

Newman Keuls Test / Student-Newman-Keuls Post Hoc Analysis

Purpose: compare ordered group means after one-way ANOVA.

H0 for ANOVA: all group means are equal.

Post hoc focus: identify homogeneous subsets and ordered mean differences.

ANOVA result:

	target_variable	group_variable	number_of_groups	total_n	grand_mean	ss_between	df_between	ms_between		
1	G3	studytime	4	649	11.90601	465.0778	3	155.0259		
	ss_within_error	df_within_error	ms_within_error	f_statistic	p_value	eta_squared	omega_squared	alpha		
1	6298.189	645	9.764634	15.87627	5.705728e-10	0.06876527	0.06434105	0.05		
	anova_decision_alpha_0_05									
1	Reject equal means									

Variance-assumption context:

	context_test
1	Bartlett and Levene context should be reviewed before relying on equal-variance post hoc tests.
	note
1	Base R script focuses on ANOVA and SNK-style ordered comparisons.

Group summary:

	group	n	mean	standard_deviation	variance	minimum	maximum	standard_error	ci95_low	ci95_high
1	1	212	10.84434	3.218624	10.359541	0	18	0.2210560	10.41107	11.27761
2	2	305	12.09180	3.243125	10.517860	0	19	0.1857008	11.72783	12.45578
3	3	97	13.22680	2.502104	6.260524	8	18	0.2540502	12.72887	13.72474
4	4	35	13.05714	3.038410	9.231933	6	19	0.5135850	12.05052	14.06377

Homogeneous subset display:

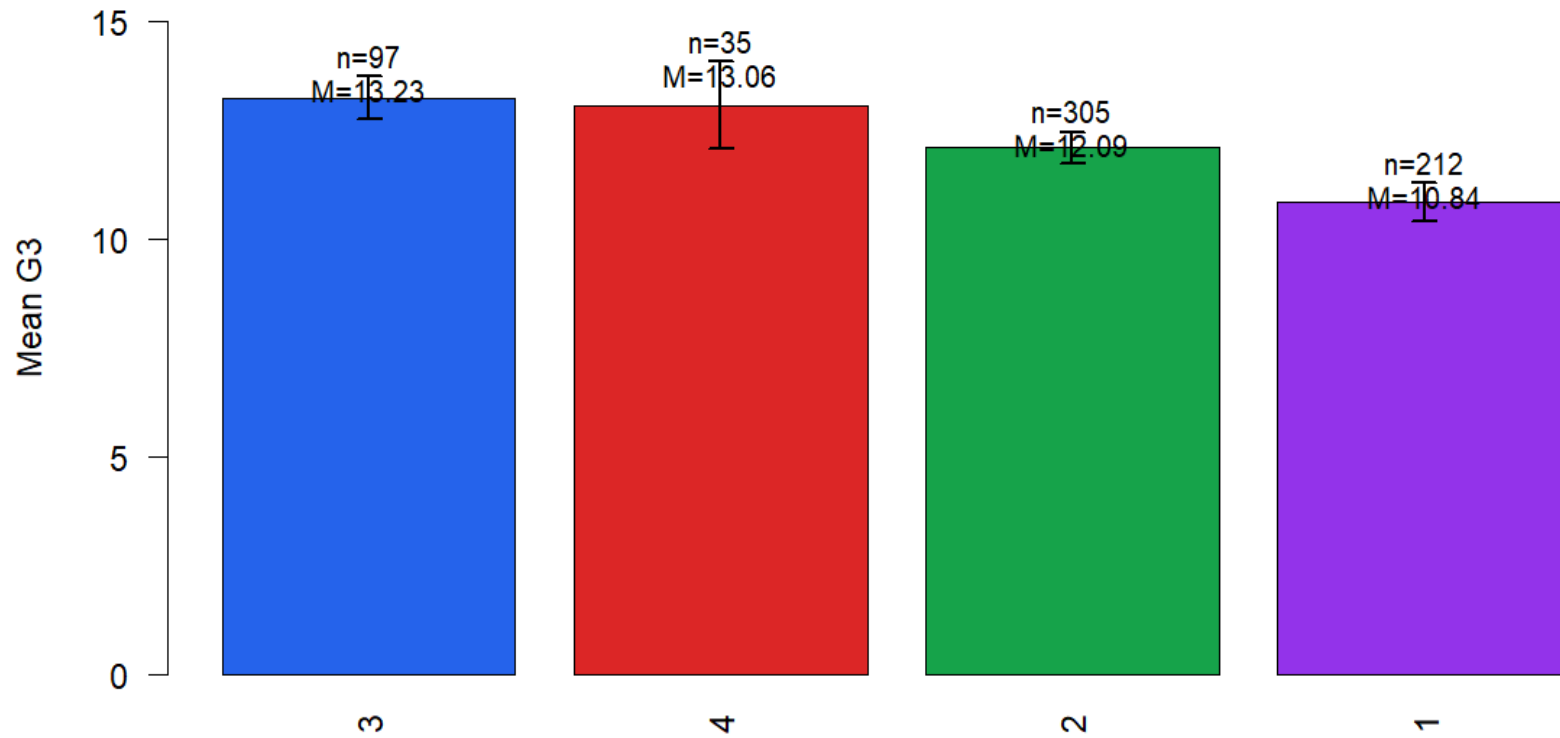
	group	n	mean	standard_deviation	variance	minimum	maximum	standard_error	ci95_low	ci95_high	homogeneous_subset_letter	subset_note
3	3	97	13.22680	2.502104	6.260524	8	18	0.2540502	12.72887	13.72474		
4	4	35	13.05714	3.038410	9.231933	6	19	0.5135850	12.05052	14.06377		
2	2	305	12.09180	3.243125	10.517860	0	19	0.1857008	11.72783	12.45578		
1	1	212	10.84434	3.218624	10.359541	0	18	0.2210560	10.41107	11.27761		
3											A	Groups sharing a letter are not separated by the generated SNK-style decisions.
4											A	Groups sharing a letter are not separated by the generated SNK-style decisions.
2											B	Groups sharing a letter are not separated by the generated SNK-style decisions.
1											C	Groups sharing a letter are not separated by the generated SNK-style decisions.

