

Kendall's Tau-c Ordinal Correlation Analysis

Primary ordinal pair: studytime by G3
N used: 649
Concordant pairs: 79088
Discordant pairs: 43543
Kendall's tau-c: 0.225039
Approximate p-value: 2.51457e-12

Formula used:
 $\text{tau-c} = [2 \cdot m \cdot (C - D)] / [n^2 \cdot (m - 1)]$, where m is the smaller number of row/column categories.

Variable summary:

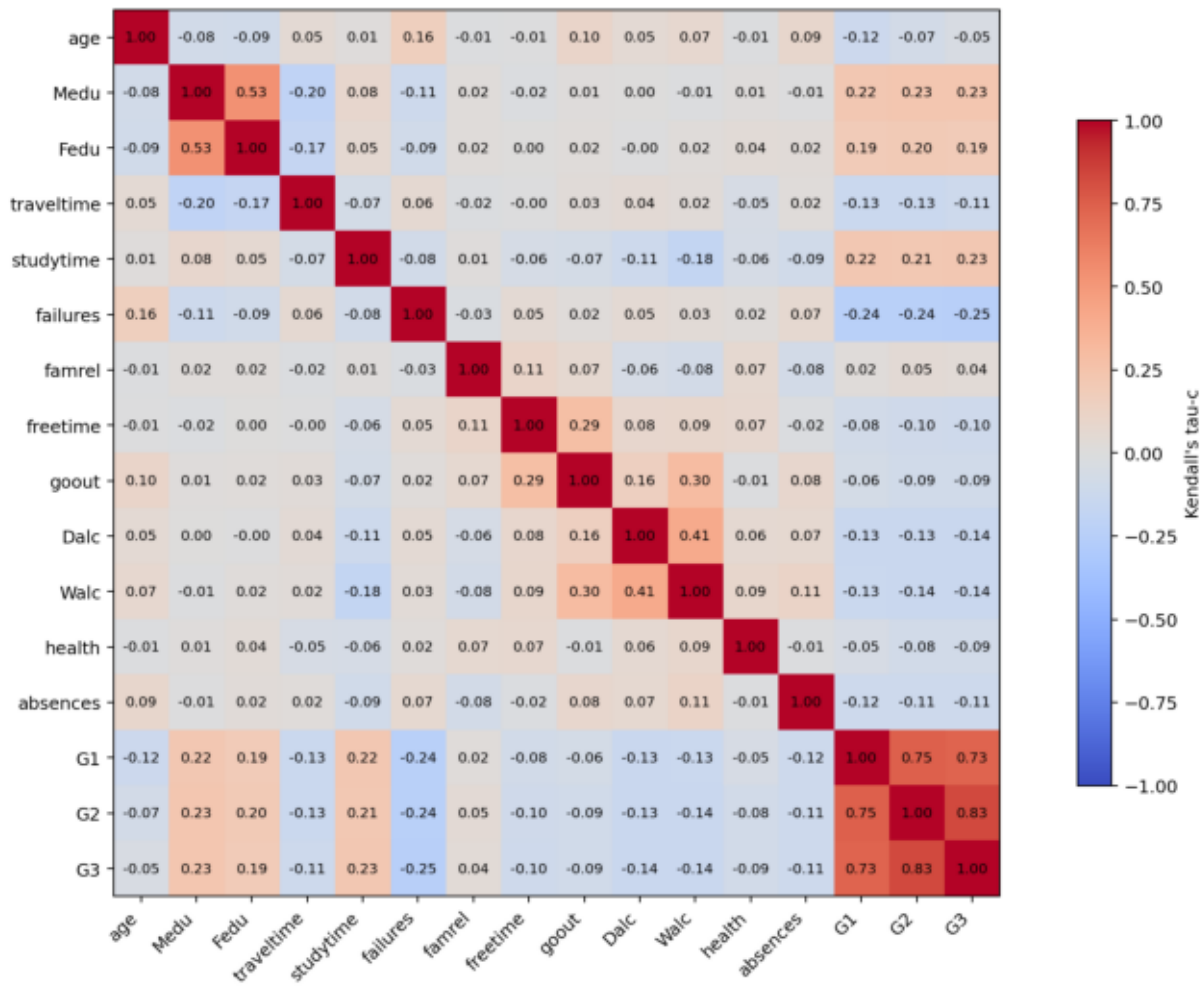
variable	valid_n	levels	minimum	maximum
age	649	8	15	22
Medu	649	5	0	4
Fedu	649	5	0	4
traveltime	649	4	1	4
studytime	649	4	1	4
failures	649	4	0	3
famrel	649	5	1	5
freetime	649	5	1	5
goout	649	5	1	5
Dalc	649	5	1	5
Walc	649	5	1	5
health	649	5	1	5
absences	649	24	0	32
G1	649	17	0	19
G2	649	16	0	19
G3	649	17	0	19

