

Workflow:

1. Run one-way ANOVA for the dependent variable across the selected factor.
2. Order group means and evaluate REGWQ-style step-down range comparisons.
3. Use SPSS REGWF/REGWQ output as the official software result.

ANOVA result:

target_variable	group_variable	number_of_groups	total_n	grand_mean	ss_between	df_between	ms_between	ss_within_error	df_within_error	ms_within_error	f_statistic	p_value	eta_squared	omega_squared	alpha	anova_decision_alpha_0_05
G3	studytime	4	649	11.906009	465.077825	3	155.025942	6298.188739	645	9.764634	15.876268	5.705728e-10	0.068765	0.064341	0.05	Reject equal means

Group summary:

group	n	mean	standard_deviation	standard_error	variance	minimum	maximum	ci95_low	ci95_high
1	212	10.844340	3.218624	0.221056	10.359541	0.0	18.0	10.411070	11.277609
2	305	12.091803	3.243125	0.185701	10.517860	0.0	19.0	11.727830	12.455777
3	97	13.226804	2.502104	0.254050	6.260524	8.0	18.0	12.728866	13.724742
4	35	13.057143	3.038410	0.513585	9.231933	6.0	19.0	12.050516	14.063769

Levene context:

context_test	statistic	p_value	interpretation
Median-centered Levene / Brown-Forsythe context	1.026312	0.380358	Equal-variance context before relying on REGW post hoc procedures.

Homogeneous subset letters:

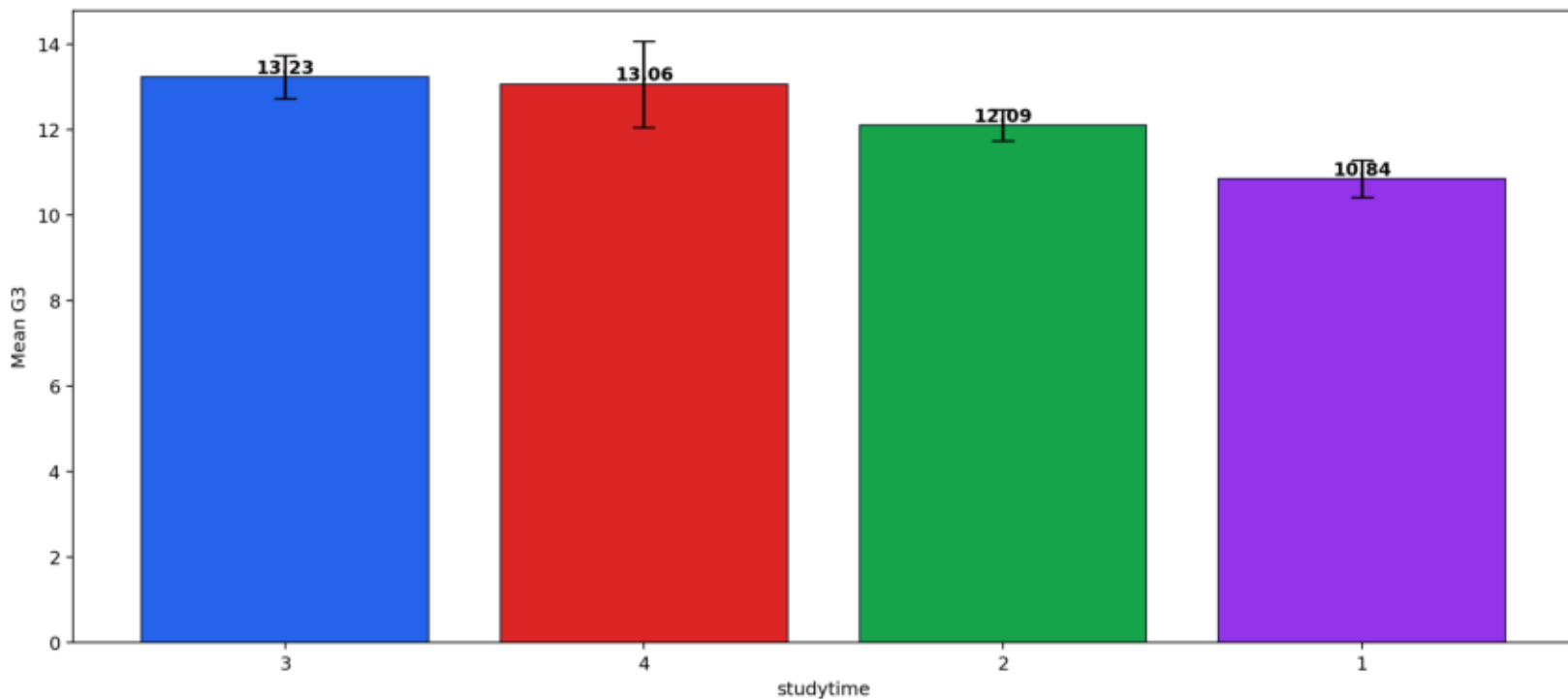
group	mean	homogeneous_subset_letters
3	13.226804	A
4	13.057143	A
2	12.091803	B
1	10.844340	C

