

Two-Factor Confirmatory Factor Analysis

Standalone verified Python analysis

Test: Two-Factor Confirmatory Factor Analysis

Design: Maximum-likelihood CFA with three academic and three social indicators.

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

Null hypothesis: The prespecified two-factor covariance model fits exactly.

Formula: $\Sigma = \Lambda \Phi \Lambda' + \Theta$; minimize $F_{ML}(S, \Sigma)$.

Source rows: 649

Calculated metrics:

chi_square: 13.76397207713822

df: 8

p_value: 0.08812864506217727

cfi: 0.9973982062491278

rmsea: 0.03334482463134081

srmr: 0.03566318315739957

Independent reference values:

chi_square: 13.76397207713822

df: 8

p_value: 0.08812864506217727

cfi: 0.9973982062491278

rmsea: 0.03334482463134081

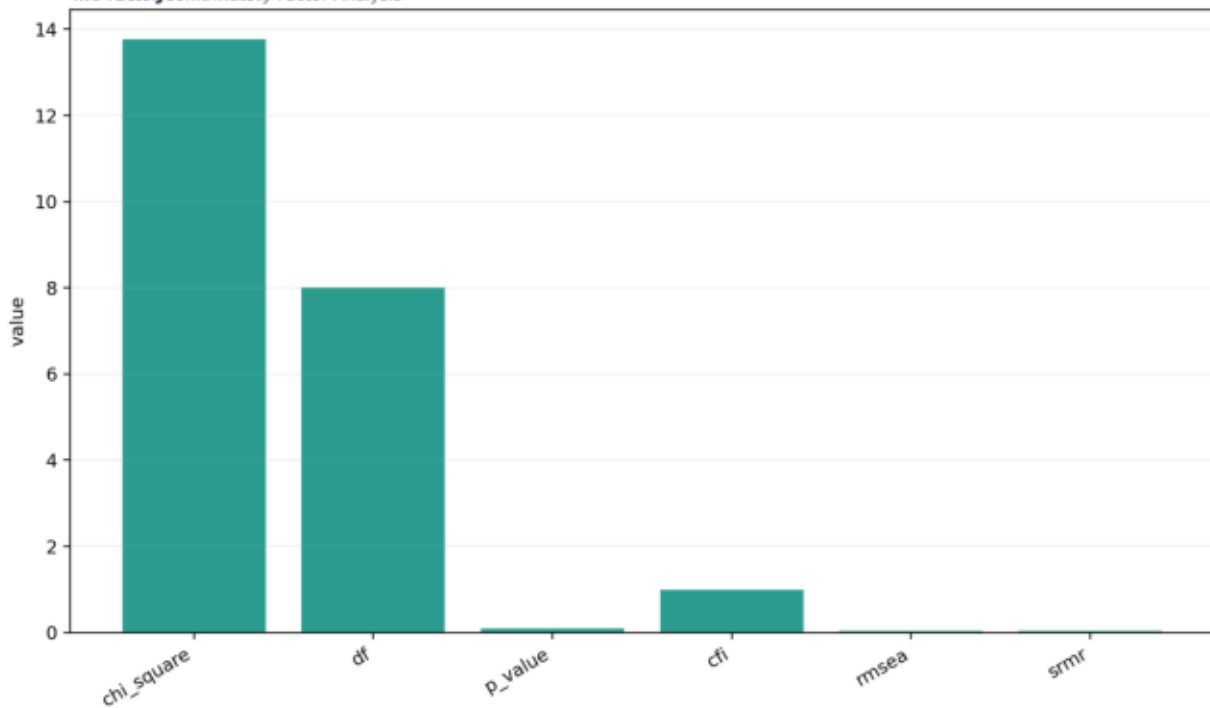
srmr: 0.03566318315739957

Interpretation:

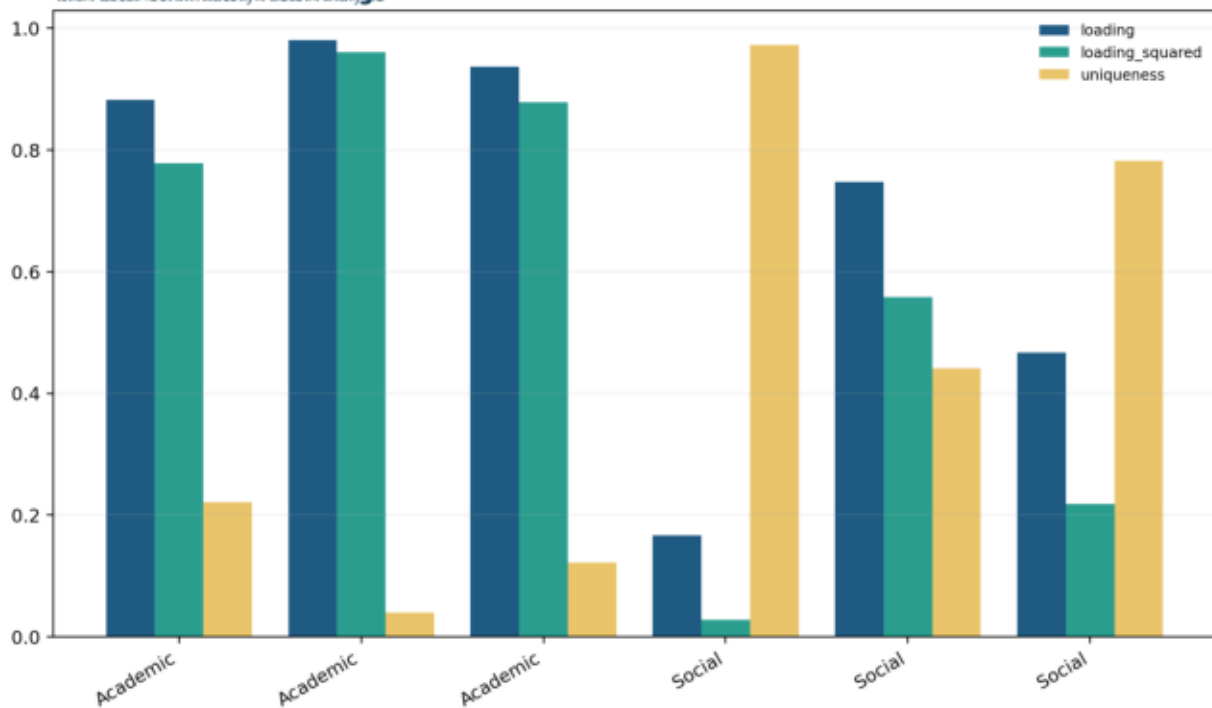
The two-factor CFA fixes all cross-loadings to zero and both latent variances to one.

CFI=0.997398, RMSEA=0.033345, SRMR=0.035663.

