

# Repeated Measures ANOVA Report

Repeated measures:  
G1, G2, G3

Model:  
score ~ grade\_time + Error(subject\_id / grade\_time)

Result:

	test_name	repeated_measures	within_factor	n_subjects	levels	f_statistic	p_value	df_time	
Repeated Measures ANOVA		G1, G2, G3	grade_time	649	3	36.28686	4.637136e-16	2	
df_error	ss_total	ss_time	ss_subject	ss_error	ms_error	eta_squared	partial_eta_squared	omega_squared	
	1296	17234.3	86.33077	15606.3	1541.669	1.18956	0.005009242	0.05302873	0.00487086
friedman_statistic	friedman_p_value	alpha				decision_alpha_0_05			
	167.3283	4.625154e-37	0.05	Reject	equal	repeated-measure means			

Repeated-measure summary:

grade_time	n	mean	median	standard_deviation	variance	minimum	maximum	standard_error	ci95_low	ci95_high
G1	649	11.39908	11	2.745265	7.536481	0	19	0.1077611	11.18747	11.61068
G2	649	11.57011	11	2.913639	8.489290	0	19	0.1143703	11.34553	11.79469
G3	649	11.90601	12	3.230656	10.437140	0	19	0.1268144	11.65699	12.15503

Pairwise paired t-tests:

comparison	measure_1	measure_2	mean_difference	measure2_minus_measure1	t_statistic	p_value_uncorrected	cohens_dz	
G2 - G1	G1	G2			0.1710324	2.945423	3.340810e-03	0.1156180
G3 - G1	G1	G3			0.5069337	7.092867	3.450523e-12	0.2784194
G3 - G2	G2	G3			0.3359014	6.694530	4.691890e-11	0.2627833

p\_value\_bonferroni decision\_bonferroni\_alpha\_0\_05

1.002243e-02	Significant
1.035157e-11	Significant
1.407567e-10	Significant

Repeated-measures ANOVA output:

Error: subject\_id

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Residuals	648	15606	24.08		

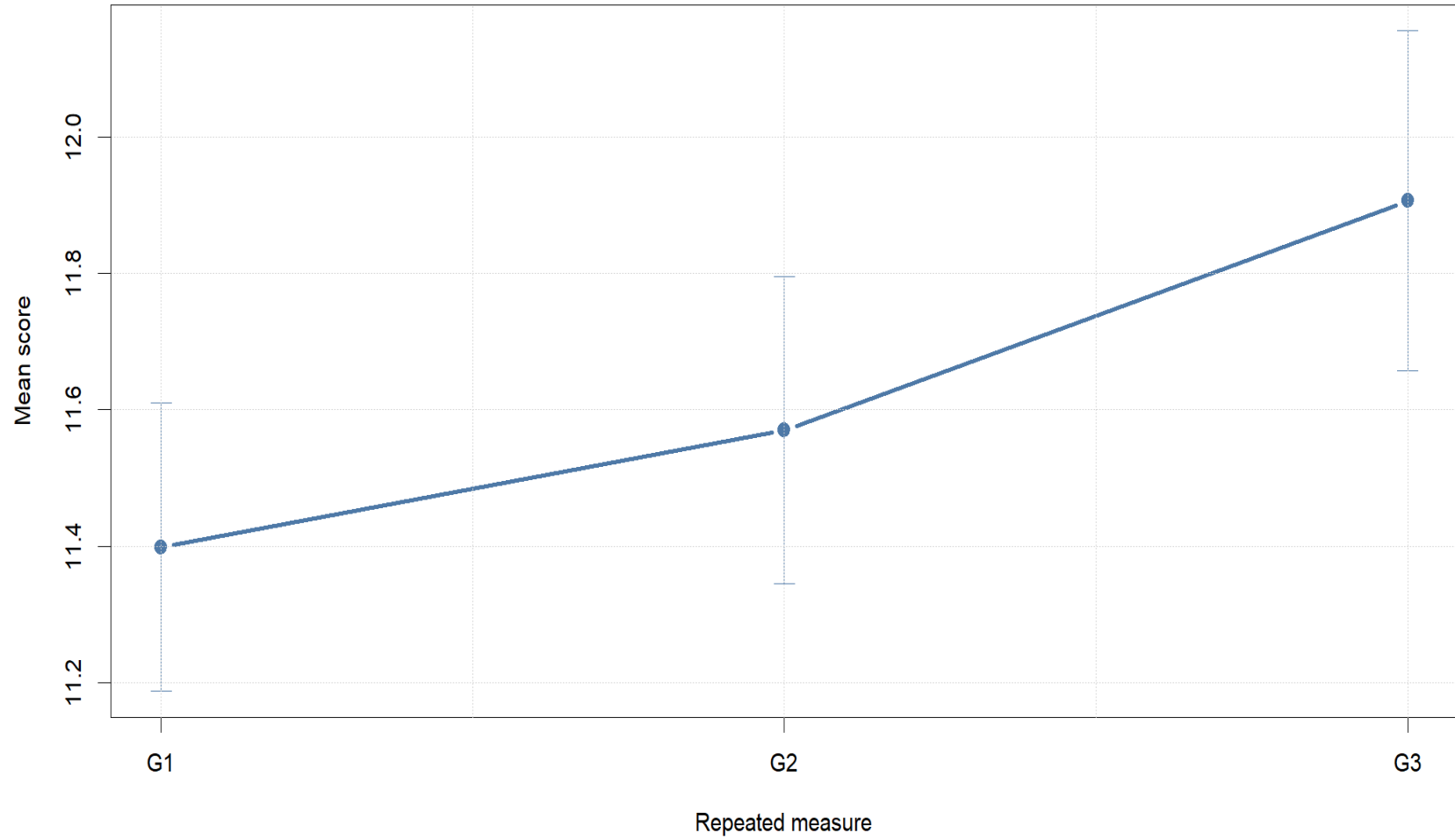
Error: subject\_id:grade\_time

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
grade_time	2	86.3	43.17	36.29	4.64e-16 ***
Residuals	1296	1541.7	1.19		

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Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

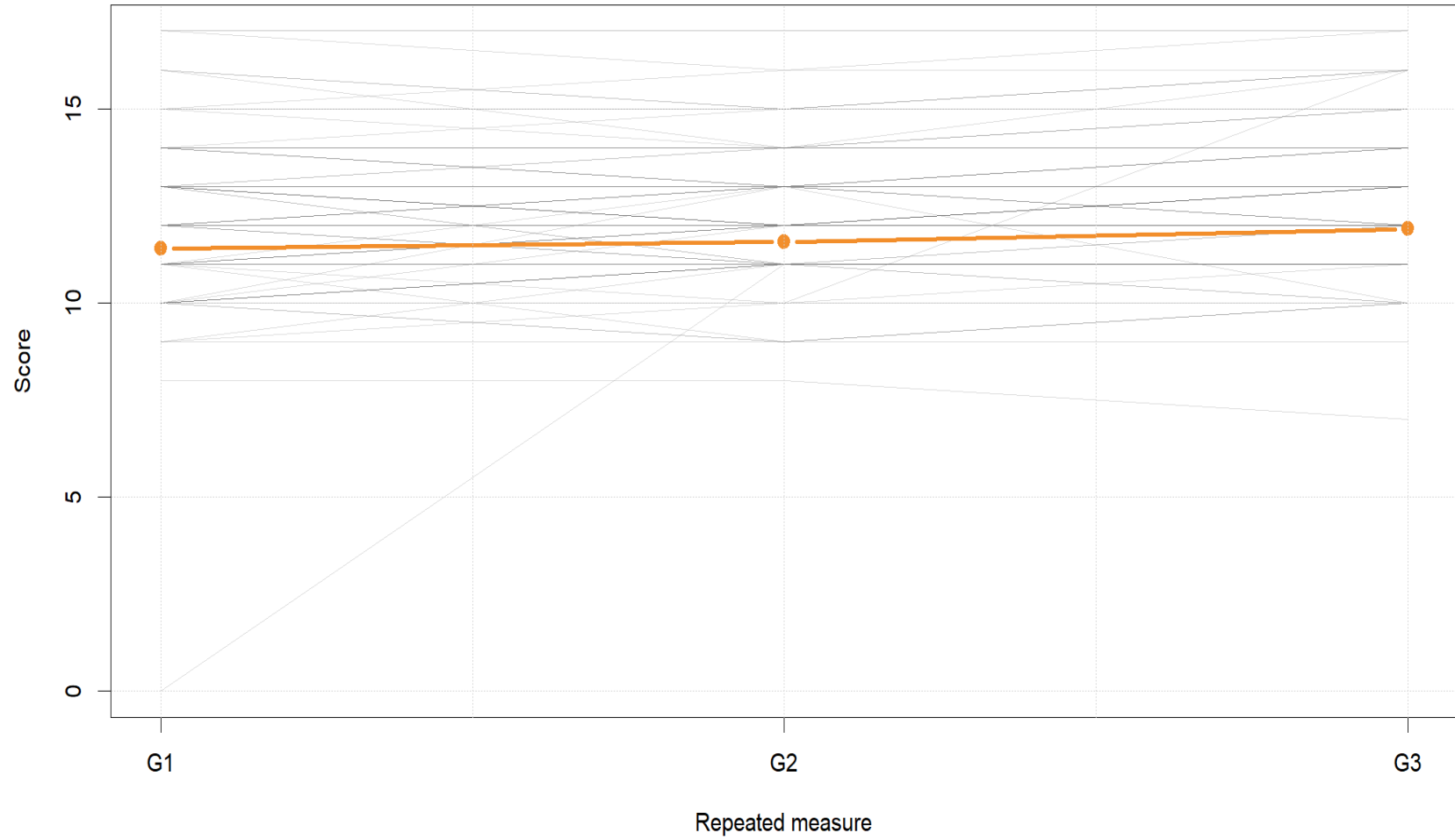
## Repeated Measures ANOVA: Mean Profile Across G1, G2, and G3

