

Mediated Regression

Test name: Mediated Regression

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

Rows in original dataset: 649

Columns in original dataset: 33

Rows used in mediated regression: 649

X independent variable: G1

Mediator variable: G2

Outcome variable: G3

Numeric covariates: studytime, failures, absences, age, Medu

Categorical covariates: school, sex, address

Mediator formula: $G2 \sim G1 + \text{studytime} + \text{failures} + \text{absences} + \text{age} + \text{Medu} + C(\text{school}) + C(\text{sex}) + C(\text{address})$

Total formula: $G3 \sim G1 + \text{studytime} + \text{failures} + \text{absences} + \text{age} + \text{Medu} + C(\text{school}) + C(\text{sex}) + C(\text{address})$

Outcome formula: $G3 \sim G1 + G2 + \text{studytime} + \text{failures} + \text{absences} + \text{age} + \text{Medu} + C(\text{school}) + C(\text{sex}) + C(\text{address})$

Path a: 0.879067

Path b: 0.881441

Total effect c: 0.908578

Direct effect c prime: 0.133732

Indirect effect a*b: 0.774846

Bootstrap 95% CI for indirect effect: [0.679190, 0.871526]

Decision: Indirect effect CI excludes zero

Interpretation: mediation is supported when the bootstrap indirect-effect confidence interval excludes zero.

Reporting guide: state X, mediator, Y, covariates, a, b, c, c prime, indirect effect, bootstrap CI, and decision.

Charts generated: 7

Mediation summary

x_variable	mediator_v	outcome_v	path_a	path_b	total_effect	direct_effect	indirect_effect	bootstrap_1	bootstrap_2	bootstrap_3	bootstrap_4	proportion	bootstrap_5	decision	comment
G1	G2	G3	0.8791	0.8814	0.9086	0.1337	0.7748	0.7752	0.0512	0.6792	0.8715	0.8528	1000.0000	Indirect effect	

Path coefficients

model	term	coefficient	standard_error	t_value	p_value	ci95_lower	ci95_upper	decision_alpha_0.05
Path a mediator model	Intercept	-1.3347	0.9036	-1.4771	0.1402	-3.1092	0.4397	Not statistically significant
Path a mediator model	C(school)[T.MS]	-0.0770	0.1375	-0.5601	0.5756	-0.3470	0.1930	Not statistically significant
Path a mediator model	C(sex)[T.M]	-0.0826	0.1207	-0.6849	0.4937	-0.3196	0.1543	Not statistically significant
Path a mediator model	C(address)[T.U]	0.0630	0.1329	0.4742	0.6355	-0.1980	0.3241	Not statistically significant
Path a mediator model	G1	0.8791	0.0244	35.9740	0.0000	0.8311	0.9271	Statistically significant
Path a mediator model	studytime	0.0136	0.0731	0.1862	0.8523	-0.1300	0.1572	Not statistically significant
Path a mediator model	failures	-0.3852	0.1086	-3.5466	0.0004	-0.5985	-0.1719	Statistically significant
Path a mediator model	absences	-0.0032	0.0129	-0.2511	0.8018	-0.0286	0.0221	Not statistically significant
Path a mediator model	age	0.1627	0.0499	3.2593	0.0012	0.0647	0.2608	Statistically significant
Path a mediator model	Medu	0.0983	0.0538	1.8247	0.0685	-0.0075	0.2040	Not statistically significant
Total effect model	Intercept	-1.3411	1.1160	-1.2017	0.2299	-3.5326	0.8504	Not statistically significant
Total effect model	C(school)[T.MS]	-0.2467	0.1698	-1.4526	0.1468	-0.5801	0.0868	Not statistically significant

Model fit statistics

model	n	df_model	df_resid	r_squared	adj_r_squared	f_statistic	f_p_value	aic	bic
Path a mediator	649.0000	9.0000	639.0000	0.7575	0.7541	221.7512	0.0000	2329.4646	2374.2189
Total effect mod	649.0000	9.0000	639.0000	0.6991	0.6949	164.9682	0.0000	2603.4667	2648.2210
Direct and med	649.0000	10.0000	638.0000	0.8524	0.8501	368.3748	0.0000	2143.3400	2192.5698