Top SNK-style comparisons:

	lower_mean_group	higher_mean_group	range_size_r	n_lower	n_higher	mean_lower	mean_higher	mean_difference
1	1	2	2	212	305	10.84434	12.09180	1.2474637
4	2	4	2	305	35	12.09180	13.05714	0.9653396
6	4	3	2	35	97	13.05714	13.22680	0.1696613
2	1	4	3	212	35	10.84434	13.05714	2.2128032

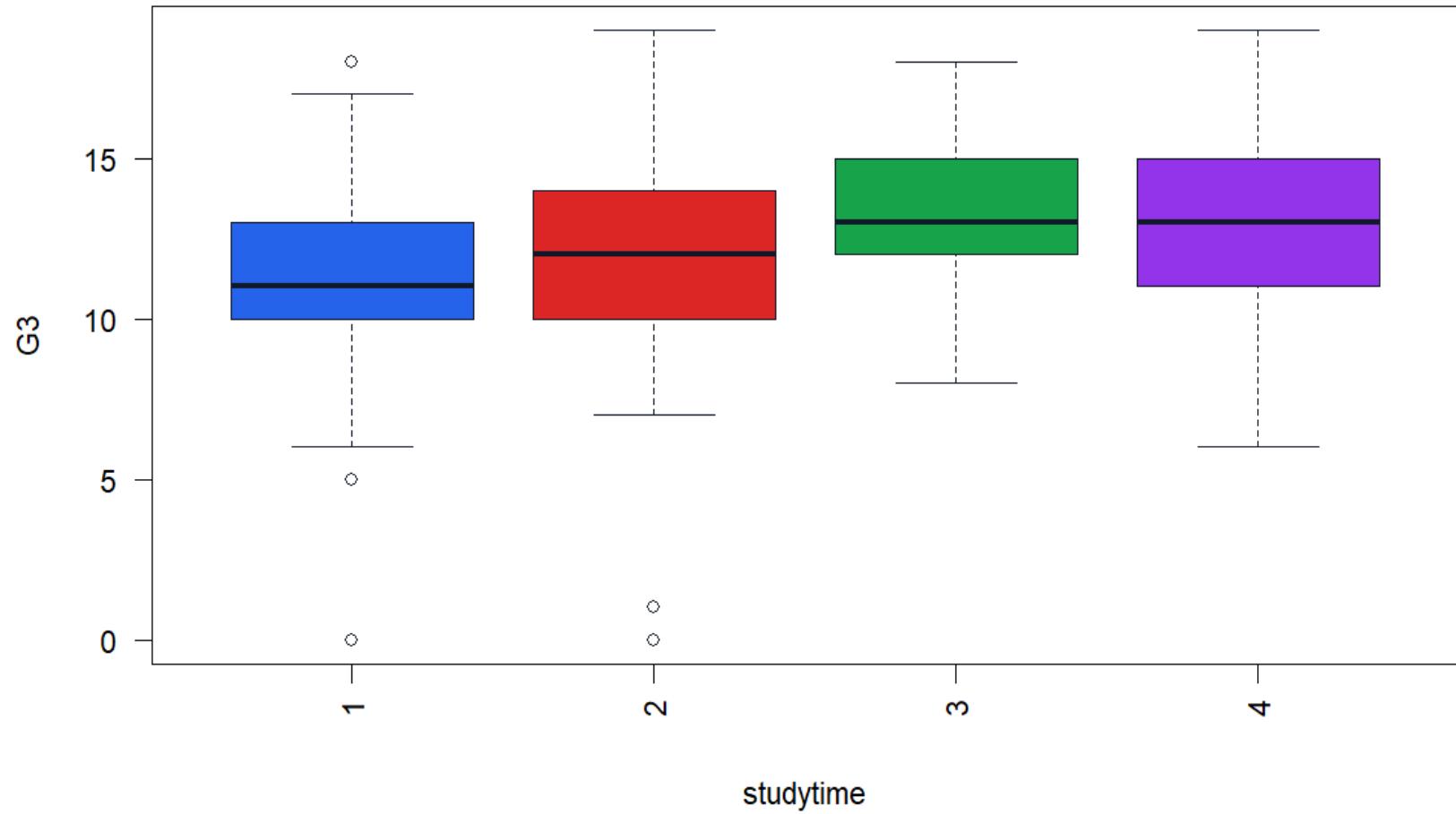
## Newman-Keuls Test: Group Means with 95% CI