Line shows repeated-measure means with 95% confidence intervals.



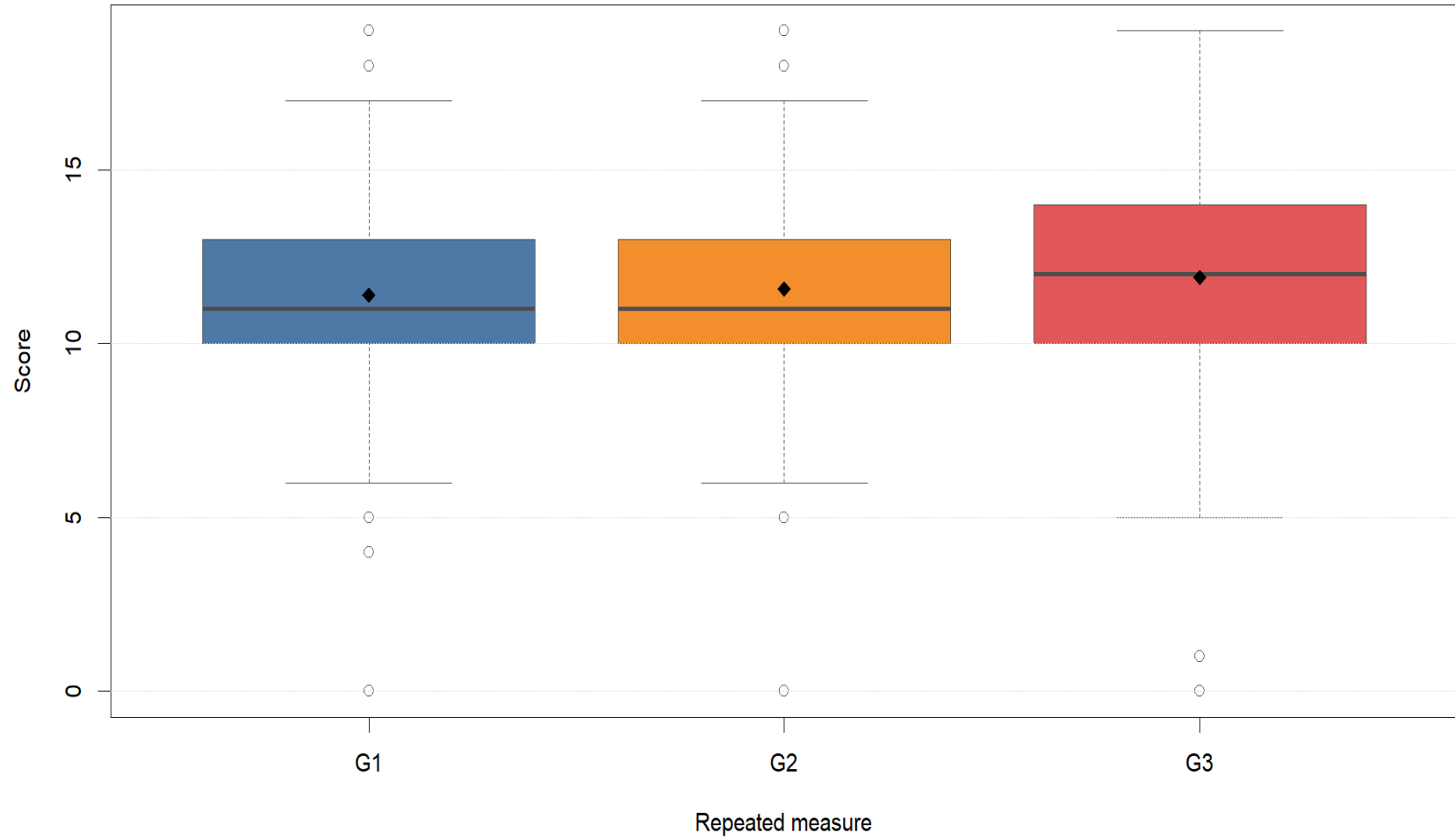
## Repeated Measures ANOVA: Individual Subject Profiles

