Factorial ANOVA Report

Default model:
G3 ~ studytime * sex

Model summary:

target_variable	factor_1	factor_2	model	total_n	factor_1_levels	factor_2_levels	number_of_cells	levene_statistic	levene_p_value	bartlett_statistic	bartlett_p_value	alpha	note
G3	studytime	sex	G3 ~ studytime * sex	649	4	2	8	0.733372	0.643729	13.523096	0.060344	0.05	Use the ANOVA table to evaluate main effects and interaction.

ANOVA table:

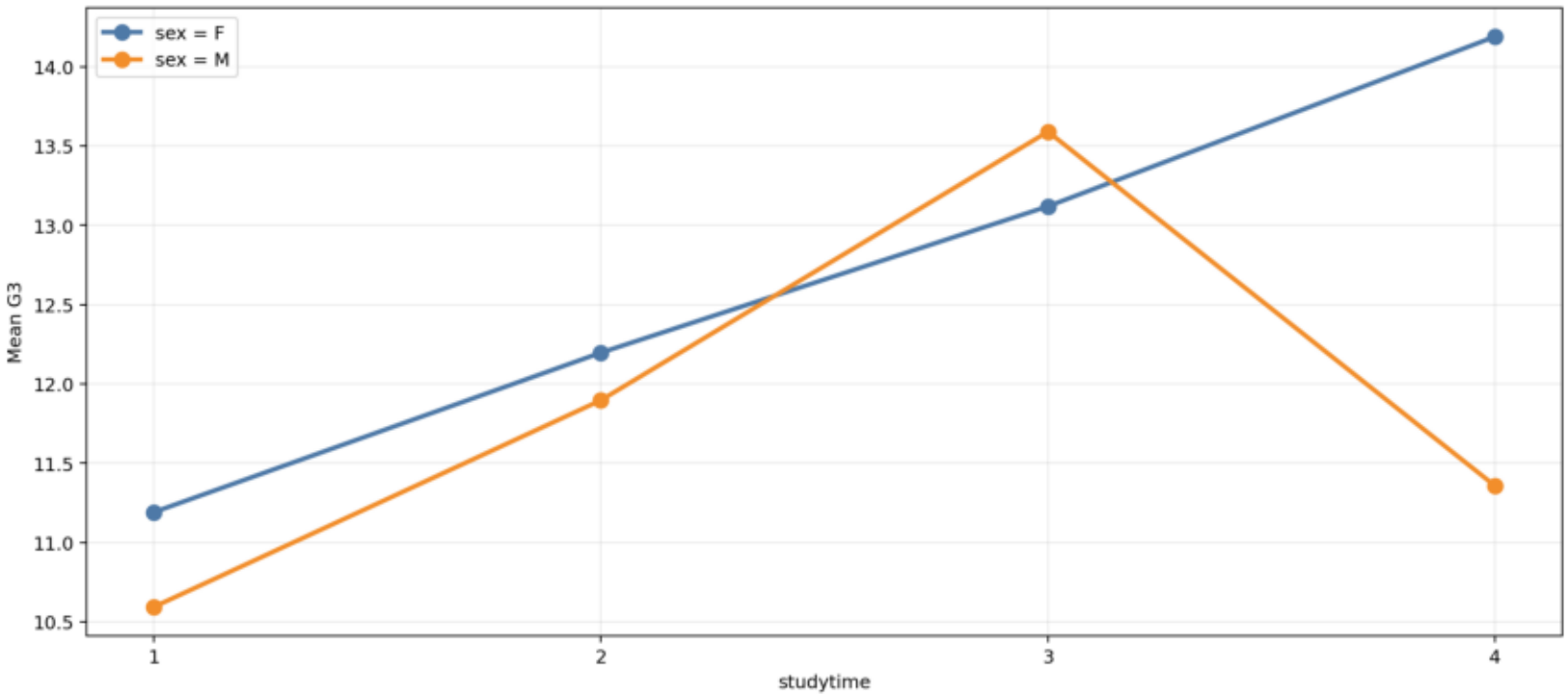
source	sum_sq	df	F	PR(>F)	eta_squared	partial_eta_squared
C(Q('studytime'))	383.462806	3.0	13.210123	2.233030e-08	0.057390	0.058226
C(Q('sex'))	31.067749	1.0	3.210810	7.362479e-02	0.004650	0.004984
C(Q('studytime')):C(Q('sex'))	64.815481	3.0	2.232865	8.322970e-02	0.009701	0.010342
Residual	6202.305509	641.0	NaN	NaN	0.928259	NaN

