

Regression for Survey Data

Standalone verified Python analysis

Method: Regression for Survey Data

Method type: regression_model

Design: Multiple OLS model for final grade using prior grade, study behavior, failures, absences, and sex.

Variables: G3, G1, studytime, failures, absences, sex

Inference scope: The applicable omnibus F test evaluates whether all non-intercept slopes are jointly zero.

Formula: $Y = X \cdot \beta + \epsilon$; $\hat{\beta} = (X'X)^{-1}X'Y$; $F = (SSR/p)/(SSE/(n-p-1))$.

Source rows: 649

Calculated metrics:

r_squared: 0.6933681724622429
adjusted_r_squared: 0.6909837881112495
f_statistic: 290.7954718681798
f_p_value: 2.2358445413375103e-162
rmse: 1.7958968209040602
g1_coefficient: 0.925917708400602
n_cases: 649

Independent reference values:

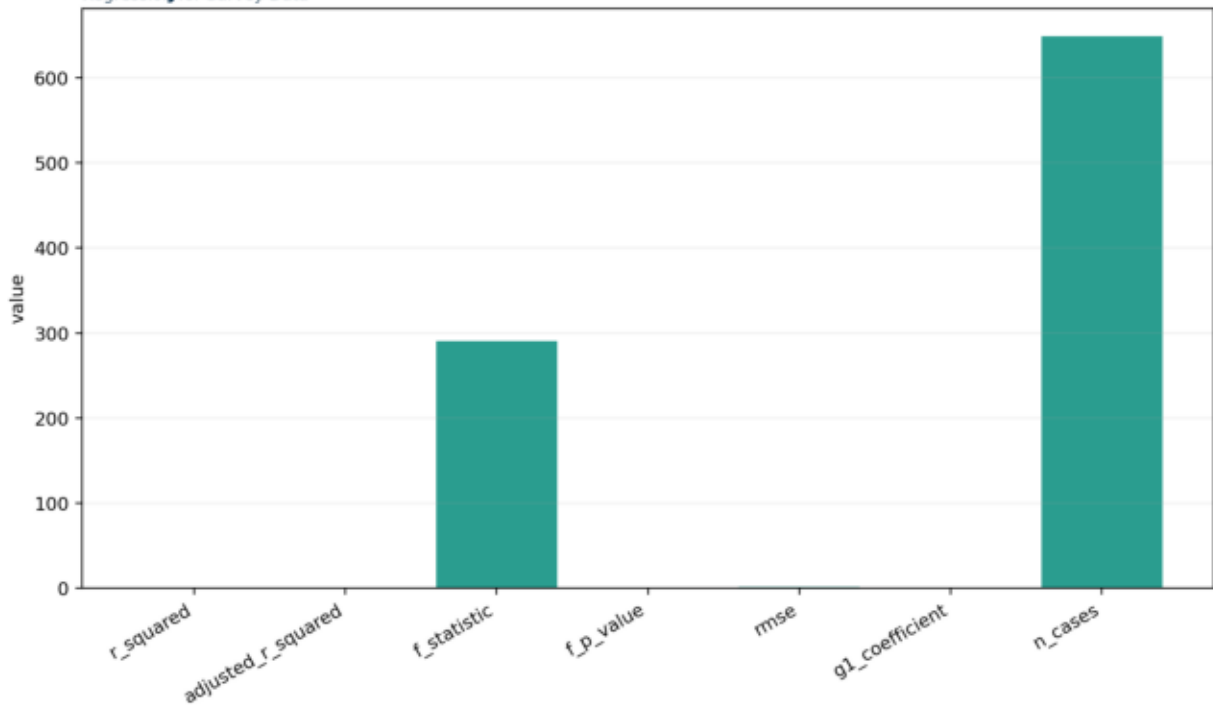
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Interpretation:

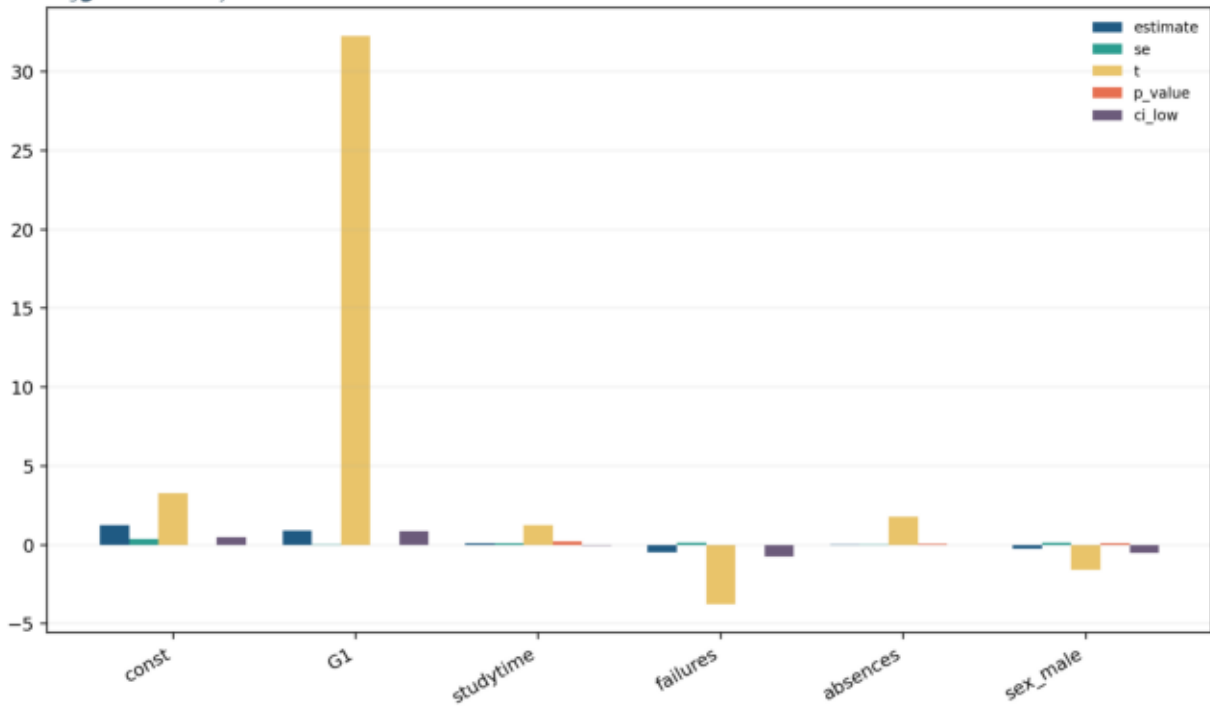
Final grade is modeled conditionally on prior grade, behavior, failures, absences, and sex.

R-squared=0.693368; RMSE=1.795897.