Colorful mean chart for the one-way ANOVA factor before SNK post hoc grouping.



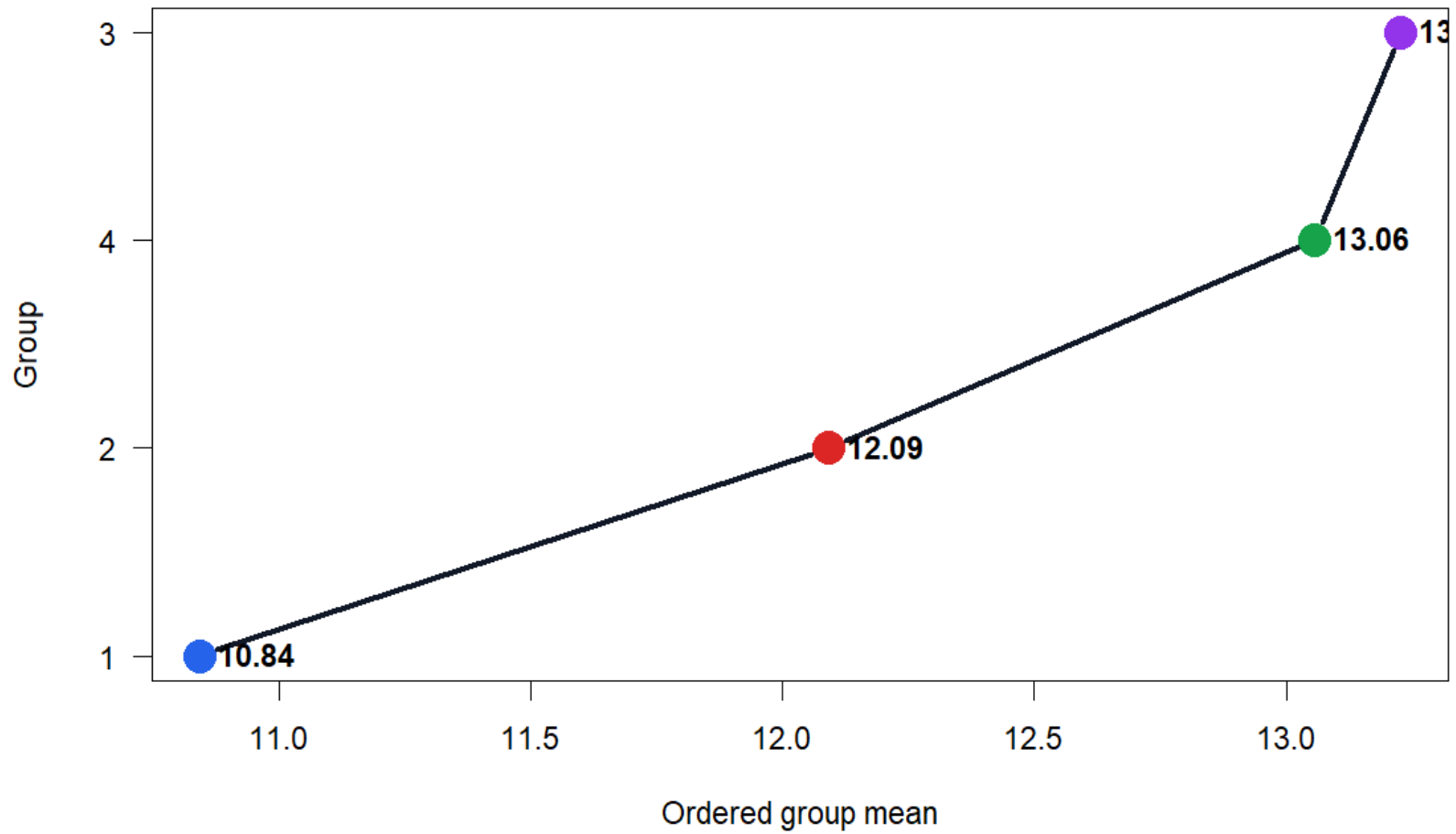
## Newman-Keuls Test: Colorful Group Boxplots

