

Conover-Iman Post-Hoc Test

Standalone verified Python analysis

Test: Conover-Iman Post-Hoc Test

Design: Pairwise rank comparisons of final grade across four study-time groups after Kruskal-Wallis.

Variables: G3, studytime

Null hypothesis: Every pair of study-time groups has the same distributional location.

Formula: $t_{ij} = (\bar{R}_i - \bar{R}_j) / \sqrt{s^2 (N-1-H^*) / (N-k) (1/n_i + 1/n_j)}$

Source rows: 649

Calculated metrics:

kruskal_wallis_h: 50.31620817945674
omnibus_p_value: 6.841570528918375e-11
rank_variance_s2: 34704.86342592593
minimum_holm_p: 2.315266878242286e-10

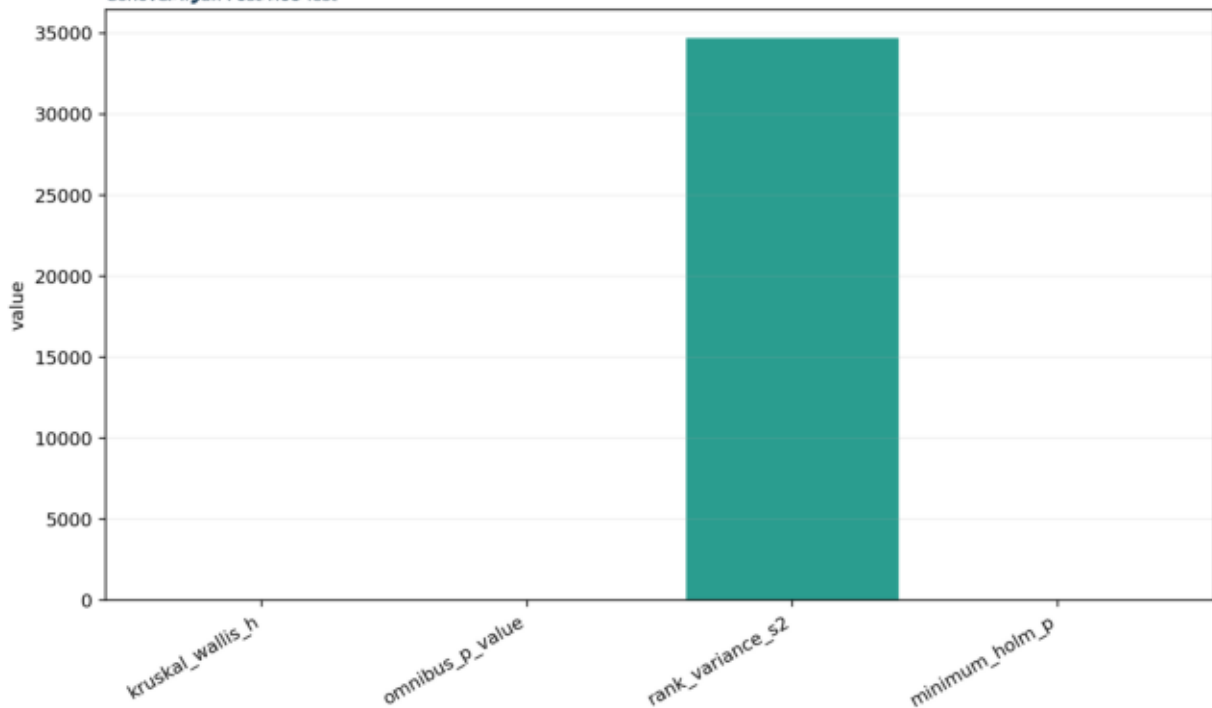
Independent reference values:

kruskal_wallis_h: 50.31620817945674
omnibus_p_value: 6.841570528918375e-11
rank_variance_s2: 34704.86342592593
minimum_holm_p: 2.315266878242286e-10

