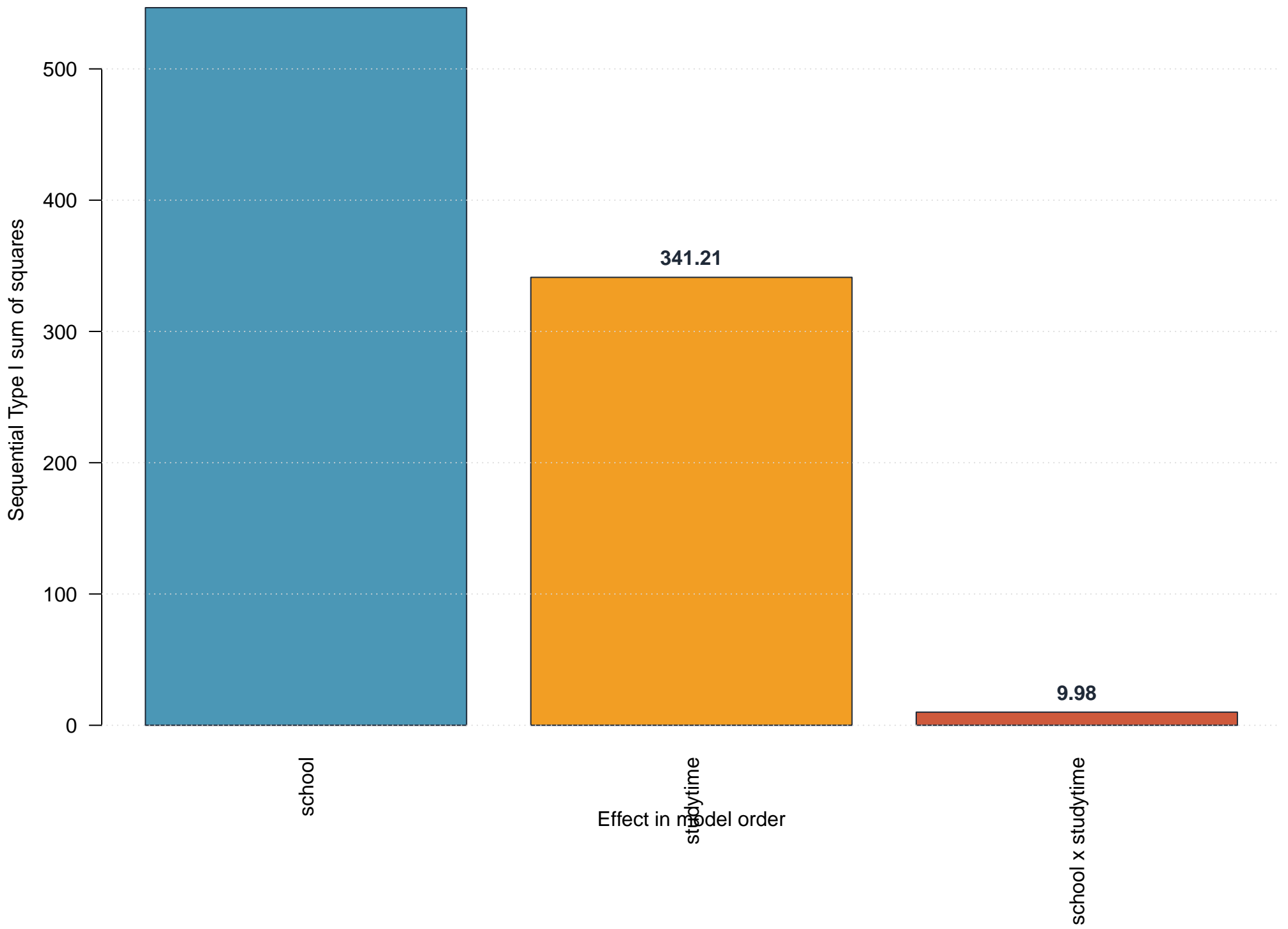




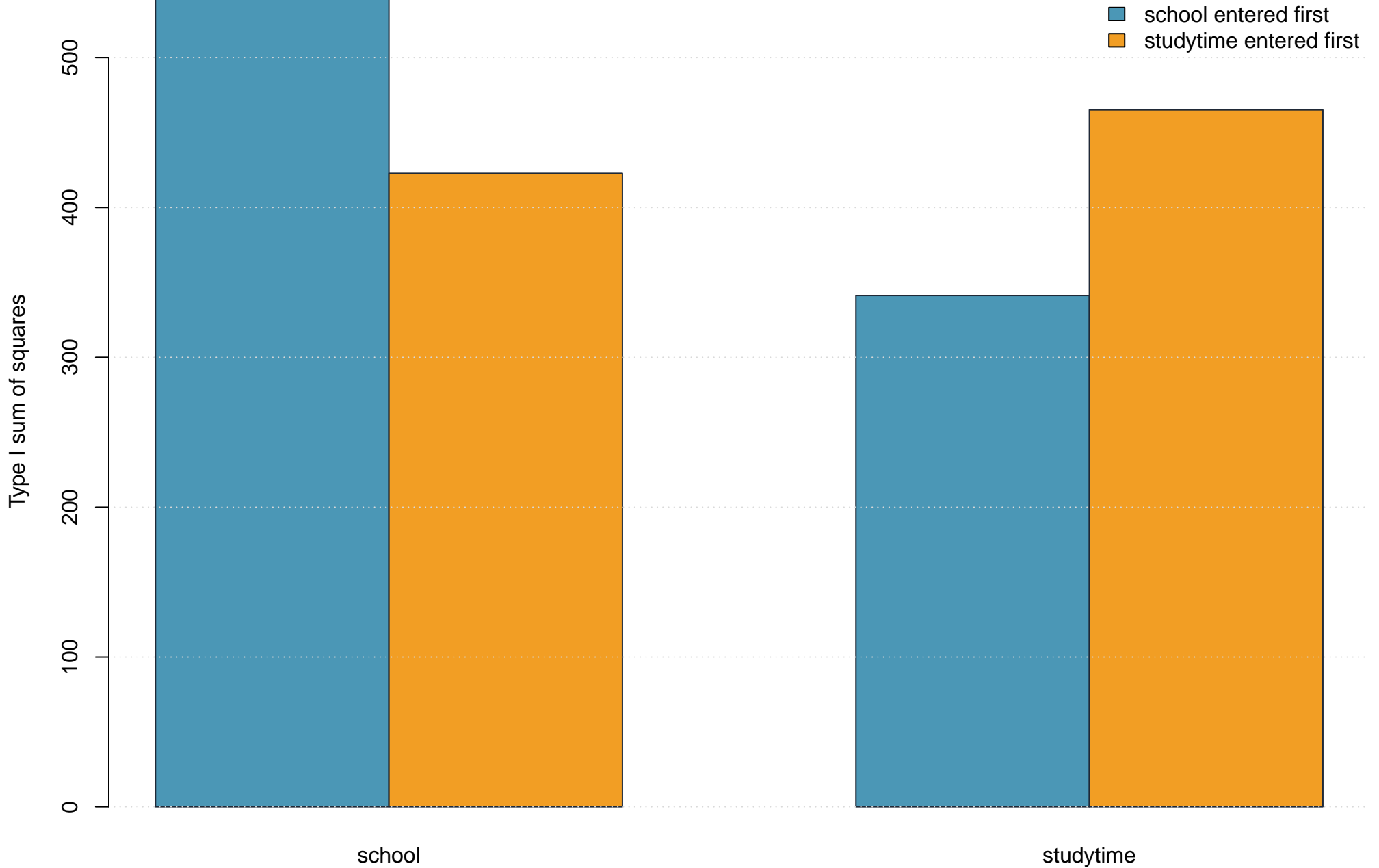
# Type I Sum of Squares by Effect

Model order: school first, then studytime then interaction.