Boxplots show spread, center, outliers, and overlap between post hoc groups.



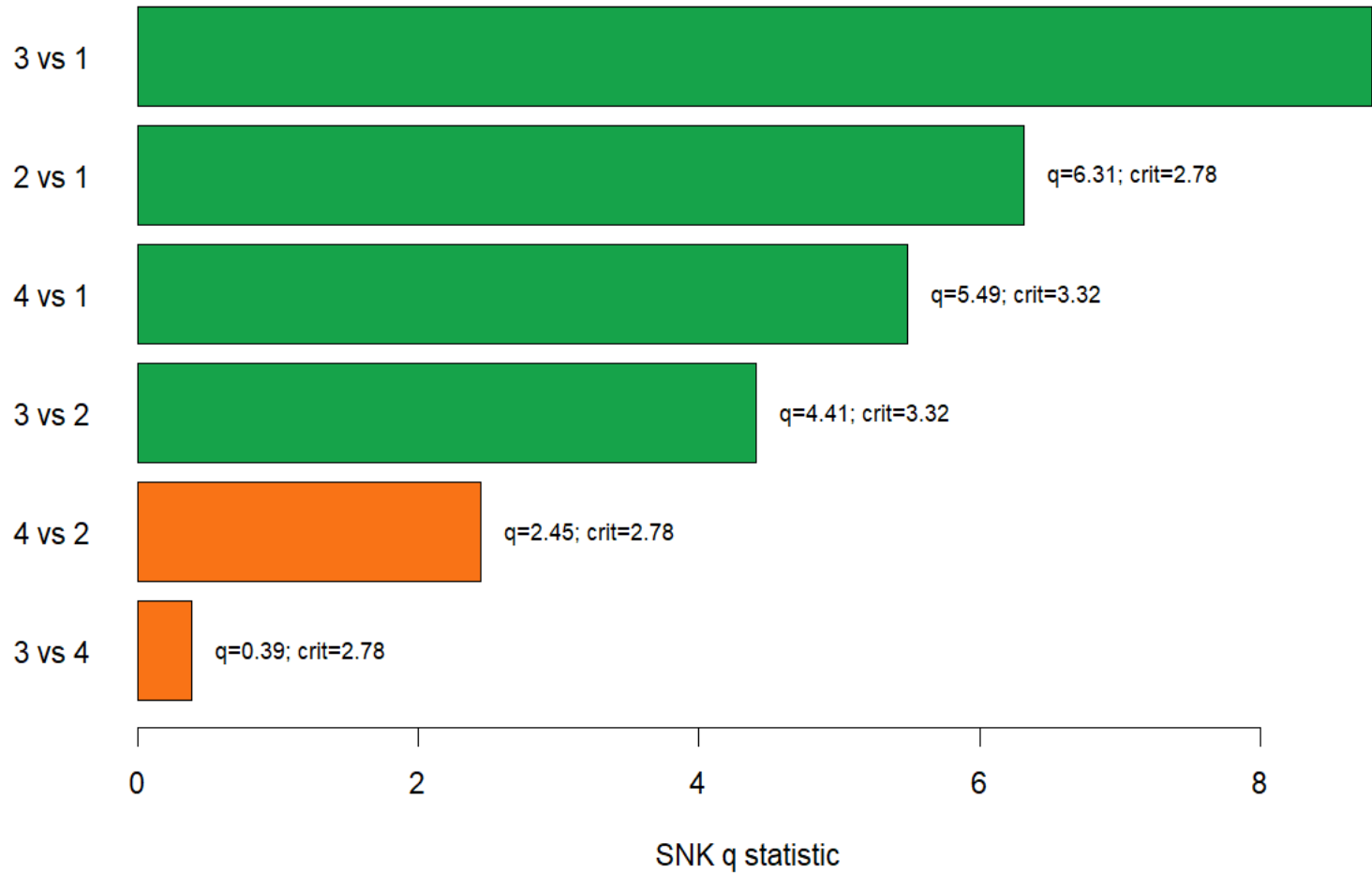
## Newman-Keuls Test: Ordered Means

SNK compares ordered means using different Studentized-range