REGWQ-style pairwise comparison table

comparison_order	ordered_range_size	lower_mean_group	higher_mean_group	lower_mean	higher_mean	mean_difference_high_minus_low	standard_error_tukey_kramer	q_statistic	df_error	regw_layer_alpha	q_critical	studentized_range_p_value	decision_alpha_0_05	method_note
1	4	1	3	10.844340	13.226804	2.382465	0.270856	8.796057	645	0.050000	3.642648	5.367514e-09	Significant	REGWQ-style step-down ordered range comparison; SPSS REGWQ/REGWF output should be treated as official.
2	3	1	4	10.844340	13.057143	2.212803	0.403143	5.488874	645	0.050000	3.322176	3.370027e-04	Significant	REGWQ-style step-down ordered range comparison; SPSS REGWQ/REGWF output should be treated as official.
3	3	2	3	12.091803	13.226804	1.135001	0.257567	4.406624	645	0.050000	3.322176	5.431301e-03	Significant	REGWQ-style step-down ordered range comparison; SPSS REGWQ/REGWF output should be treated as official.
4	2	1	2	10.844340	12.091803	1.247464	0.197579	6.313752	645	0.025321	3.170230	9.473280e-06	Significant	REGWQ-style step-down ordered range comparison; SPSS REGWQ/REGWF output should be treated as official.
5	2	2	4	12.091803	13.057143	0.965340	0.394338	2.448001	645	0.025321	3.170230	8.393031e-02	Not significant	REGWQ-style step-down ordered range comparison; SPSS REGWQ/REGWF output should be treated as official.
6	2	4	3	13.057143	13.226804	0.169661	0.435692	0.389406	645	0.025321	3.170230	7.831343e-01	Not significant	REGWQ-style step-down ordered range comparison; SPSS REGWQ/REGWF output should be treated as official.

