Hochberg's GT2 Post Hoc Analysis

Purpose: compare all pairs of group means after a one-way ANOVA.
H0 for each pair: the two group means are equal.
H1 for each pair: the two group means are different.

Summary:

analysis	target_variable	group_variable	number_of_groups	number_of_pairwise_comparisons	significant_pairwise_comparisons_alpha_0_05	omnibus_anova_p_value	alpha	method_note	when_to_use_note
Hochberg's GT2 post hoc pairwise comparison test	G3	studytime	4	6	4	5.705728e-10	0.05	Python uses an educational GT2-style maximum-modulus approximation. Use SPSS output for the official SPSS Hochberg's GT2 table.	Hochberg's GT2 is commonly used after one-way ANOVA for pairwise comparisons and homogeneous subsets, especially when group sizes are unequal but not extremely unbalanced.

ANOVA table:

source	sum_of_squares	df	mean_square	f_value	p_value
Between groups	465.077825	3	155.025942	15.876268	5.705728e-10
Within groups	6298.188739	645	9.764634	NaN	NaN
Total	6763.266564	648	NaN	NaN	NaN

Assumption context:

check	statistic	p_value	note
Brown-Forsythe / median Levene	NaN	NaN	Robust equal-variance context for post hoc selection.
Bartlett variance test	NaN	NaN	Sensitive to non-normality; use as context only.

Group summary:

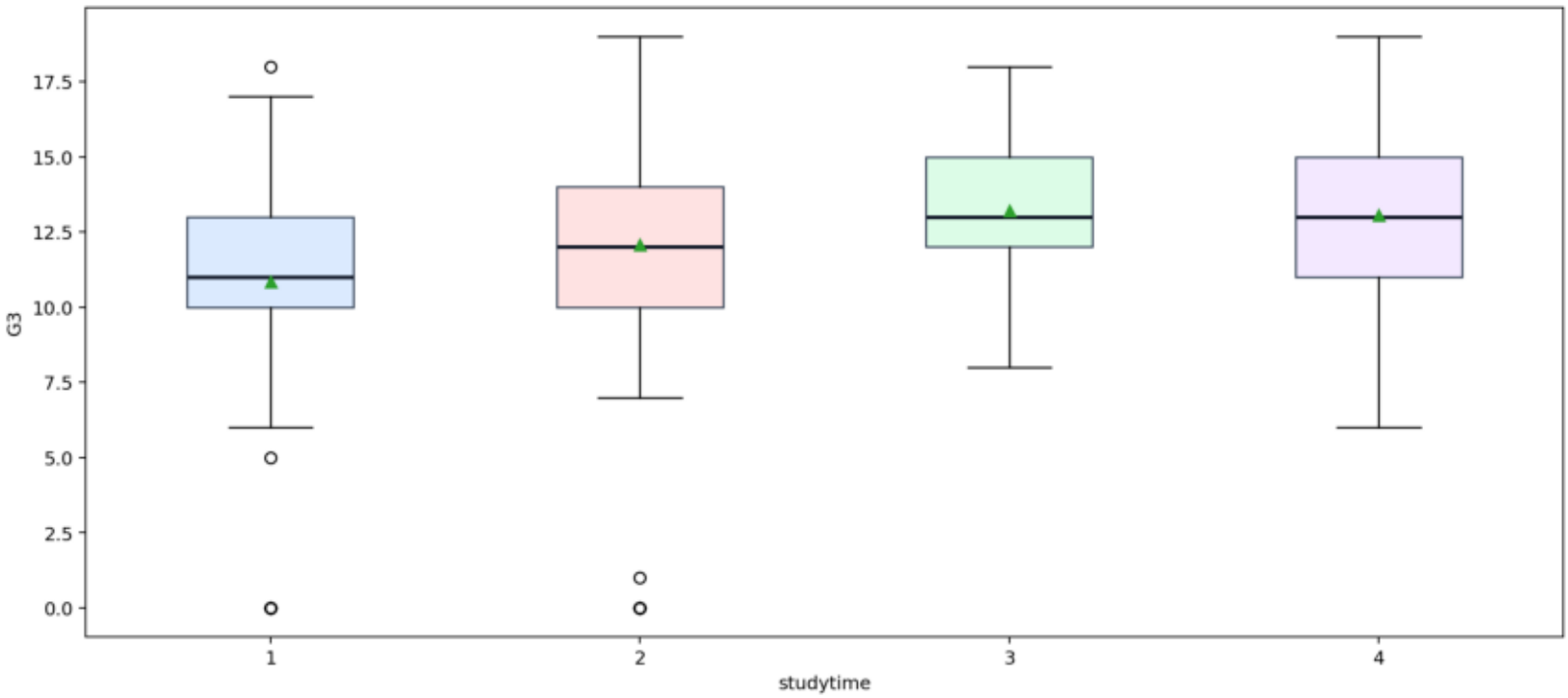
group	n	mean	standard_deviation	variance	standard_error	minimum	maximum	mean_ci95_lower	mean_ci95_upper
1	212	10.844340	3.218624	10.359541	0.221056	0	18	10.411070	11.277609
2	305	12.091803	3.243125	10.517860	0.185701	0	19	11.727830	12.455777
3	97	13.226804	2.502104	6.260524	0.254050	8	18	12.728866	13.724742
4	35	13.057143	3.038410	9.231933	0.513585	6	19	12.050516	14.063769

