

Regression Coefficients

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Dataset: D:\DATA ANALYSIS\H Regression Tests and Models\Regression Coefficients\dataset.csv

Outcome: G3

Predictors: G1, G2, studytime, failures, absences, age

Complete observations: 649

R-squared: 0.850632

Adjusted R-squared: 0.849236

Overall F statistic: 609.352742

Overall model p-value: 3.254128277e-261

RMSE: 1.254409

Strongest standardized predictor: G2 (beta = 0.796713)

Interpretation guide:

- Unstandardized B is the expected outcome change for one unit of the predictor, holding the others constant.
- Standardized beta compares predictor strength using standard-deviation units.
- A 95% confidence interval excluding zero and $p < 0.05$ indicate stronger evidence of a unique coefficient effect.
- The squared semi-partial correlation is the predictor's unique contribution to R-squared.
- VIF values of 5 or more warrant closer multicollinearity review.

Charts generated: 8

Regression coefficients

term	coefficient_b	standard_error	t_value	p_value	ci95_lower	ci95_upper	decision_alpha_0_05
const	-0.545315	0.762635	-0.715040	0.474844	-2.042876	0.952247	Not statistically significant
G1	0.142169	0.036589	3.885600	0.000113	0.070321	0.214016	Statistically significant
G2	0.883399	0.034210	25.822927	0.000000	0.816222	0.950576	Statistically significant
studytime	0.094579	0.061966	1.526303	0.127427	-0.027102	0.216261	Not statistically significant
failures	-0.233156	0.094932	-2.456036	0.014312	-0.419571	-0.046742	Statistically significant
absences	0.022679	0.010874	2.085726	0.037398	0.001327	0.044031	Statistically significant
age	0.023641	0.043473	0.543809	0.586762	-0.061726	0.109008	Not statistically significant

Standardized coefficients

term	unstandardized_b	standardized_beta	absolute_standardized_beta
G2	0.883399	0.796713	0.796713
G1	0.142169	0.120808	0.120808
failures	-0.233156	-0.042814	0.042814
absences	0.022679	0.032578	0.032578
studytime	0.094579	0.024284	0.024284
age	0.023641	0.008914	0.008914

