

Kendall's Tau-b Rank Correlation Report

Test purpose:

Kendall's Tau-b measures monotonic association between two ordinal or continuous variables.

It is useful when Pearson correlation assumptions are weak, variables are ordinal, or ties are common.

Variables analyzed: 16

Worked pair: G2 vs G3

Top associations:

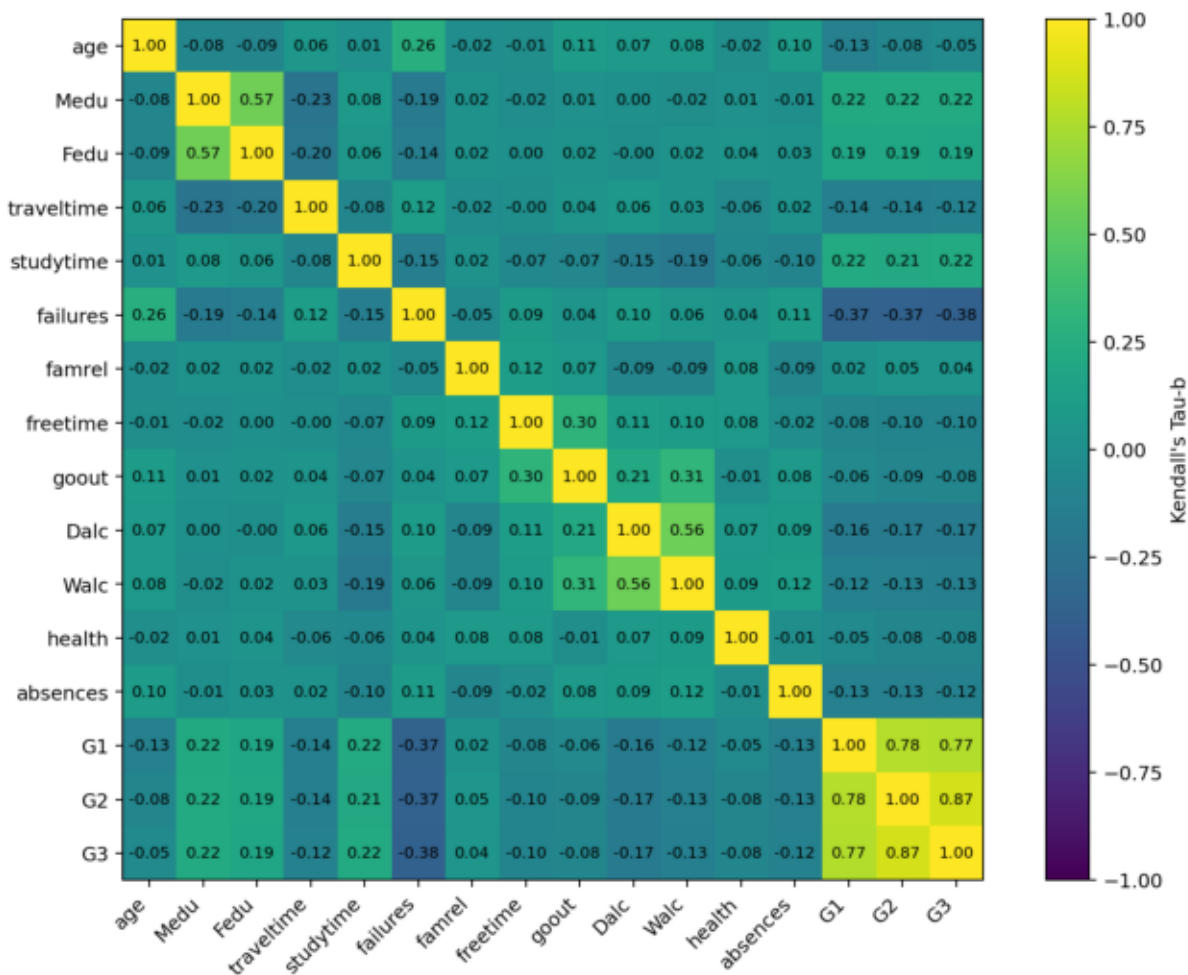
variable 1	variable 2	n_pairwise	kendalls_tau_b	p_value	two_tailed	decision
G2	G3	649	0.869595	2.113285e-199	Significant	monotonic association
G1	G2	649	0.780639	4.403489e-161	Significant	monotonic association
G1	G3	649	0.766198	2.108694e-155	Significant	monotonic association
Medu	Fedu	649	0.569954	5.622318e-68	Significant	monotonic association
Dalc	Walc	649	0.555407	4.096093e-59	Significant	monotonic association
failures	G3	649	-0.378883	2.182742e-30	Significant	monotonic association
failures	G2	649	-0.367969	9.916502e-29	Significant	monotonic association
failures	G1	649	-0.365780	1.963360e-28	Significant	monotonic association
goout	Walc	649	0.314907	1.732229e-22	Significant	monotonic association
freetime	goout	649	0.303904	6.841912e-21	Significant	monotonic association
age	failures	649	0.258367	1.259734e-13	Significant	monotonic association
Medu	traveltime	649	-0.230626	2.076133e-11	Significant	monotonic association