critical values by range size.



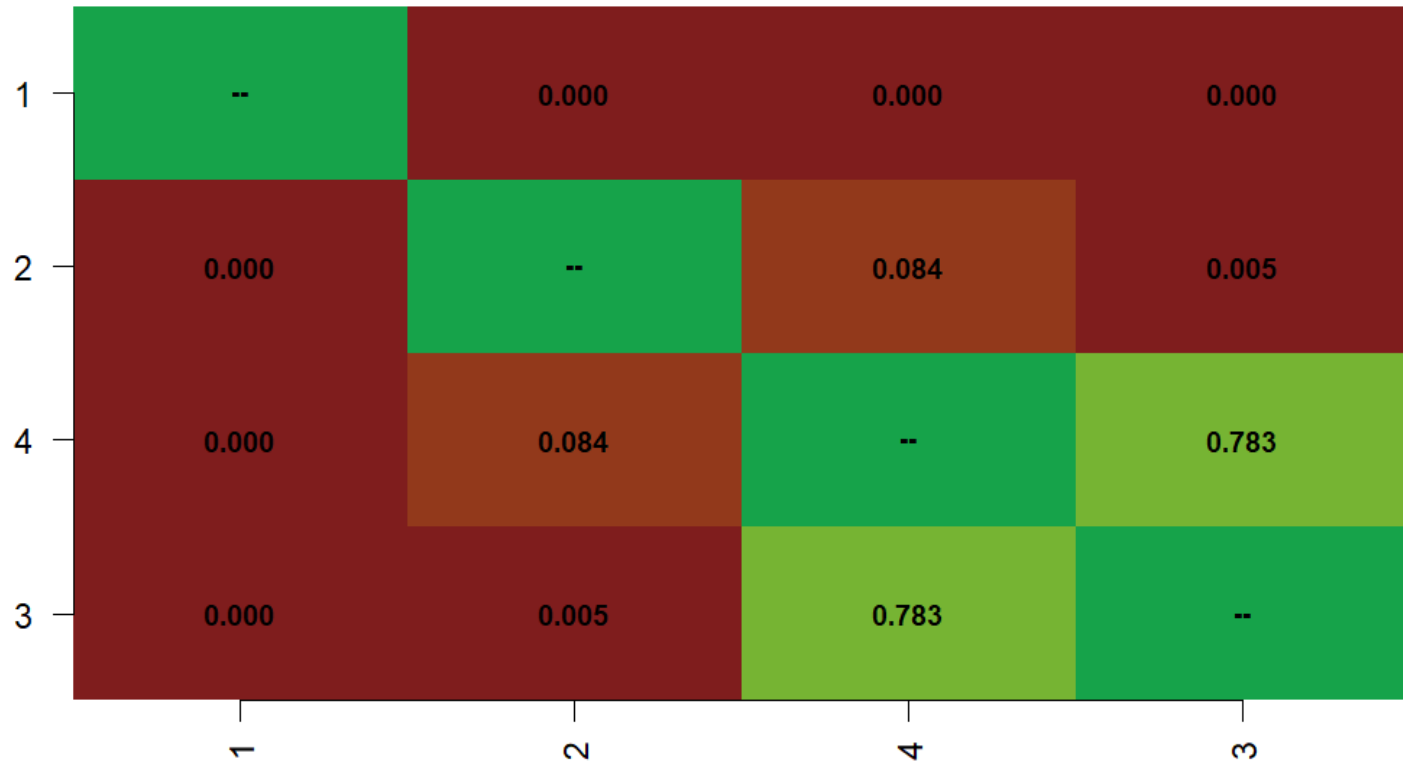
## Newman-Keuls Test: Largest SNK q Statistics

Green bars are significant at alpha = 0.05; orange bars are not significant.



