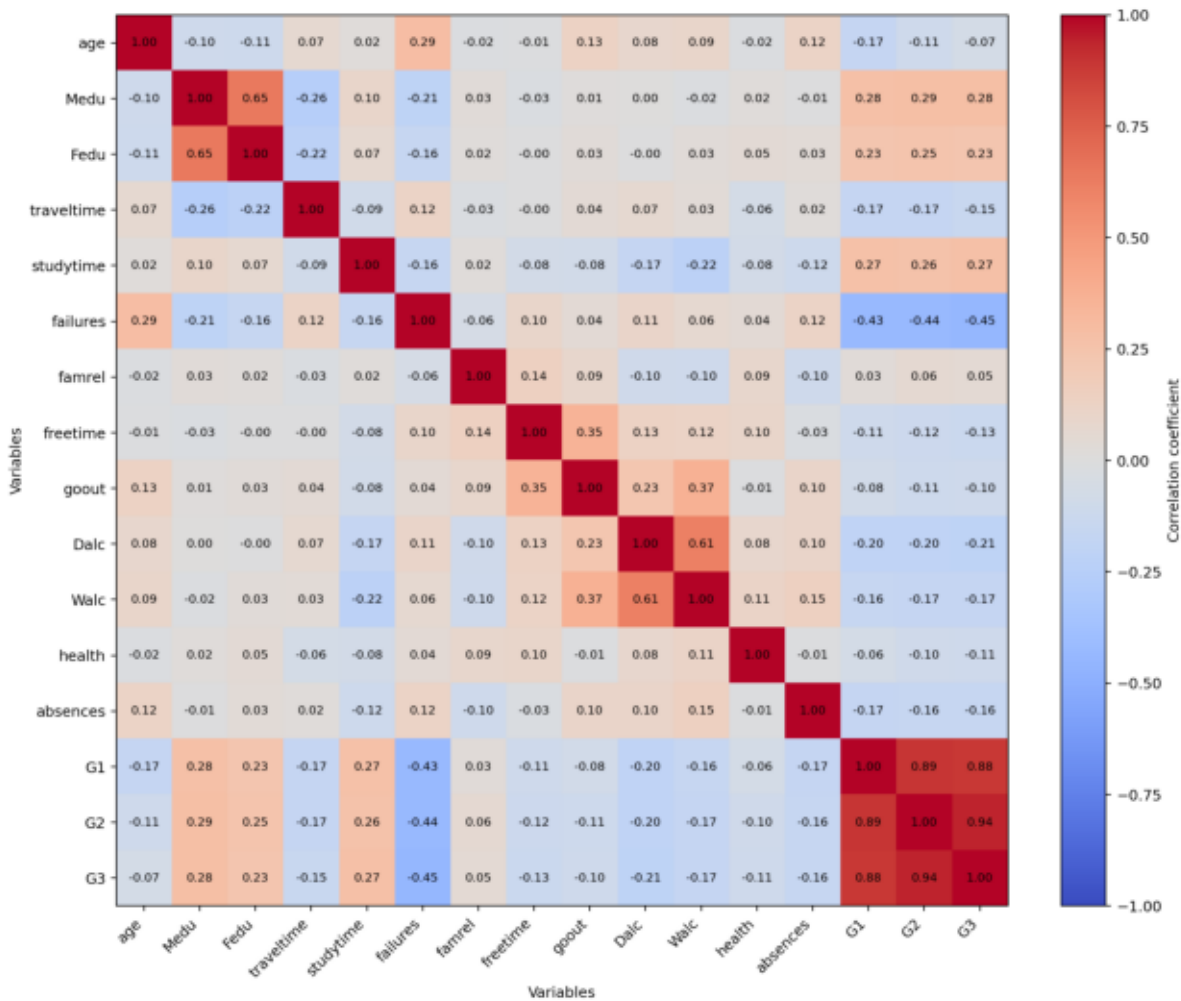
Correlation Heatmap: Pearson Correlation Matrix

Pearson r measures linear association between numeric variables.



