

Quasi Poisson Regression

Test name: Quasi Poisson Regression

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

Rows in original dataset: 649

Columns in original dataset: 33

Rows used in quasi-Poisson model: 649

Count outcome created: qp_count = round(G3) clipped at zero

Numeric predictors: G1, G2, studytime, failures, absences, age

Categorical predictors: school, sex, address

Formula: qp_count ~ G1 + G2 + studytime + failures + absences + age + C(school) + C(sex) + C(address)

Family/link: Poisson mean with log link; quasi-Poisson inference uses Pearson scale correction.

Pearson dispersion estimate: 0.2431

Quasi-Poisson reported scale: 0.2431

The fitted data show underdispersion rather than overdispersion, but the quasi-Poisson scale correction is still reported.

Standard Poisson deviance: 247.0655

Standard Poisson Pearson chi-square: 155.3659

Interpretation: coefficients are log-rate effects; exp(coefficient) is the estimated rate ratio.

Decision guide: $p < 0.05$ and rate-ratio CI not crossing 1 indicates stronger evidence for a predictor effect.

Reporting guide: state the count outcome, link, predictors, dispersion, rate ratios, 95% CIs, and whether dispersion supported quasi-Poisson correction.

Charts generated: 7

Quasi-Poisson coefficients

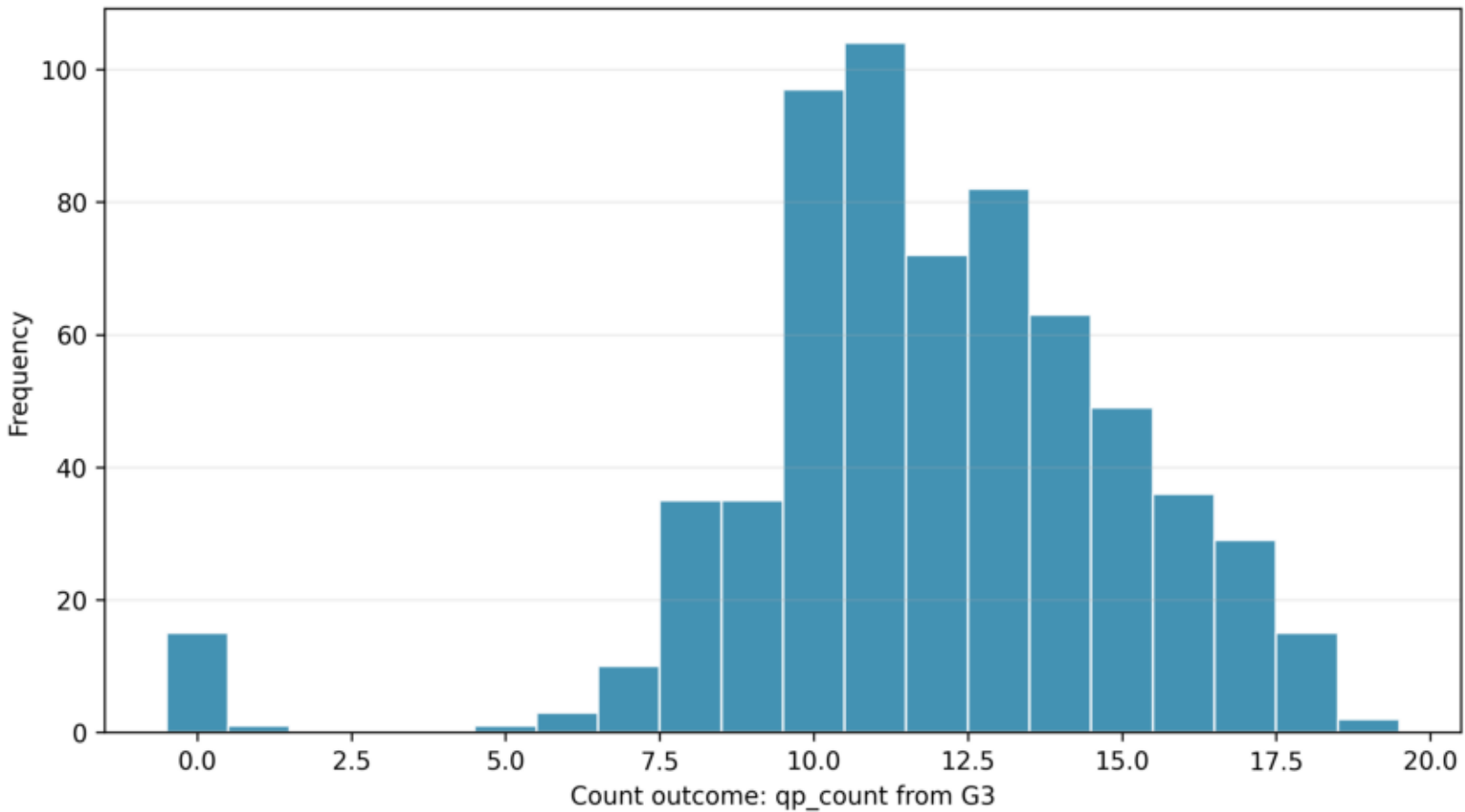
model	term	log_rate_coef	standard_err	z_or_t_value	p_value	ci95_lower_lc	ci95_upper_lc	rate_ratio_exp	rate_ratio_ci95_lower	rate_ratio_ci95_upper	decision_alpha