Assumption notes:

1. Observations should be paired and independent.
2. Variables should be at least ordinal.
3. Kendall's Tau-b handles ties, but heavy ties should be reported.
4. The relationship should be monotonic for substantive interpretation.

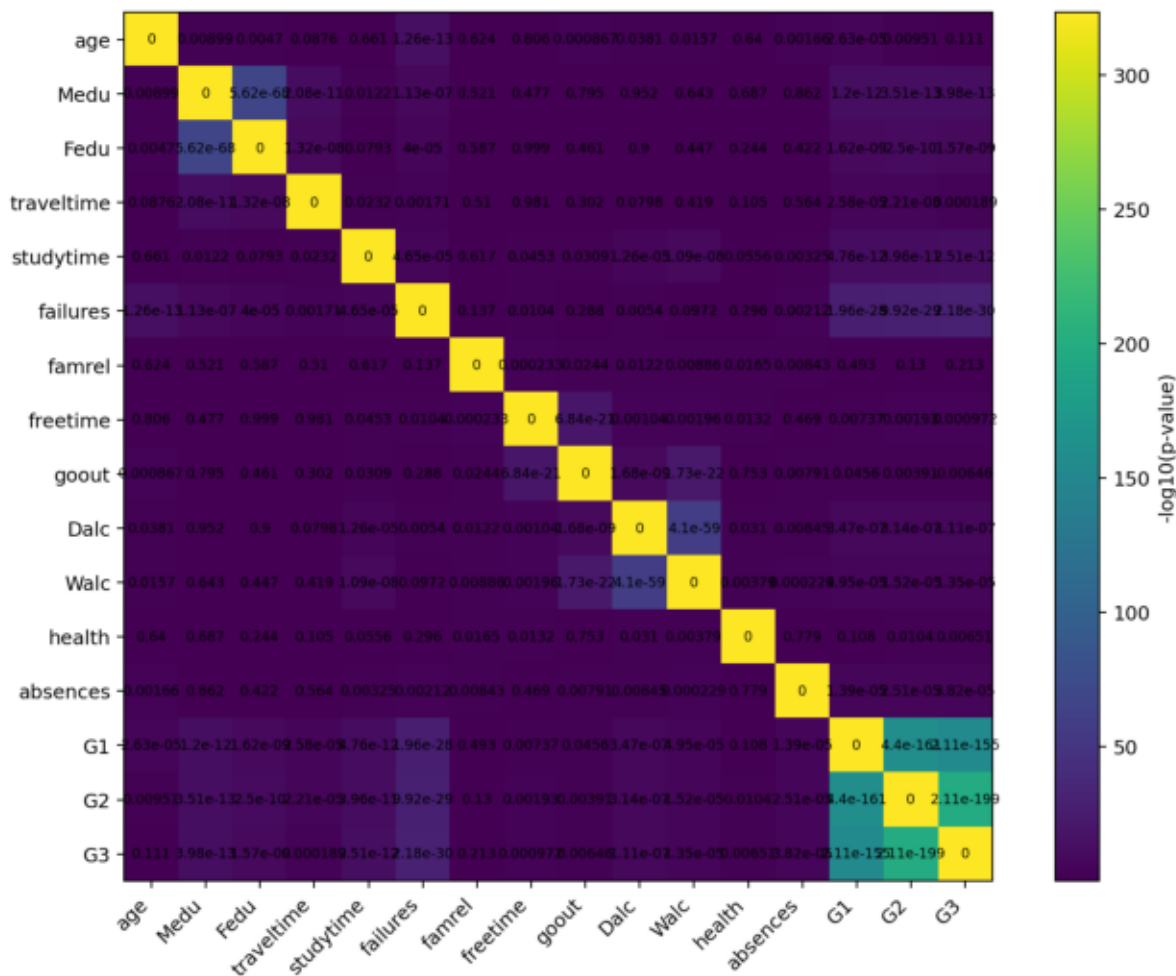