Thin lines show individual repeated scores; bold line shows the overall mean trend.



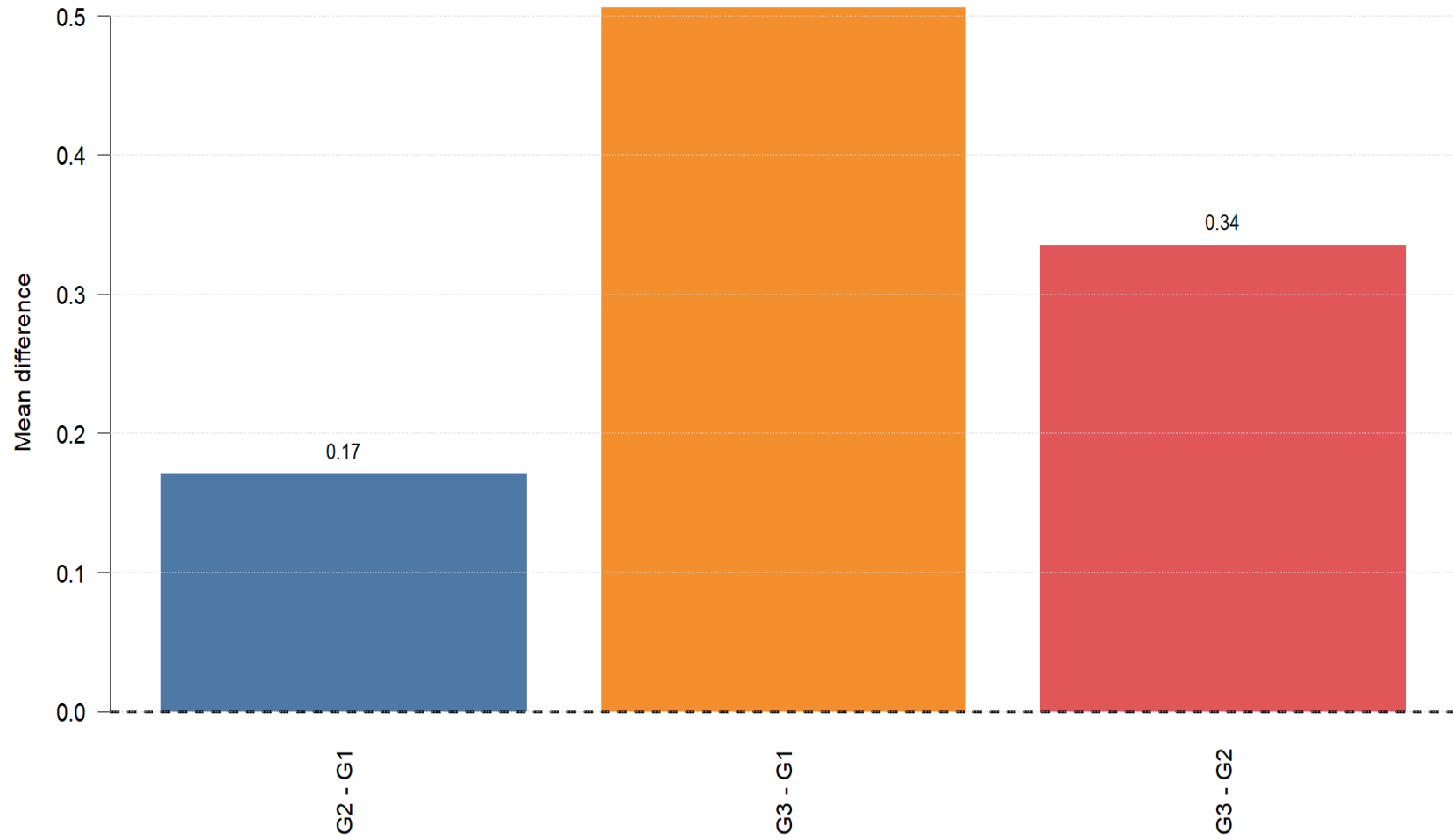
## Repeated Measures ANOVA: Distribution by Time Level