Quasi-Poisson	Intercept	1.5753	0.0887	17.7686	0.0000	1.4015	1.7490	4.8320	4.0613	5.7490	Statistically significant
Quasi-Poisson	C(school)[T.M]	-0.0334	0.0137	-2.4440	0.0145	-0.0601	-0.0066	0.9672	0.9416	0.9934	Statistically significant
Quasi-Poisson	C(sex)[T.M]	-0.0168	0.0119	-1.4098	0.1586	-0.0401	0.0065	0.9834	0.9607	1.0066	Not statistically significant
Quasi-Poisson	C(address)[T.M]	0.0084	0.0134	0.6282	0.5299	-0.0178	0.0346	1.0084	0.9824	1.0352	Not statistically significant
Quasi-Poisson	G1	-0.0022	0.0045	-0.4888	0.6250	-0.0109	0.0066	0.9978	0.9891	1.0066	Not statistically significant
Quasi-Poisson	G2	0.0864	0.0044	19.8434	0.0000	0.0778	0.0949	1.0902	1.0810	1.0996	Statistically significant
Quasi-Poisson	studytime	0.0027	0.0072	0.3785	0.7050	-0.0113	0.0168	1.0027	0.9887	1.0169	Not statistically significant
Quasi-Poisson	failures	-0.0406	0.0126	-3.2314	0.0012	-0.0652	-0.0160	0.9602	0.9369	0.9842	Statistically significant
Quasi-Poisson	absences	0.0027	0.0013	2.0612	0.0393	0.0001	0.0052	1.0027	1.0001	1.0052	Statistically significant
Quasi-Poisson	age	-0.0059	0.0051	-1.1698	0.2421	-0.0159	0.0040	0.9941	0.9842	1.0040	Not statistically significant

Poisson vs quasi-Poisson fit statistics

model	family	link	n	df_model	df_resid	deviance	pearson_chi2	dispersion_param	aic_standardized	note
Standard Poisson	Poisson mean	log	649.0000	9.0000	639.0000	247.0655	155.3659	0.2431	3009.7990	Quasi-Poisson used
Quasi-Poisson	Poisson mean	log	649.0000	9.0000	639.0000	247.0655	155.3659	0.2431	12316.6631	Quasi-Poisson used