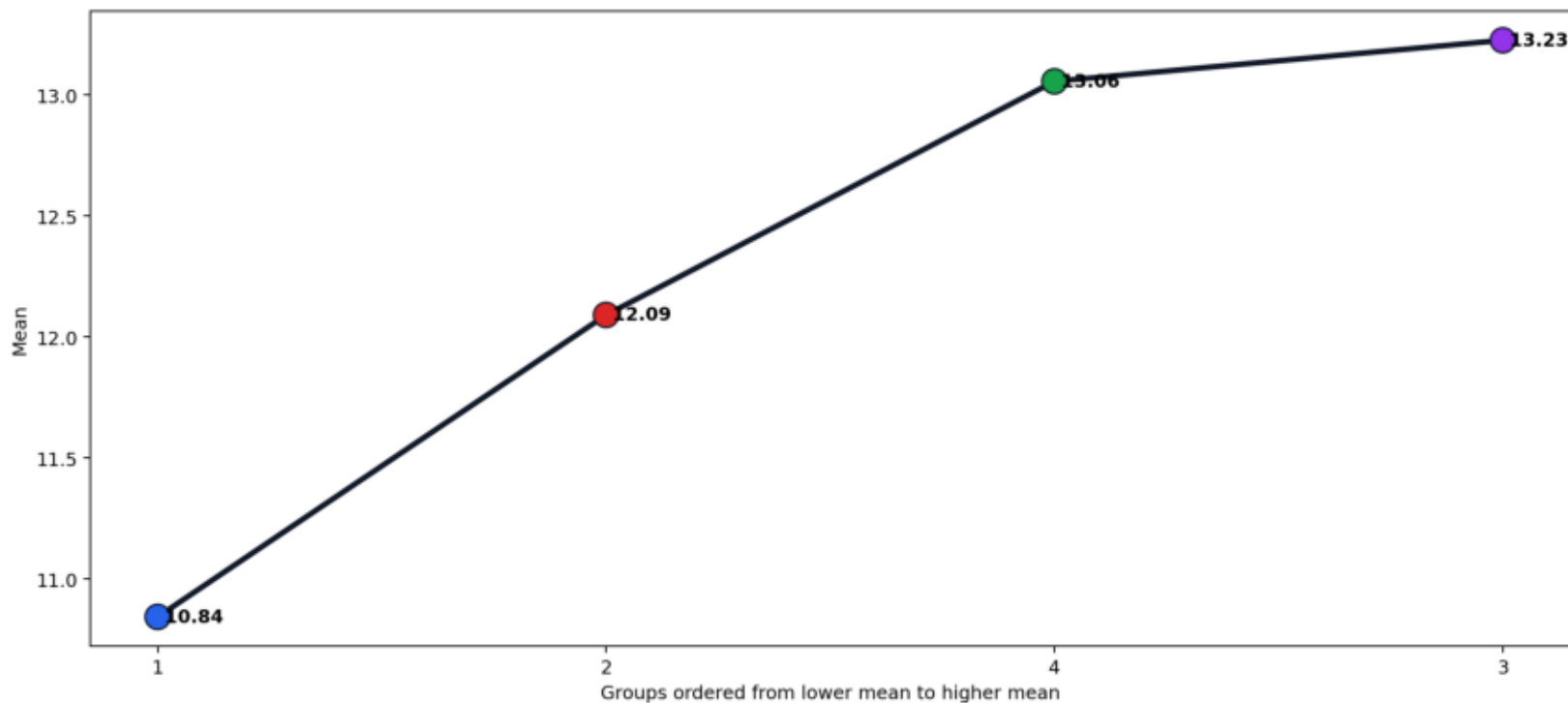
Ryan-Einot-Gabriel-Welsch Test: Group Means

Colored bars show group means with approximate 95% confidence intervals.