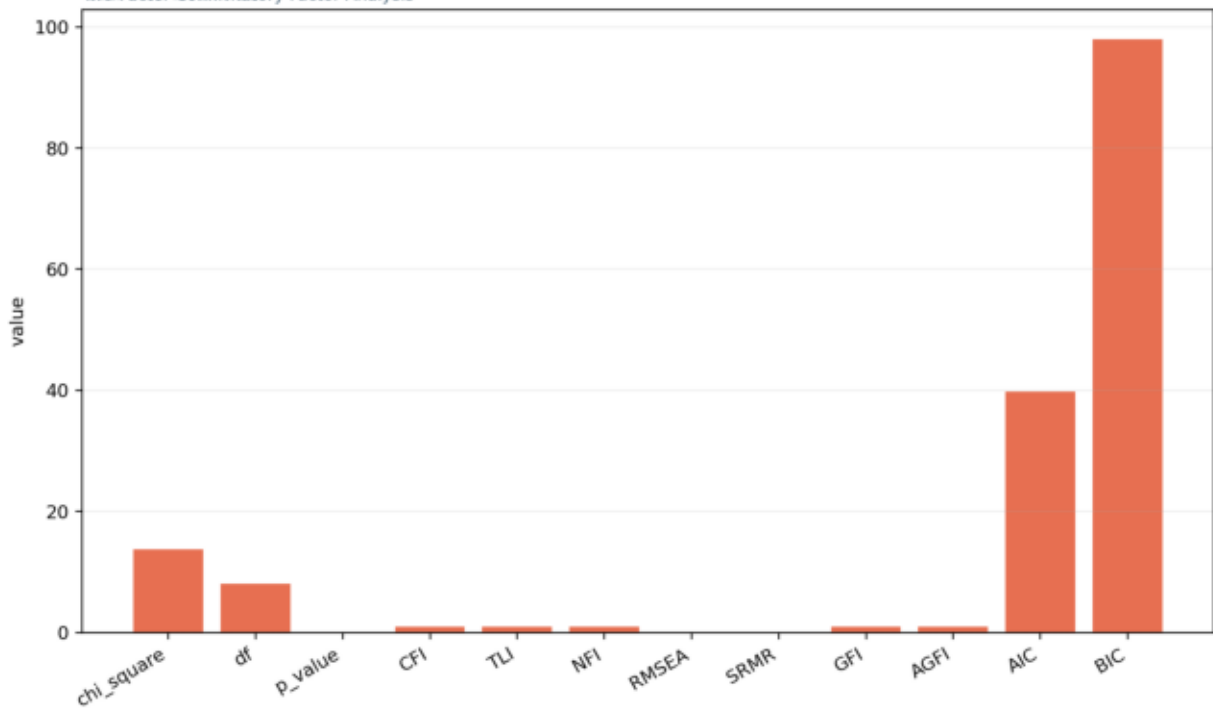
Primary Metrics



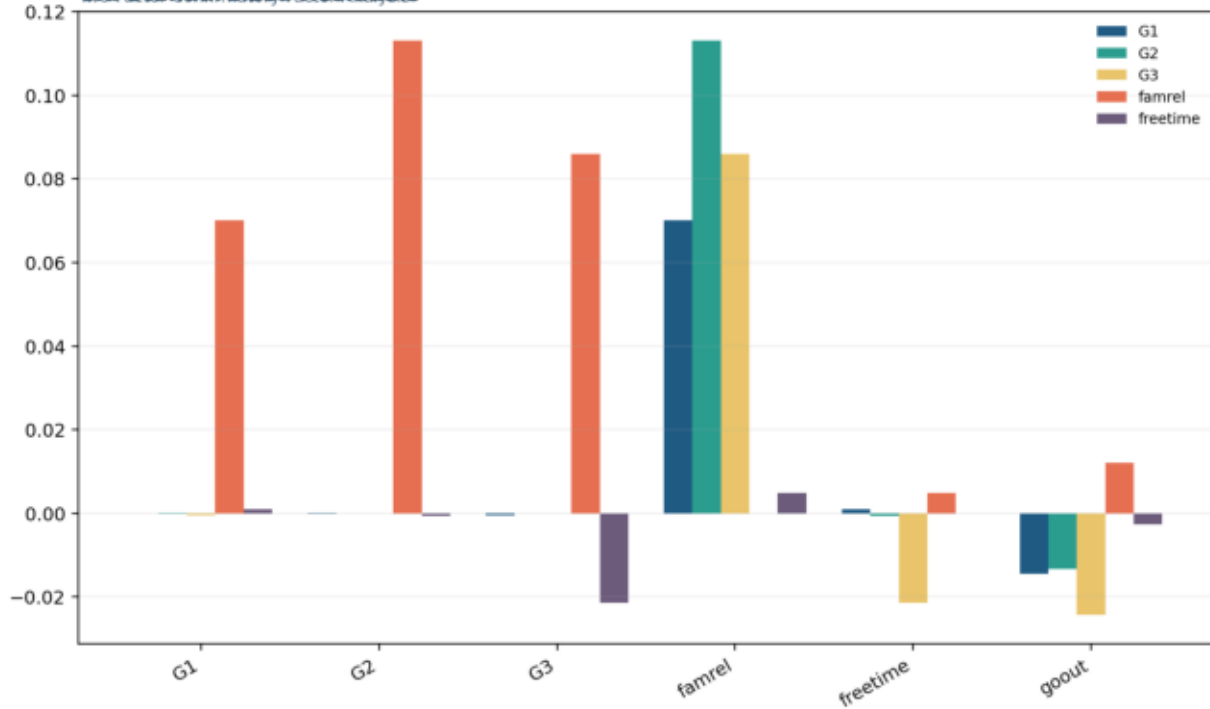
Cfa Standardized Loadings



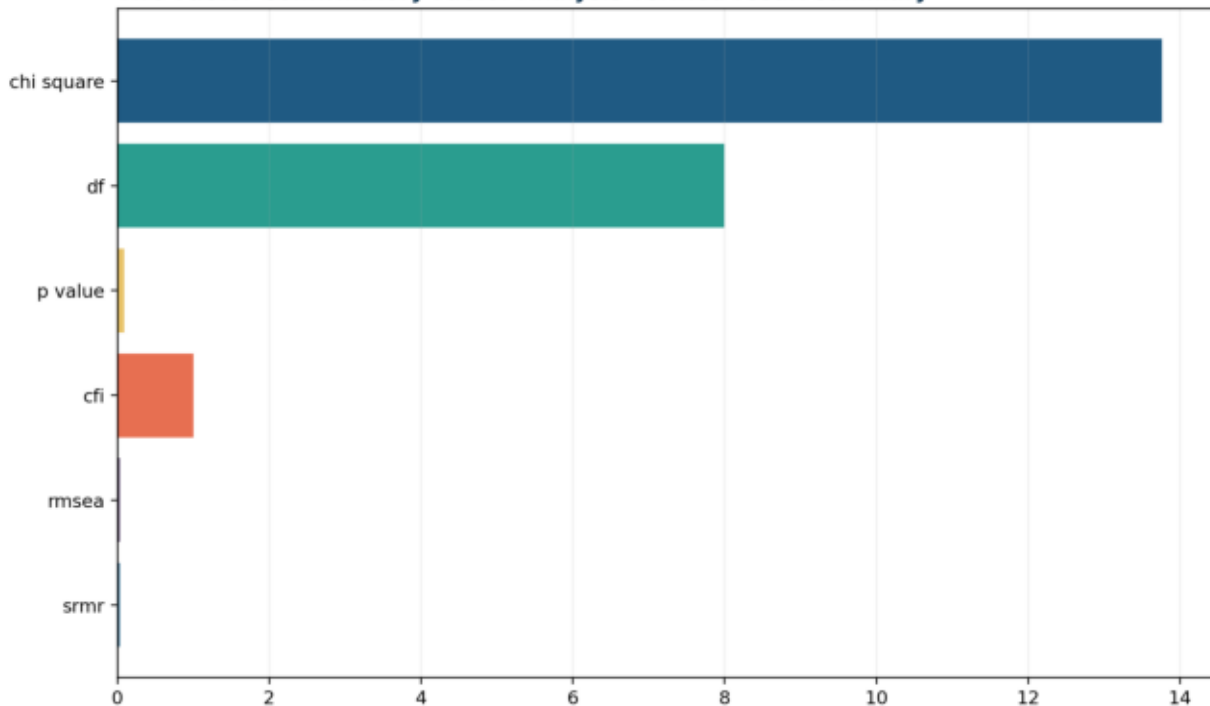
Cfa-Fit Indices
CFA Fit Indices



Cfa Standardized Residuals



Two-Factor Confirmatory Factor Analysis verified result summary



Primary Metrics

metric	value
chi_square	13.764
df	8
p_value	0.0881286
cfi	0.997398
rmsea	0.0333448
srmr	0.0356632

Cfa Standardized Loadings

construct	item	loading	loading_squared	uniqueness
Academic	G1	0.882325	0.778498	0.221502
Academic	G2	0.980163	0.96072	0.0392796
Academic	G3	0.937143	0.878238	0.121762
Social	famrel	0.16641	0.0276922	0.972308
Social	freetime	0.747409	0.55862	0.44138
Social	goout	0.466884	0.217981	0.782019

Cfa Fit Indices

index	value
chi_square	13.764
df	8
p_value	0.0881286
CFI	0.997398
TLI	0.995122
NFI	0.993829
RMSEA	0.0333448
SRMR	0.0356632
GFI	0.992635
AGFI	0.980667
AIC	39.764
BIC	97.9446

Cfa Standardized Residuals

item	G1	G2	G3	famrel	freetime	goout
G1	9.82827e-09	0.000158759	-0.000478078	0.0700397	0.000923277	-0.0144466
G2	0.000158759	6.59088e-08	-5.69385e-06	0.113189	-0.000677231	-0.0132537
G3	-0.000478078	-5.69385e-06	1.85794e-07	0.0859262	-0.0213567	-0.0243314
famrel	0.0700397	0.113189	0.0859262	9.66359e-09	0.00483956	0.0120124
freetime	0.000923277	-0.000677231	-0.0213567	0.00483956	6.20226e-08	-0.00260153
goout	-0.0144466	-0.0132537	-0.0243314	0.0120124	-0.00260153	8.58988e-08