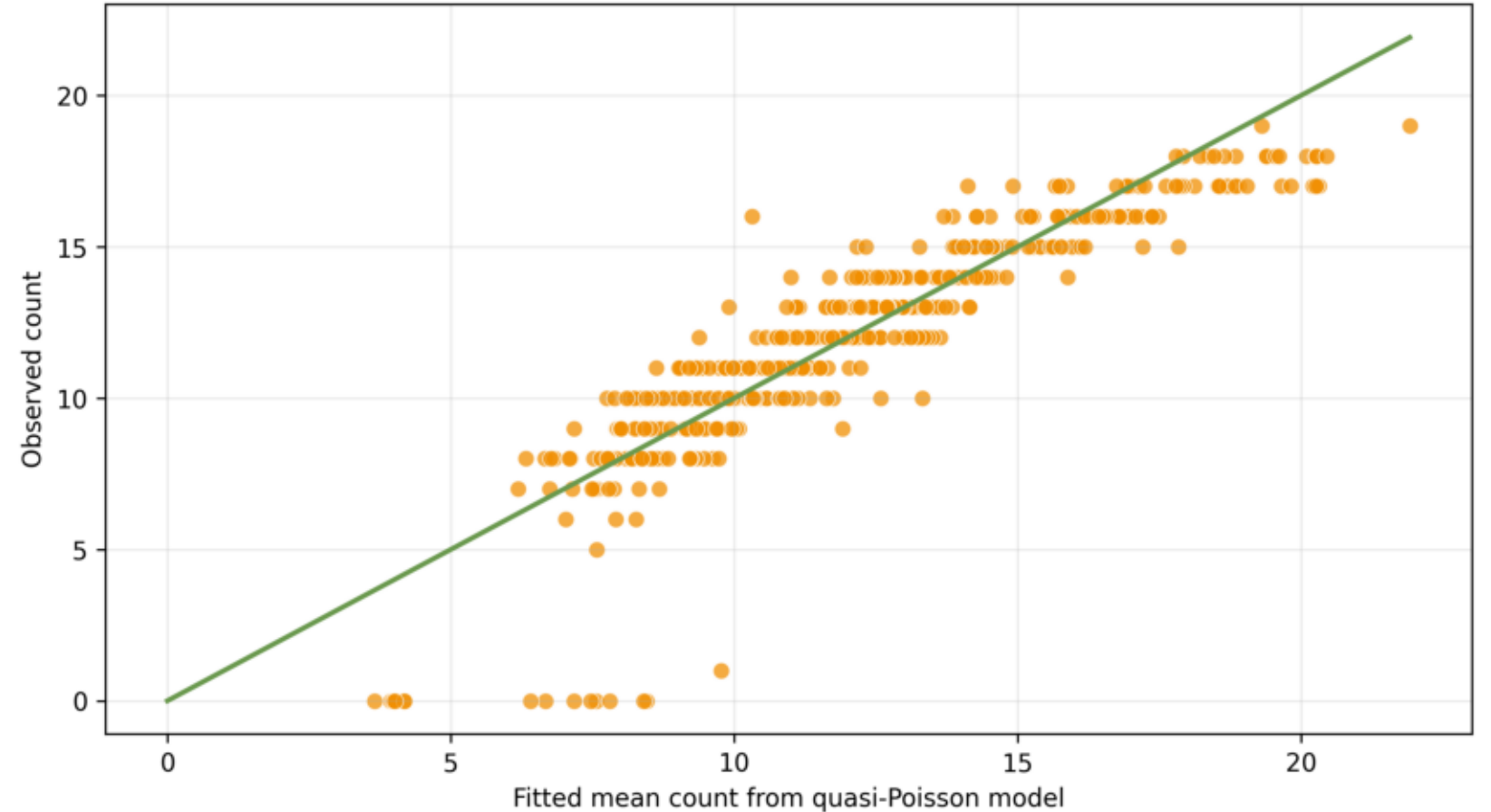
Count outcome distribution

The quasi-Poisson model treats the rounded non-negative outcome as count data.