Top pairwise tau-c results:

variable_1	variable_2	n	row_levels	column_levels	m_min_levels	concordant_pairs	discordant_pairs	kendalls_tau_c	approx_p_value_kendall_rank_test	direction	strength	decision_alpha_0_05
G2	G3	649	16	17	16	169536.0	5460.0	0.831026	2.113285e-199	Positive	Very strong	Significant ordinal association
G1	G2	649	17	16	16	159879.0	12549.0	0.746209	4.403489e-161	Positive	Very strong	Significant ordinal association
G1	G3	649	17	17	17	158466.0	13791.0	0.729899	2.108694e-155	Positive	Very strong	Significant ordinal association
Medu	Fedu	649	5	5	5	107233.0	17491.0	0.532655	5.622318e-68	Positive	Strong	Significant ordinal association
Dalc	Walc	649	5	5	5	78377.0	8691.0	0.413615	4.096093e-59	Positive	Moderate	Significant ordinal association
goout	Walc	649	5	5	5	86114.0	35927.0	0.297880	1.732229e-22	Positive	Weak	Significant ordinal association
freetime	goout	649	5	5	5	84446.0	36422.0	0.285042	6.841912e-21	Positive	Weak	Significant ordinal association
failures	G3	649	4	17	4	6573.0	45952.0	-0.249312	2.182742e-30	Negative	Weak	Significant ordinal association
failures	G2	649	4	16	4	7163.0	45389.0	-0.242013	9.916502e-29	Negative	Weak	Significant ordinal association
failures	G1	649	4	17	4	7368.0	45395.0	-0.240753	1.963360e-28	Negative	Weak	Significant ordinal association
Medu	G2	649	5	16	5	90336.0	51764.0	0.228941	3.512910e-13	Positive	Weak	Significant ordinal association
Medu	G3	649	5	17	5	90343.0	51861.0	0.228406	3.982446e-13	Positive	Weak	Significant ordinal association