Zero-order, partial, and part correlations

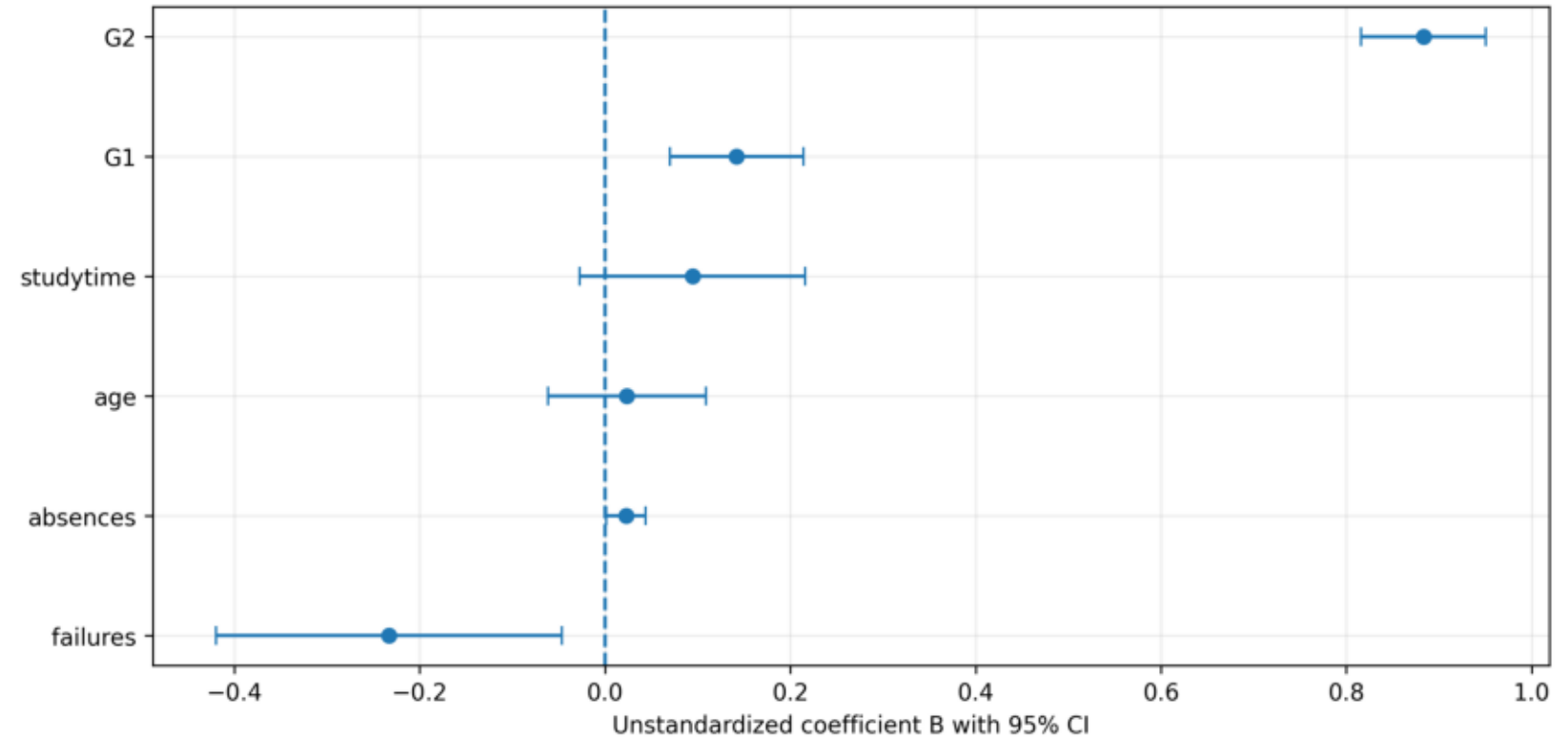
term	zero_order_correlation	partial_correlation	semi_partial_part_correlation	unique_r_squared_contribution
G1	0.826387	0.151580	0.059268	0.003513
G2	0.918548	0.713781	0.393882	0.155143
studytime	0.249789	0.060129	0.023281	0.000542
failures	-0.393316	-0.096480	-0.037462	0.001403
absences	-0.091379	0.082040	0.031814	0.001012
age	-0.106505	0.021457	0.008295	0.000069

Multicollinearity statistics

term	vif	tolerance	decision
const	239.883500	0.004169	Acceptable
G1	4.154857	0.240682	Acceptable
G2	4.091388	0.244416	Acceptable
studytime	1.088056	0.919070	Acceptable
failures	1.306096	0.765641	Acceptable
absences	1.048621	0.953634	Acceptable
age	1.154871	0.865898	Acceptable