Hochberg's GT2 pairwise comparisons:

group_1	group_2	mean_group_1	mean_group_2	mean_difference_group_1_minus_group_2	absolute_mean_difference	n_group_1	n_group_2	harmonic_mean_n_all_groups	mse_within	hochbergs_gt2_standard_error	hochbergs_gt2_max_modulus_statistic	df_error	k_groups	pairwise_comparison_count	max_modulus_critical_alpha_0_05_approx	hochbergs_gt2_adjusted_p_value_approx	hochbergs_gt2_critical_difference	hochbergs_gt2_ci95_lower	hochbergs_gt2_ci95_upper	alpha	decision_alpha_0_05
1	3	10.844340	13.226804	-2.382465	2.382465	212	97	85.330827	9.764634	0.383048	6.219751	645	4	6	2.639141	5.371758e-09	1.010918	-3.393383	-1.371546	0.05	Significant
1	2	10.844340	12.091803	-1.247464	1.247464	212	305	85.330827	9.764634	0.279419	4.464497	645	4	6	2.639141	5.683834e-05	0.737425	-1.984889	-0.510039	0.05	Significant
1	4	10.844340	13.057143	-2.212803	2.212803	212	35	85.330827	9.764634	0.570131	3.881220	645	4	6	2.639141	6.875444e-04	1.504655	-3.717459	-0.708148	0.05	Significant
2	3	12.091803	13.226804	-1.135001	1.135001	305	97	85.330827	9.764634	0.364255	3.115953	645	4	6	2.639141	1.143463e-02	0.961320	-2.096320	-0.173681	0.05	Significant
2	4	12.091803	13.057143	-0.965340	0.965340	305	35	85.330827	9.764634	0.557678	1.730998	645	4	6	2.639141	4.090223e-01	1.471791	-2.437130	0.506451	0.05	Not significant
3	4	13.226804	13.057143	0.169661	0.169661	97	35	85.330827	9.764634	0.616162	0.275352	645	4	6	2.639141	9.998960e-01	1.626139	-1.456477	1.795800	0.05	Not significant