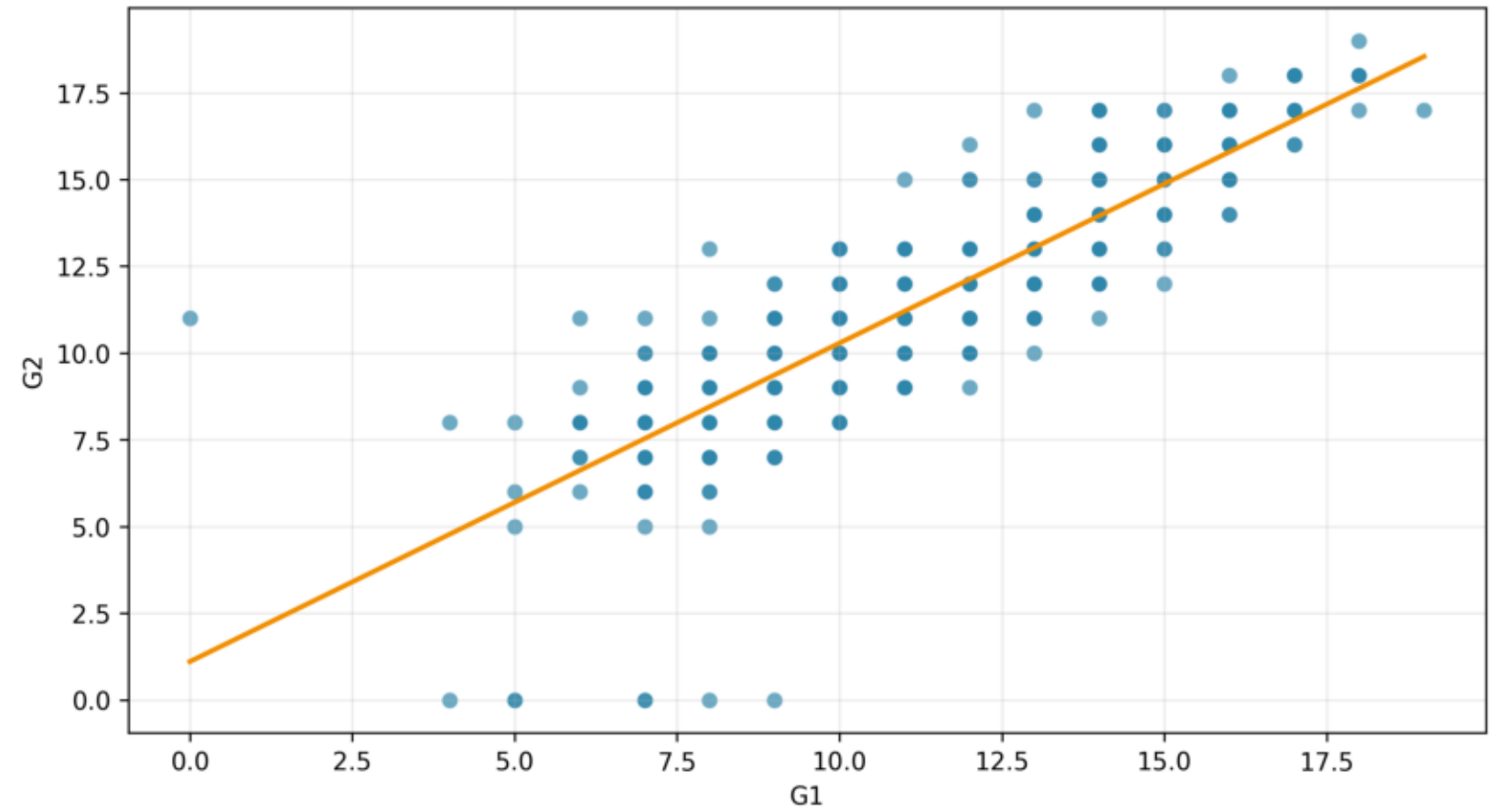
Mediated regression path diagram

The model decomposes the total X effect into direct and indirect paths through the mediator.