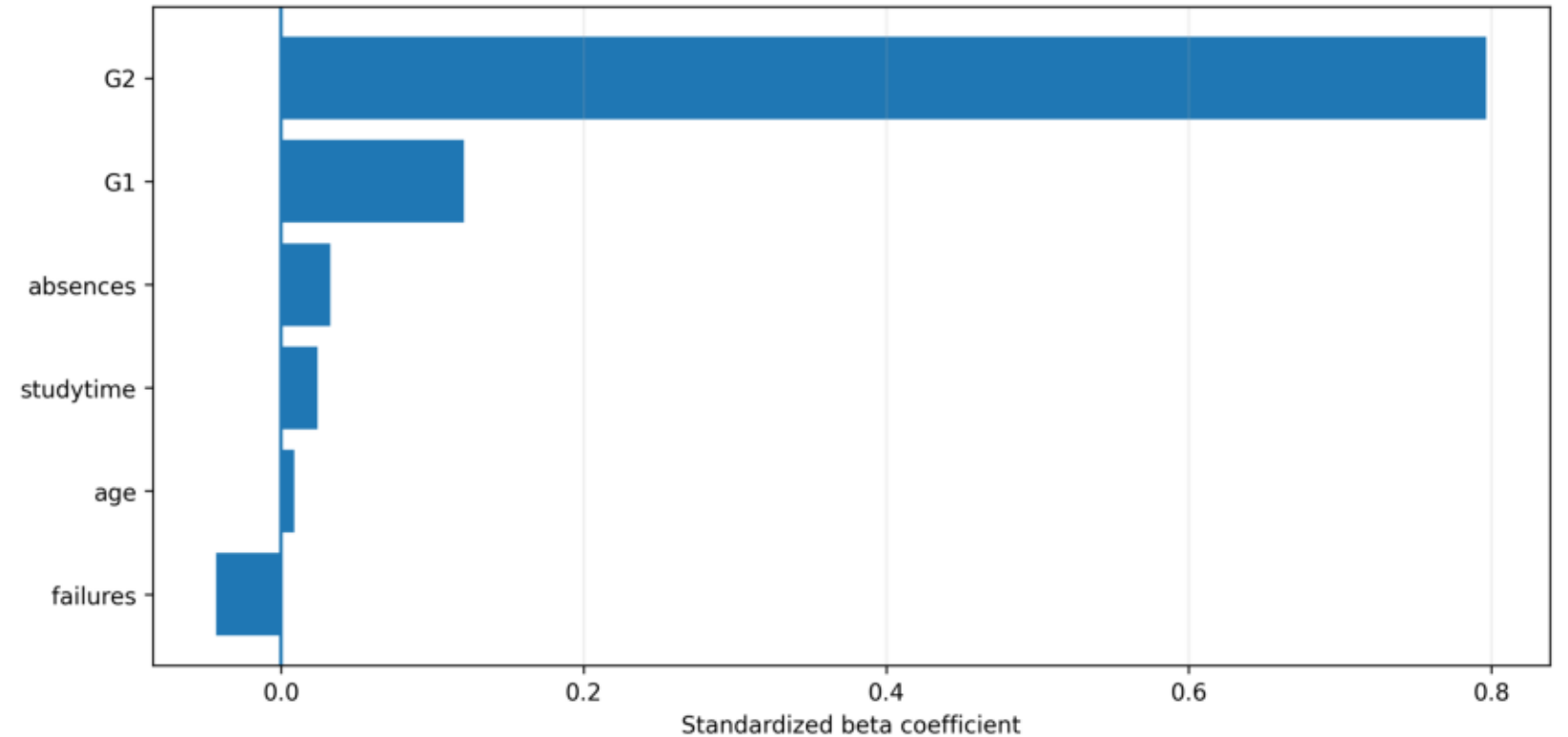
Regression coefficient estimates

Confidence intervals crossing zero indicate weaker evidence for a unique predictor effect.