Boxplots show medians, spread, mean markers, and possible outliers for each repeated measure.



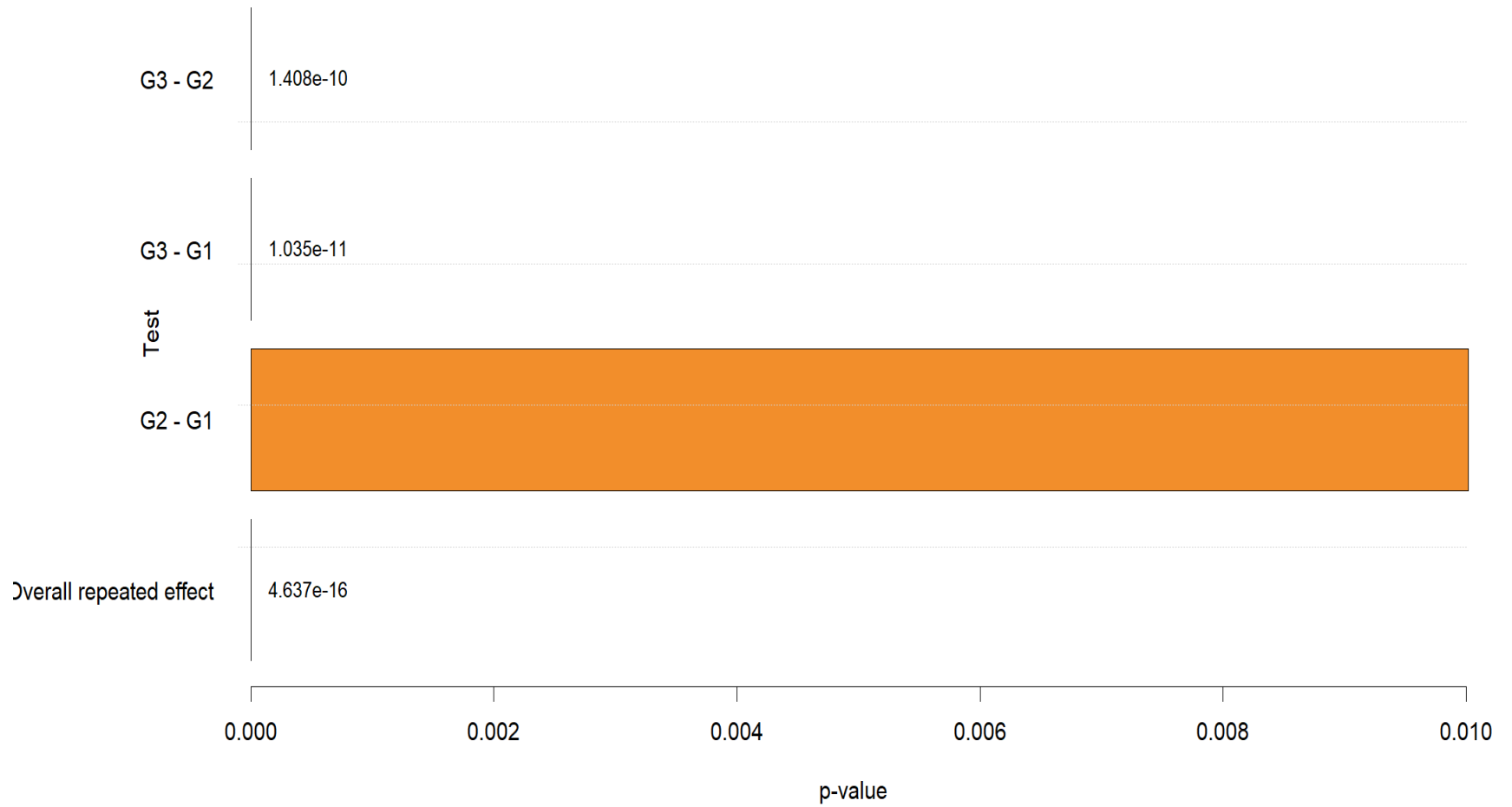
## Repeated Measures ANOVA: Pairwise Mean Changes

