

Pearson Correlation Analysis

Numeric variables analysed: age, Medu, Fedu, traveltime, studytime, failures, famrel, freetime, goout, Dalc, Walc, health, absences, G1, G2, G3

Pearson correlation tests linear association between numeric variables.

H0: Pearson $r = 0$.

H1: Pearson r is not 0.

Top pairwise correlations by absolute r :

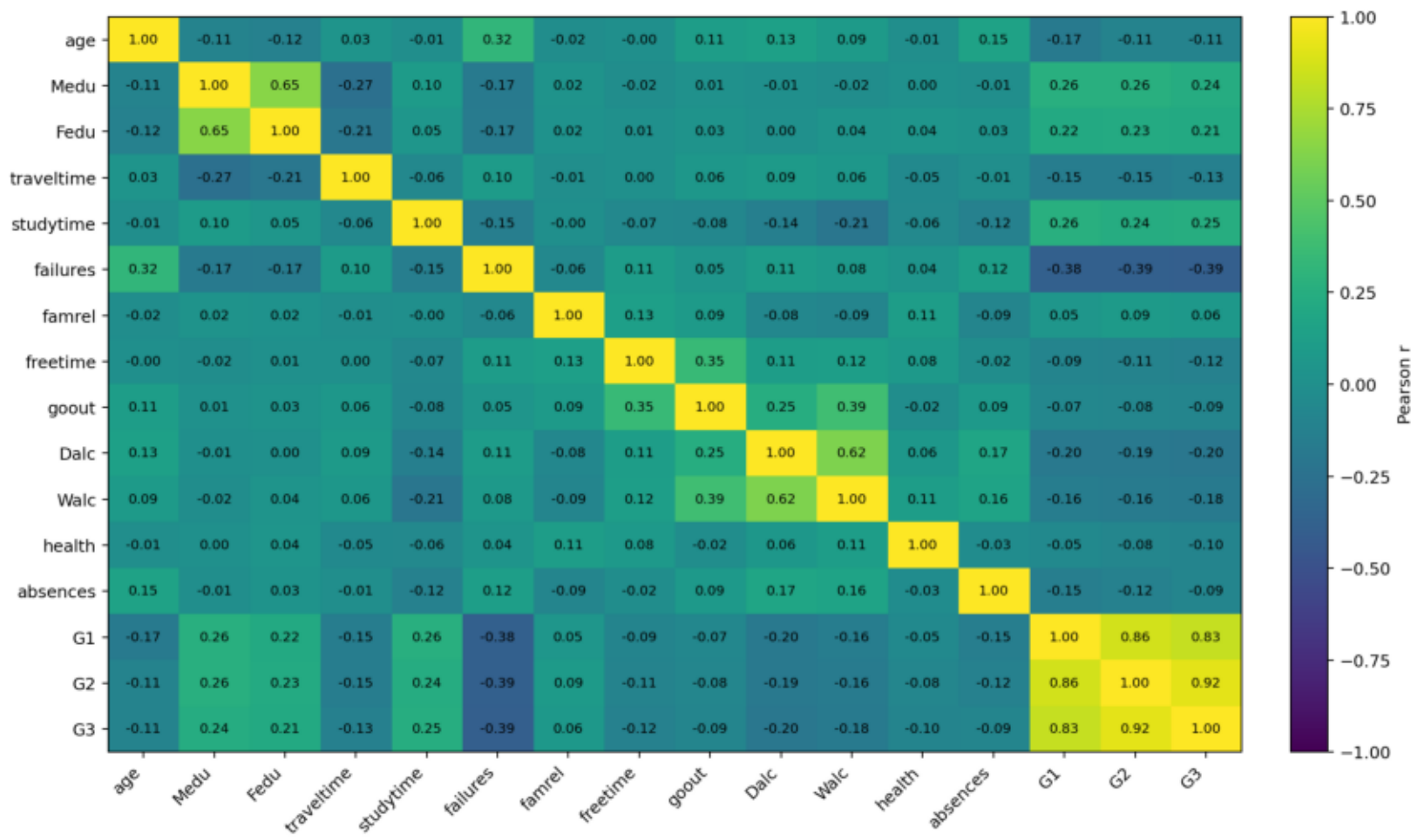
variable_1	variable_2	n_pairwise	pearson_r	r_squared	t_statistic	df	p_value_two_tailed	ci95_lower	ci95_upper	decision_alpha_0_05	interpretation
G2	G3	649	0.918548	0.843730	59.103989	647	5.642401e-263	0.905606	0.929781	Significant correlation	very strong positive
G1	G2	649	0.864982	0.748193	43.845529	647	6.373795e-196	0.844220	0.883151	Significant correlation	very strong positive
G1	G3	649	0.826387	0.682916	37.329167	647	1.617571e-163	0.800326	0.849331	Significant correlation	very strong positive
Medu	Fedu	649	0.647477	0.419226	21.610889	647	2.190291e-78	0.600435	0.690052	Significant correlation	strong positive
Dalc	Walc	649	0.616561	0.380148	19.919775	647	3.239244e-69	0.566480	0.662105	Significant correlation	strong positive
failures	G3	649	-0.393316	0.154697	-10.881458	647	1.934153e-25	-0.456460	-0.326229	Significant correlation	moderate negative
goout	Walc	649	0.388680	0.151072	10.730220	647	7.812237e-25	0.321331	0.452117	Significant correlation	moderate positive
failures	G2	649	-0.385782	0.148828	-10.636179	647	1.848633e-24	-0.449401	-0.318270	Significant correlation	moderate negative
failures	G1	649	-0.384210	0.147618	-10.585323	647	2.939047e-24	-0.447927	-0.316611	Significant correlation	moderate negative
freetime	goout	649	0.346352	0.119960	9.391139	647	9.968392e-20	0.276768	0.412322	Significant correlation	moderate positive
age	failures	649	0.319968	0.102379	8.590377	647	6.472062e-17	0.249142	0.387390	Significant correlation	moderate positive
Medu	traveltime	649	-0.265079	0.070267	-6.992755	647	6.736153e-12	-0.335202	-0.192035	Significant correlation	weak negative
Medu	G2	649	0.264035	0.069715	6.963155	647	8.193734e-12	0.190954	0.334205	Significant correlation	weak positive
studytime	G1	649	0.260875	0.068056	6.873696	647	1.474934e-11	0.187682	0.331187	Significant correlation	weak positive
Medu	G1	649	0.260472	0.067846	6.862301	647	1.588891e-11	0.187265	0.330802	Significant correlation	weak positive