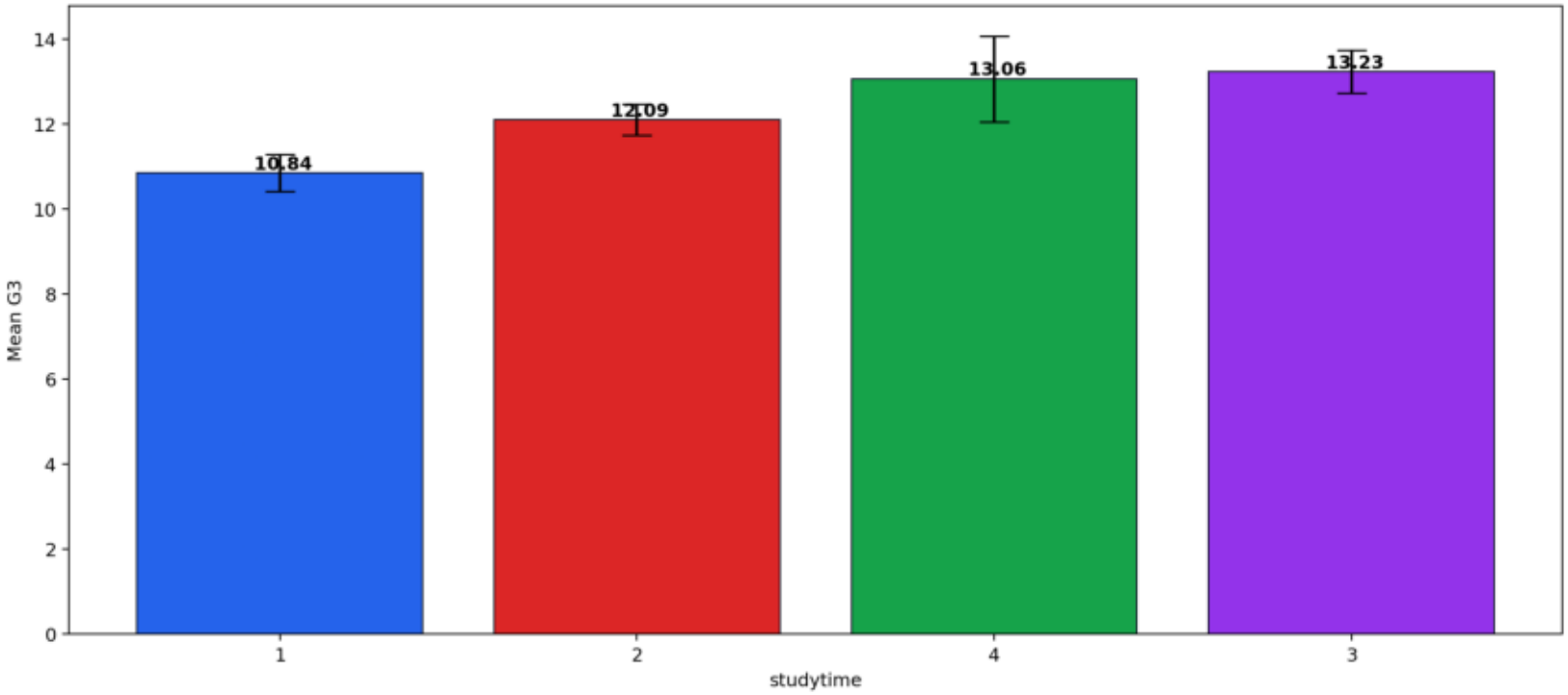
Hochberg's GT2: Colorful Group Distribution Boxplots

Boxplots show group centers and spreads before GT2 post-hoc pairwise comparisons.



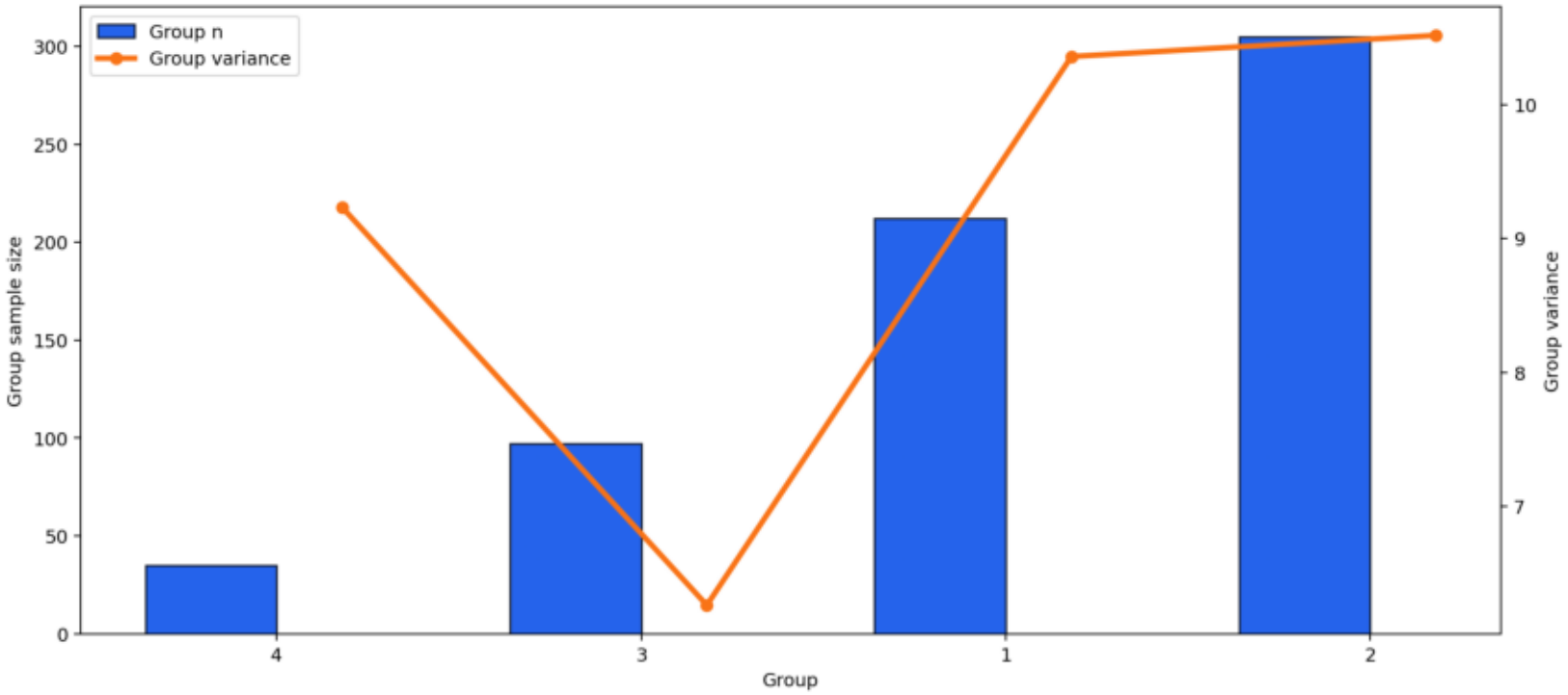
Hochberg's GT2: Colorful Group Means with 95% CIs