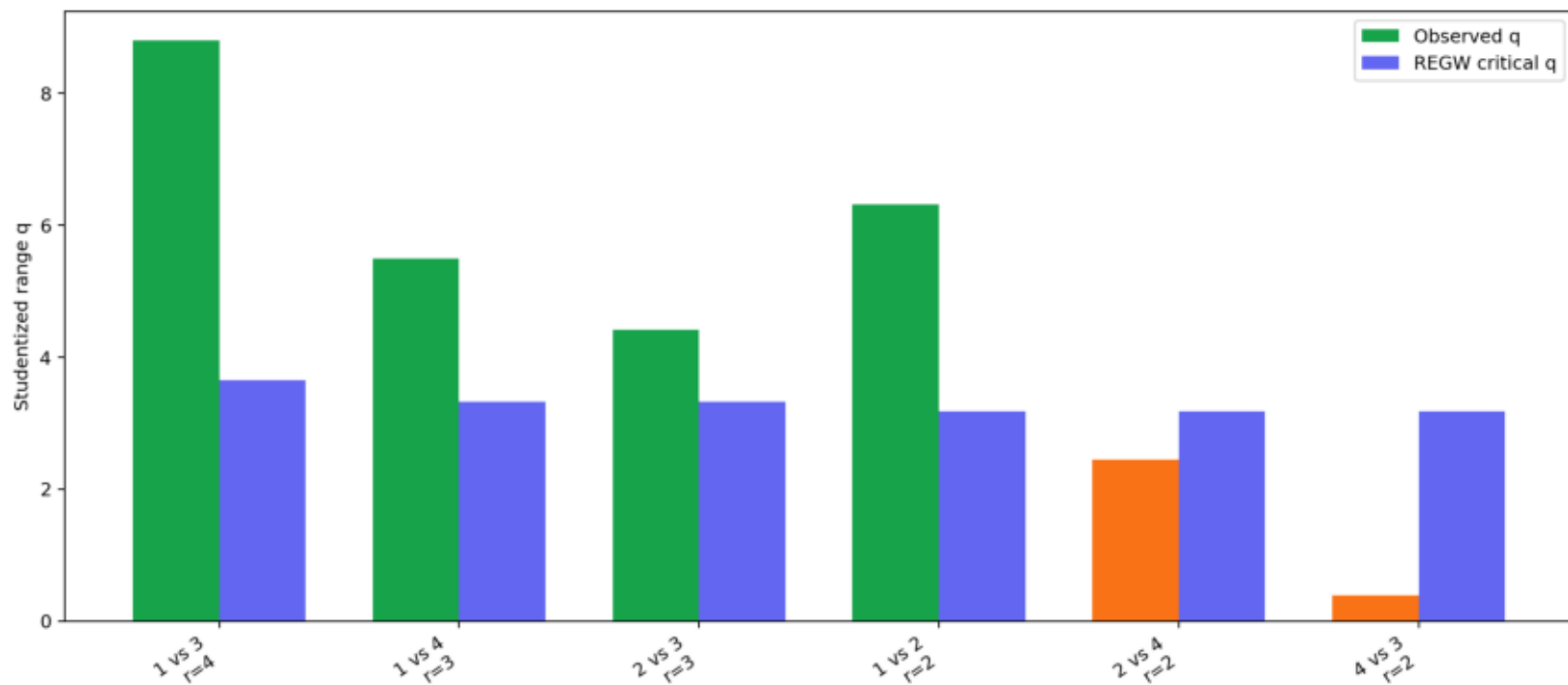
REGW Ordered Means

REGW procedures compare ordered means using step-down range logic.