Cell summary:

studytime	sex	n	mean	median	standard_deviation	variance	minimum	maximum
1	F	89	11.191011	11.0	2.969069	8.815373	0	17
1	M	123	10.593496	11.0	3.377450	11.407170	0	18
2	F	198	12.196970	12.0	3.223737	10.392478	0	18
2	M	107	11.897196	11.0	3.284999	10.791218	0	19
3	F	75	13.120000	13.0	2.609546	6.809730	8	18
3	M	22	13.590909	14.0	2.108014	4.443723	9	17
4	F	21	14.190476	14.0	2.874353	8.261905	10	19
4	M	14	11.357143	11.0	2.499450	6.247253	6	17

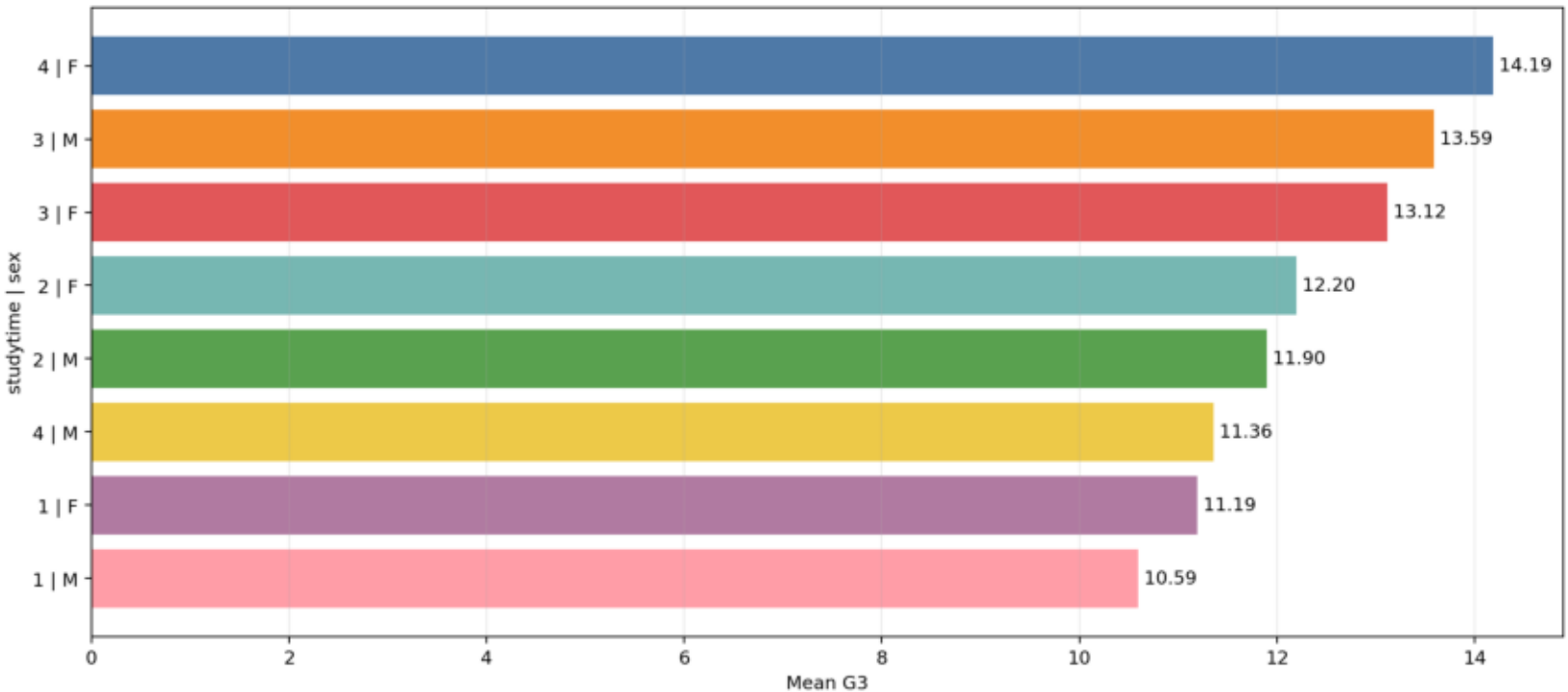
Factorial ANOVA: Interaction Plot

Non-parallel lines suggest a possible studytime × sex interaction.