GT2 compares each pair of group means after the omnibus one-way ANOVA.



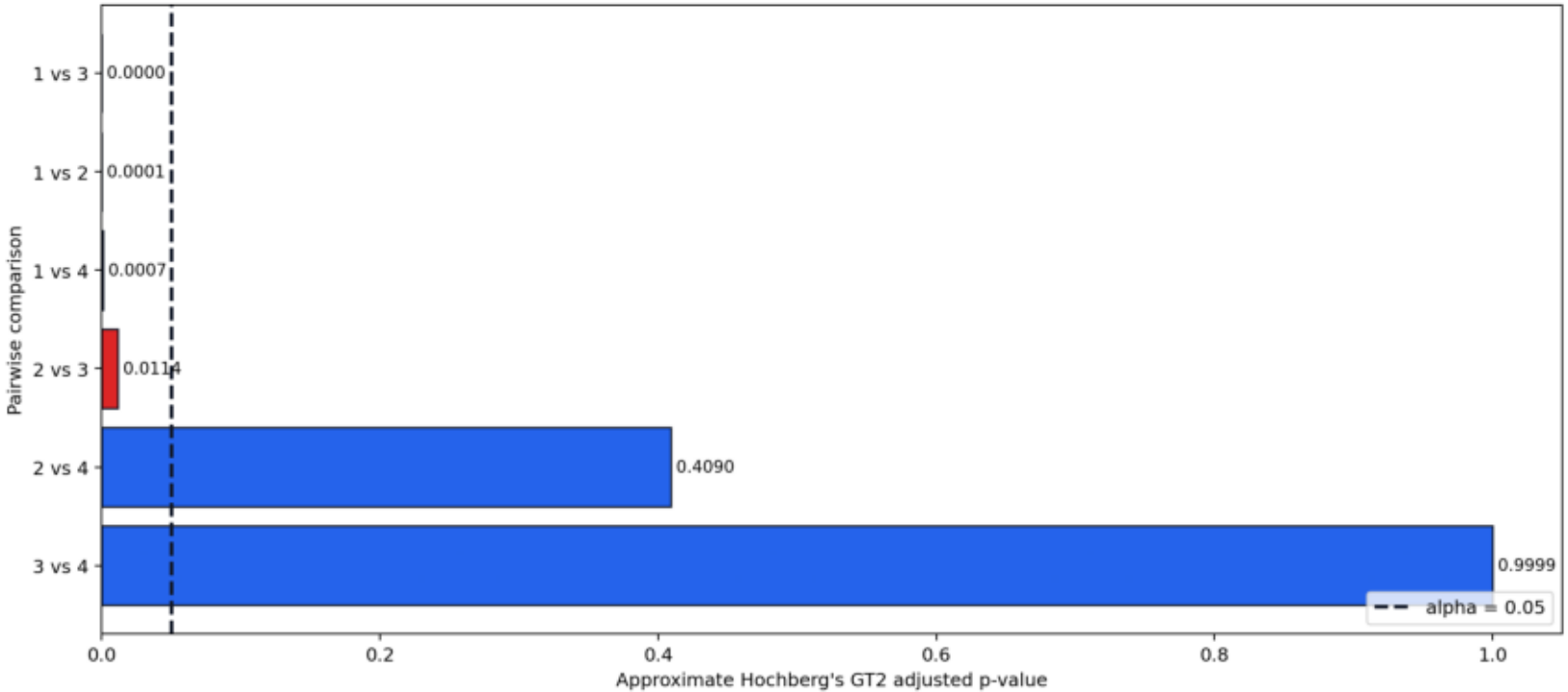
Hochberg's GT2: Group Size and Variance Context

