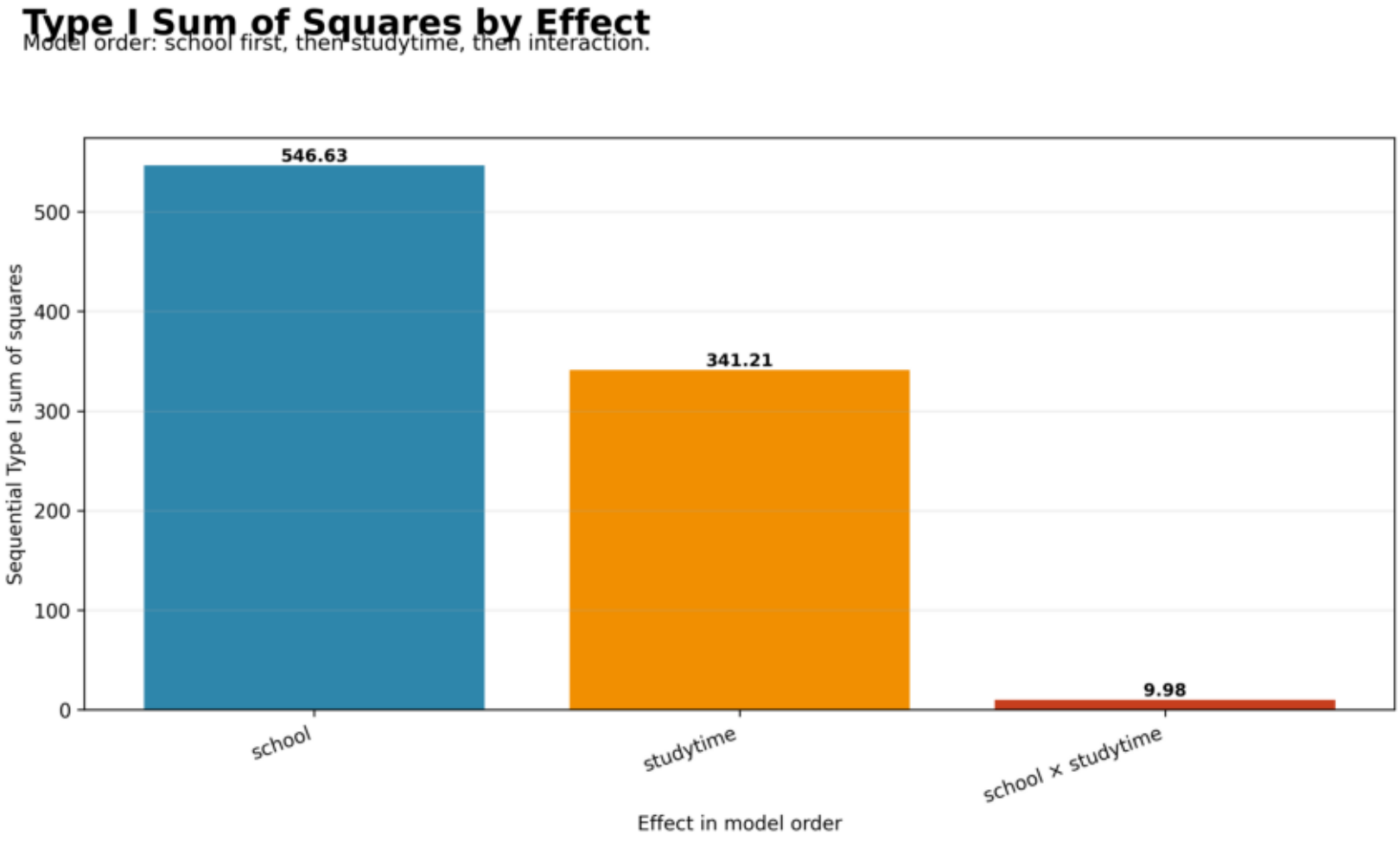
Type I Sum of Squares ANOVA Report

Outcome: G3
Model order: school + studytime + school:studytime

Type I sums of squares are sequential.
Each effect is tested after earlier effects have entered the model.