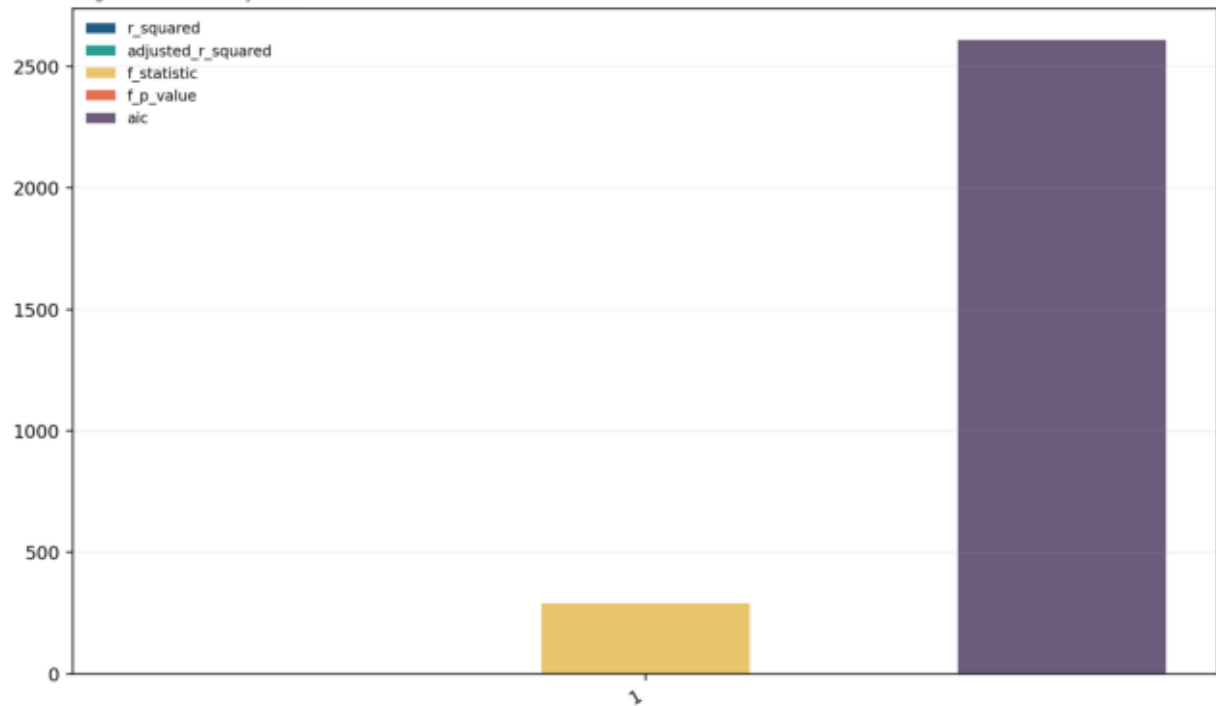
Primary Metrics



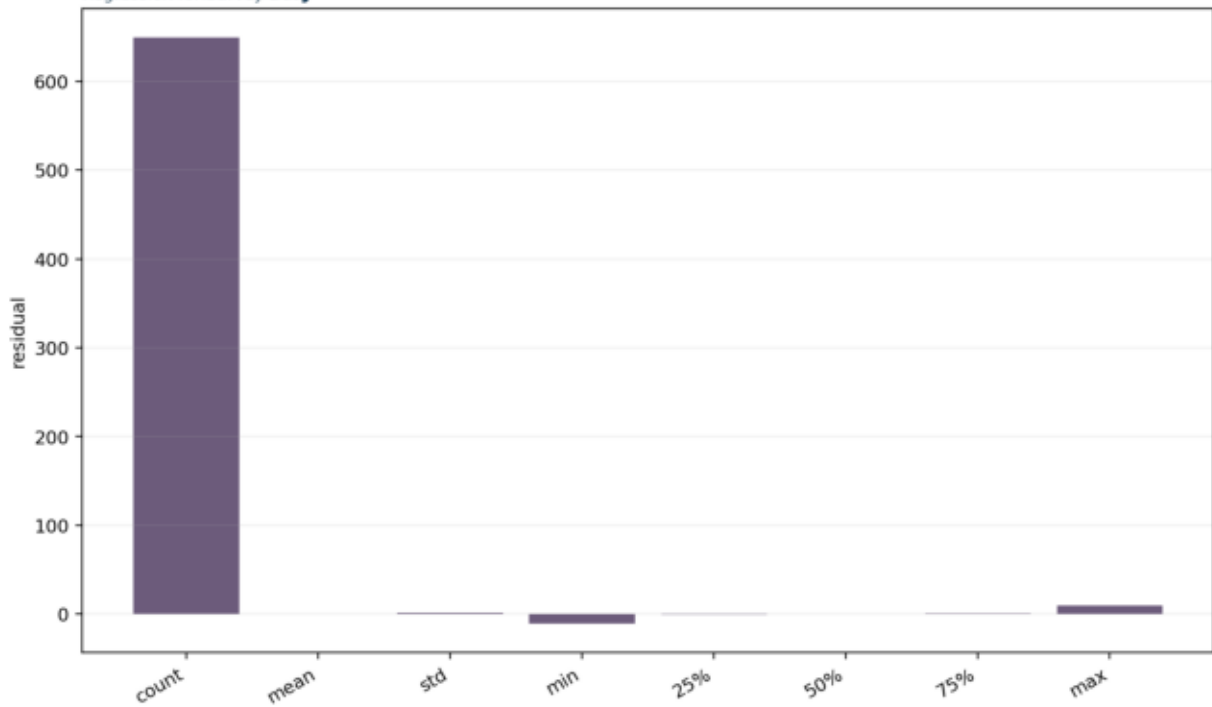
Regression Coefficients



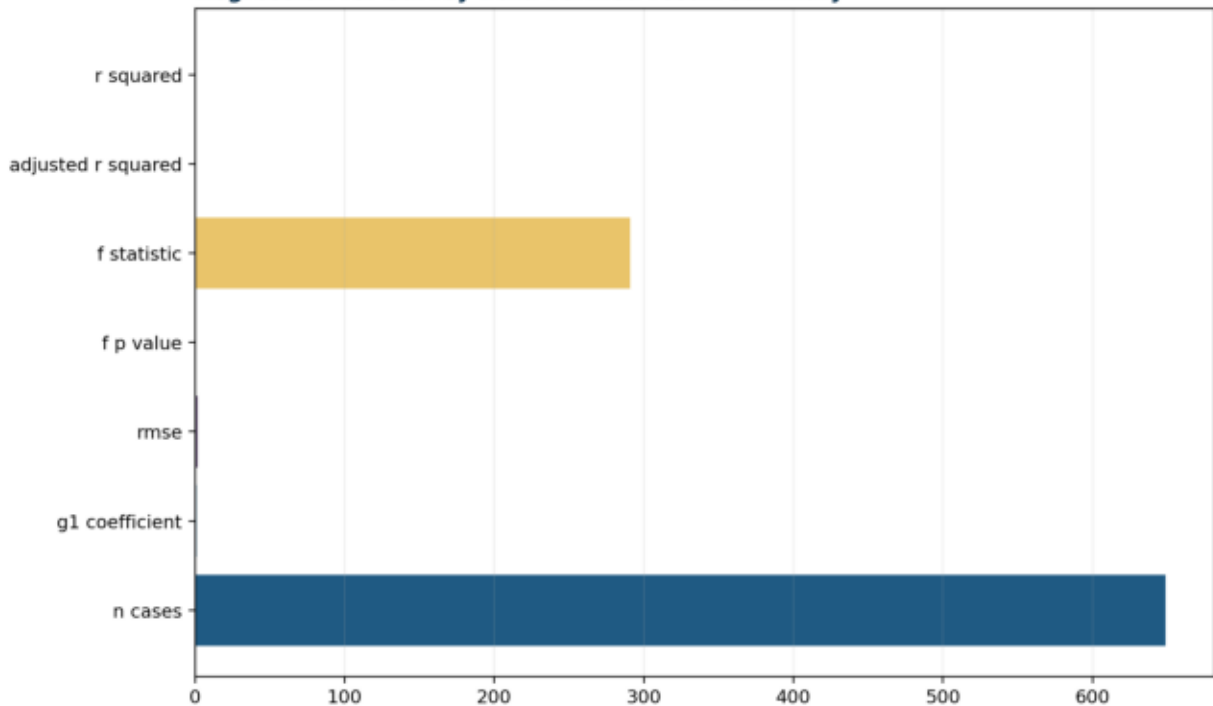
Model Fit Survey Data



Residual Summary



Regression for Survey Data verified result summary



Primary Metrics

metric	value
r_squared	0.693368
adjusted_r_squared	0.690984
f_statistic	290.795
f_p_value	2.23584e-162
rmse	1.7959
g1_coefficient	0.925918
n_cases	649

Regression Coefficients

term	estimate	se	t	p_value	ci_low	ci_high
const	1.23757	0.379283	3.26292	0.00116107	0.492789	1.98236
G1	0.925918	0.0286958	32.2666	1.45011e-136	0.869569	0.982267
studytime	0.112023	0.0900686	1.24375	0.214045	-0.0648412	0.288887
failures	-0.48469	0.129346	-3.74724	0.000194872	-0.738682	-0.230699
absences	0.0274899	0.015461	1.77802	0.0758728	-0.00287015	0.0578501
sex_male	-0.233014	0.146761	-1.58771	0.112843	-0.521203	0.0551743

Model Fit

r_squared	adjusted_r_squared	f_statistic	f_p_value	aic	bic
0.693368	0.690984	290.795	2.23584e-162	2607.74	2634.59

Residual Summary

statistic	residual
count	649
mean	8.255e-15
std	1.78895
min	-10.3323
25%	-0.707701
50%	0.215837
75%	0.92489
max	9.42842