GT2 is often selected when equal variances are assumed and sample sizes differ across groups.



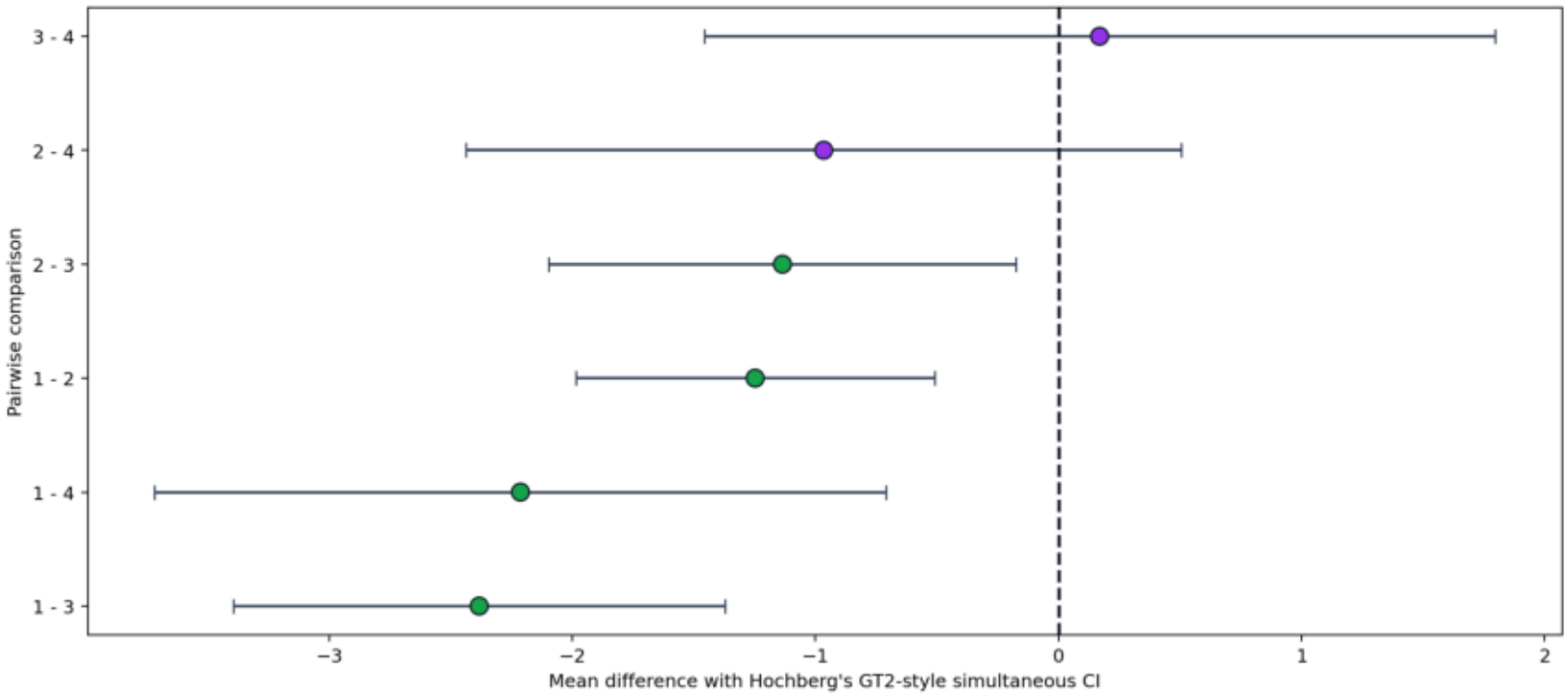
Hochberg's GT2: Colorful Pairwise Adjusted p-values

Red bars are significant at .05; blue bars are not significant under the GT2-style approximation.