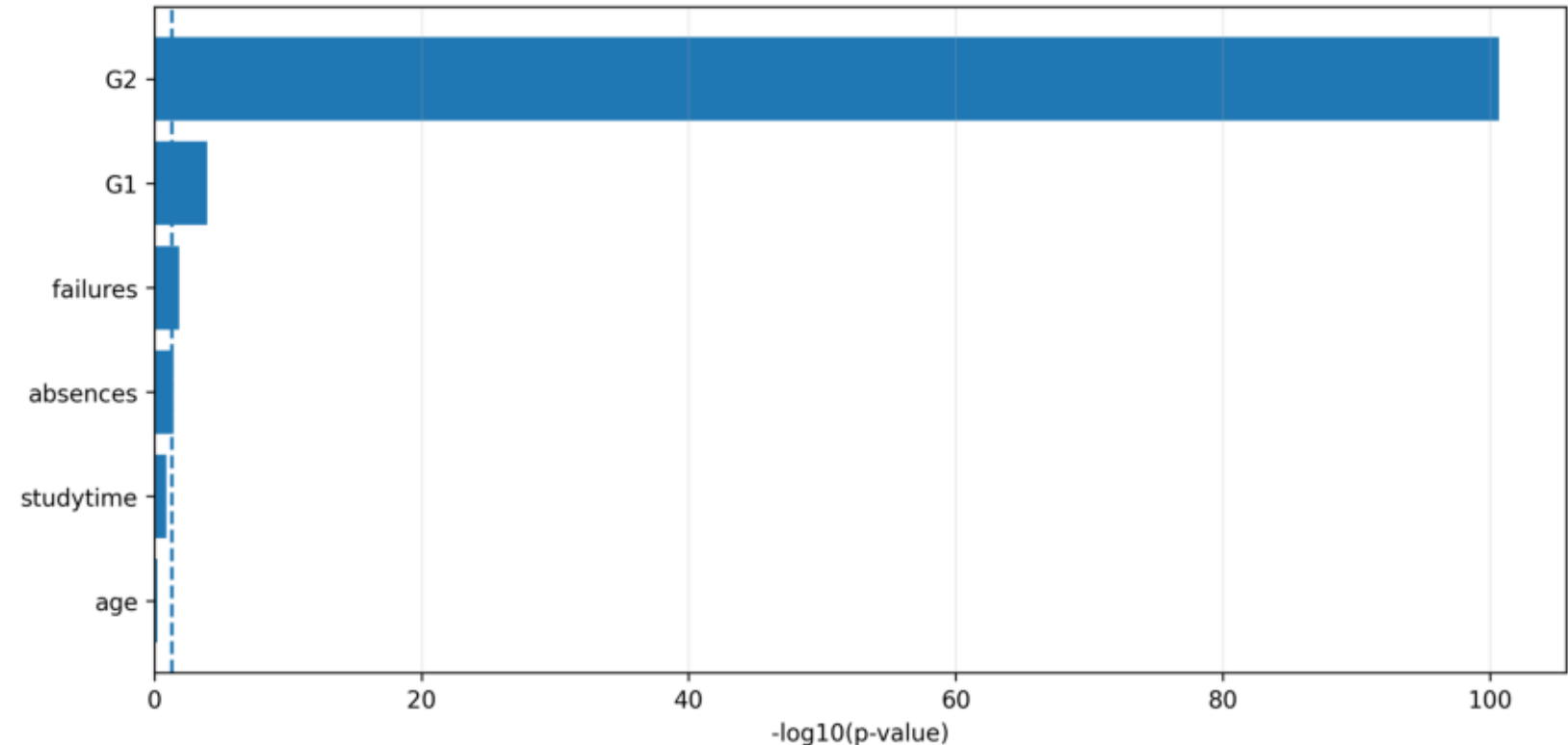
Standardized regression coefficients

Absolute beta values compare predictor strength on a common standard-deviation scale.