Assumption summary:

variable	n	skewness	kurtosis	iqr_outlier_count
age	649	0.416795	0.071509	1
Medu	649	-0.029950	-1.260619	0
Fedu	649	0.215343	-1.109241	0
traveltime	649	1.247648	1.108865	16
studytime	649	0.699619	0.037846	35
failures	649	3.092699	9.824409	100
famrel	649	-1.105934	1.348973	51
freetime	649	-0.181277	-0.396959	45
goout	649	-0.008580	-0.865454	0
Dalc	649	2.141913	4.349297	34
Walc	649	0.635904	-0.770689	0
health	649	-0.500656	-1.121175	0
absences	649	2.020694	5.781078	21
G1	649	-0.002774	0.036638	16
G2	649	-0.360283	1.662465	25
G3	649	-0.912909	2.712204	16

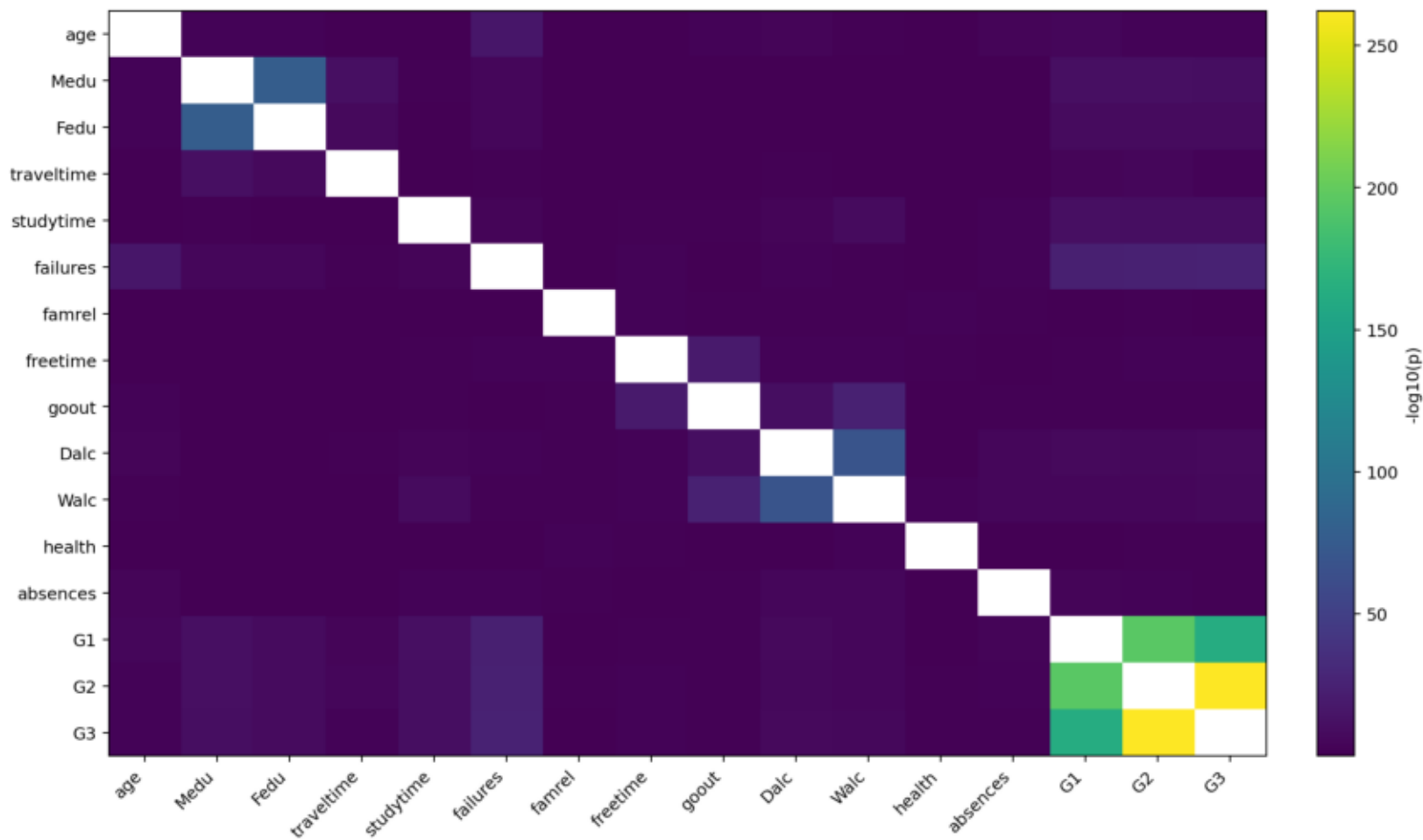
Pearson Correlation Matrix

Values near +1 or -1 show stronger linear association.



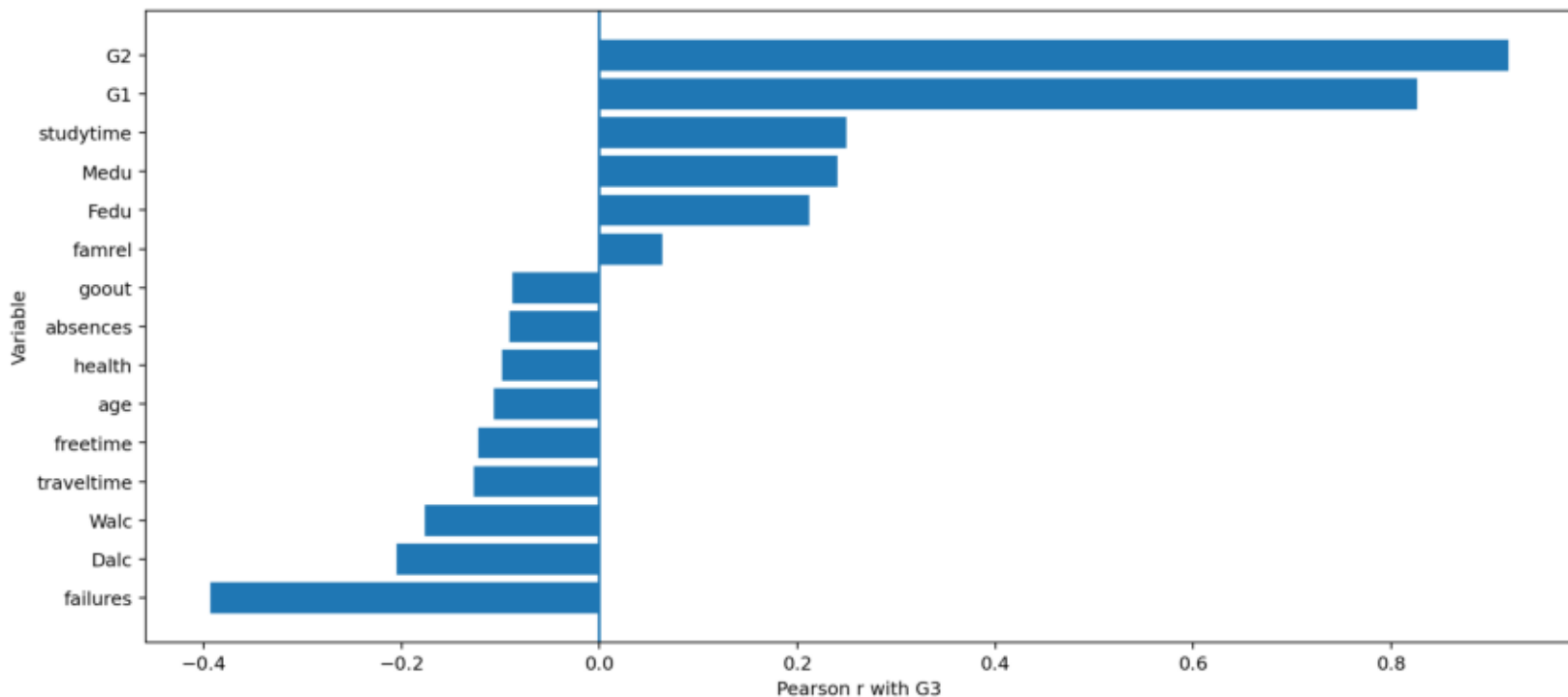
Pearson Correlation Significance Heatmap

Larger values indicate smaller p-values.