Kendall's Tau-b Correlation Heatmap

Positive values indicate increasing monotonic association; negative values indicate decreasing association.



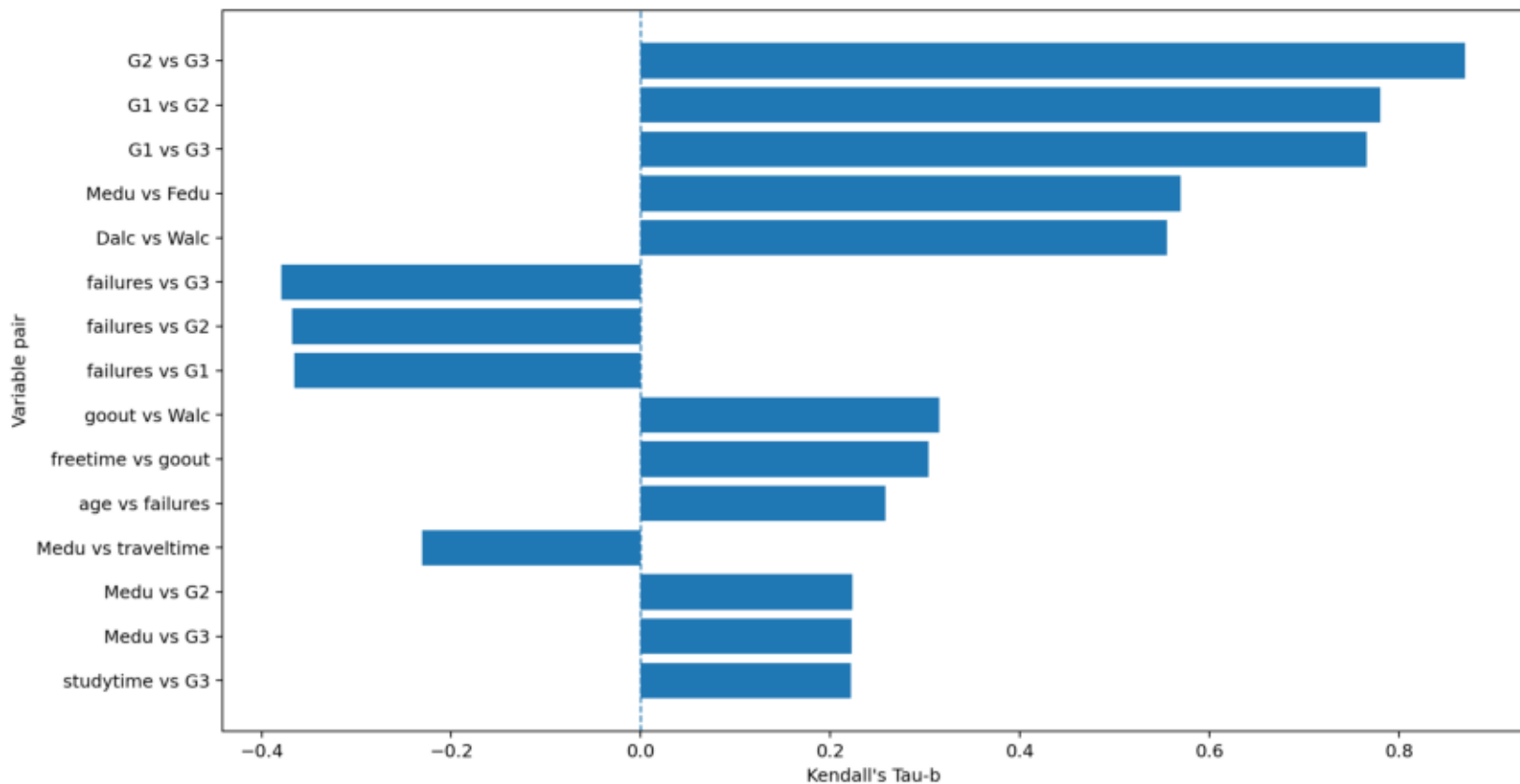
Kendall's Tau-b p-value Heatmap

Smaller p-values provide stronger evidence against the null of no monotonic association.



