

Partial Least Squares SEM

Standalone verified Python analysis

Test: Partial Least Squares SEM

Design: Component-based outer models and predictive structural regression for academic achievement.

Variables: G1, G2, G3, famrel, freetime, goout, studytime, failures

Null hypothesis: The PLS construct scores have no predictive structural relationship.

Formula: Outer weights maximize component variance; inner paths are OLS regressions among construct scores.

Source rows: 649

Calculated metrics:

- social_to_academic: -0.047089820120738896
- studytime_to_academic: 0.2030470703509362
- failures_to_academic: -0.3725739993744453
- academic_r_squared: 0.20849058206409432
- academic_composite_reliability: 0.9693952591759201
- social_composite_reliability: 0.7128393255337119

Independent reference values:

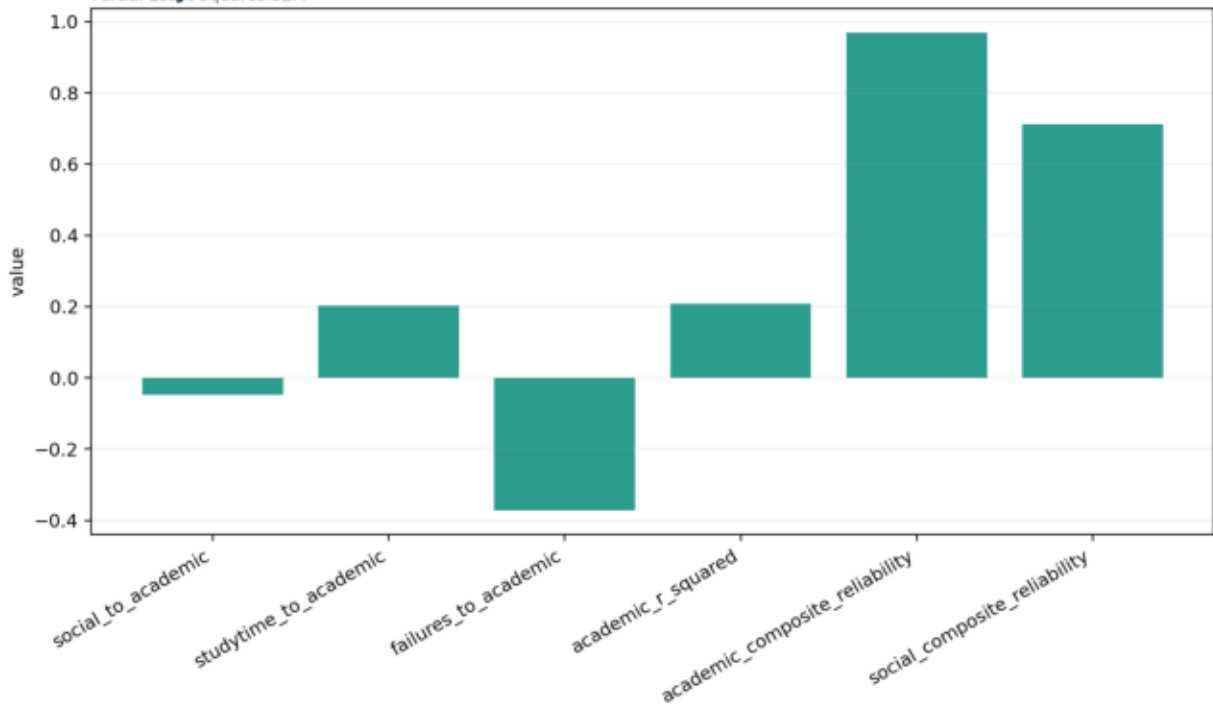
- social_to_academic: -0.047089820120738896
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Interpretation:

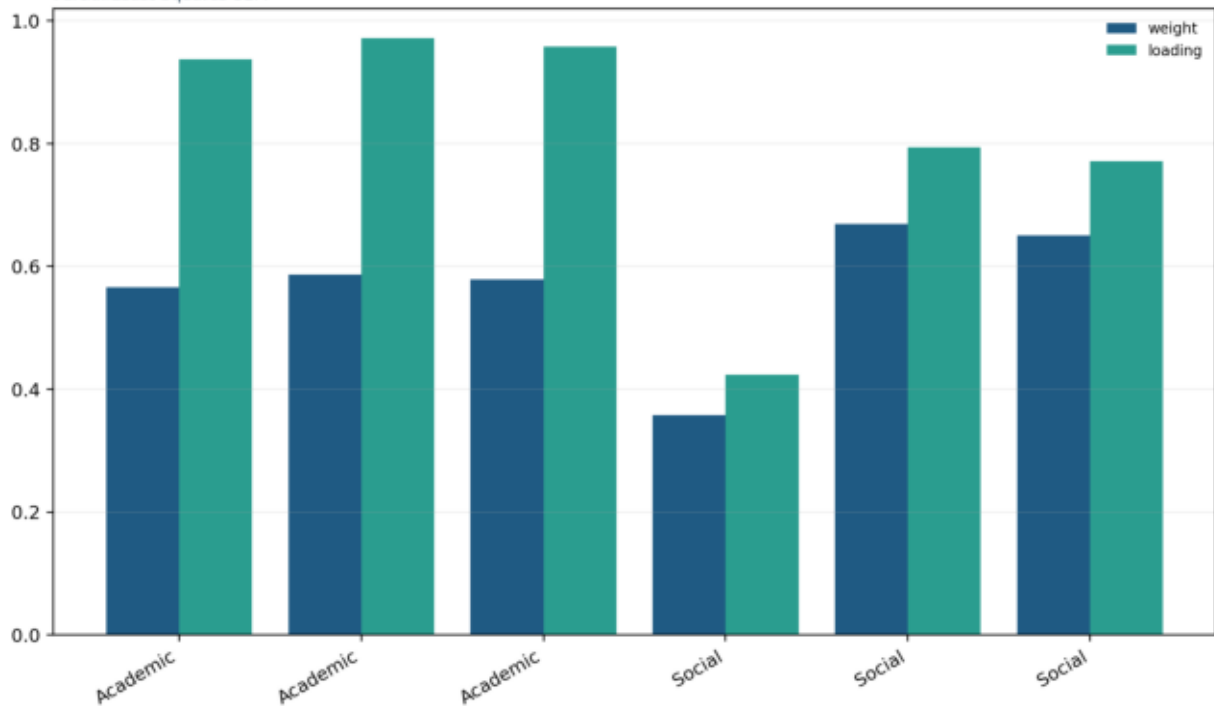
PLS-SEM optimizes component scores and predictive inner paths.

Academic R-squared=0.208491.