Bars show average within-subject change between repeated grade measures.



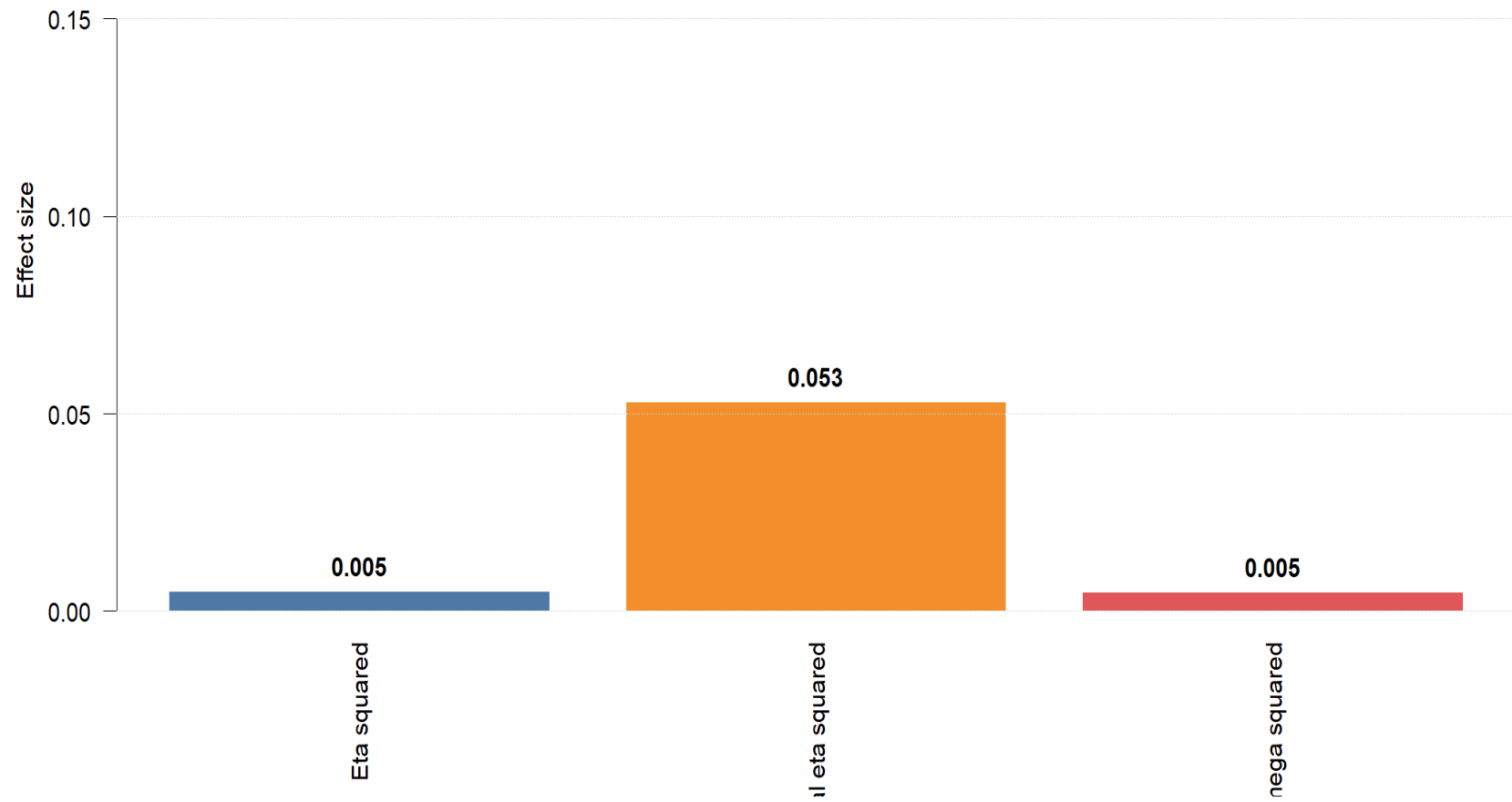
## Repeated Measures ANOVA: p-value Decision Summary

Overall ANOVA p-value plus Bonferroni-adjusted paired comparison p-values.