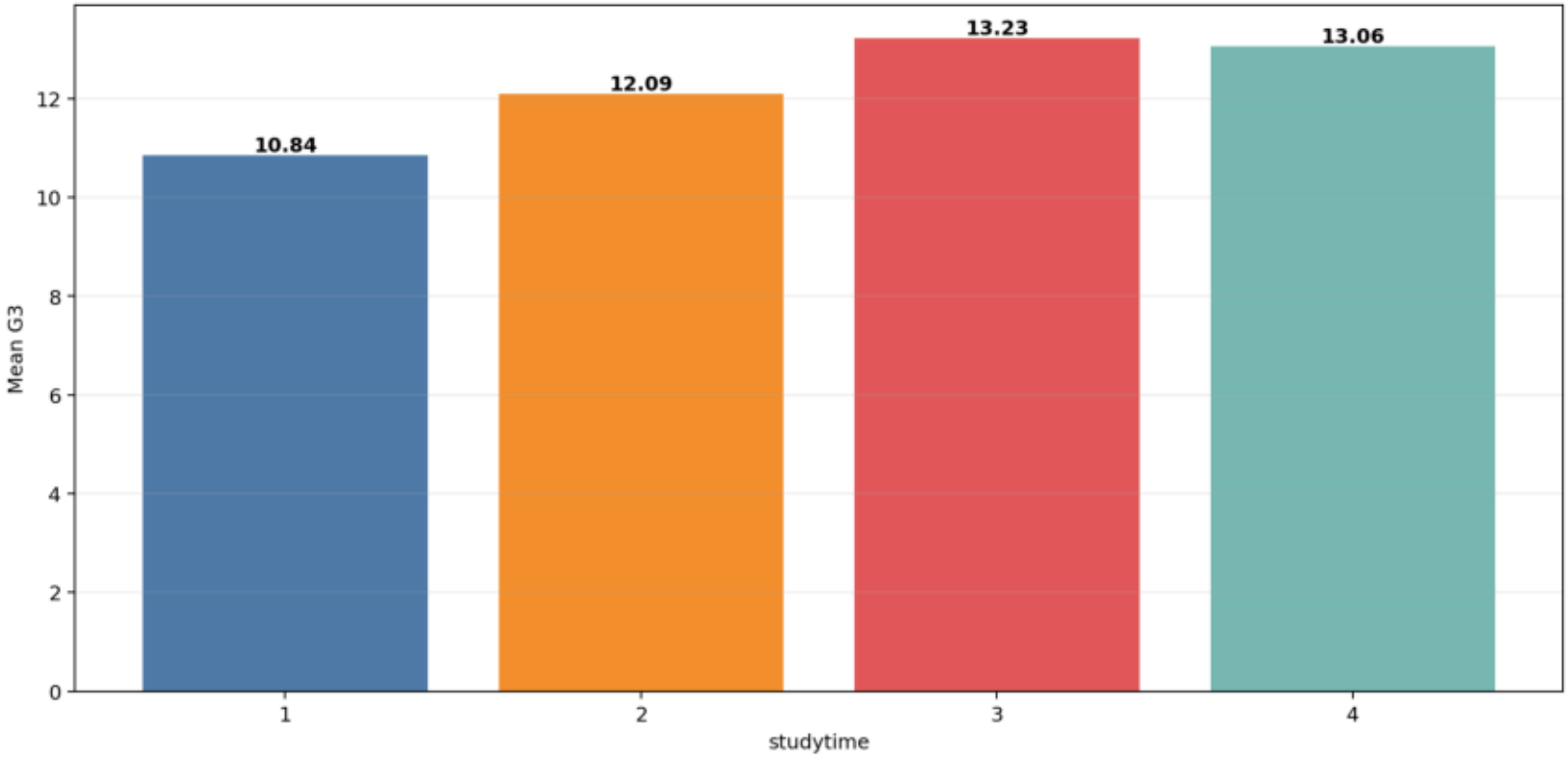
Factorial ANOVA: Cell Means

Each bar represents the outcome mean for one