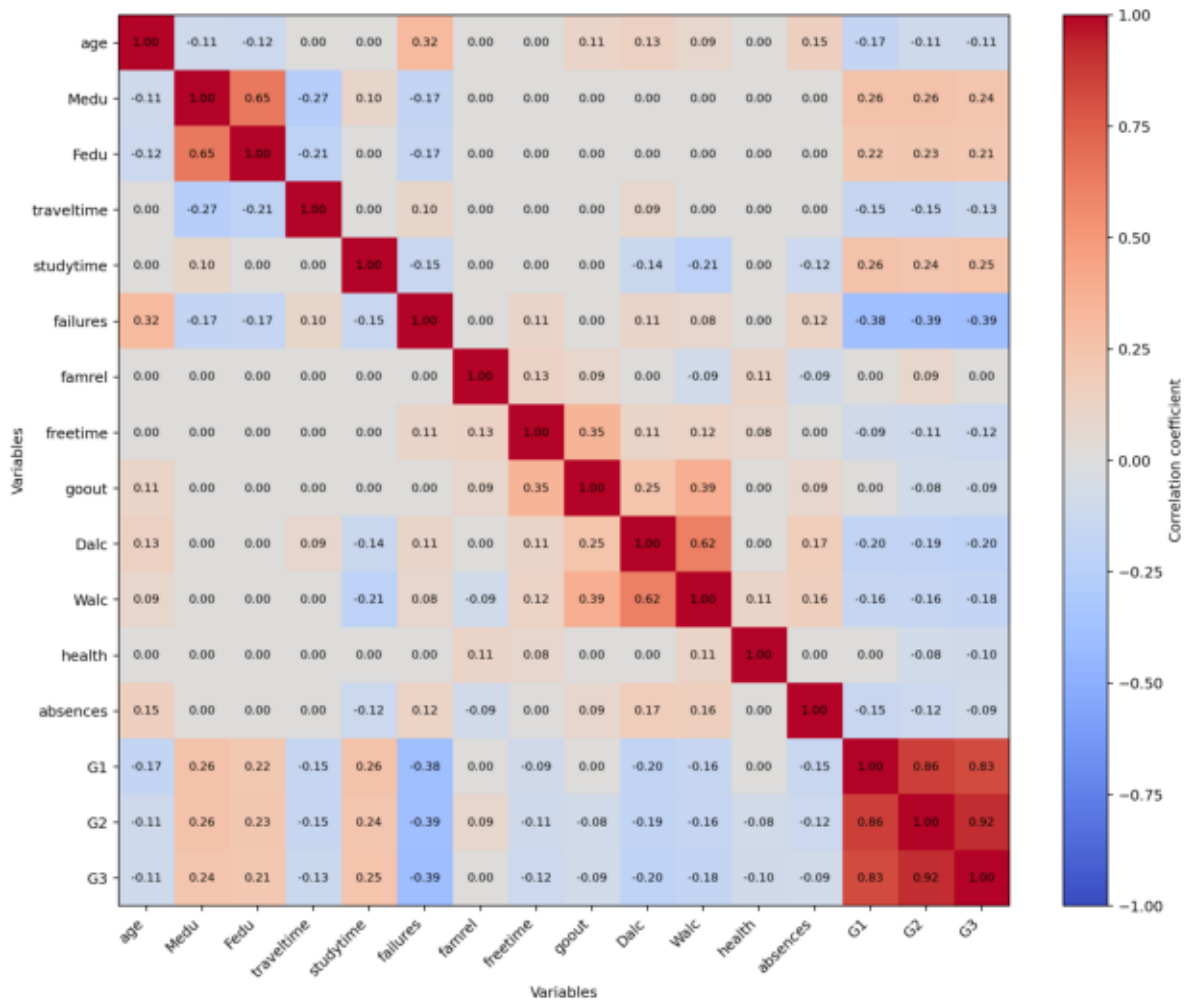
Correlation Heatmap: Spearman Rank Correlation Matrix

Spearman rho measures monotonic association and is useful when variables are ordinal or non-normal.