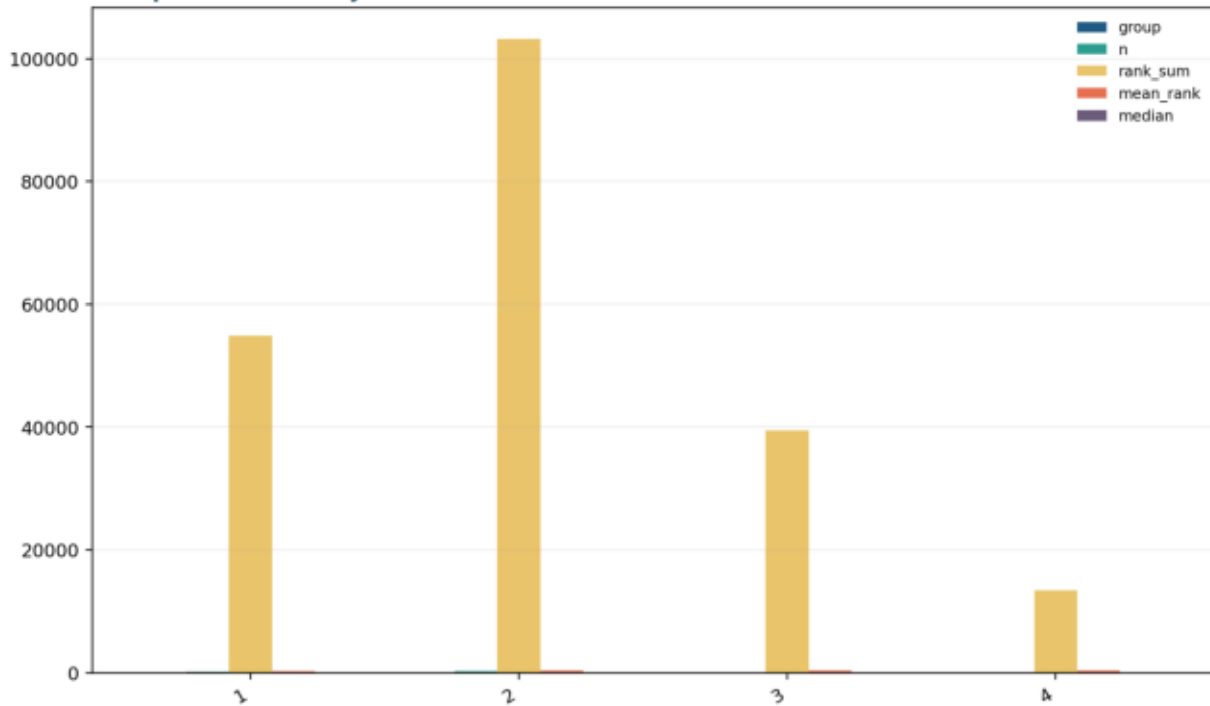
Interpretation:

The tie-corrected omnibus H is 50.316208 (p=6.84157e-11).
Conover-Iman pairwise t statistics use the pooled rank variance and N-k degrees of freedom.