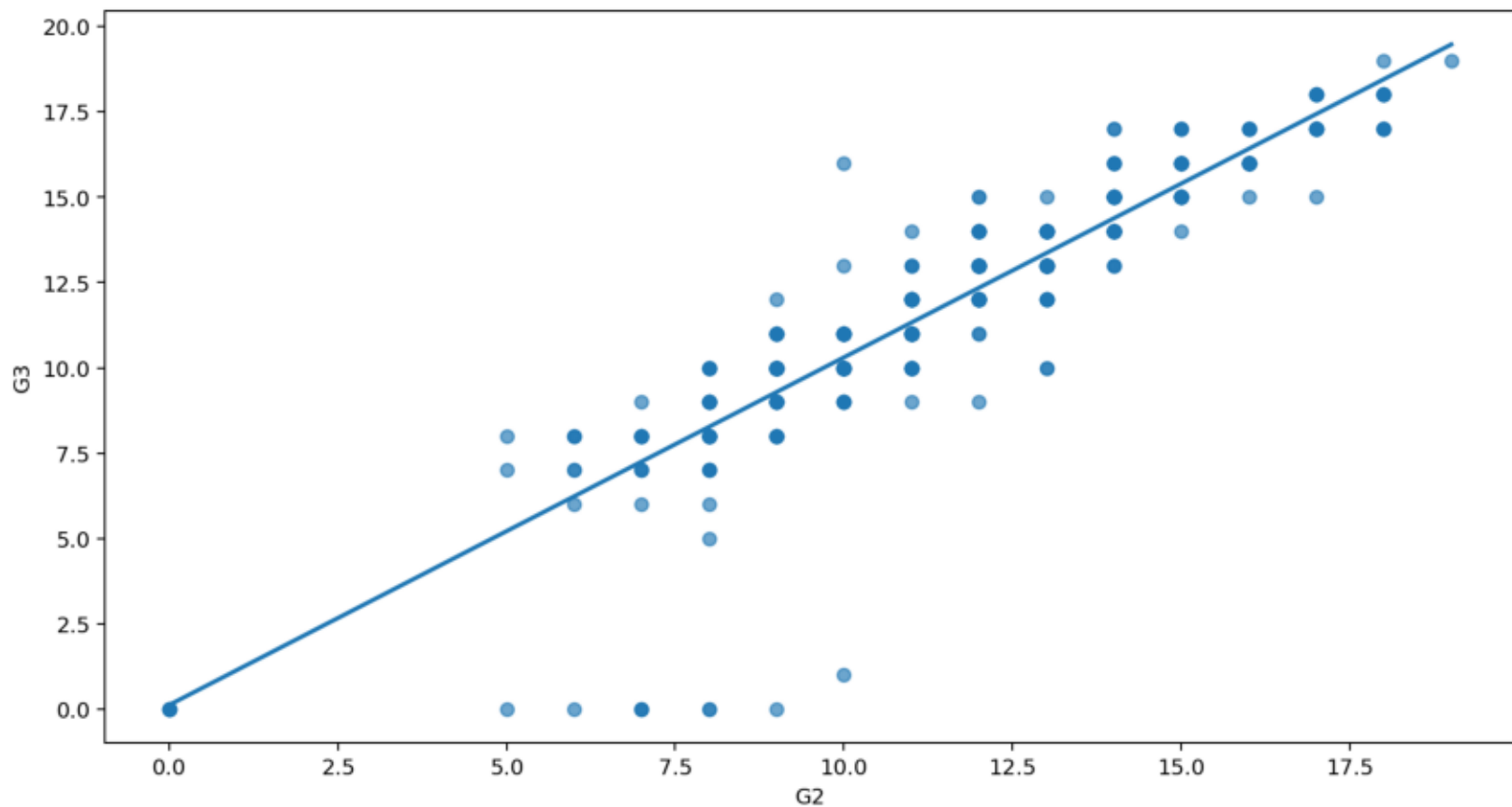
Pearson Correlations with G3

This ranking shows which variables have stronger positive or negative linear relationships with the selected outcome.



Pearson Correlation: Strongest Pair Scatterplot

G2 vs G3; $r = 0.919$, $p = 5.642\text{e-}263$



Pearson Correlation Assumption Context

Variables with many outliers should be checked carefully before reporting Pearson r .