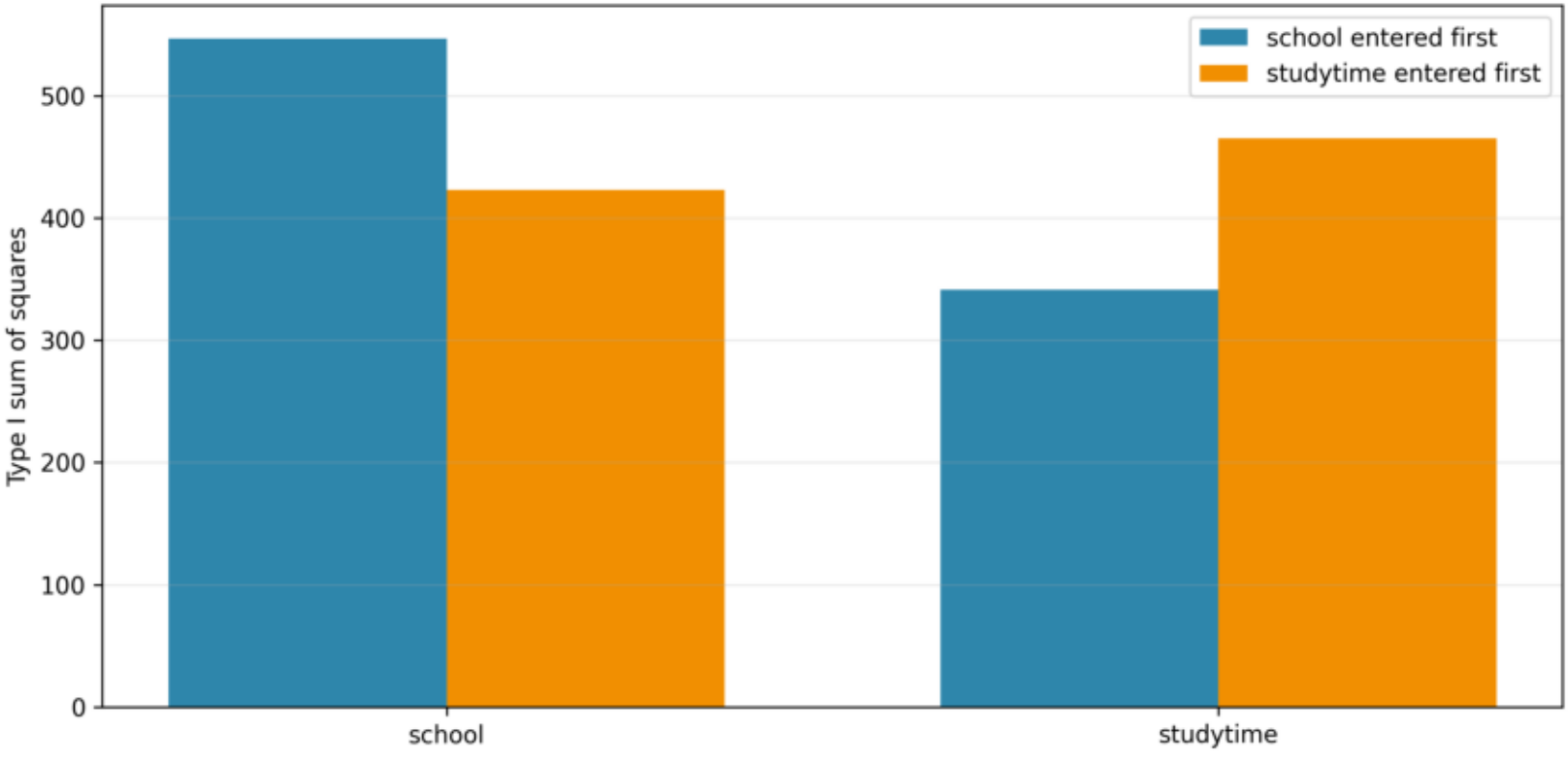
Main ANOVA table:

effect	df	sum_sq	mean_sq	F	PR(>F)	model_order	eta_squared_sequential	partial_eta_squared	decision_alpha_0_05
C(Q("school"))	1.0	546.628653	546.628653	59.737838	4.202088e-14	school first, then studytime	0.080823	0.085250	Reject H0
C(Q("studytime"))	3.0	341.211787	113.737262	12.429678	6.556833e-08	school first, then studytime	0.050451	0.054975	Reject H0
C(Q("school")):C(Q("studytime"))	3.0	9.981718	3.327239	0.363614	7.793037e-01	school first, then studytime	0.001476	0.001699	Fail to reject H0
Residual	641.0	5865.444406	9.150459	NaN	NaN	school first, then studytime	NaN	NaN	Not tested


