

Jonckheere-Terpstra Ordered Trend Test

Standalone verified Python analysis

Test: Jonckheere-Terpstra Ordered Trend Test

Design: Ordered final-grade trend across study-time levels 1 through 4.

Variables: G3, ordered studytime

Null hypothesis: There is no monotone increase in final grade as study time increases.

Formula: $JT = \sum_{i < j} [\text{number}(Y_j > Y_i) + 0.5 \text{ number}(Y_j = Y_i)]$; p uses fixed-size permutation.

Source rows: 649

Calculated metrics:

jt_statistic: 85922.0

permutation_null_mean: 68196.97775

permutation_null_sd: 2591.876165185707

z_from_permutation: 6.838684072983094

one_sided_monte_carlo_p: 0.0004997501249375312

permutations: 2000

seed: 20260716

Independent reference values:

jt_statistic: 85922.0

permutation_null_mean: 68196.97775

permutation_null_sd: 2591.876165185707

z_from_permutation: 6.838684072983094

one_sided_monte_carlo_p: 0.0004997501249375312

permutations: 2000

seed: 20260716

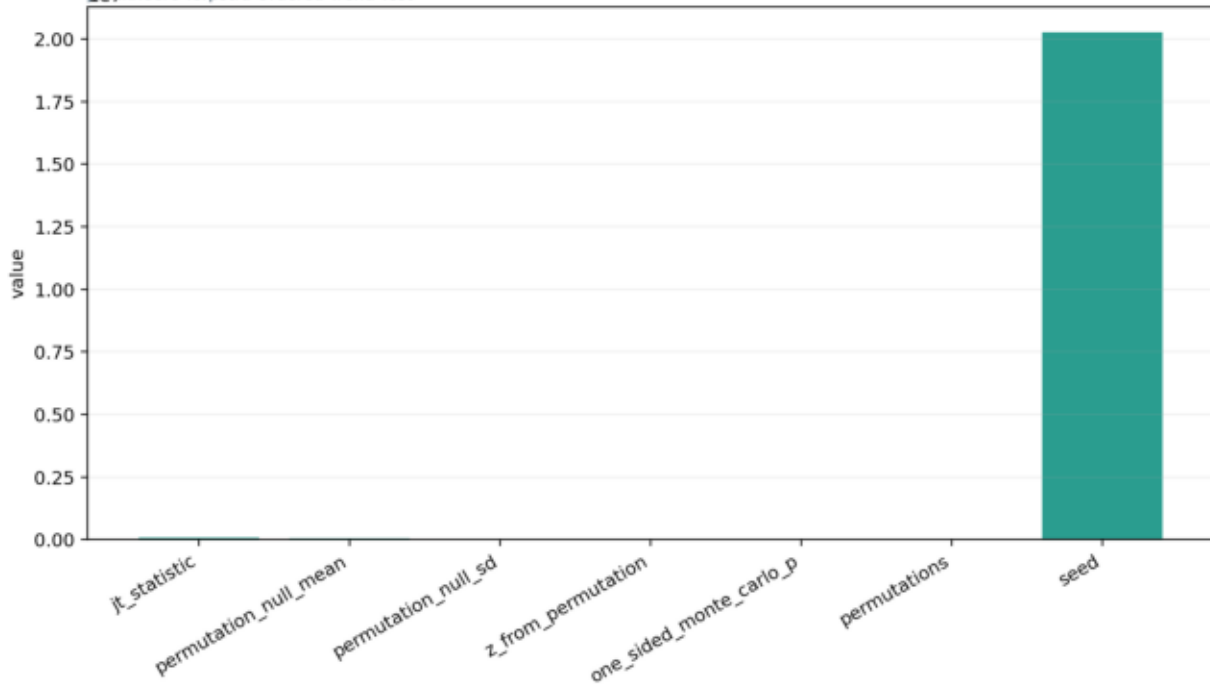
Interpretation:

Only increases in the prespecified study-time order contribute favorable pairs.