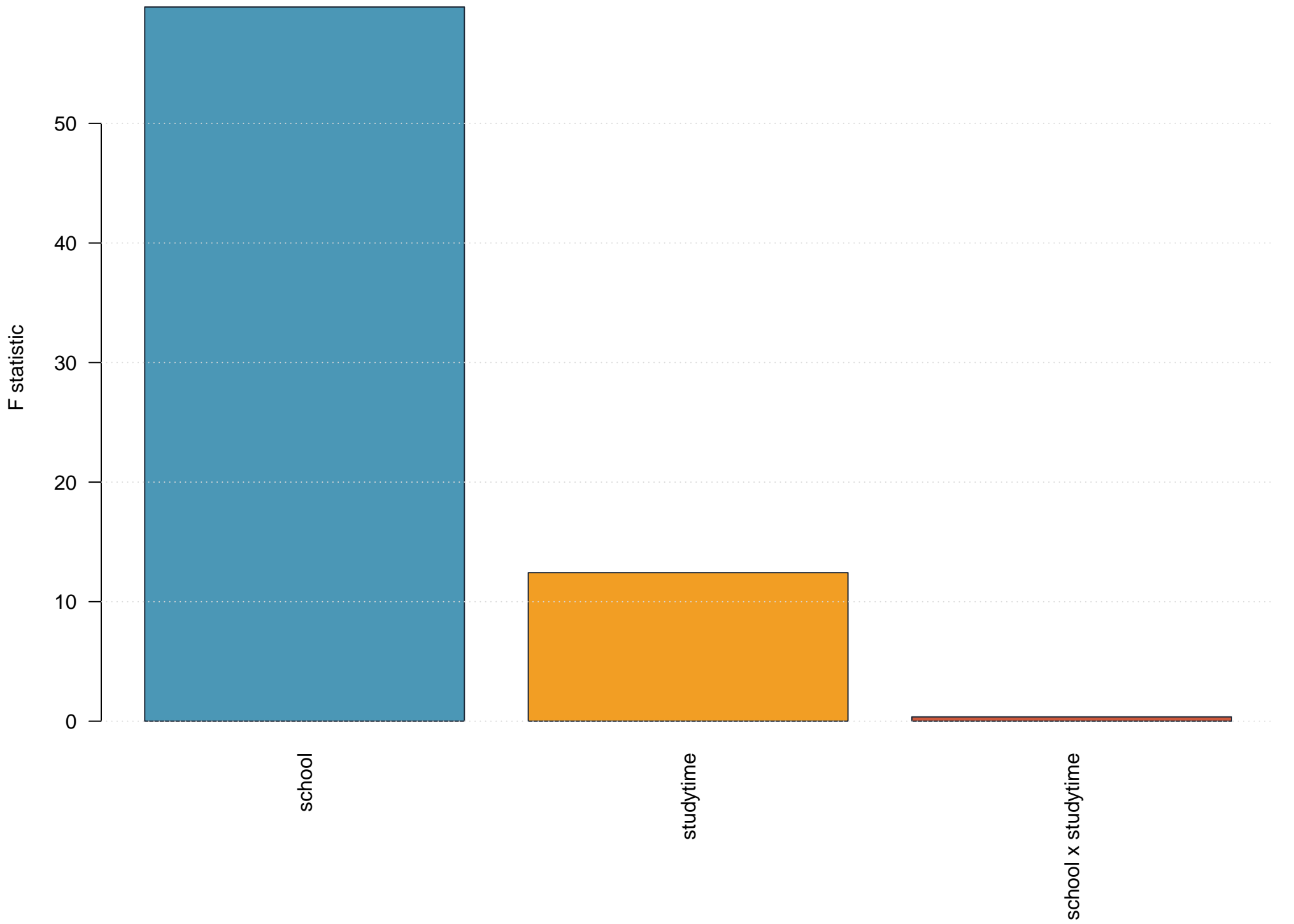
# Type I SS Changes When Model Order Changes