Type I Sum of Squares by Effect
Model order: school first, then studytime, then interaction.
546.63
341.21
9.98
500
400
300
200
100
0
Sequential Type I sum of squares
school
studytime
school x studytime
Effect in model order

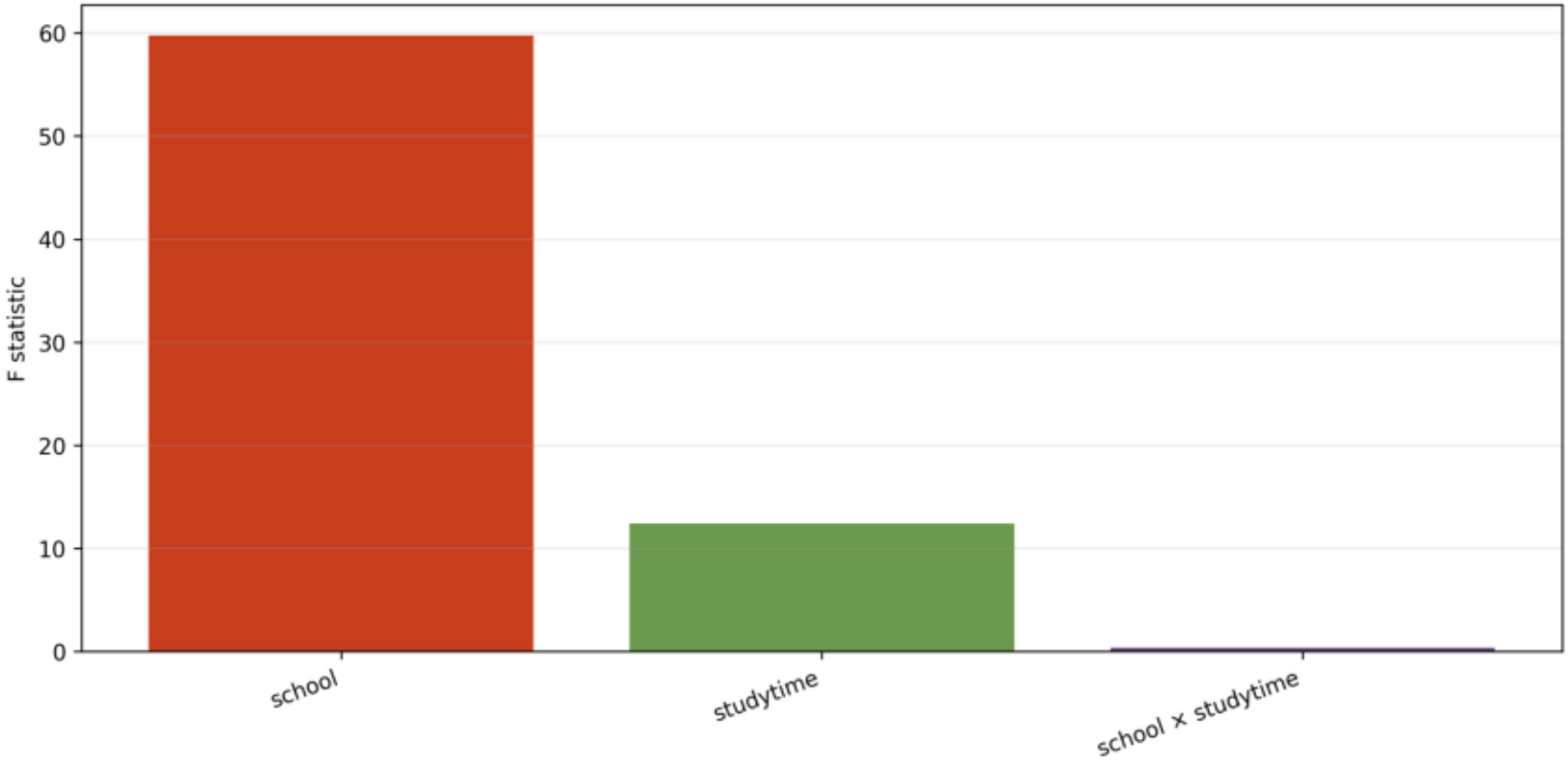
Type I SS Changes When Model Order Changes

Sequential sums of squares are order-dependent in unbalanced designs.