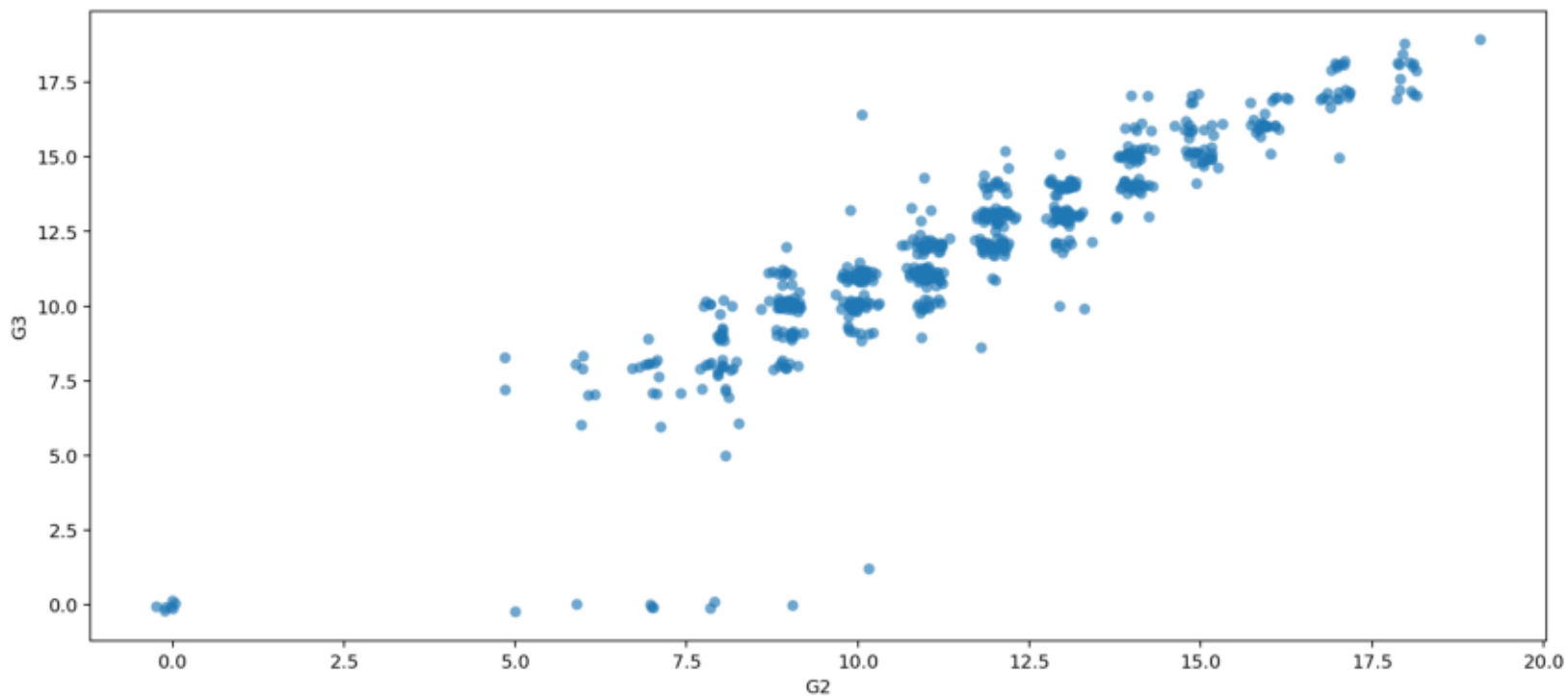
Strongest Kendall's Tau-b Associations

Pairs are ranked by the absolute size of the monotonic relationship.