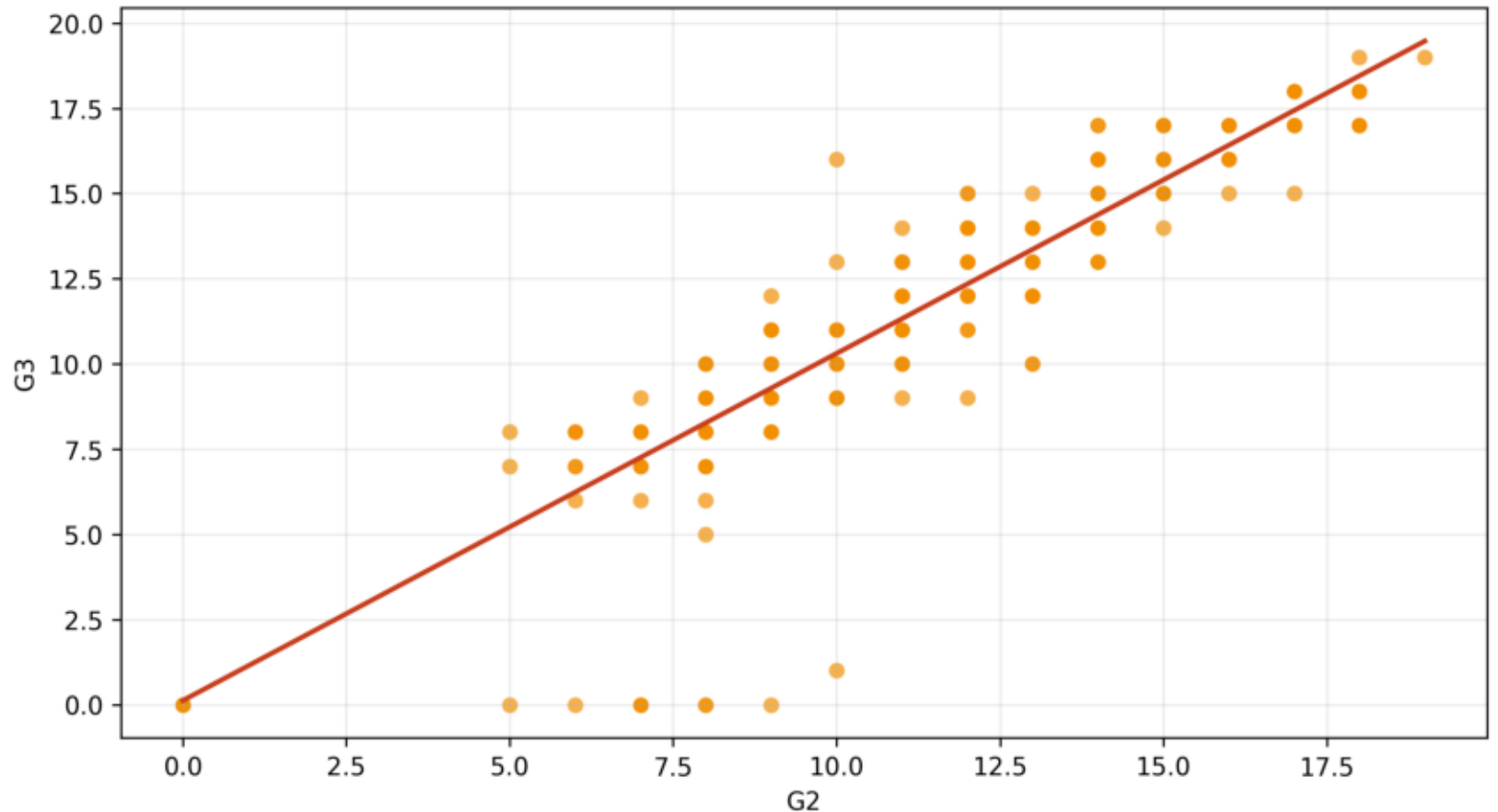
Path a: G1 predicts G2

This chart checks the first mediation path from the independent variable to the mediator.