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



# Type I ANOVA F Statistics

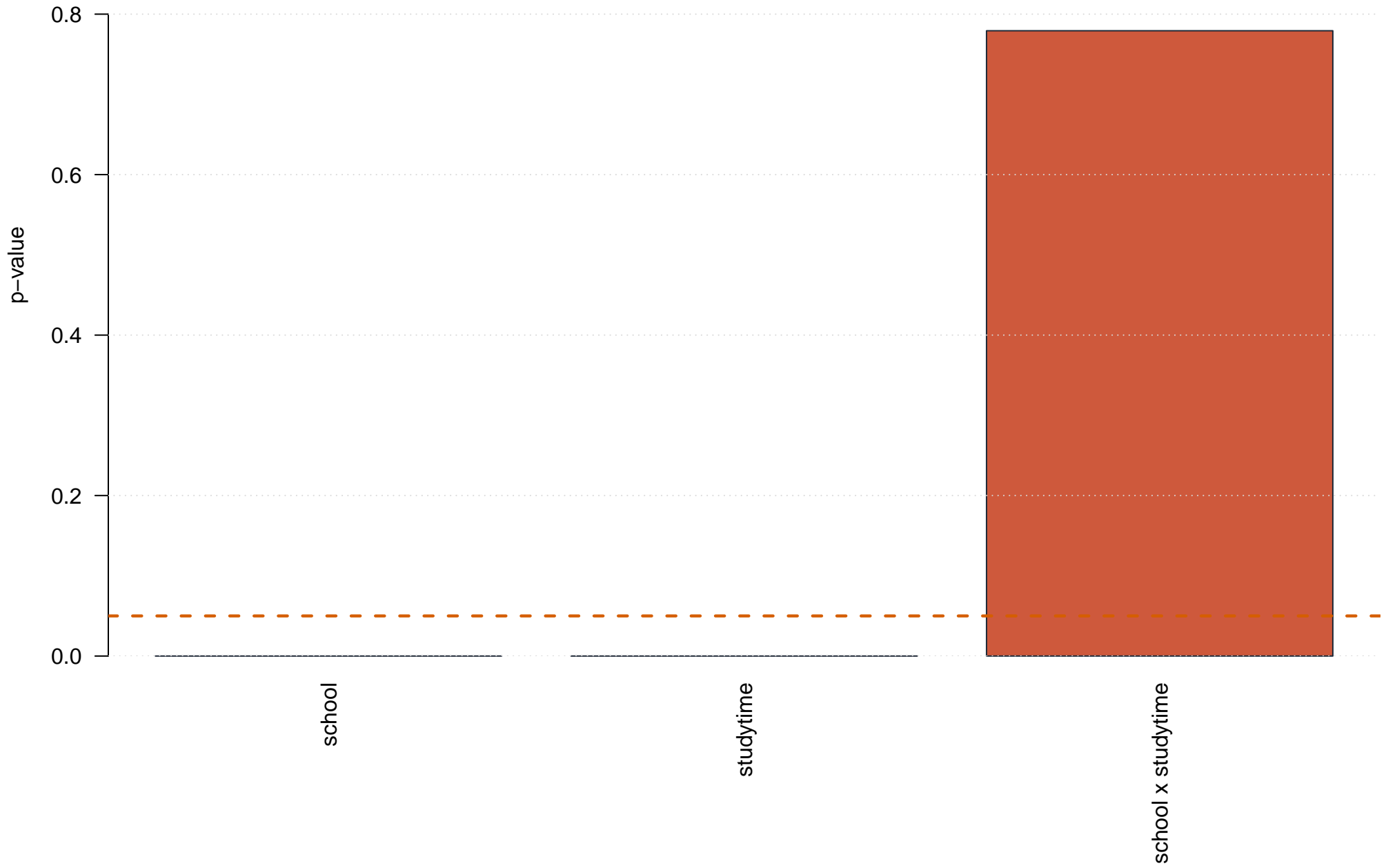
F values test each effect after earlier effects in the sequence.