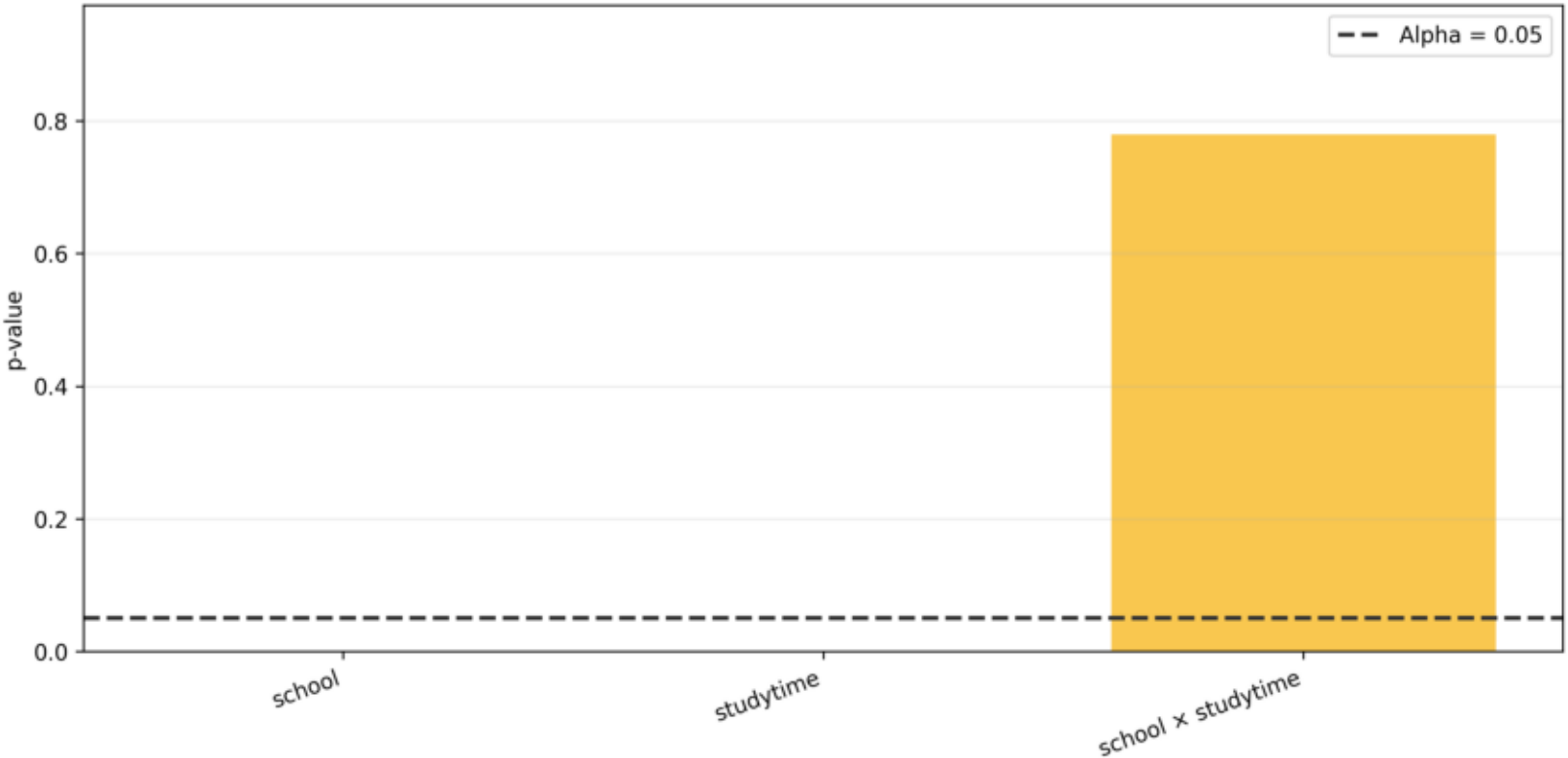
Type I ANOVA F Statistics

F values test each effect after earlier effects in the sequence.