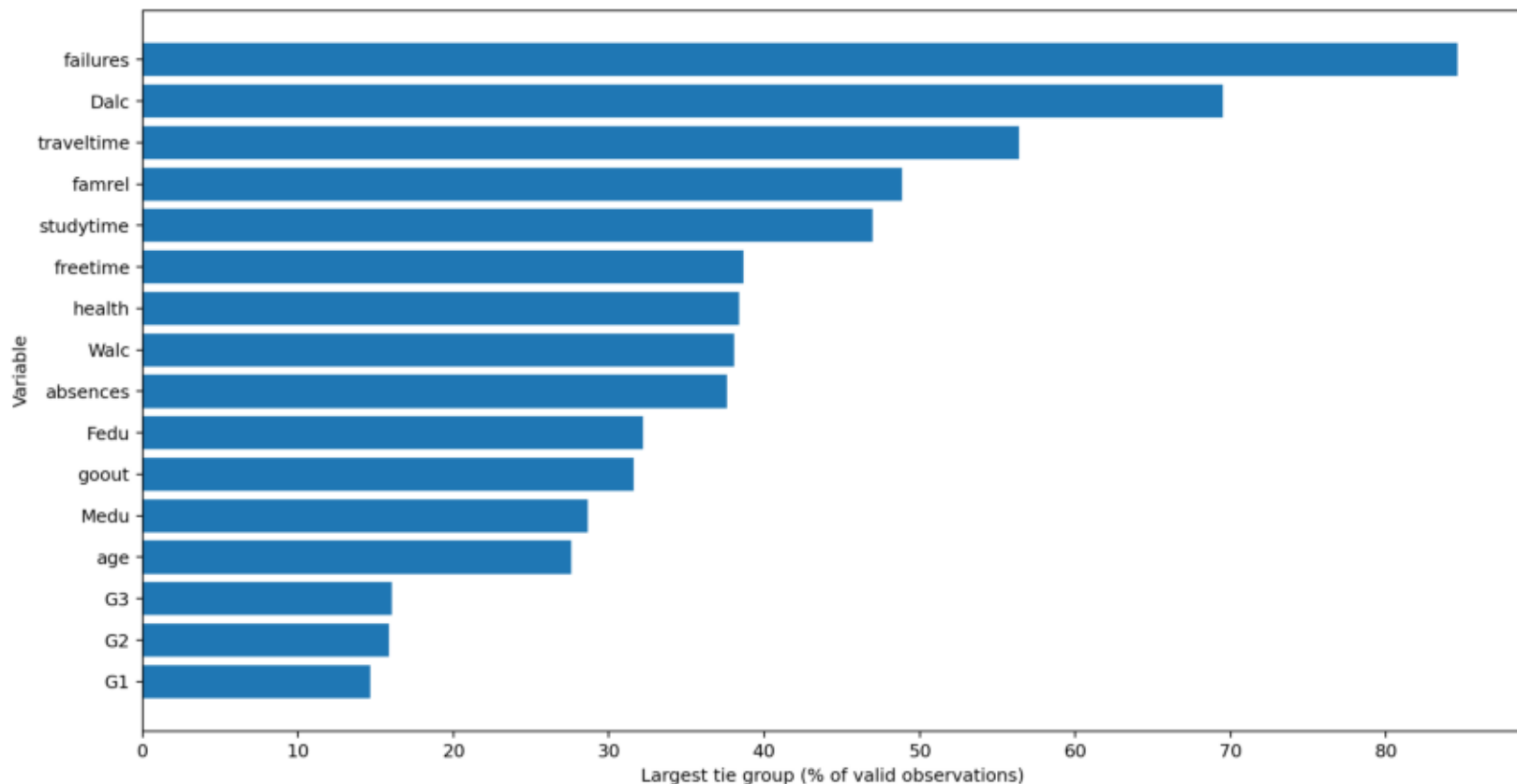
Kendall's Tau-b Worked Pair: Jittered Rank Scatter

Selected strongest pair: tau-b = 0.8696, $p = 2.113\text{e-}199$, $n = 649$.



Tie Profile for Kendall's Tau-b

Tau-b adjusts for tied ranks; variables with many repeated values need the tie correction.



Kendall's Tau-b Pair Classification

G2 vs G3 uses all pairwise row comparisons.