# Type I ANOVA p-value Decision

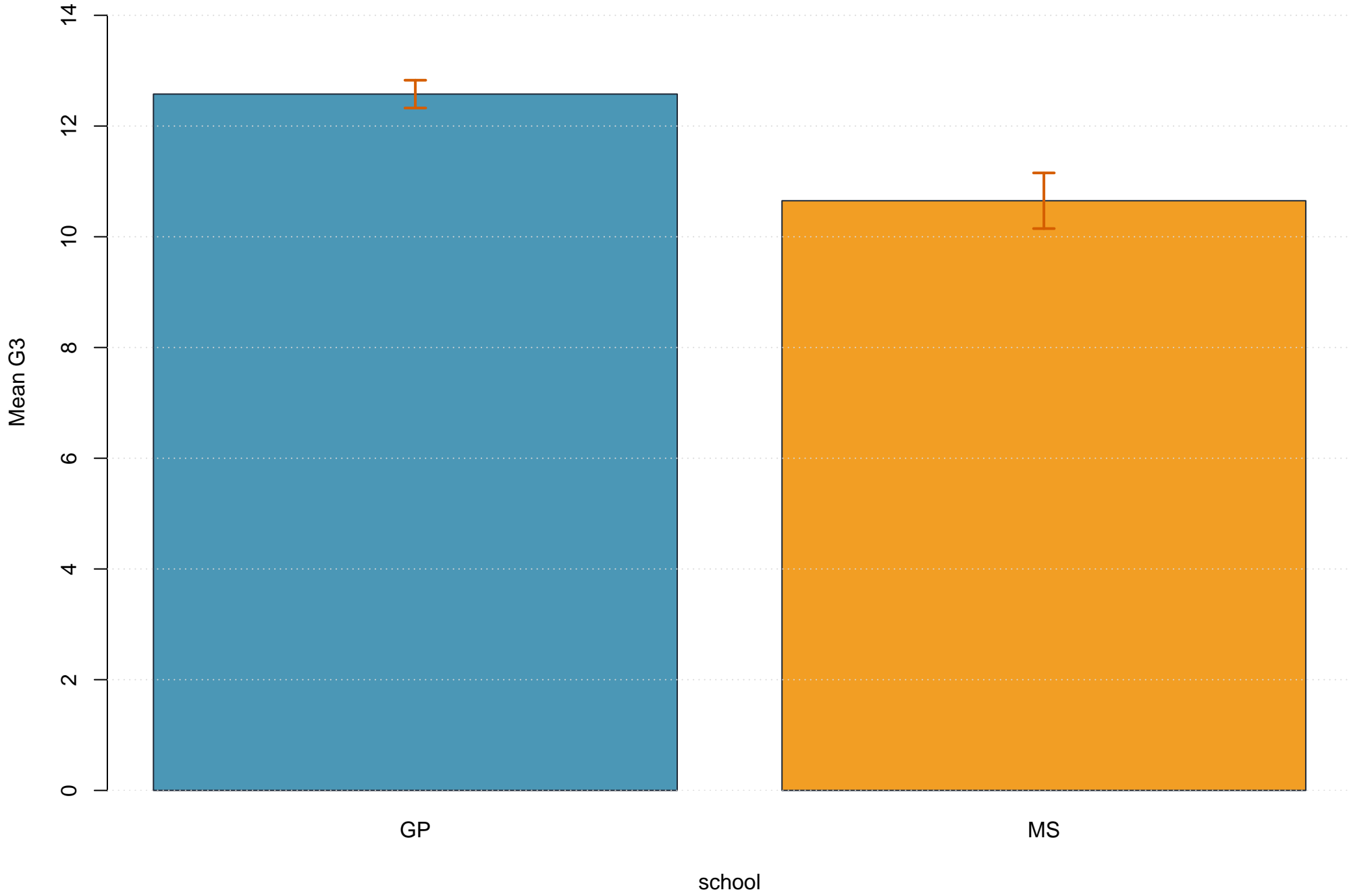
A p-value below alpha supports rejecting that sequential effect null hypothesis.