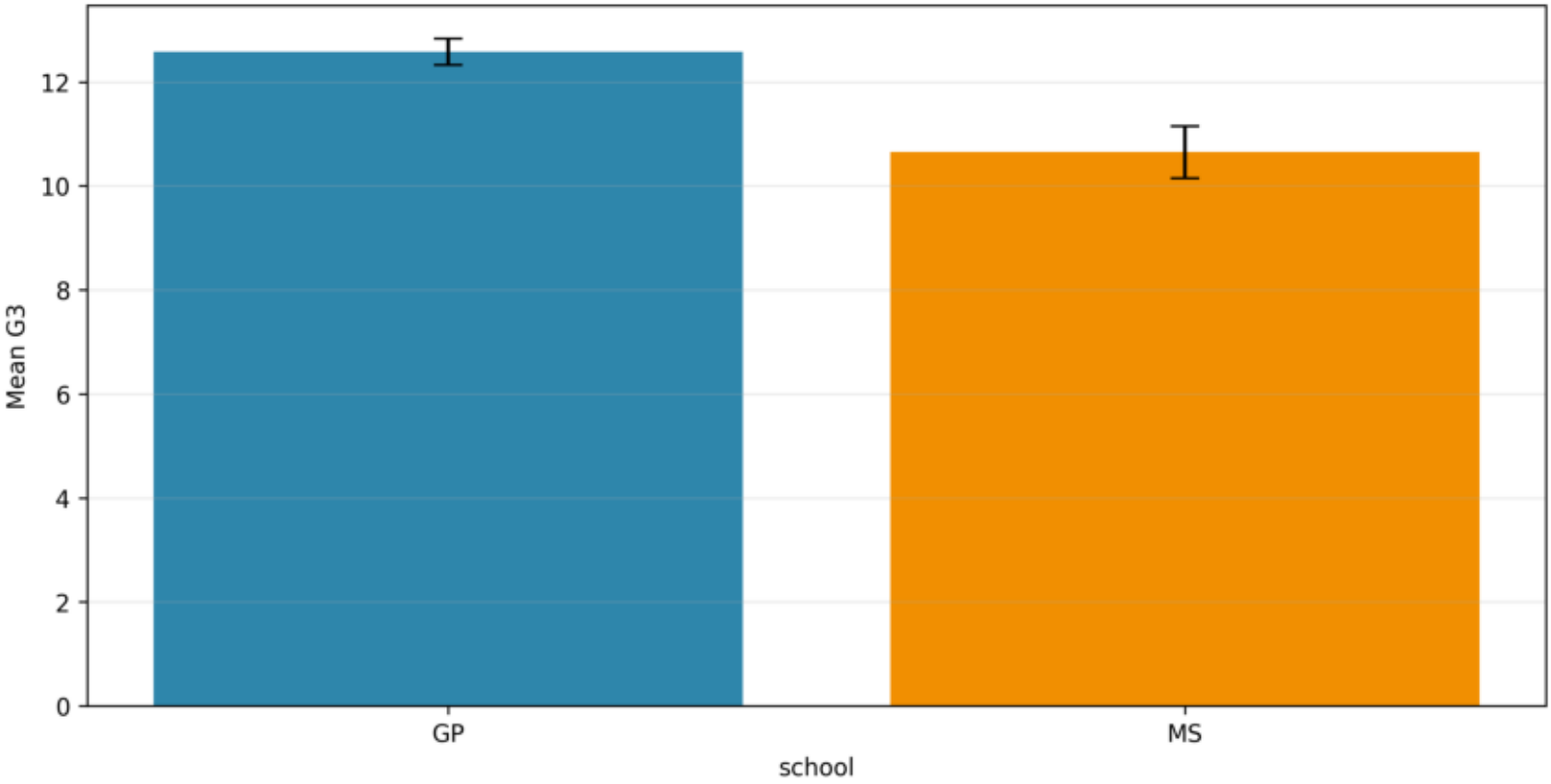
Type I ANOVA p-value Decision

A p-value below alpha supports rejecting that sequential effect null hypothesis.