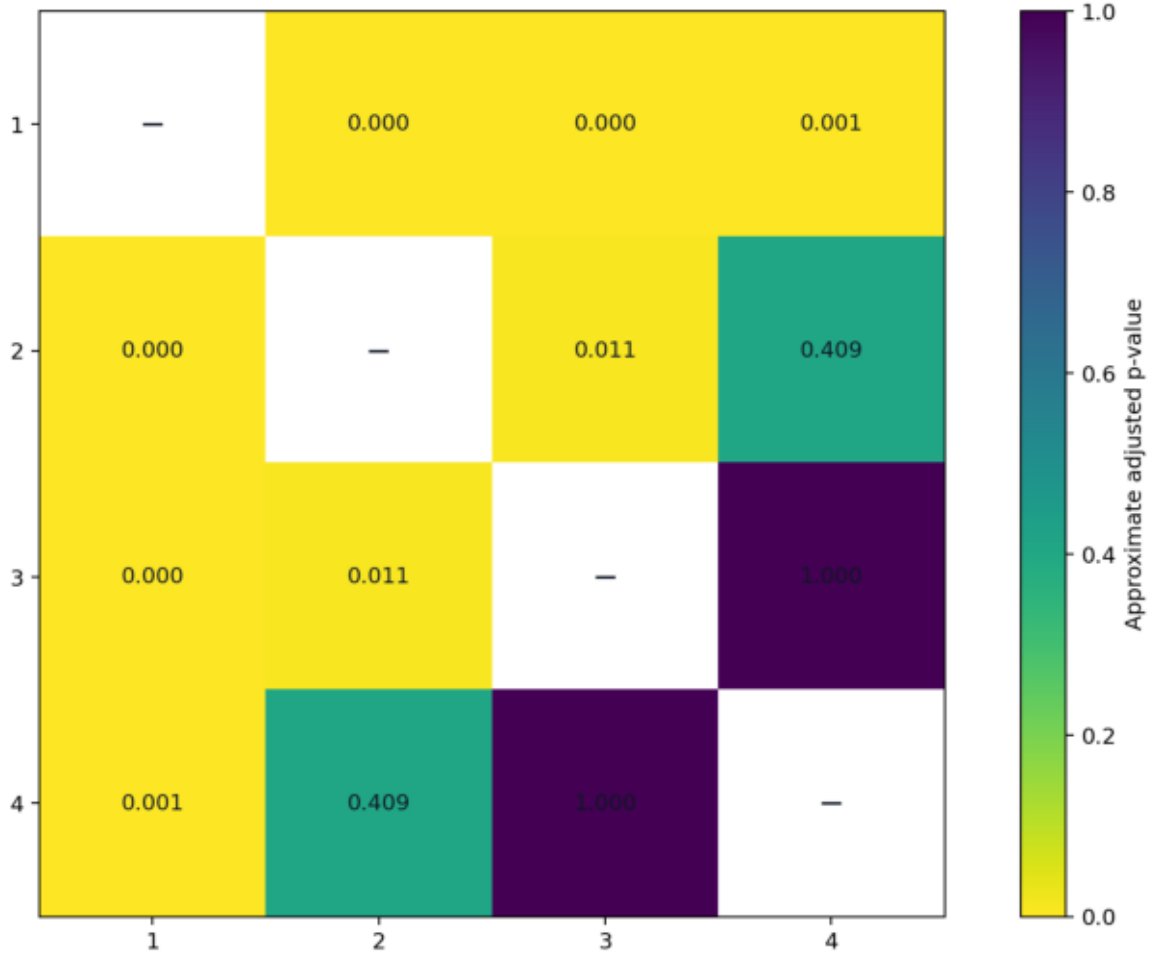
Hochberg's GT2: Colorful Mean Difference Intervals

Intervals that exclude zero indicate pairwise mean differences after familywise adjustment.



Hochberg's GT2: Pairwise p-value Heatmap

Darker cells represent smaller adjusted p-values for pairwise group comparisons.



Hochberg's GT2: Significant Difference Count by Group

This chart highlights which groups drive the post-hoc differences.