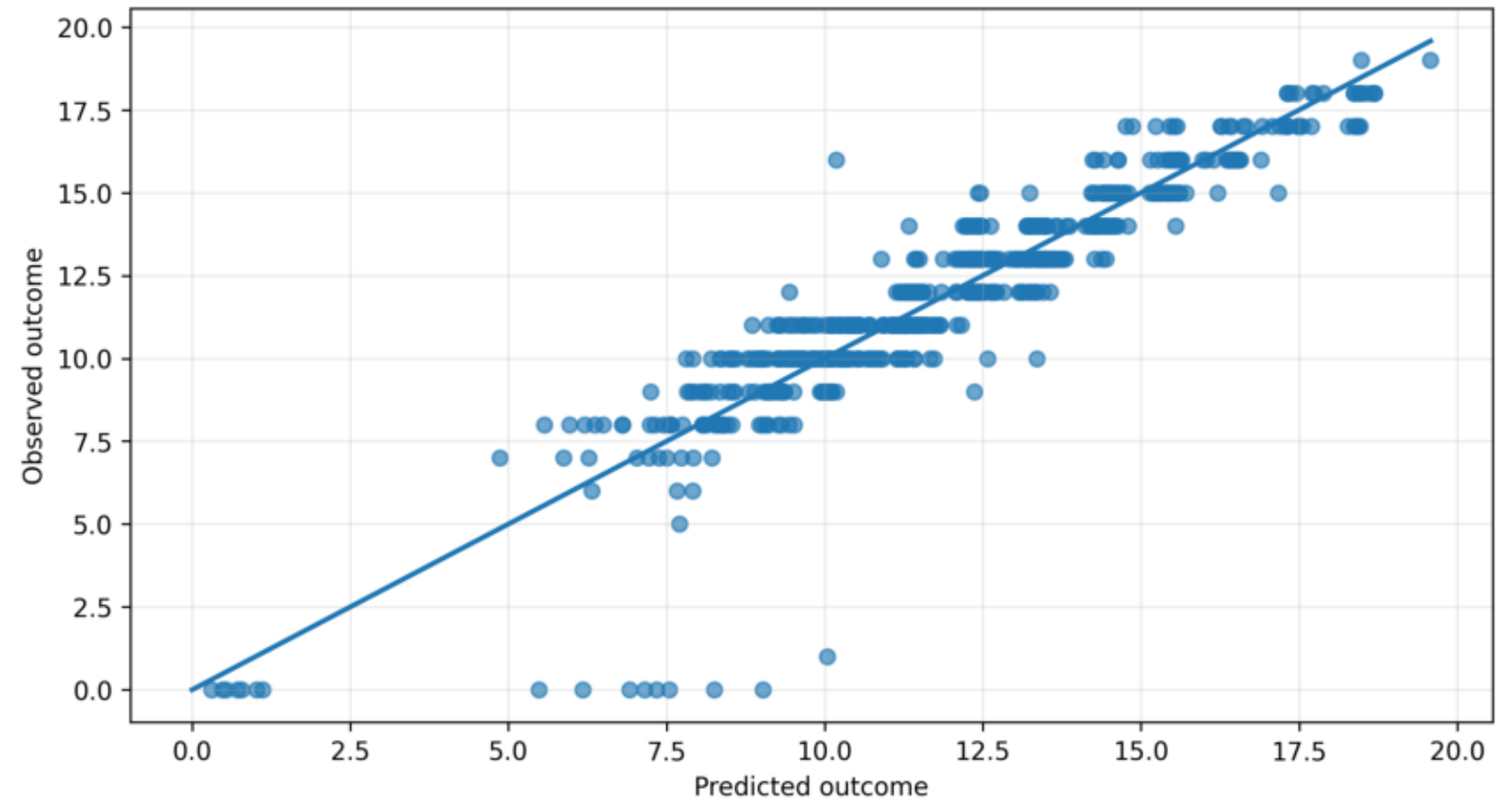
Coefficient significance evidence

Bars beyond the dashed line correspond to $p < 0.05$.