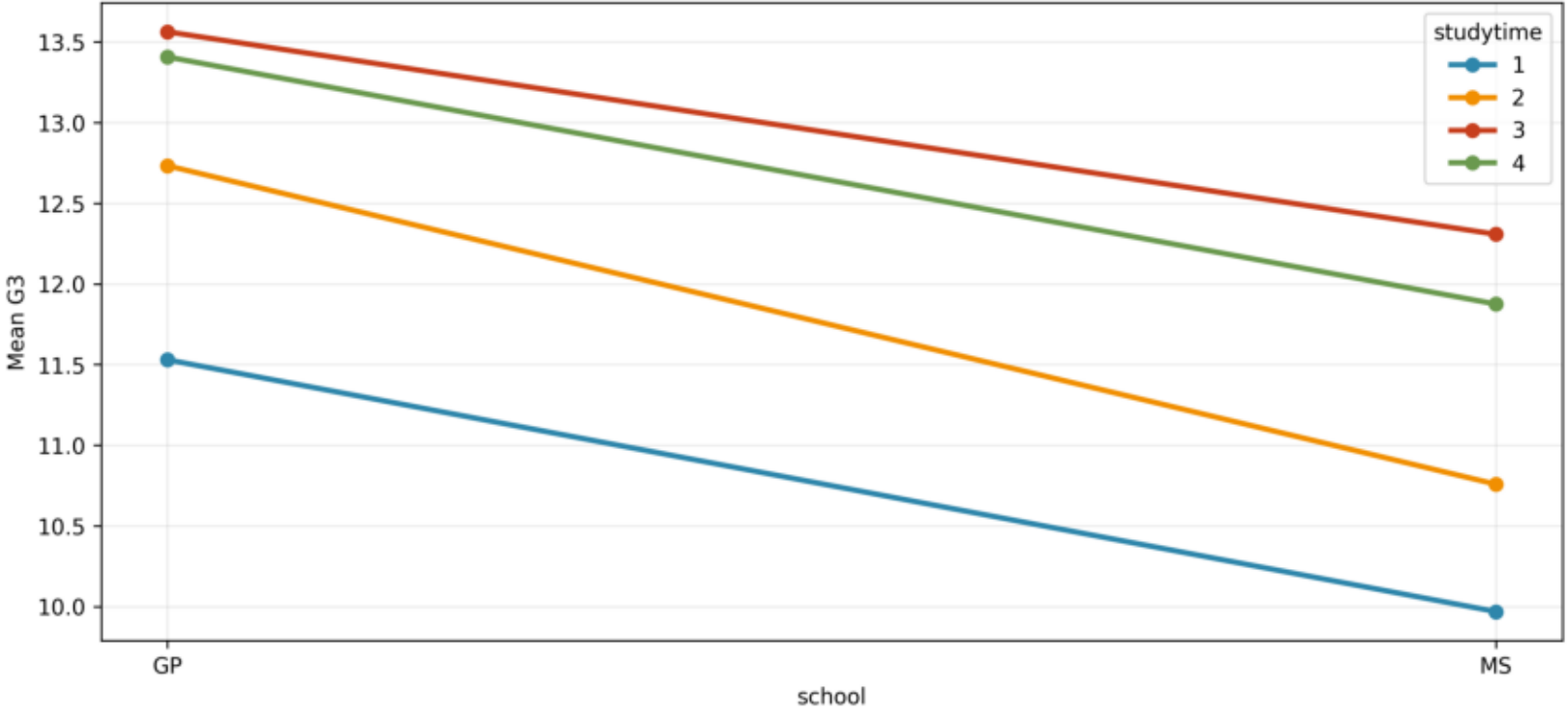
Mean G3 by school

Group means provide context for the sequential ANOVA table.