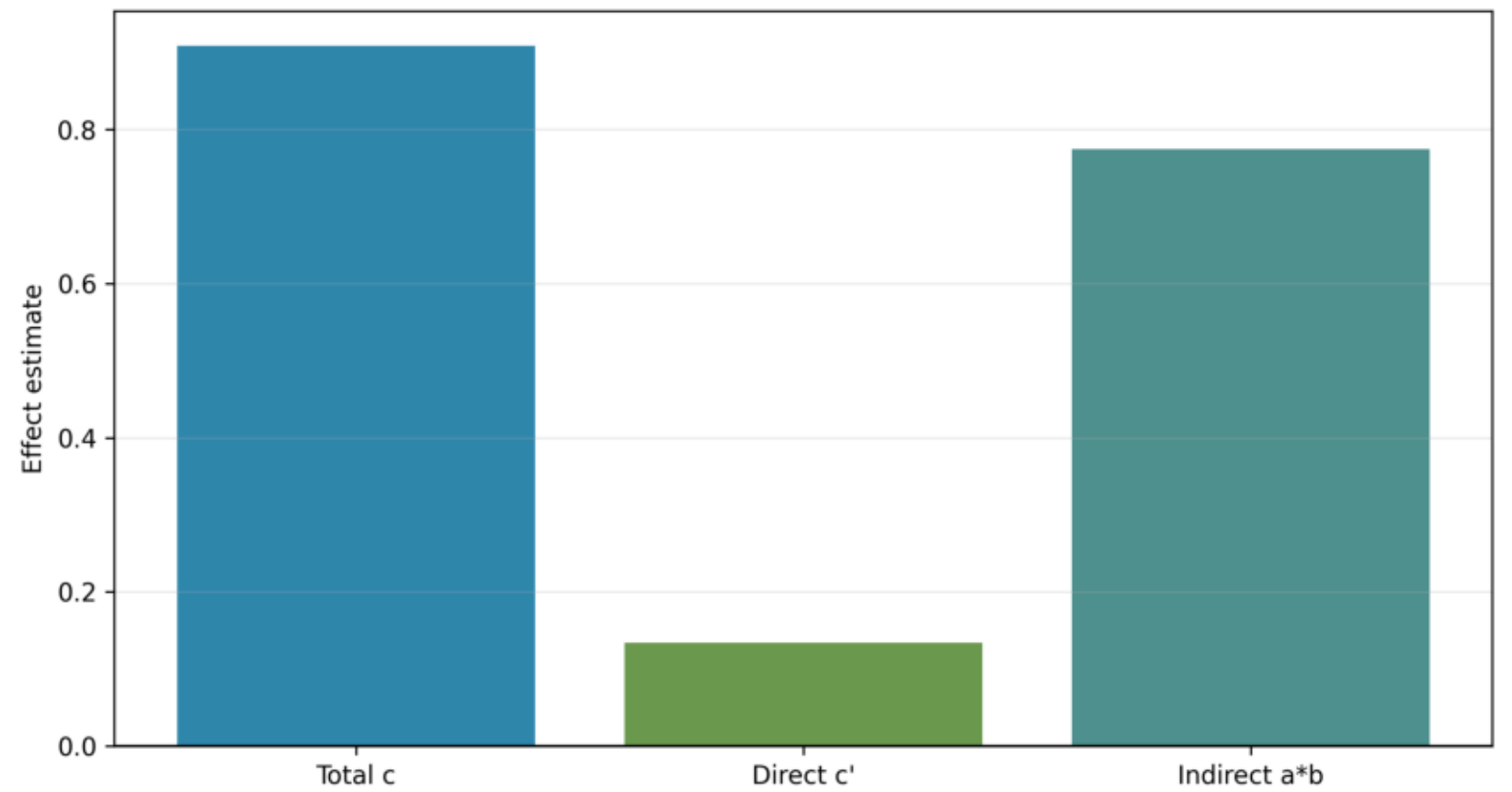
Path b: G2 predicts G3

This chart checks the mediator-to-outcome association before considering other covariates.