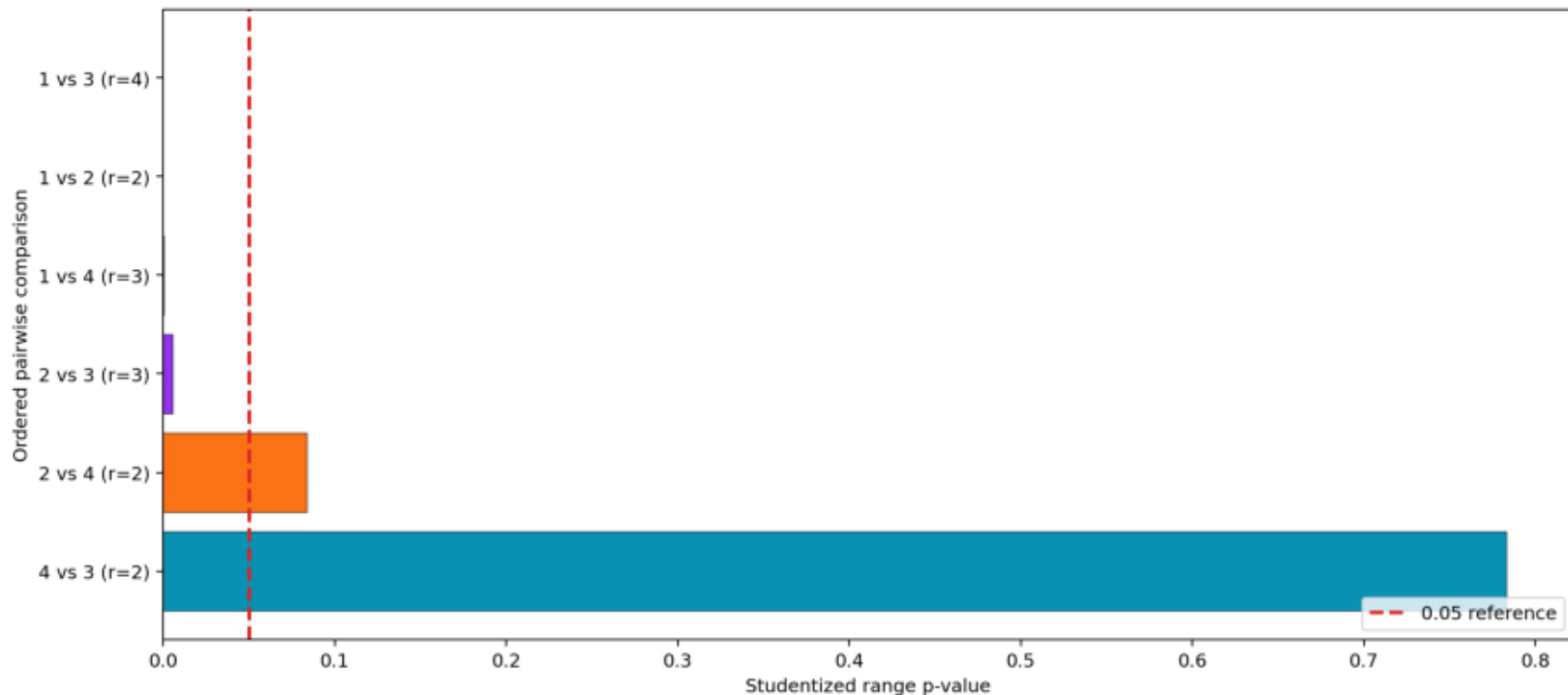
REGW q Statistic vs Critical Value

A comparison is significant when the observed q statistic exceeds the REGW critical value.