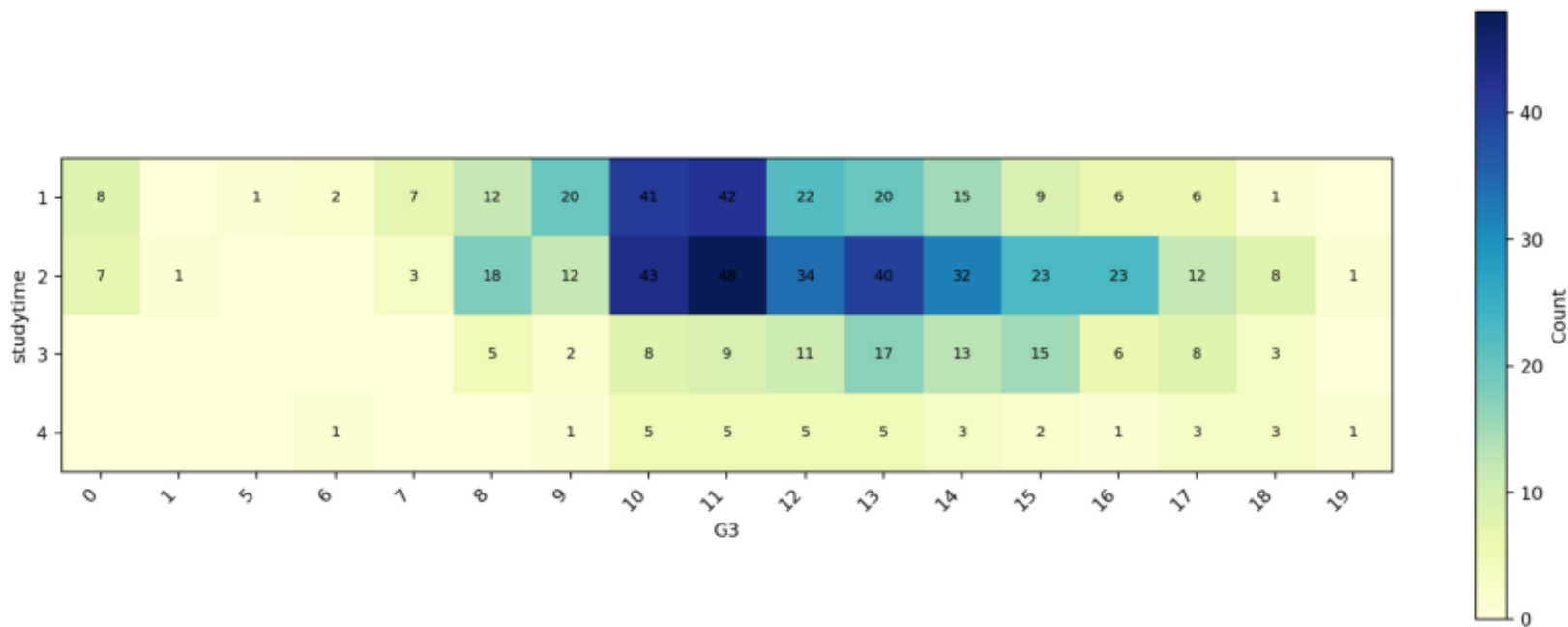
Kendall's Tau-c Correlation Heatmap

Positive values rise together; negative values move in opposite ordinal directions.



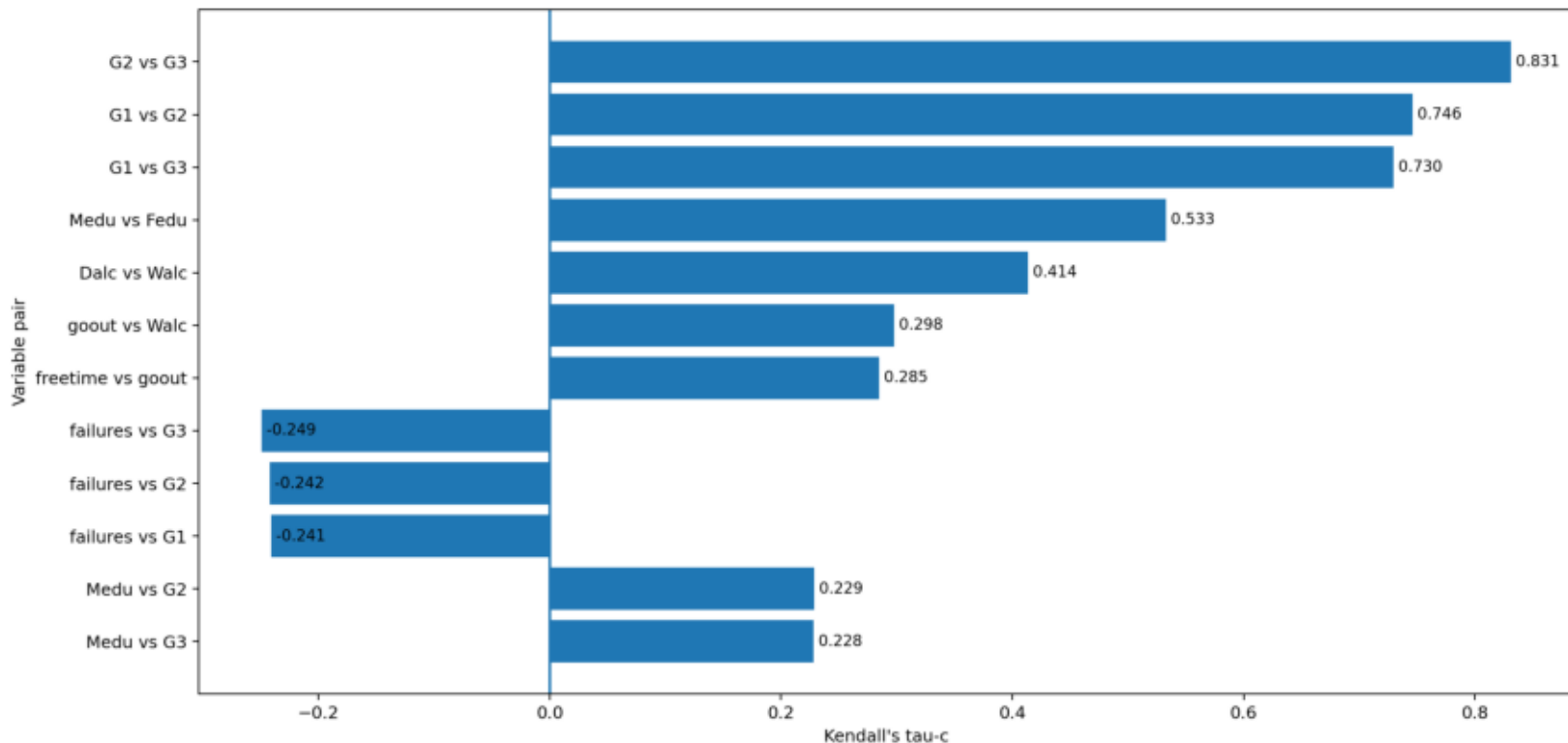
Primary Kendall's Tau-c Contingency Heatmap

Cell counts for ordinal relationship: studytime by G3.