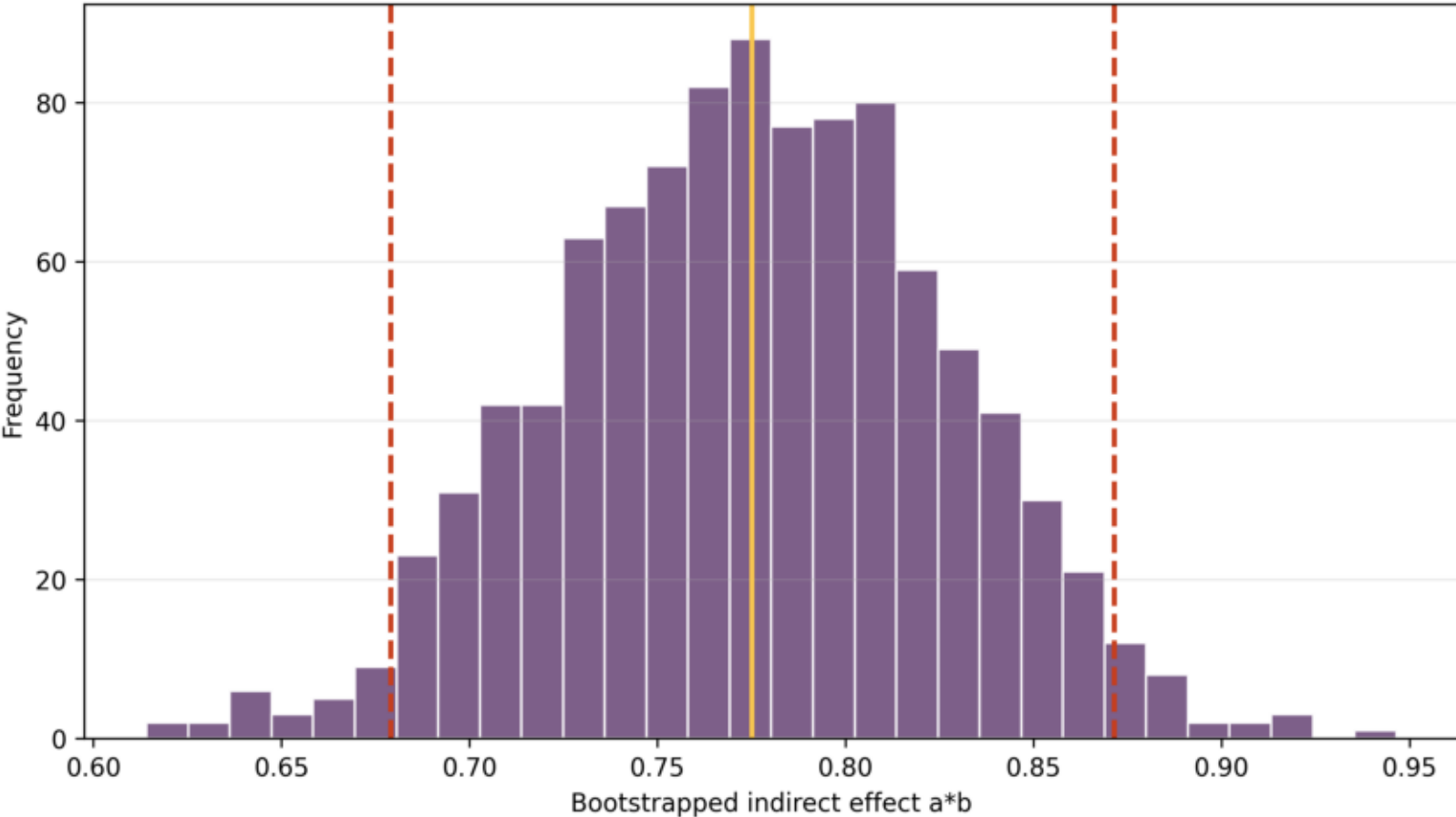
Total, direct, and indirect effects

A smaller direct effect than total effect supports mediation through the selected mediator.