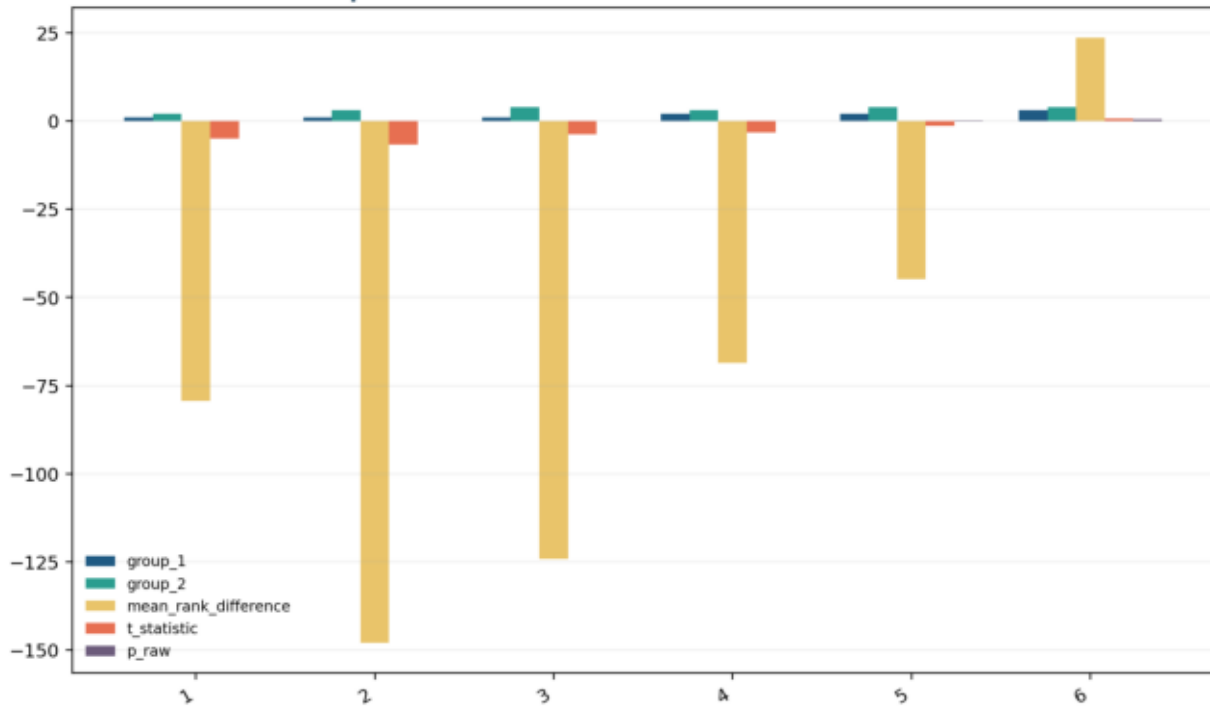
Primary Metrics



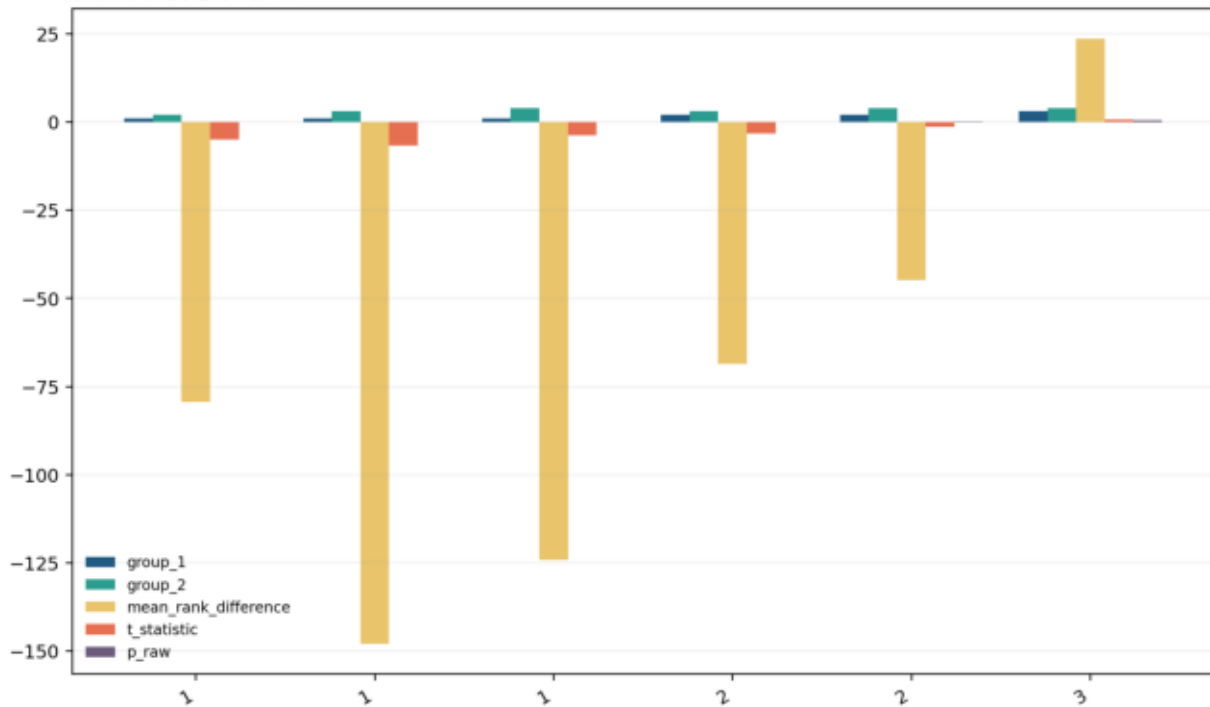
Group Rank Summary



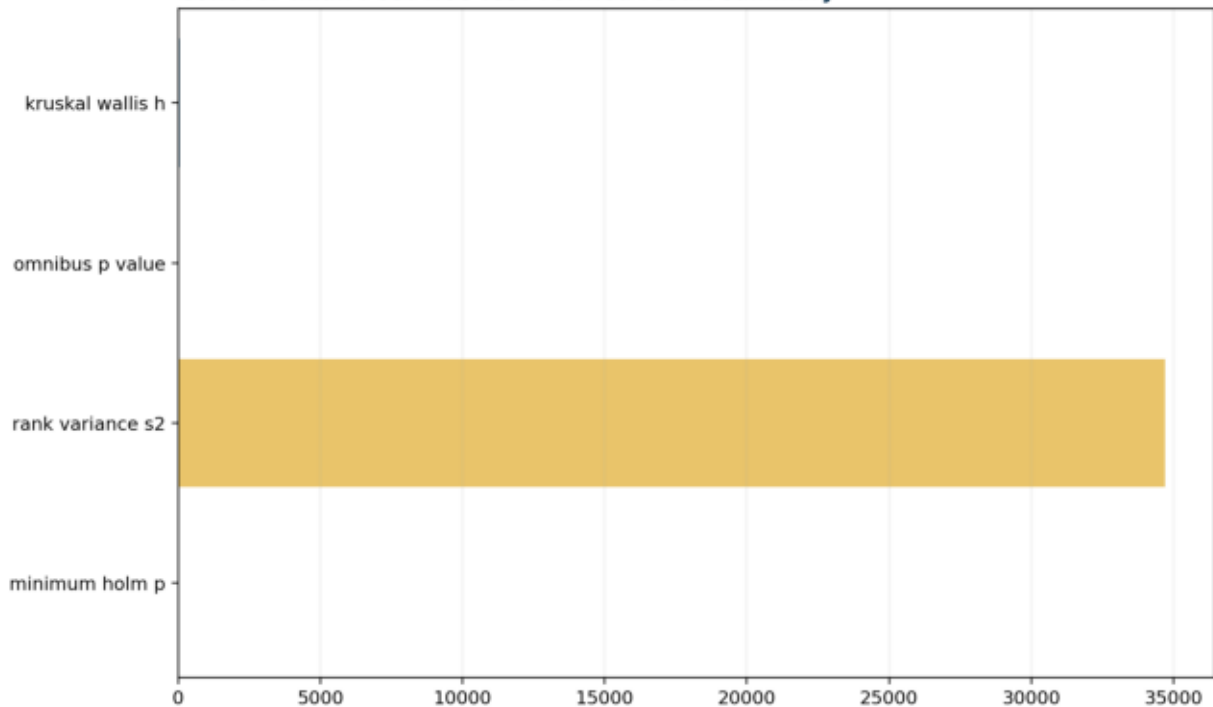
Conover Pairwise Comparisons



Holm Decisions Test



Conover-Iman Post-Hoc Test verified result summary



Primary Metrics

metric	value
kruskal_wallis_h	50.3162
omnibus_p_value	6.84157e-11
rank_variance_s2	34704.9
minimum_holm_p	2.31527e-10

Group Rank Summary

group	n	rank_sum	mean_rank	median
1	212	54889.5	258.913	11
2	305	103170	338.264	12
3	97	39455.5	406.758	13
4	35	13409.5	383.129	13

Conover Pairwise Comparisons

group_1	group_2	mean_rank_difference	t_statistic	p_raw	p_holm
1	2	-79.3512	-4.94852	9.55463e-07	4.77732e-06
1	3	-147.845	-6.72559	3.85878e-11	2.31527e-10
1	4	-124.216	-3.79646	0.00016062	0.000642478
2	3	-68.4938	-3.2766	0.00110699	0.00332098
2	4	-44.8646	-1.40184	0.161445	0.32289
3	4	23.6292	0.668236	0.504222	0.504222

Holm Decisions

group_1	group_2	mean_rank_difference	t_statistic	p_raw	p_holm	significant_holm
1	2	-79.3512	-4.94852	9.55463e-07	4.77732e-06	True
1	3	-147.845	-6.72559	3.85878e-11	2.31527e-10	True
1	4	-124.216	-3.79646	0.00016062	0.000642478	True
2	3	-68.4938	-3.2766	0.00110699	0.00332098	True
2	4	-44.8646	-1.40184	0.161445	0.32289	False
3	4	23.6292	0.668236	0.504222	0.504222	False