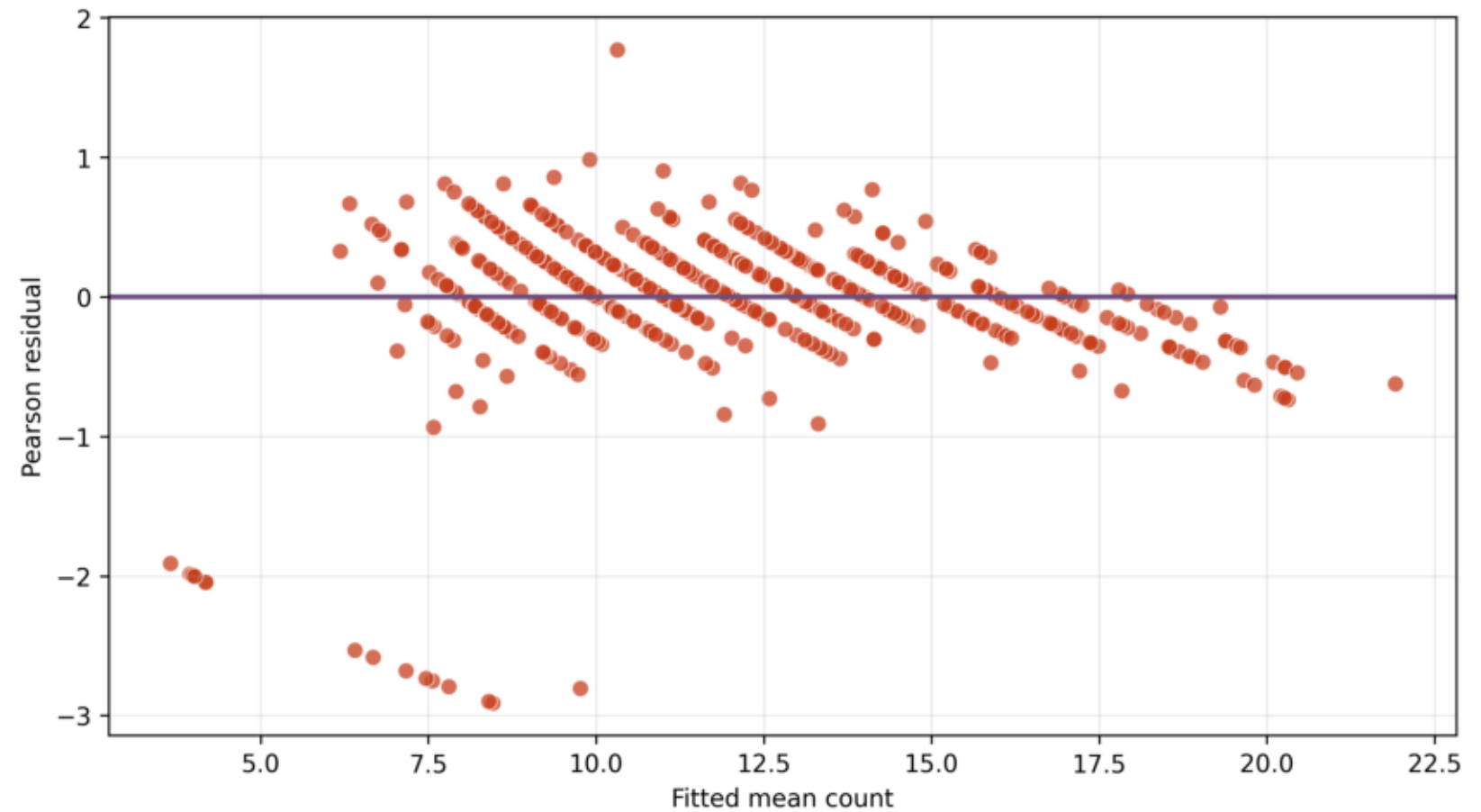
Observed vs fitted count values

Points near the diagonal show stronger agreement between observed and fitted count means.