Alpha = 0.05



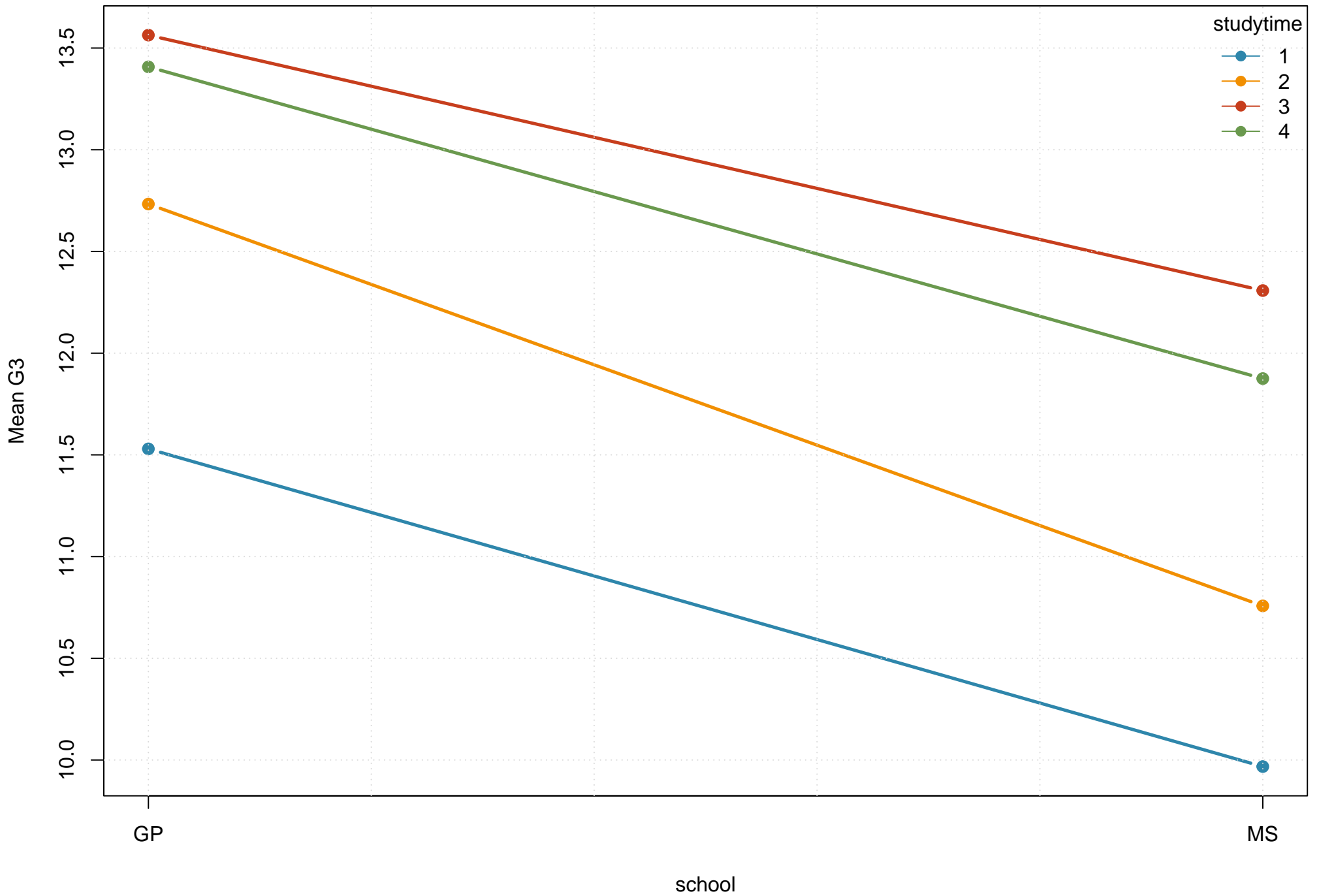
# Mean G3 by school

Group means provide context for the sequential ANOVA table.