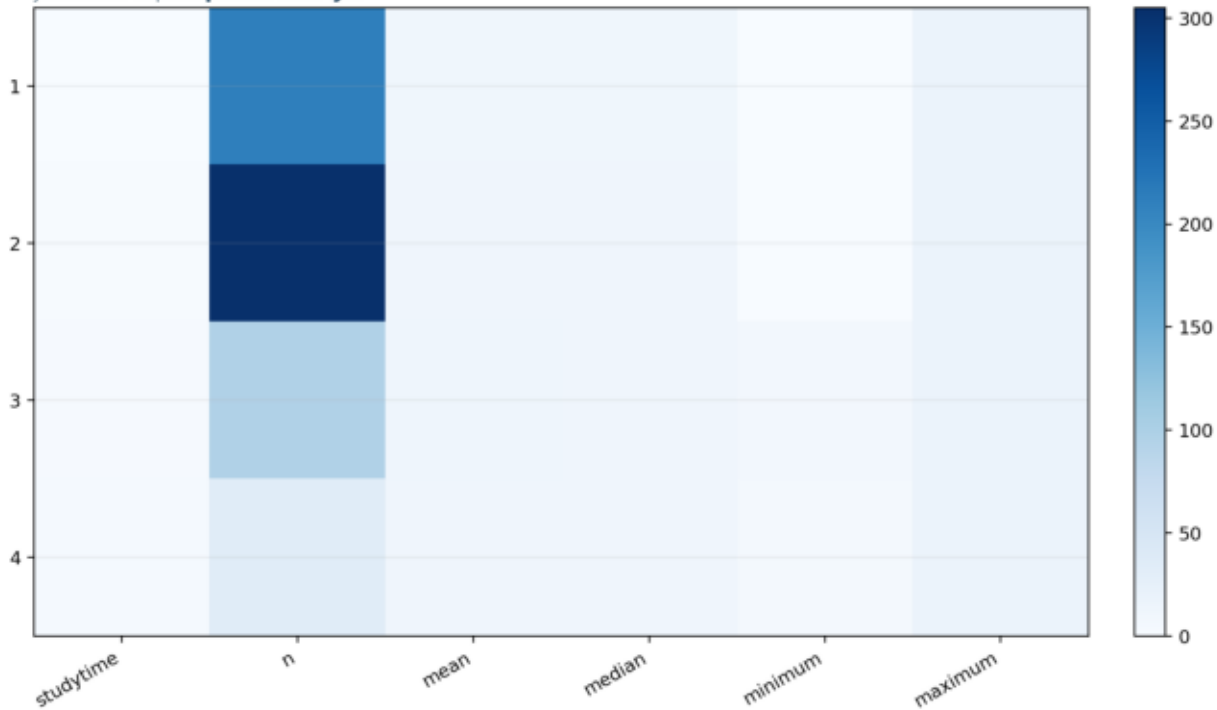
The one-sided permutation p-value is 0.00049975 from 2,000 fixed-size permutations.