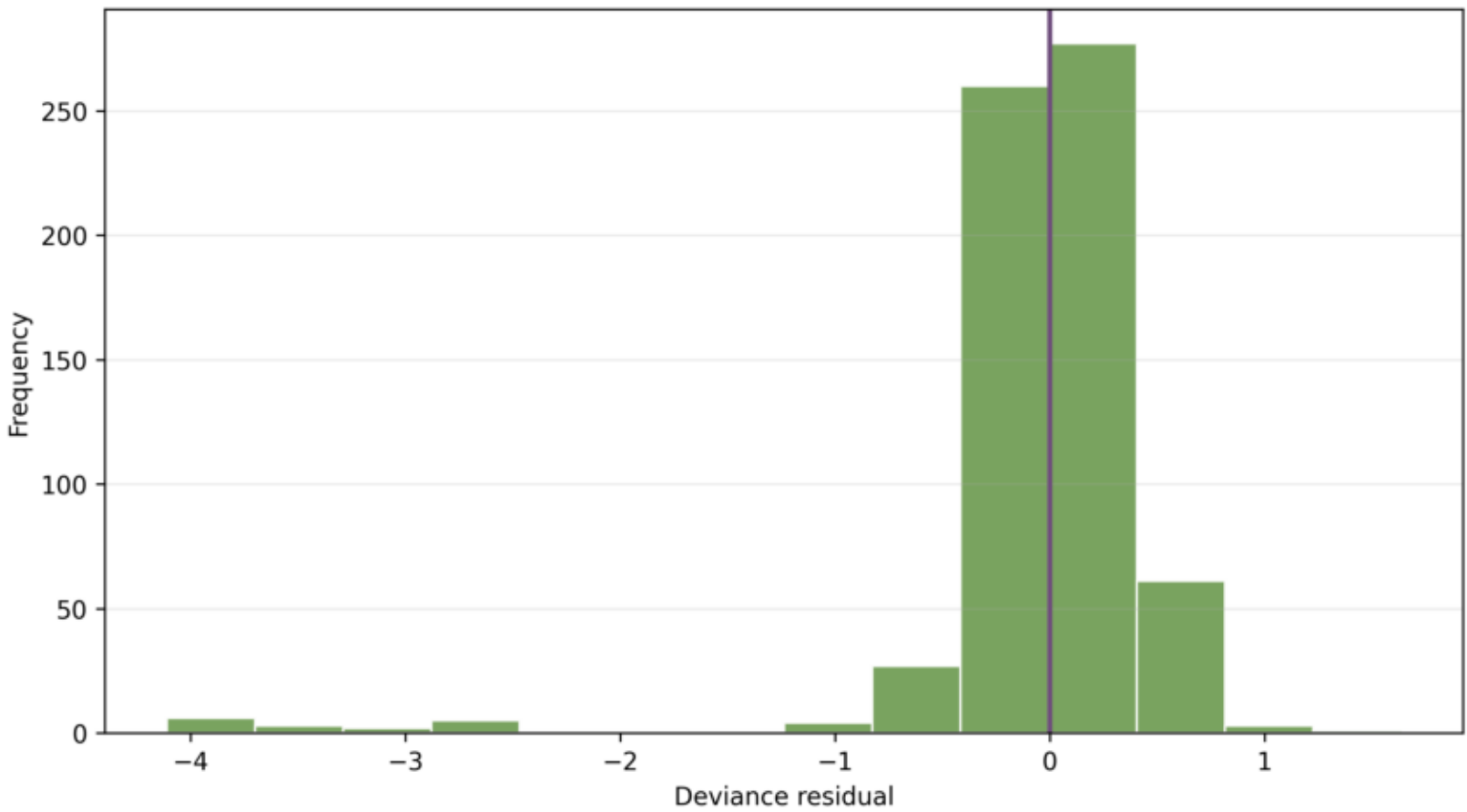
Pearson residuals vs fitted values

Large residual patterns suggest lack of fit or remaining overdispersion structure.