combination of the two factors.



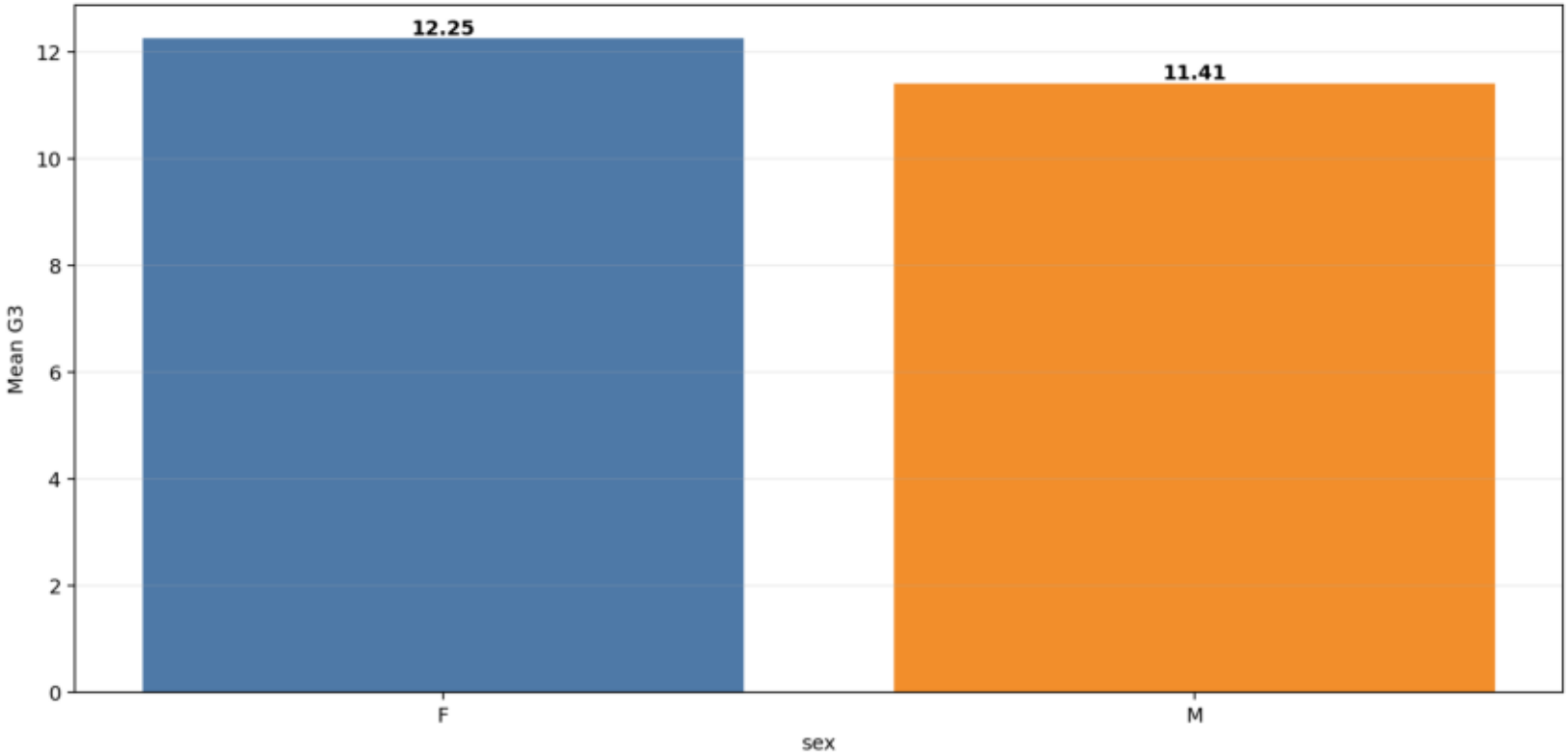
Factorial ANOVA: Main Effect of studytime