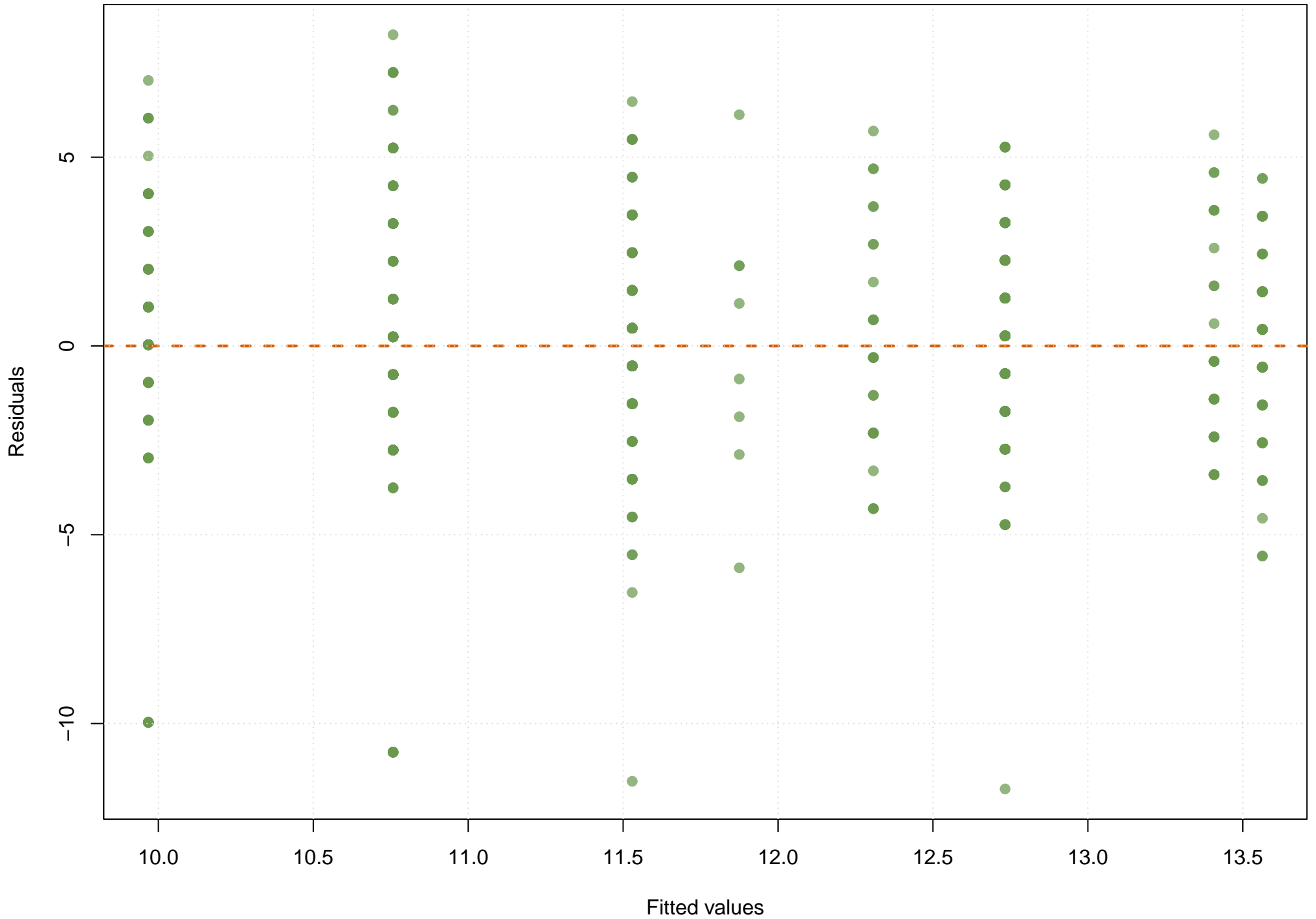
# Interaction Mean Pattern

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	eta2_seq	partial_eta2	Decision
school	1	546.6	59.74	4.202e-14	0.0808	0.0852	Reject H0
studytime	3	341.2	12.43	6.557e-08	0.0505	0.0550	Reject H0
school x studytime	3	9.982	0.3636	0.7793	0.0015	0.0017	Fail to reject H0