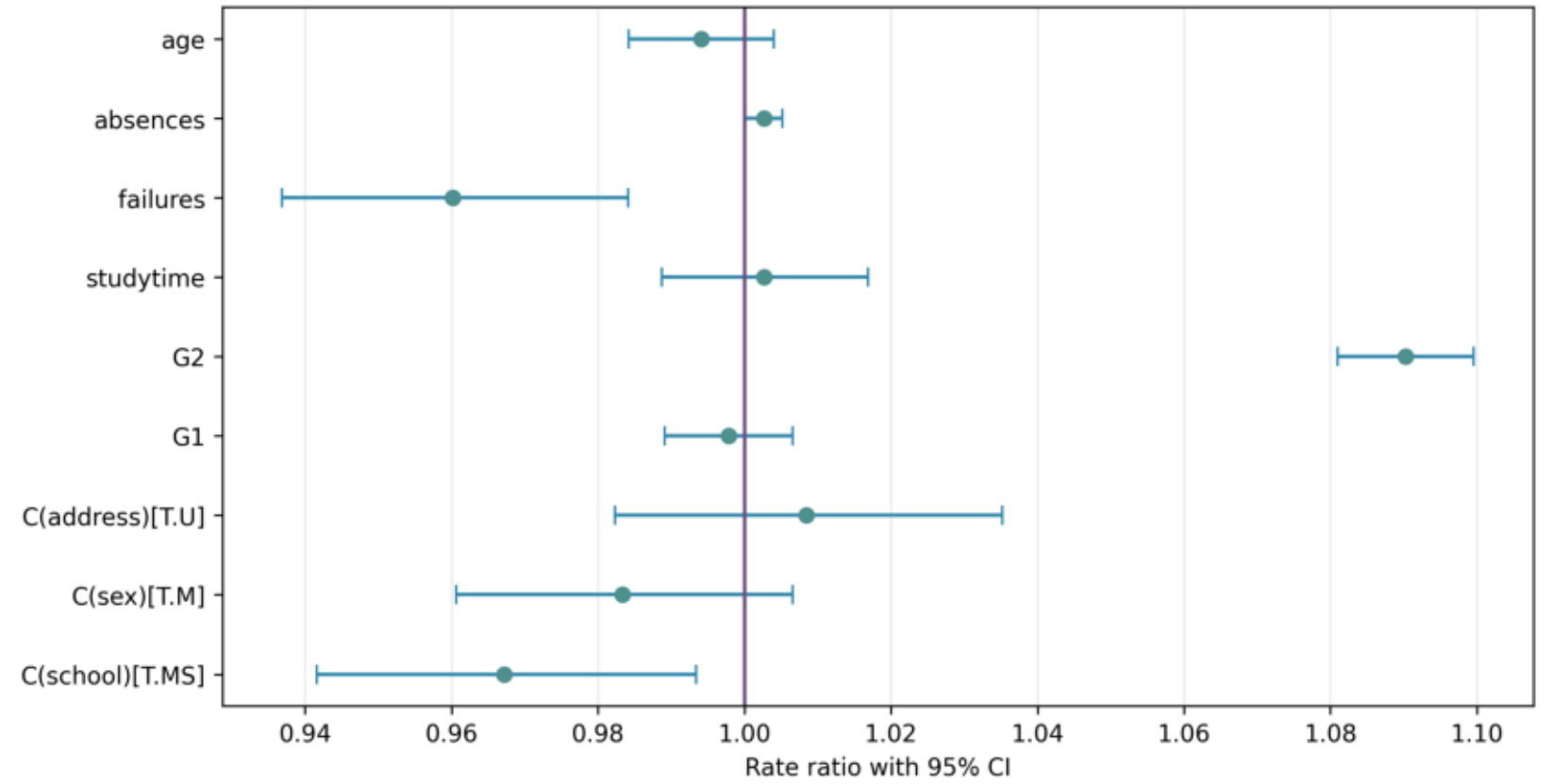
Quasi-Poisson deviance residual distribution

This distribution summarizes how far observed counts are from the fitted mean counts.