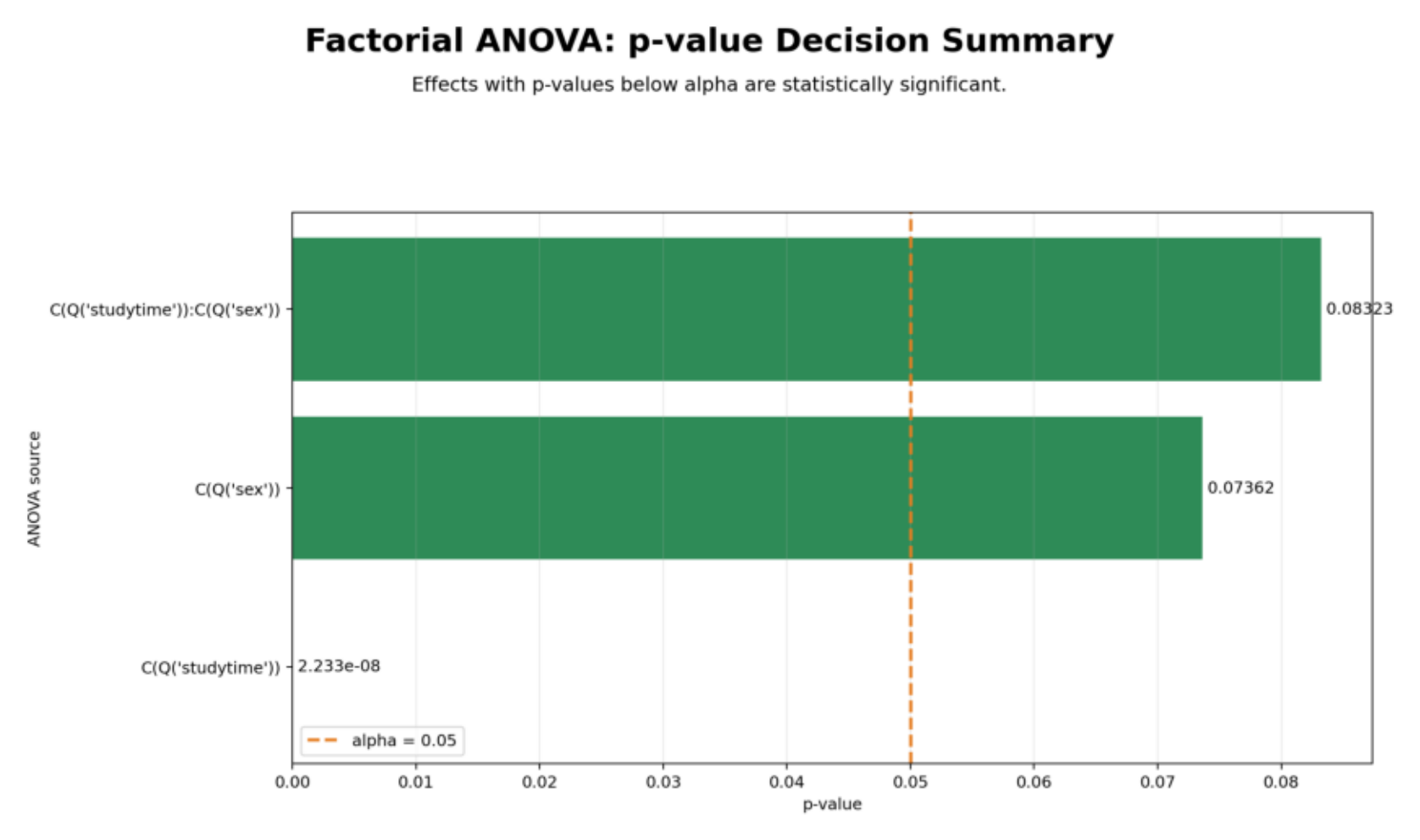
This chart compares overall mean G3 across levels of studytime.