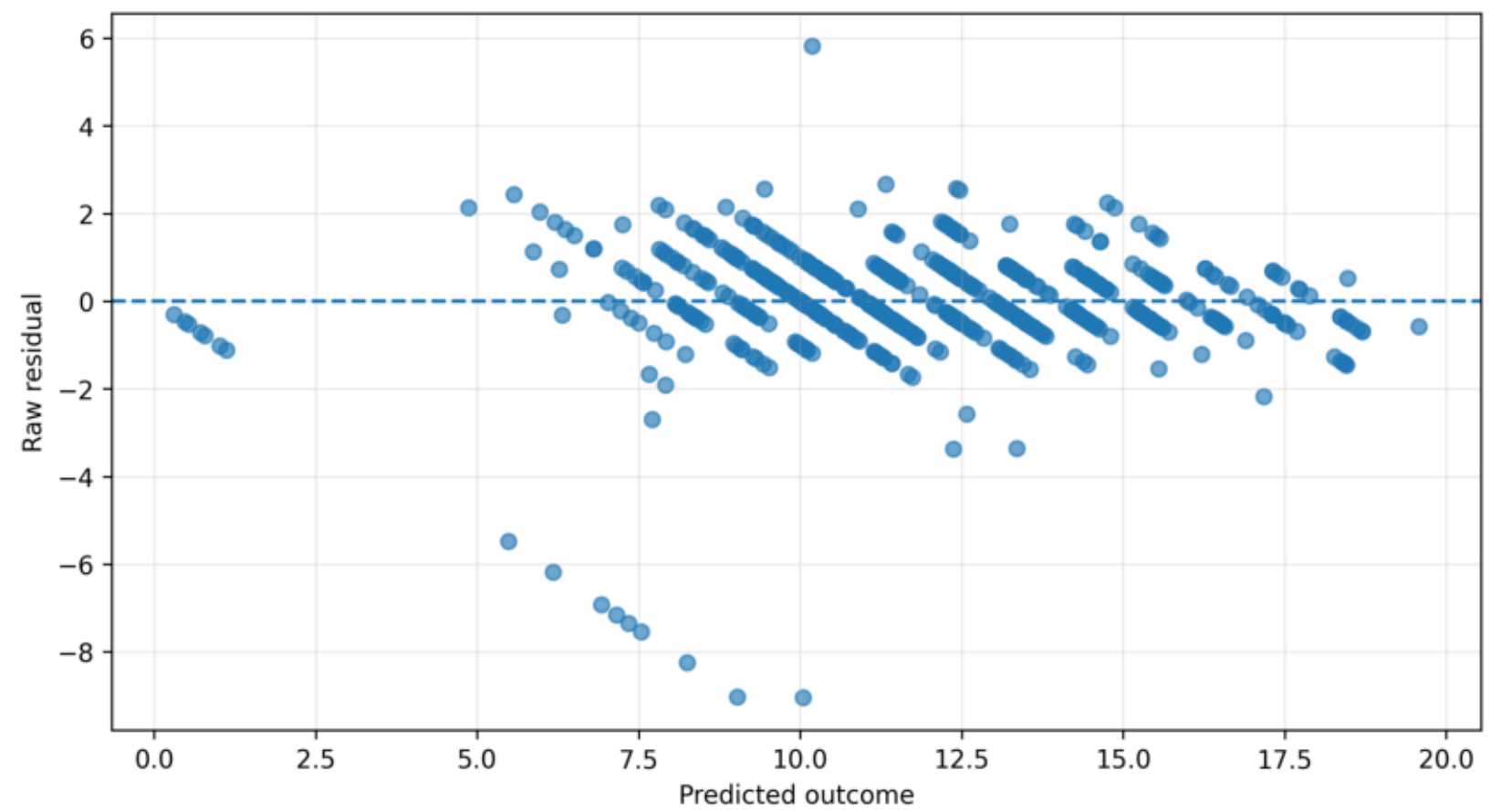
Observed versus predicted values

Points near the diagonal indicate close agreement between observed and fitted values.