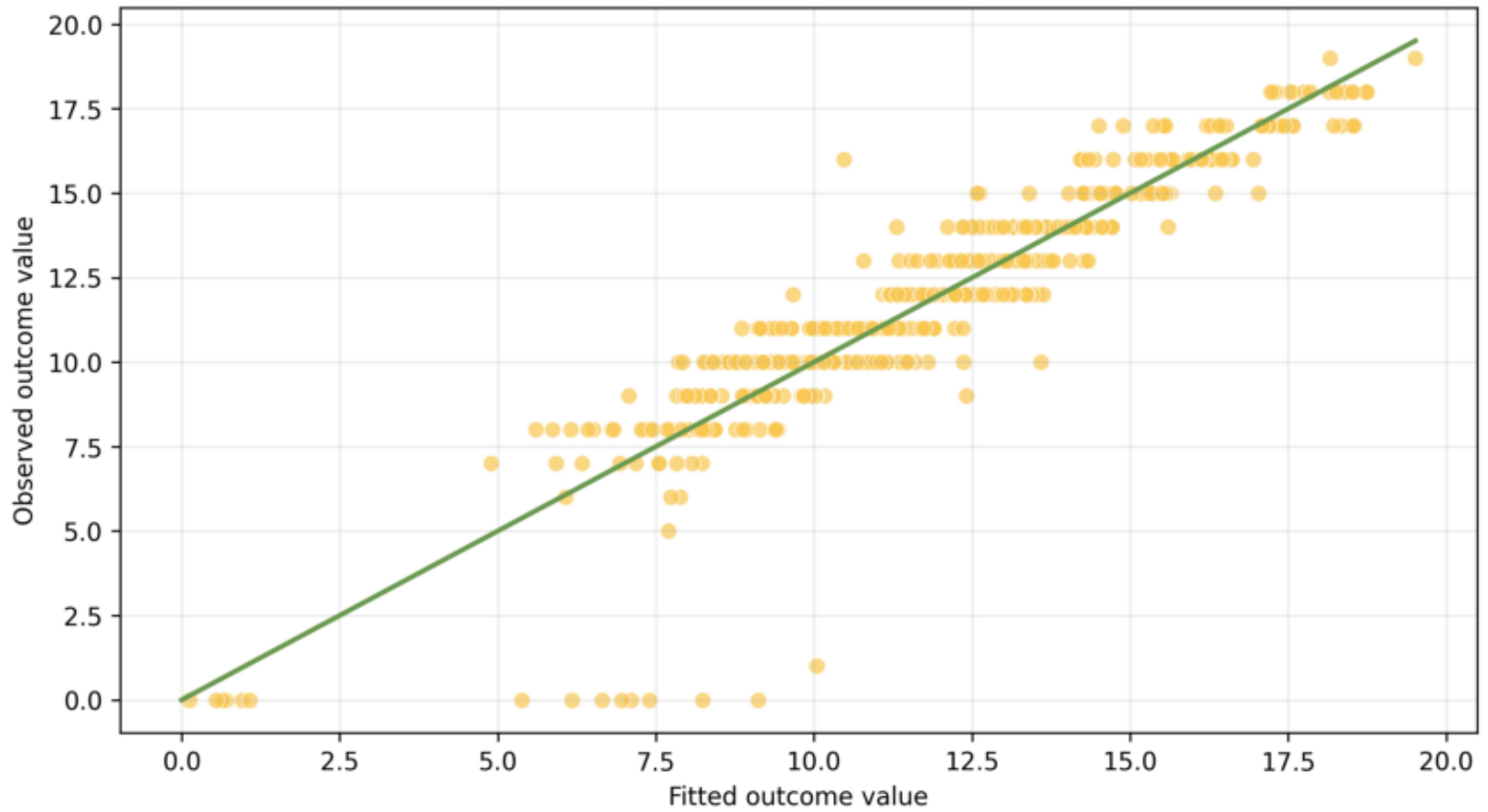
Bootstrap distribution of indirect effect

The dashed lines show the percentile 95% confidence interval for the mediation effect.



Observed vs fitted outcome values

Points near the diagonal show stronger agreement between observed and fitted outcome values.



Outcome model residuals vs fitted values

Residual patterns help assess whether the mediated regression model has systematic lack of fit.