Primary Metrics

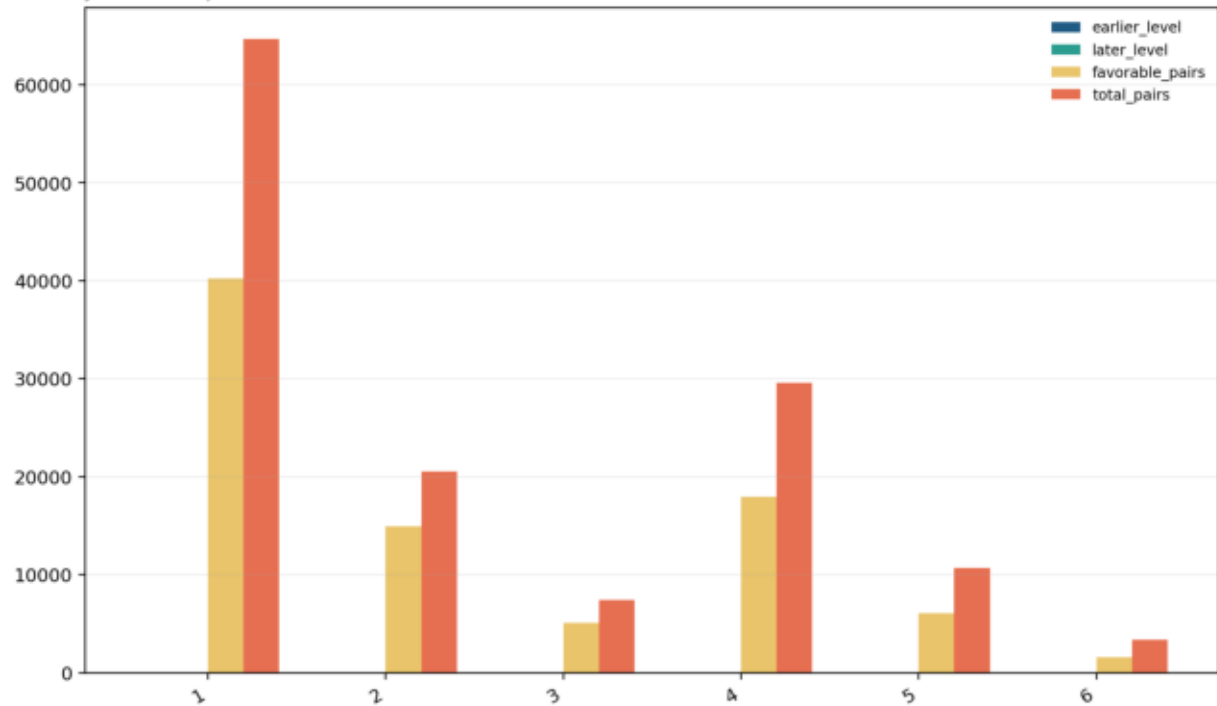
Perkheere-Terpstra Ordered Trend Test



Ordered Group Summary

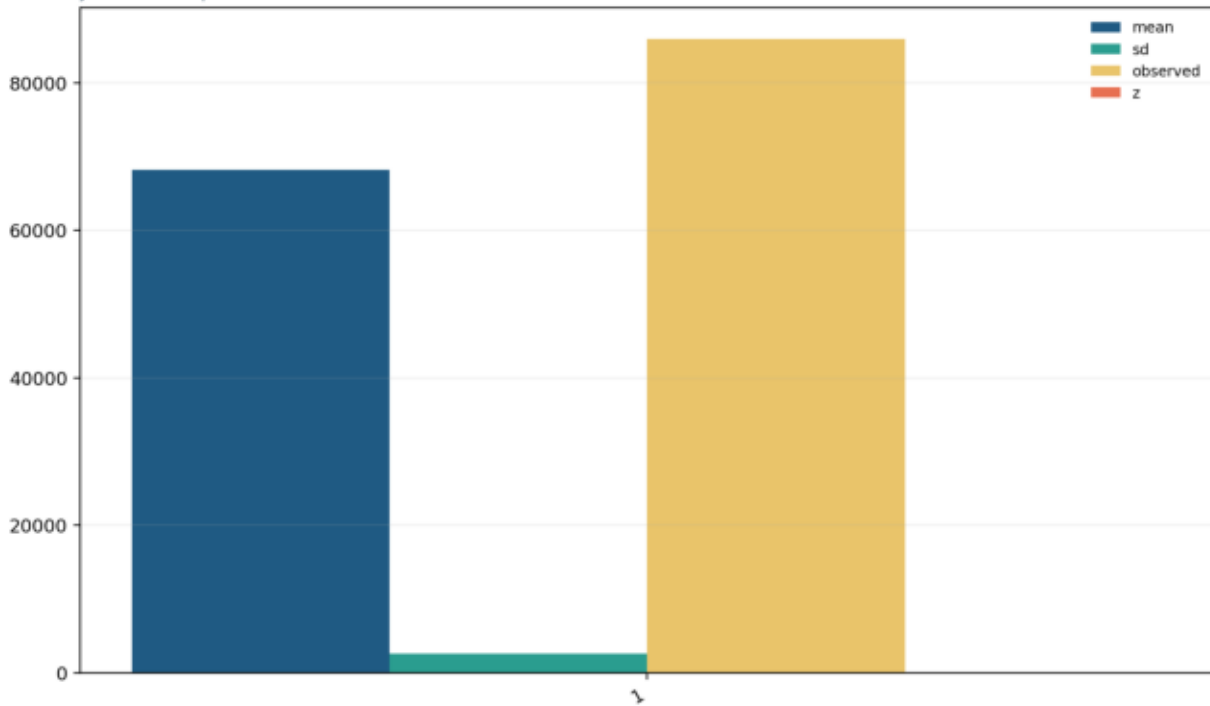


Pairwise Order Counts

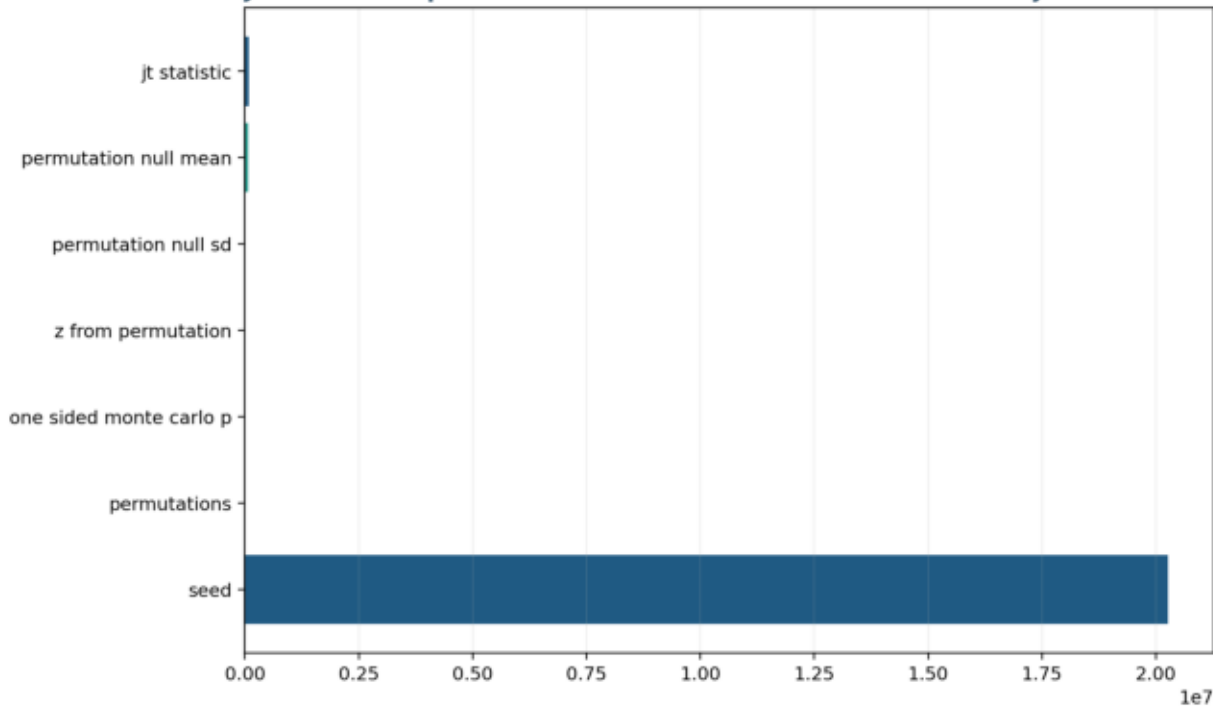


Null Reference

Ordered Trend Test



Jonckheere-Terpstra Ordered Trend Test verified result summary



Primary Metrics

metric	value
jt_statistic	85922
permutation_null_mean	68197
permutation_null_sd	2591.88
z_from_permutation	6.83868
one_sided_monte_carlo_p	0.00049975
permutations	2000
seed	2.02607e+07

Ordered Group Summary

studytime	n	mean	median	minimum	maximum	q1	q3
1	212	10.8443	11	0	18	10	13
2	305	12.0918	12	0	19	10	14
3	97	13.2268	13	8	18	12	15
4	35	13.0571	13	6	19	11	15

Pairwise Order Counts

earlier_level	later_level	favorable_pairs	total_pairs
1	2	40254.5	64660
1	3	14961.5	20564
1	4	5116.5	7420
2	3	17926.5	29585
2	4	6082.5	10675
3	4	1580.5	3395

Null Reference

mean	sd	observed	z
68197	2591.88	85922	6.83868