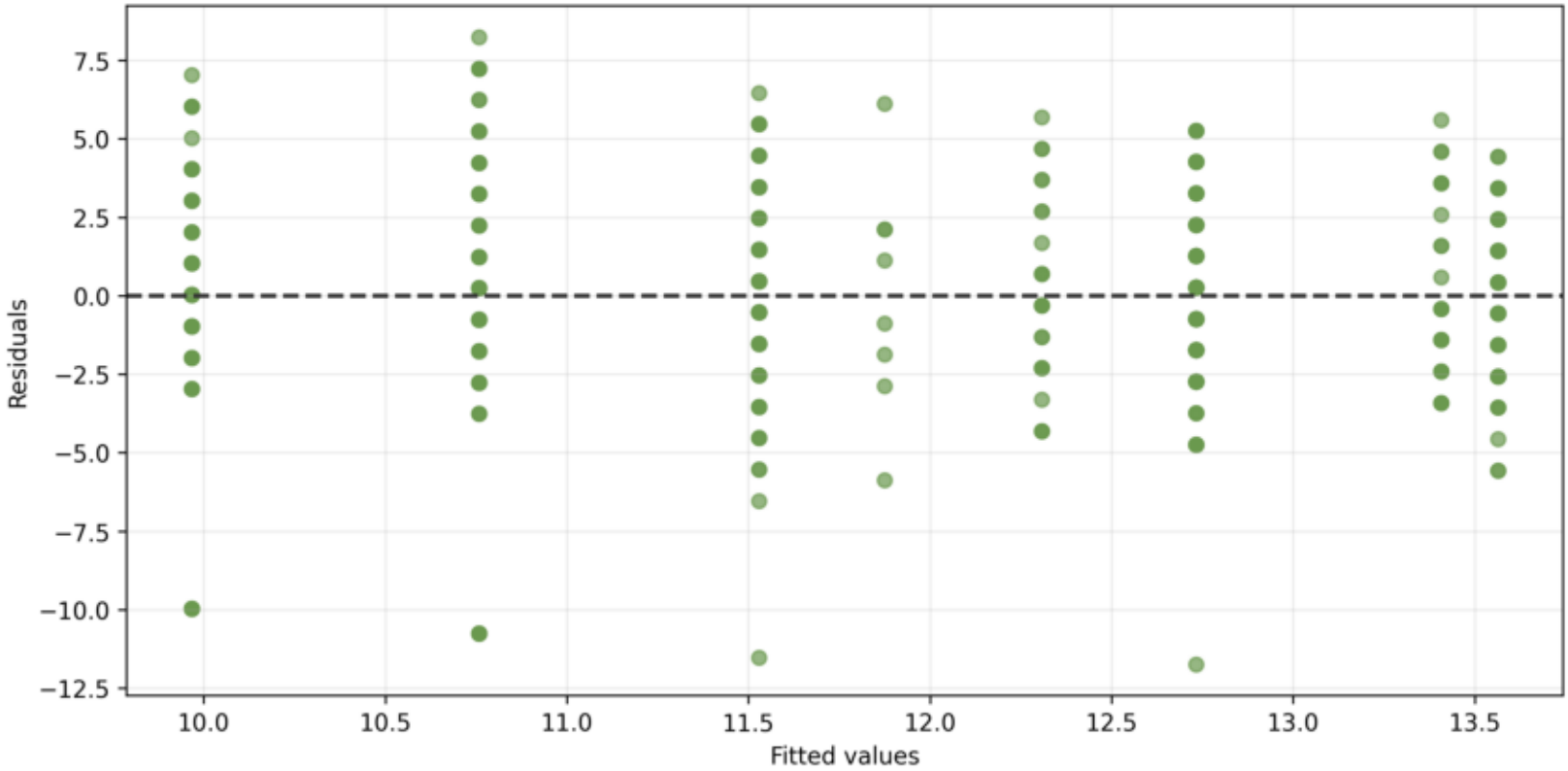
Interaction Mean Pattern

Lines show whether the second factor has similar patterns inside first-factor groups.



Residuals vs Fitted Values

A random pattern around zero supports the ANOVA model interpretation.



Type I Sum of Squares ANOVA Table

Sequential SS is reported in the order terms are entered into the model.

Effect	df	SS	F	p	η² seq	partial η²	Decision
school	1	546.6	59.74	4.202e-14	0.08082	0.08525	Reject H0
studytime	3	341.2	12.43	6.557e-08	0.05045	0.05498	Reject H0
school × studytime	3	9.982	0.3636	0.7793	0.001476	0.001699	Fail to reject H0