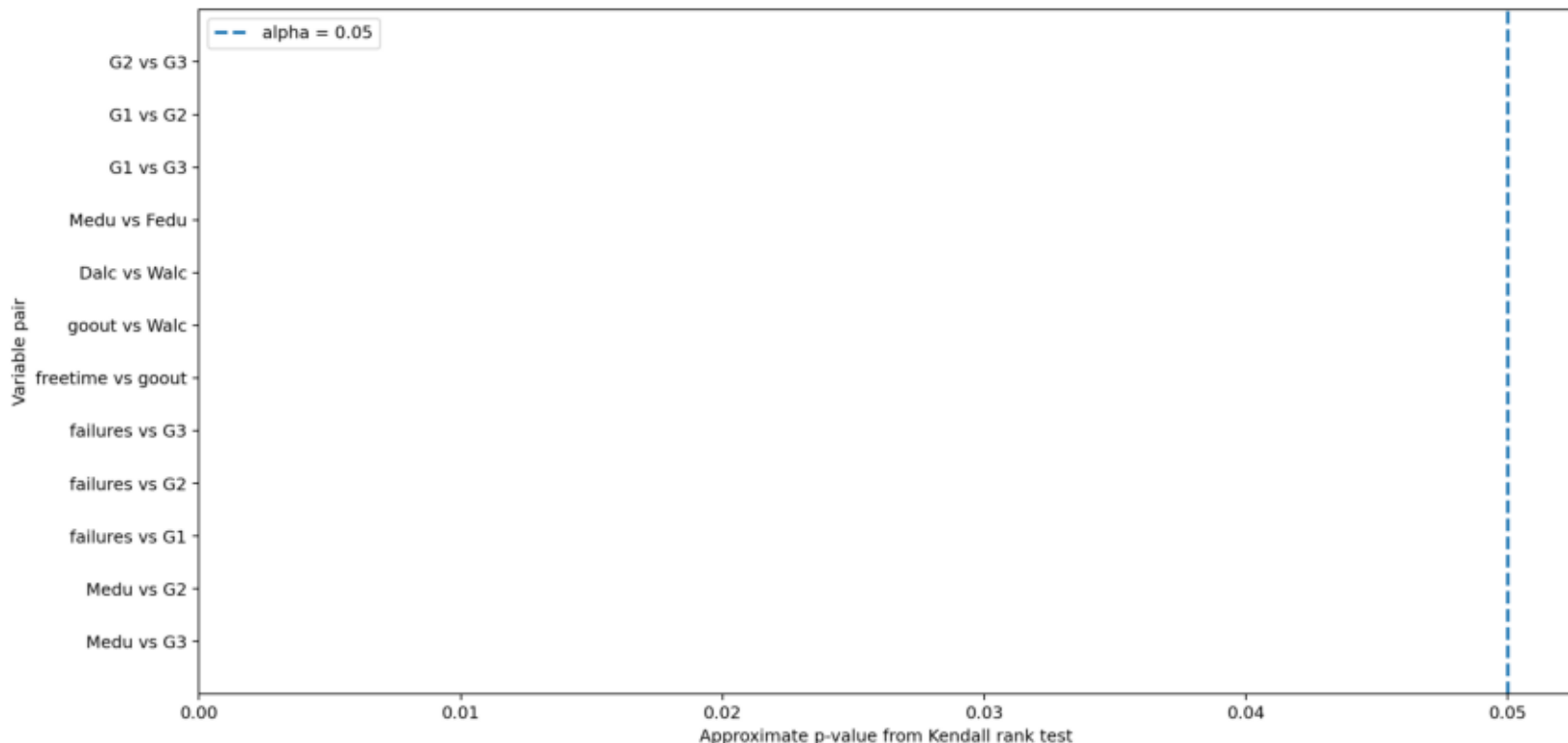
Strongest Kendall's Tau-c Relationships

Pairs are ranked by the absolute size of the ordinal association.



Kendall's Tau-c Significance Context

The p-values are Kendall rank-test approximations used as significance context for tau-c.



Ordinal Pattern for Primary Kendall's Tau-c Pair

Small jitter separates overlapping points while preserving ordinal levels.