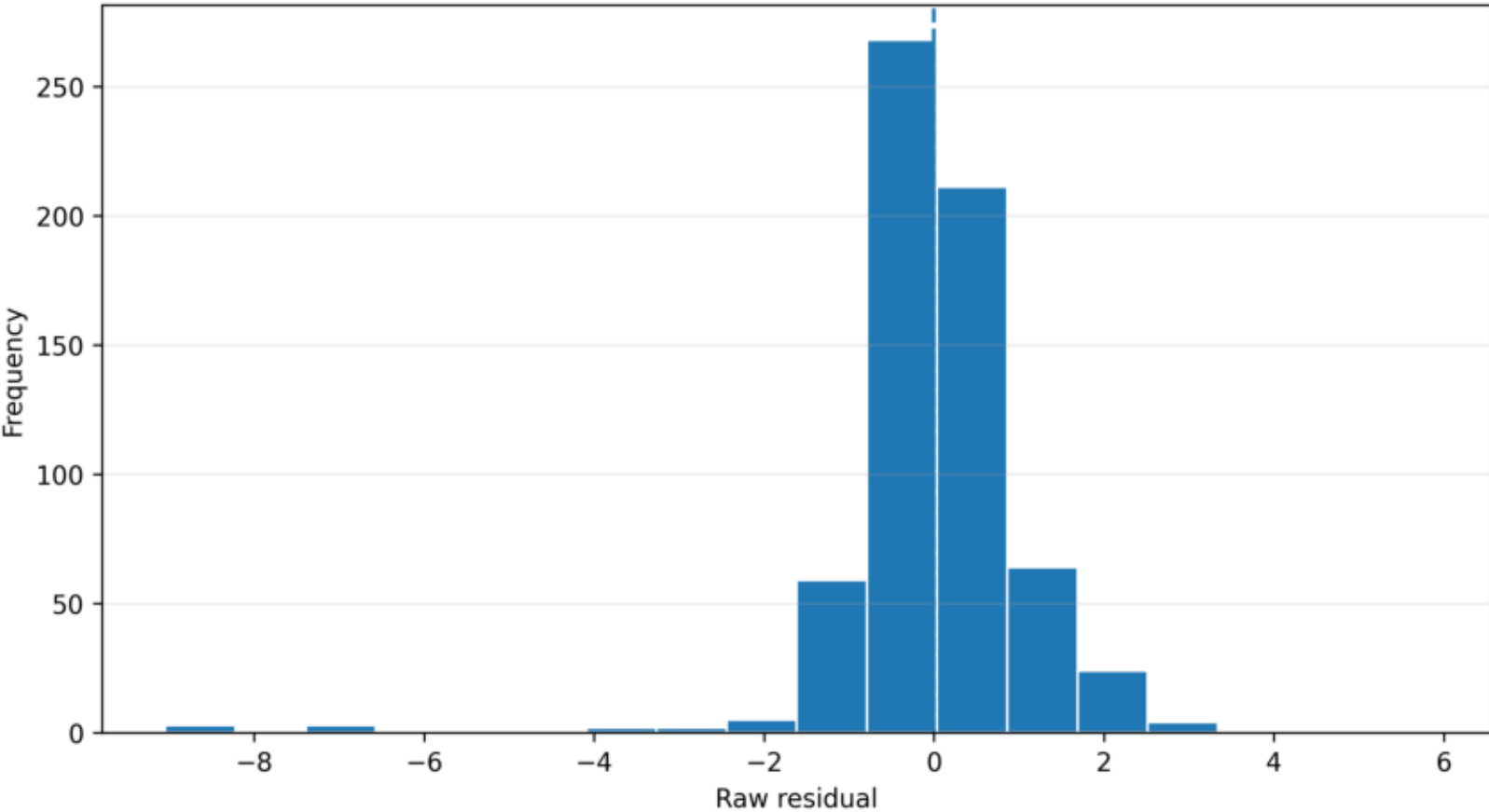
Residuals versus fitted values

A random horizontal band around zero supports linearity and constant residual variance.