Factorial ANOVA: Main Effect of sex

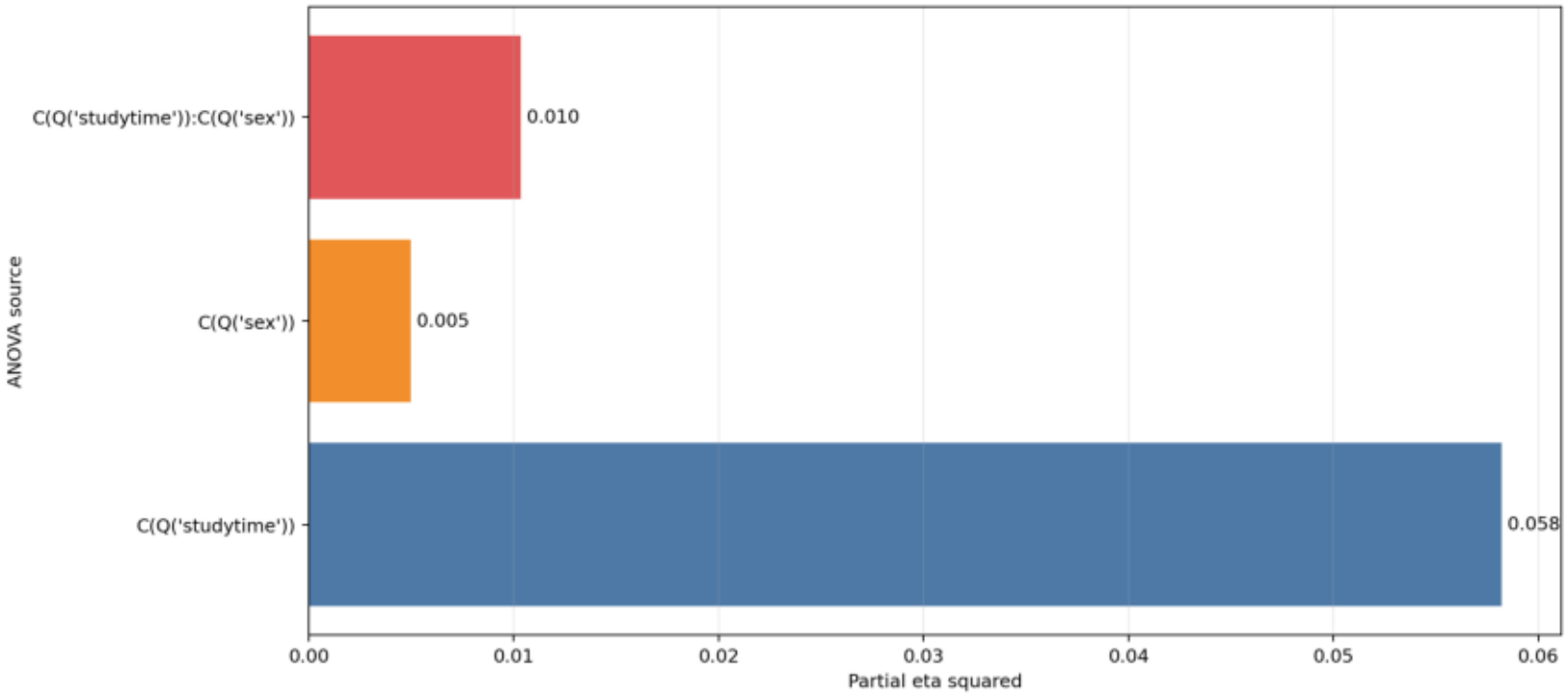
This chart compares overall mean G3 across levels of sex.