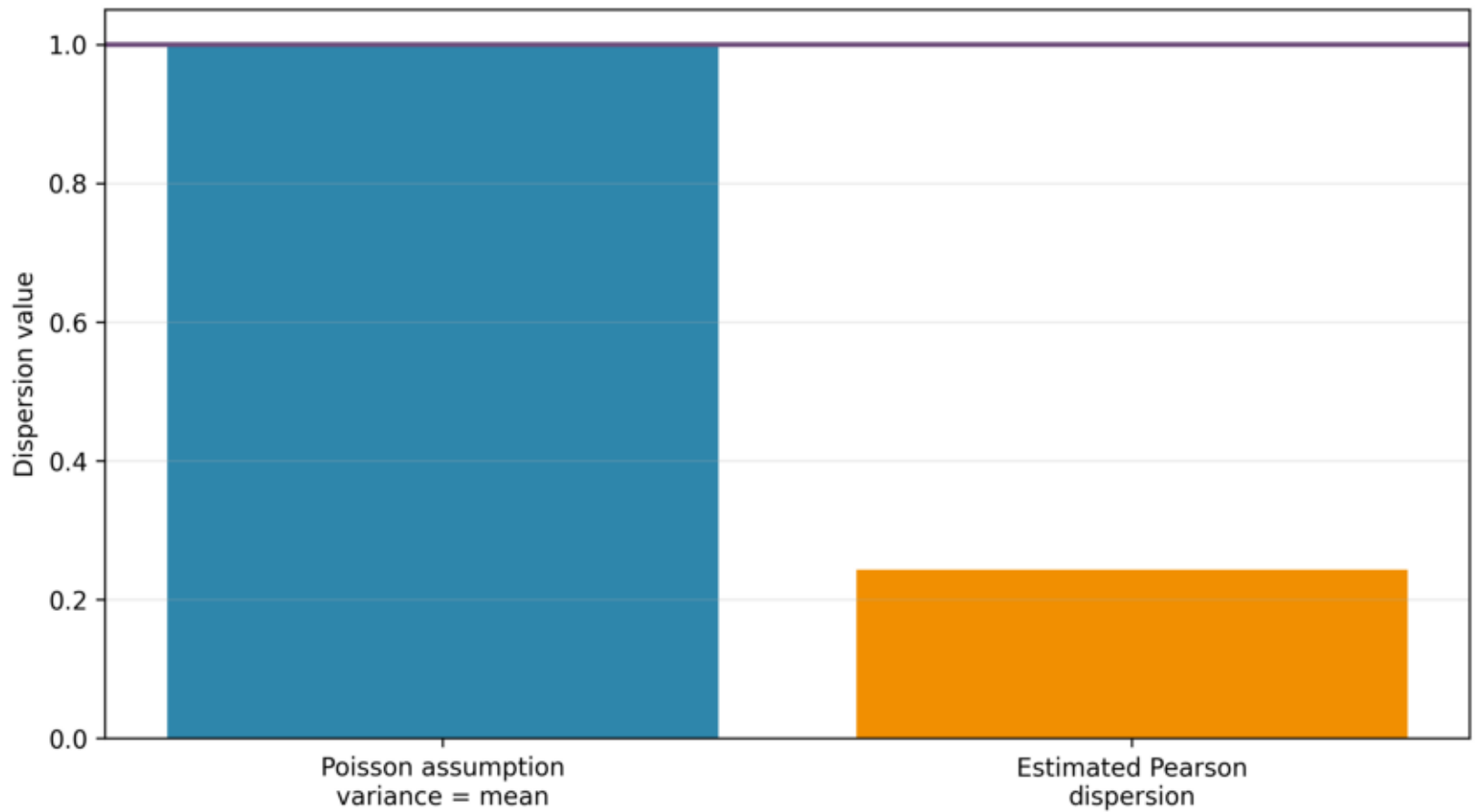
Quasi-Poisson rate ratio plot

Intervals not crossing 1 indicate stronger evidence for a predictor effect on the expected count.



Dispersion check for quasi-Poisson

Values far above 1 suggest overdispersion; values below 1 suggest underdispersion.



Observed and fitted count means by G1

This chart compares grouped observed count means with the quasi-Poisson fitted means.