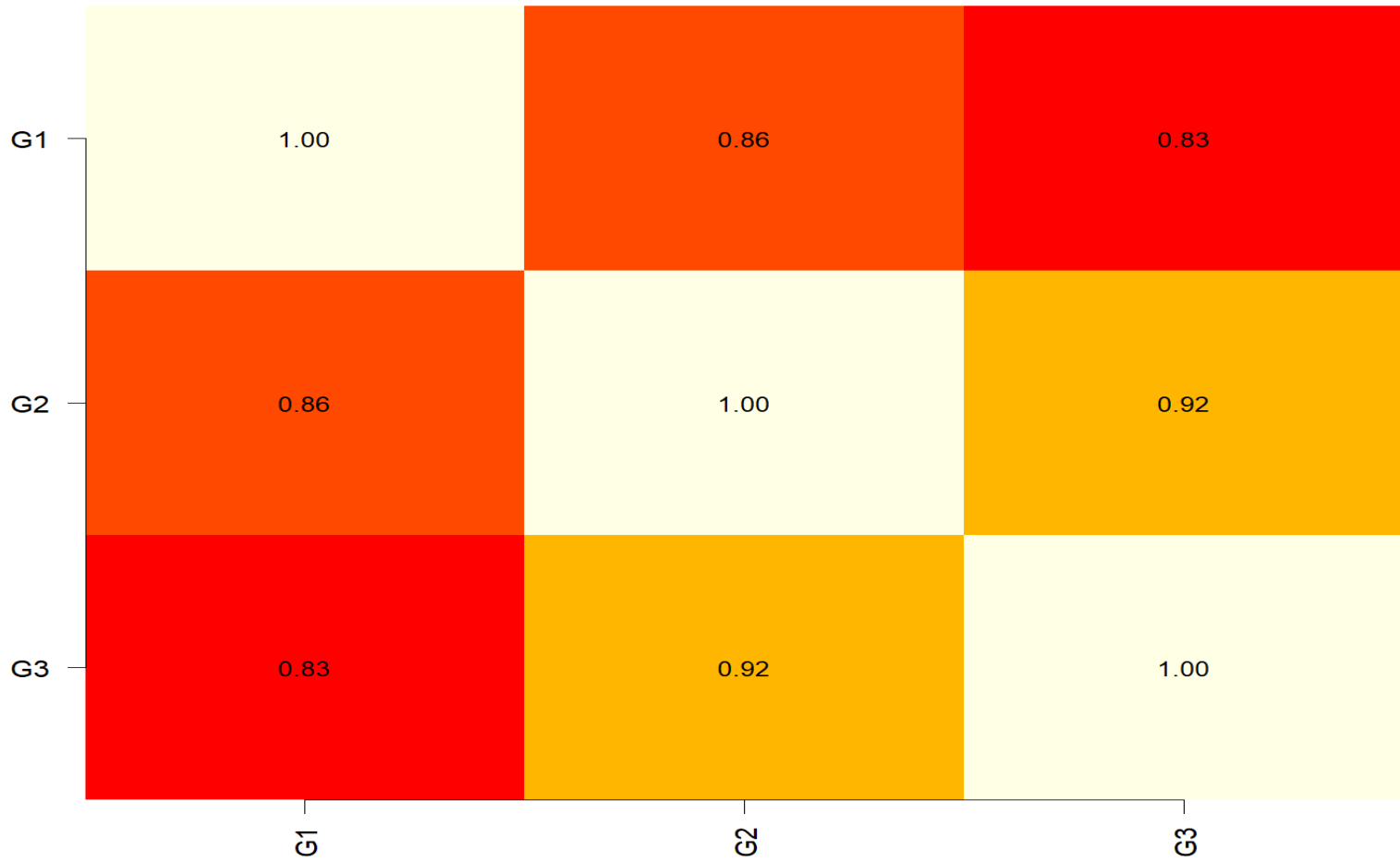
## Repeated Measures ANOVA: Effect Size Summary

Effect sizes summarize how much repeated-measure variation is explained by time.