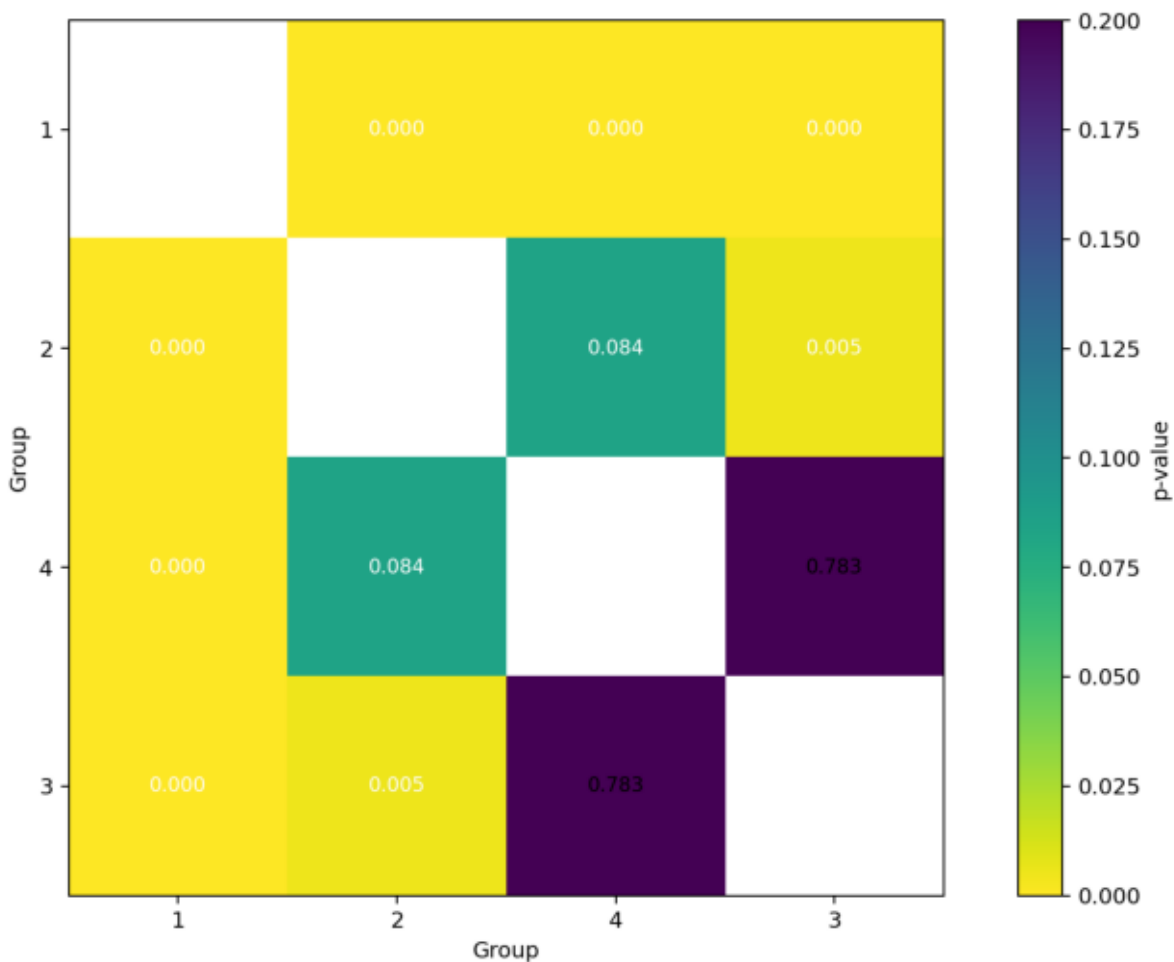
REGW Pairwise p-value Ranking

Smaller p-values indicate stronger evidence of mean differences between ordered groups.



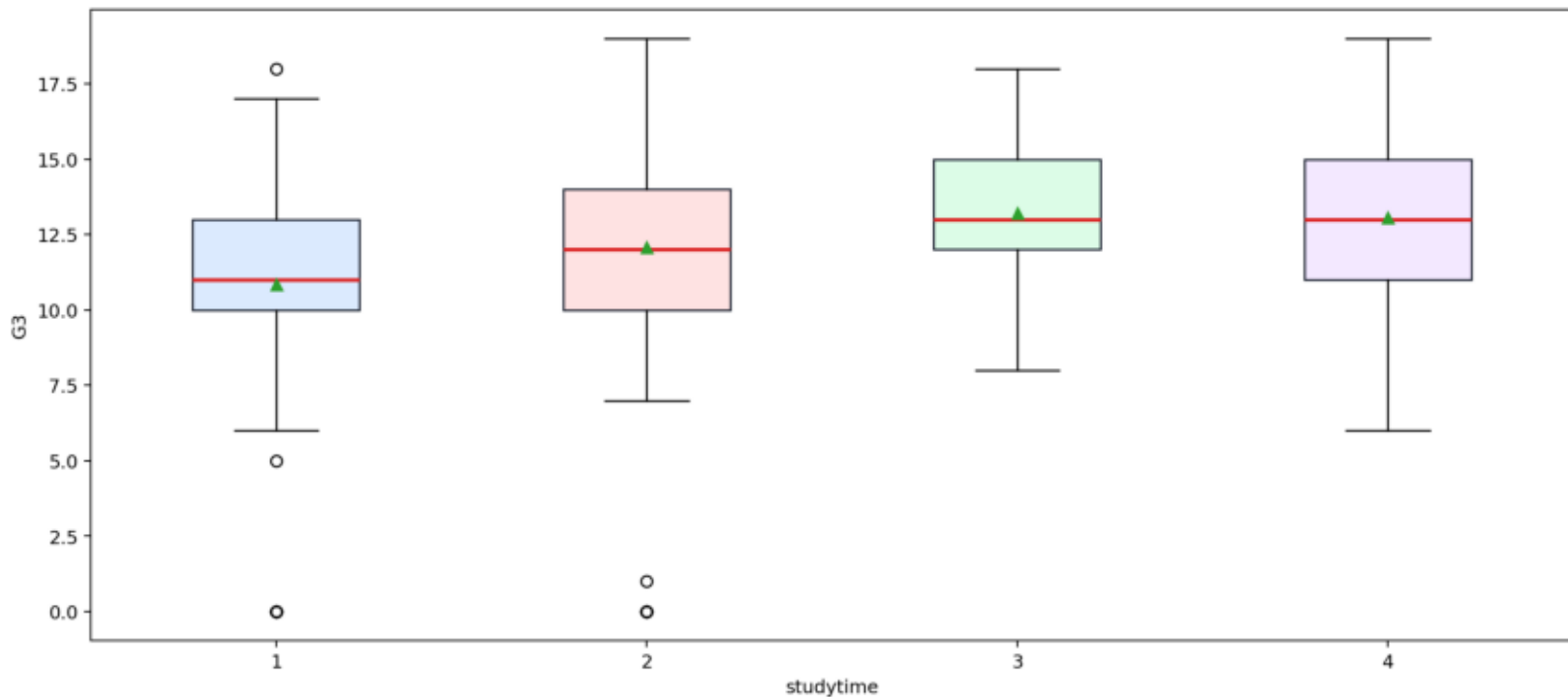
REGW Pairwise p-value Heatmap

Darker cells show smaller p-values and stronger pairwise evidence.