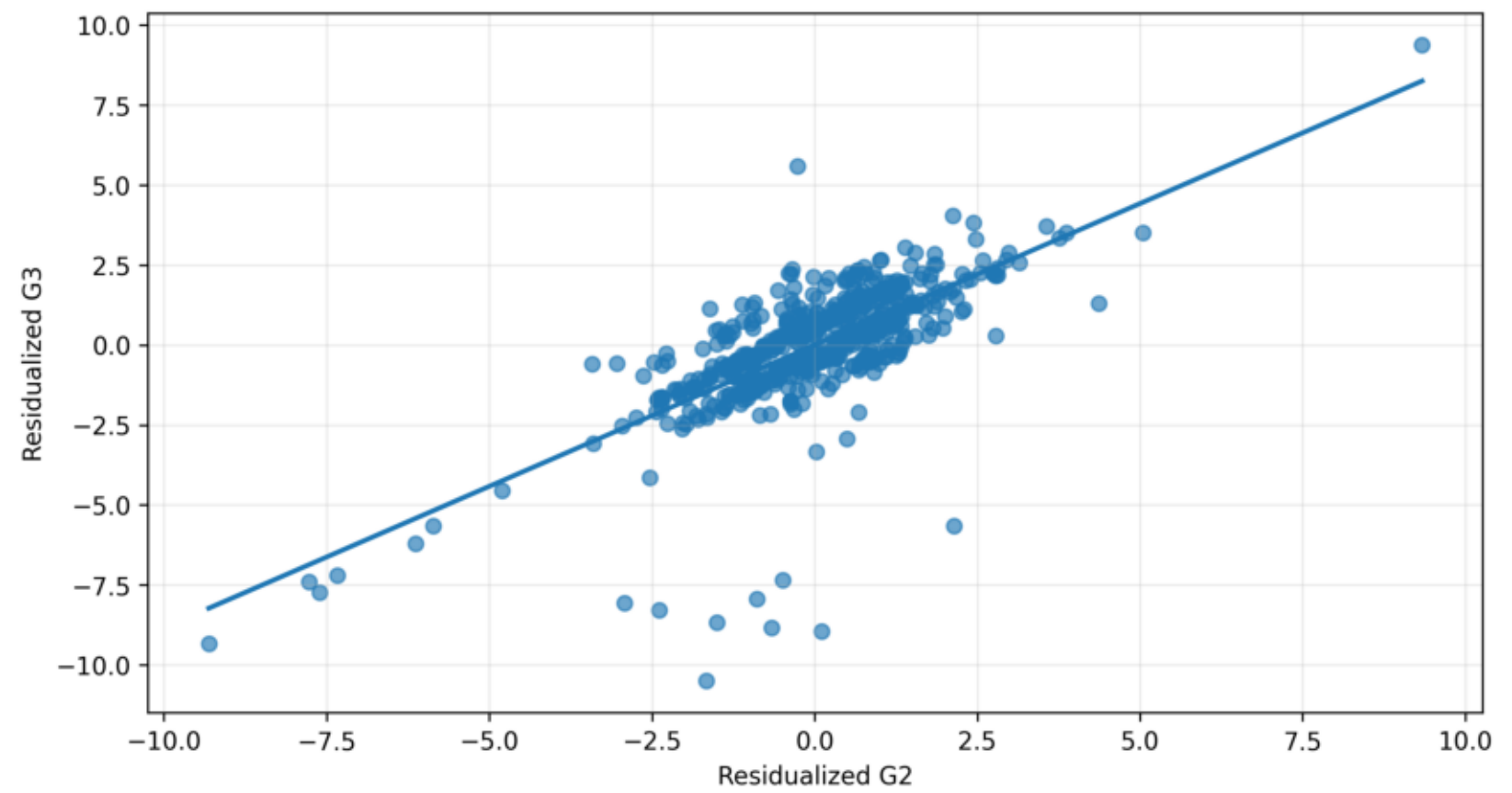
Residual distribution

A roughly symmetric distribution centered on zero is desirable for coefficient inference.



Partial regression plot for G2

The slope represents the predictor coefficient after controlling for the other predictors.



Zero-order, partial, and semi-partial correlations

Semi-partial correlations quantify each predictor's unique contribution to explained variance.