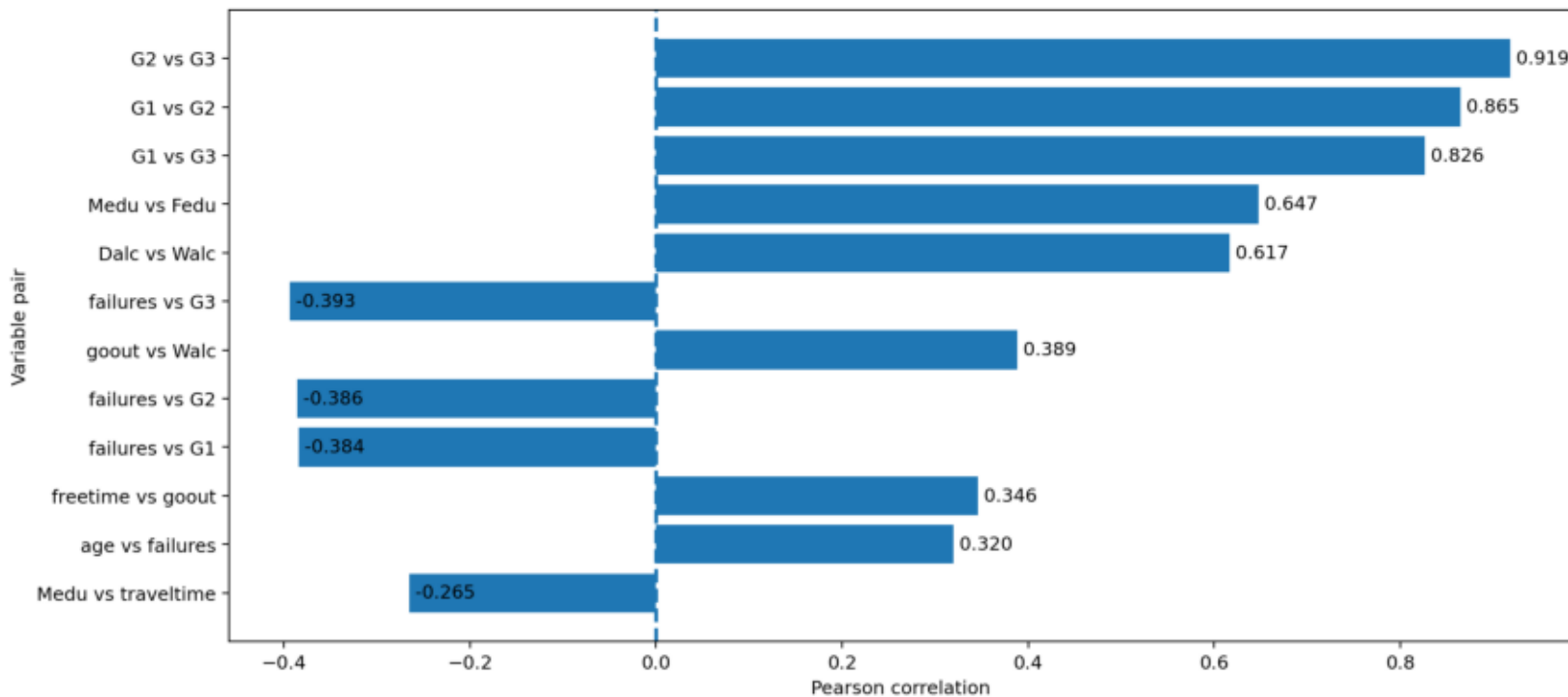
Correlation Heatmap: Significant Pearson Correlations

Cells are labeled with r values; non-significant off-diagonal cells are shown as zero for reporting focus.



Correlation Heatmap: Strongest Variable Pairs

The largest absolute correlations are ranked to highlight the most important relationships.



Correlation Heatmap: Correlations with G3

This chart ranks variables by their linear relationship with the selected target variable.