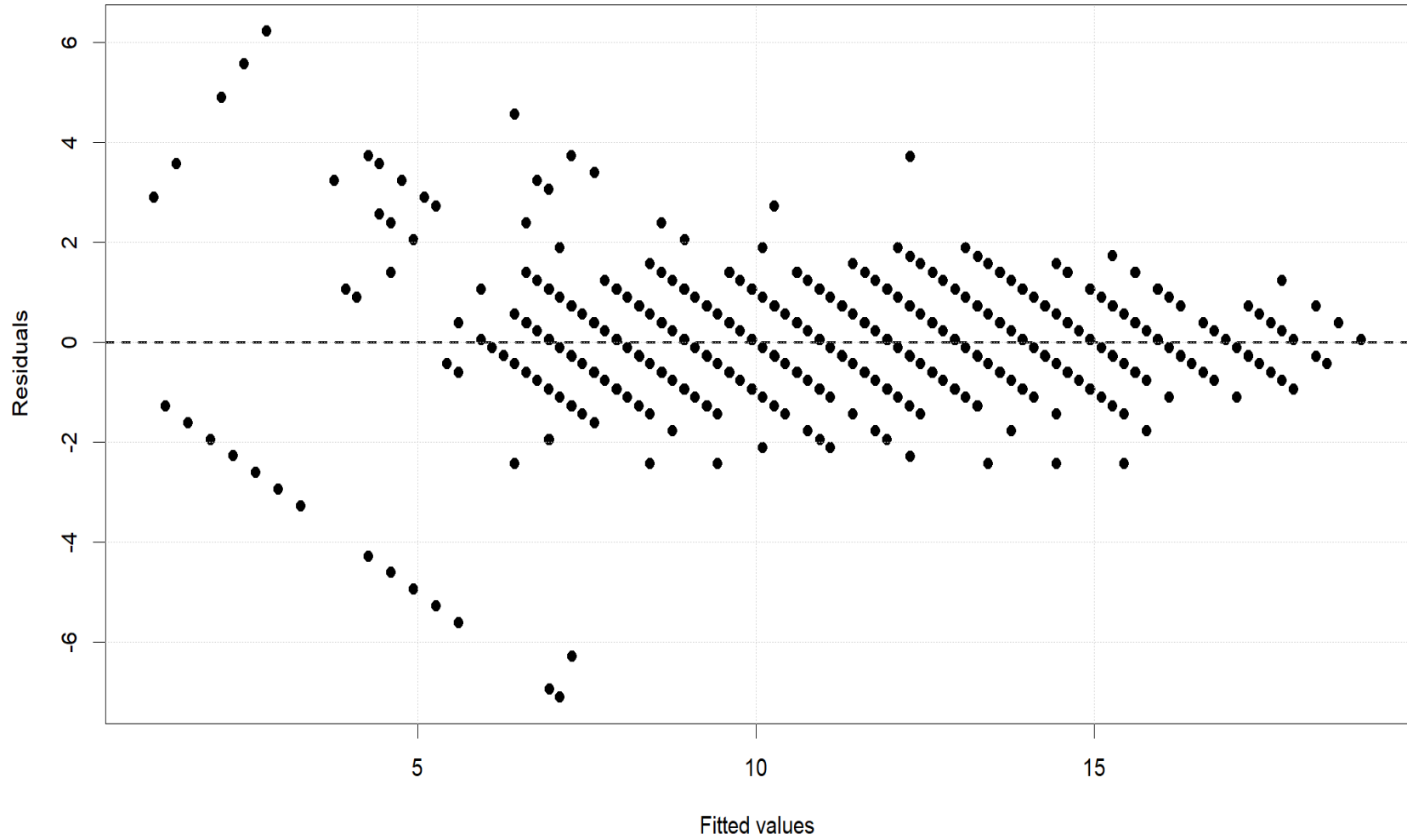
## Repeated Measures ANOVA: Correlation Matrix

Correlations among repeated measures show how strongly subject scores track over time.



# Repeated Measures ANOVA: Residuals vs Fitted

A random cloud around zero supports the follow-up model fit.



# Repeated Measures ANOVA: Residual Q-Q Plot

Points close to the reference line support approximate residual normality.