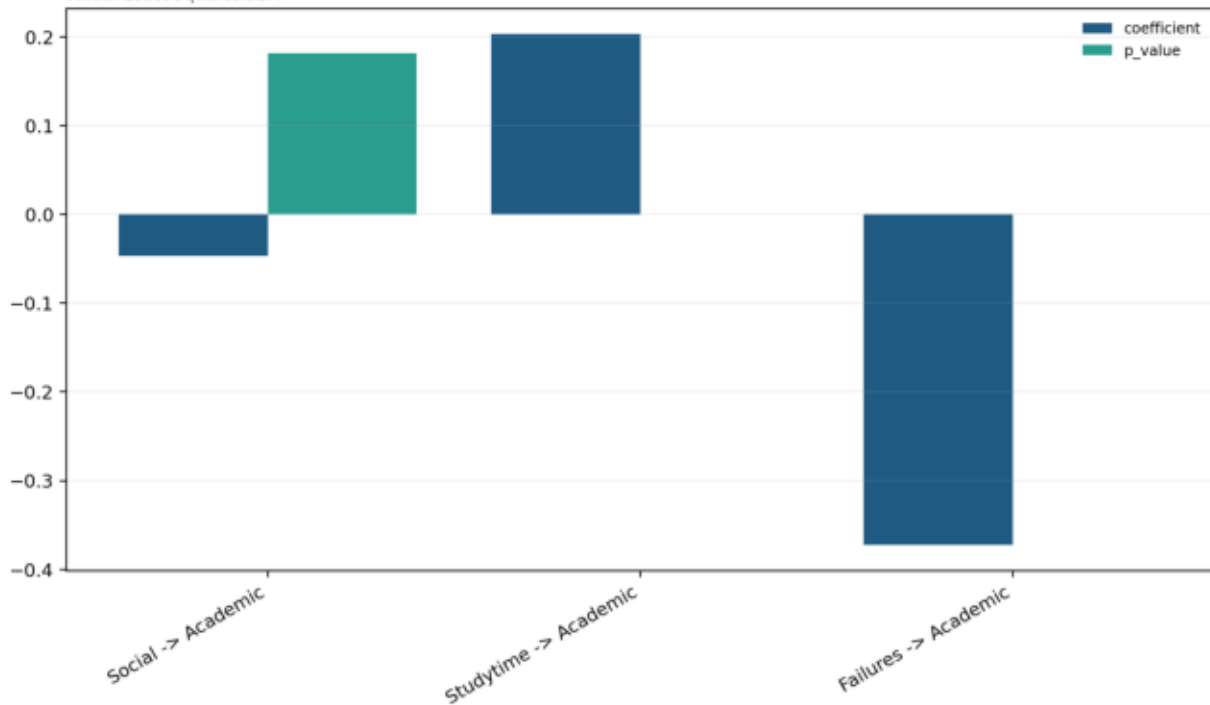
Primary Metrics



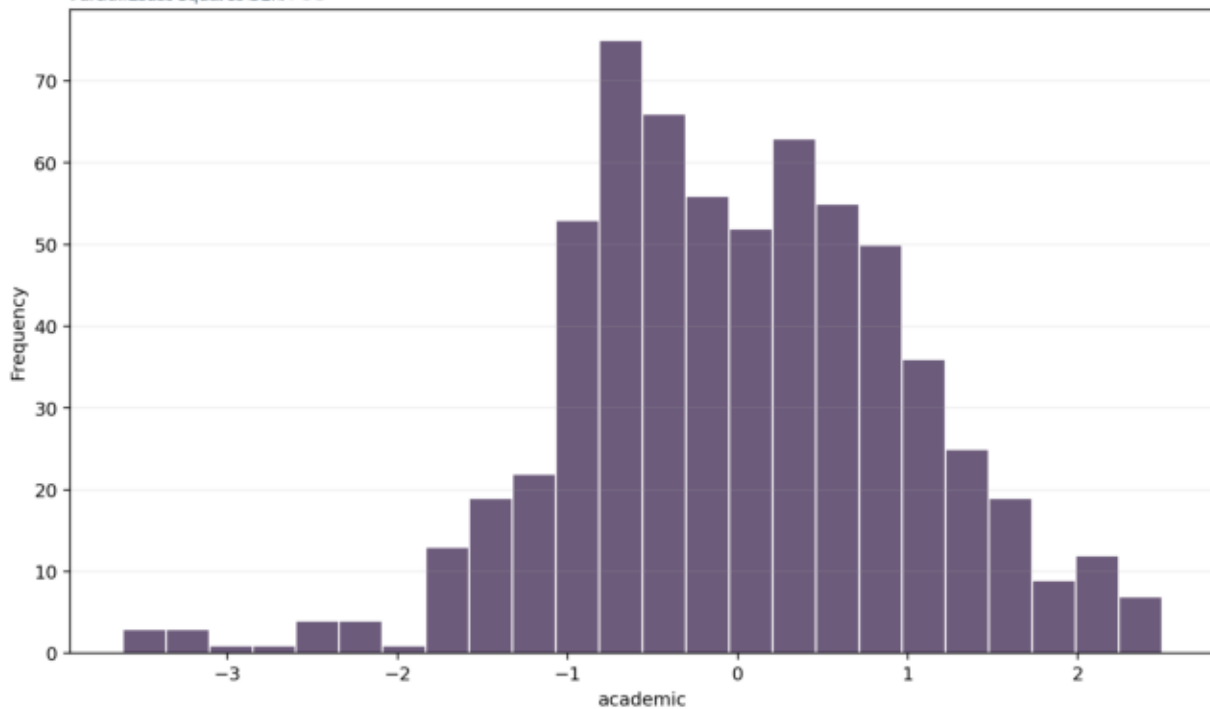
PLS Outer Model



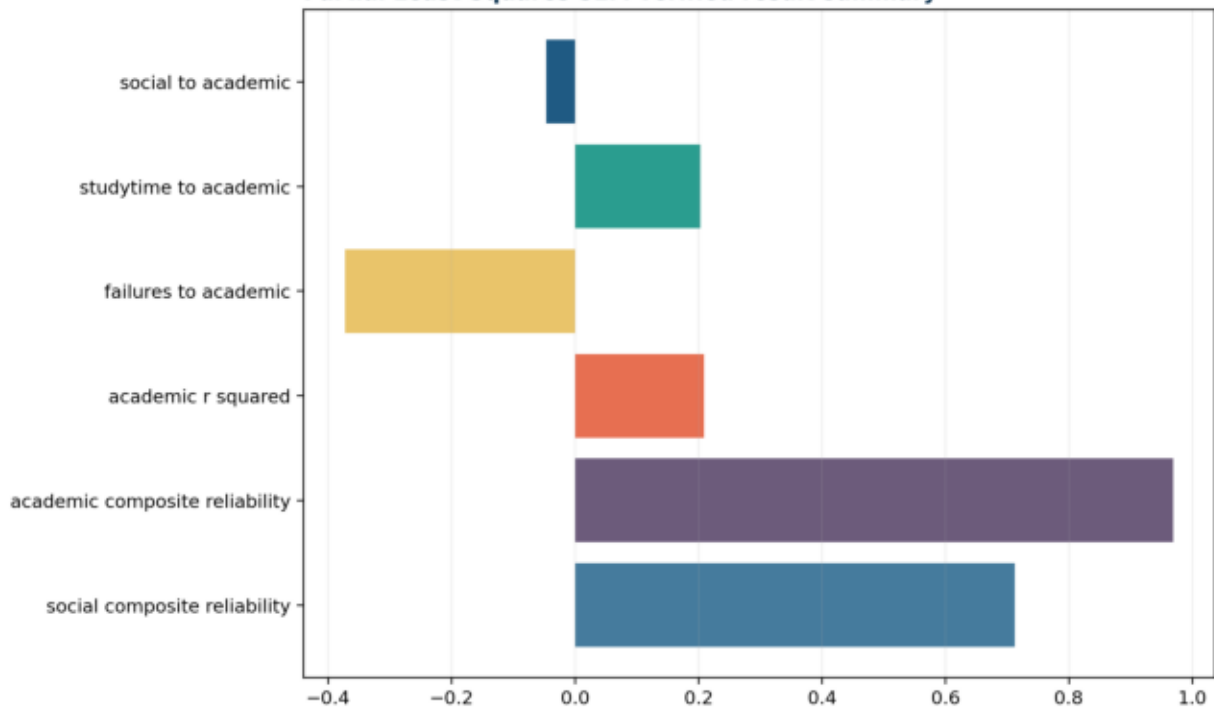
PLS Inner Model



Pls Construct Scores



Partial Least Squares SEM verified result summary



Primary Metrics

metric	value
social_to_academic	-0.0470898
studytime_to_academic	0.203047
failures_to_academic	-0.372574
academic_r_squared	0.208491
academic_composite_reliability	0.969395
social_composite_reliability	0.712839

Pls Outer Model

construct	item	weight	loading
Academic	G1	0.566384	0.937618
Academic	G2	0.586852	0.9715
Academic	G3	0.578631	0.957891
Social	famrel	0.35735	0.423665
Social	freetime	0.669738	0.794025
Social	goout	0.650962	0.771764

Pls Inner Model

path	coefficient	p_value
Social -> Academic	-0.0470898	0.181482
Studytime -> Academic	0.203047	1.65087e-08
Failures -> Academic	-0.372574	6.29231e-24

Pls Construct Scores

academic	social
-1.58802	0.30562
-0.466377	0.154013
0.259033	-0.628356
0.846341	-1.48118
0.242599	-0.628356
0.245557	0.224471
0.370184	0.843067
0.117972	-0.769273
1.53888	-1.1658
0.245557	0.29493
0.846341	-0.476749
-0.00369699	-0.850422
0.259033	-0.161368
0.245557	0.69146
0.954533	0.446537
1.9098	0.843067
0.600045	-1.0142
0.721714	-0.312975
-1.38878	2.16288
0.137365	-1.55164
0.475418	-0.557898
0.0127378	0.224471
0.475418	-0.020451
-0.571611	1.15845
-0.449942	-0.628356
-0.233558	-2.11194