Factorial ANOVA: p-value Decision Summary
Effects with p-values below alpha are statistically significant.
ANOVA source
C(Q('studytime')):C(Q('sex'))
C(Q('sex'))
C(Q('studytime'))
0.08323
0.07362
2.233e-08
alpha = 0.05
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
p-value

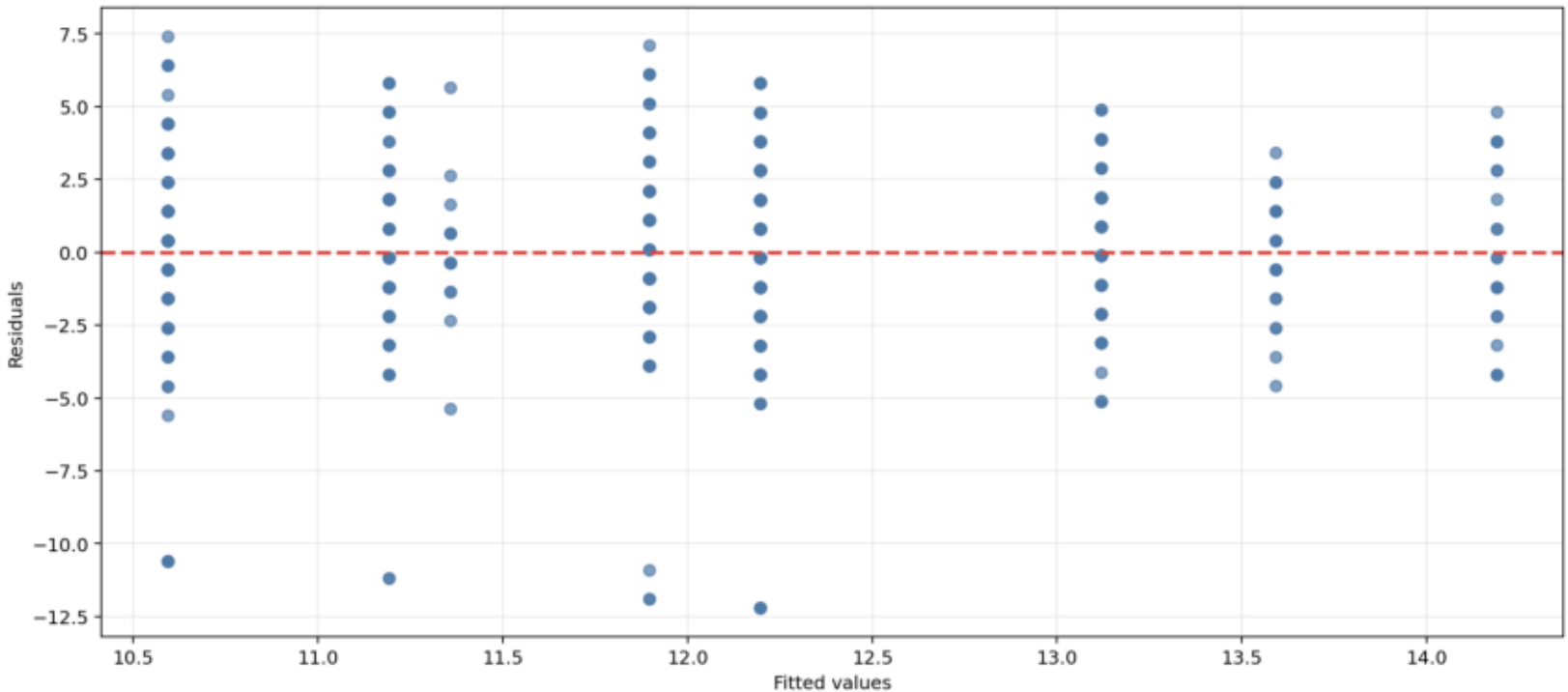
Factorial ANOVA: Effect Size Summary

Partial eta squared shows the relative size of each main effect and interaction.



Factorial ANOVA: Residuals vs Fitted Values

A random pattern around zero supports the model fit and variance assumptions.



Factorial ANOVA: Q-Q Plot of Residuals

Points close to the reference line support approximate residual normality.