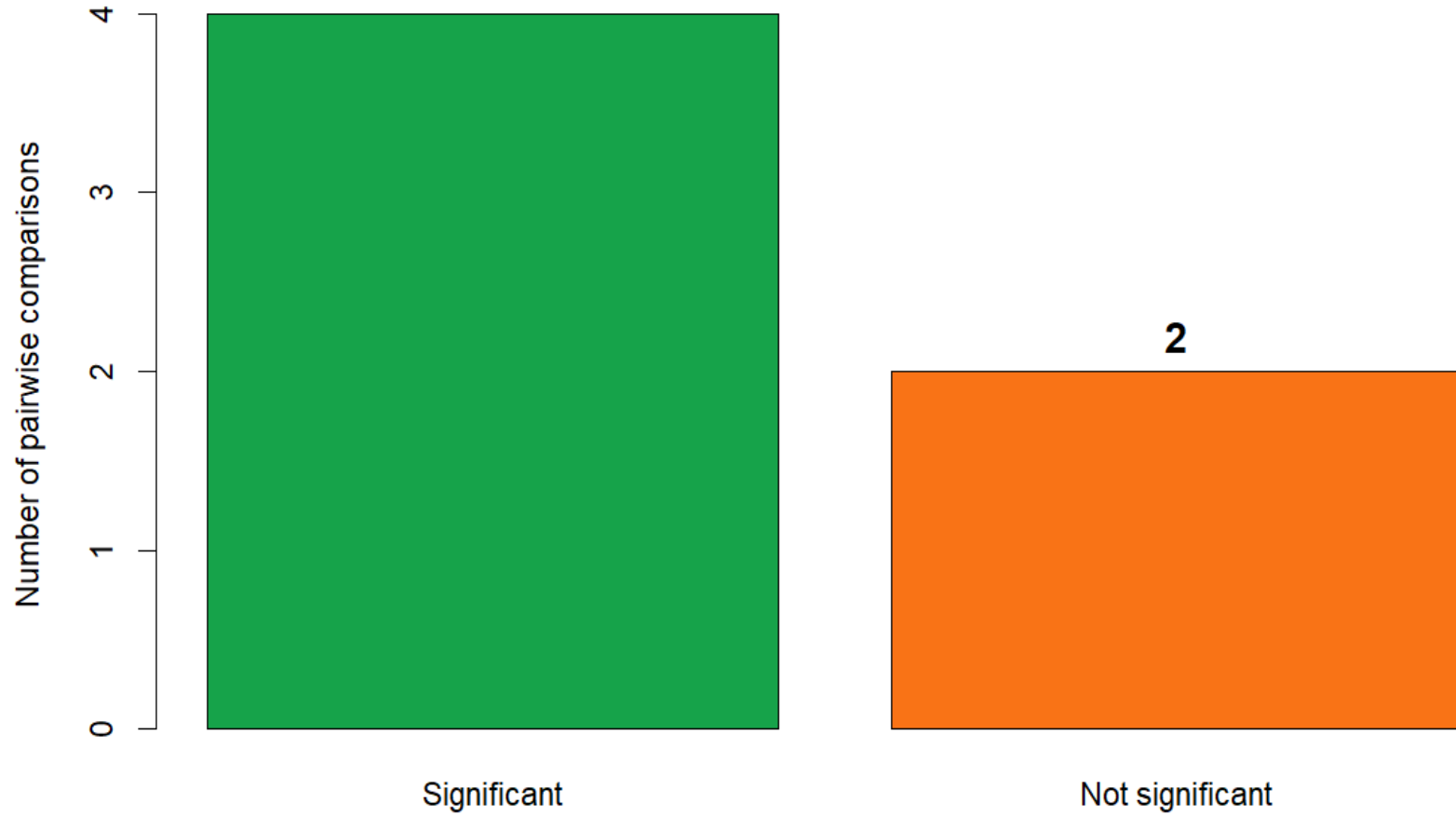
## Newman-Keuls Test: Pairwise p-value Heatmap

Darker low p-values indicate stronger evidence of post hoc mean differences.



## Newman-Keuls Test: Decision Summary

This chart summarizes how many SNK-style pair comparisons are significant.



## Newman-Keuls Test: Sample Size and SD Context

SNK assumes the ANOVA error term is meaningful, so group size and spread should be reviewed.