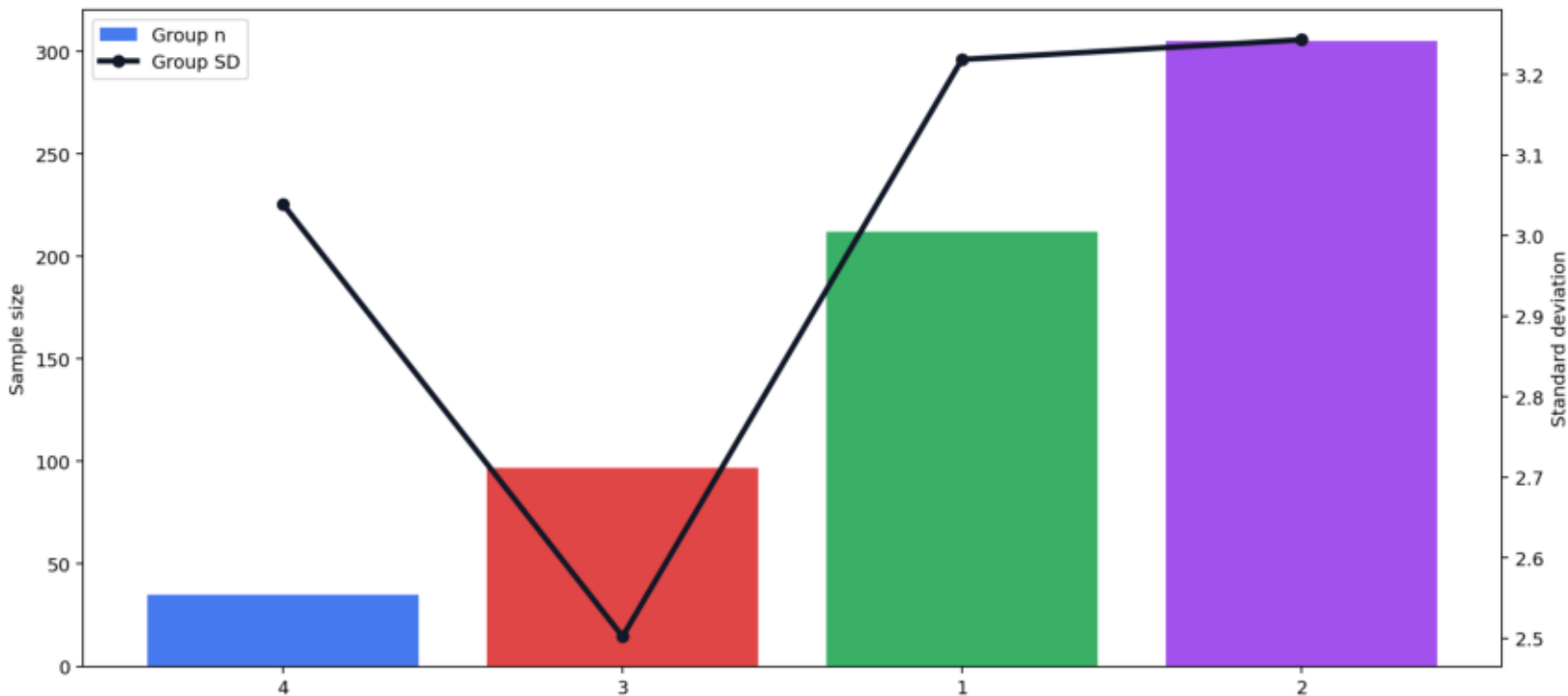
REGW Distribution Context by Group

Boxplots help verify whether group spread and outliers may influence post-hoc results.



REGW Sample Size and Standard Deviation

REGW procedures are most appropriate when ANOVA assumptions are reasonable and sample sizes are balanced.



ANOVA Effect Size Before REGW

REGW post-hoc results should be interpreted after checking the omnibus ANOVA effect.

