Common-Factor Communalities

Standalone verified Python analysis

Test: Common-Factor Communalities

Design: Principal-axis variance in each item explained by two common factors.

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

Null hypothesis: An item's communality is zero.

Formula: h_i^2=sum_j lambda_ij^2; uniqueness=1-h_i^2.

Source rows: 649

Calculated metrics:

mean_communality: 0.5668425200713844

minimum_communality: 0.044644194156506216

maximum_communality: 0.9659050434706113

factors: 2

iterations: 500

Independent reference values:

mean_communality: 0.5668425200713844

minimum_communality: 0.044644194156506216

maximum_communality: 0.9659050434706113

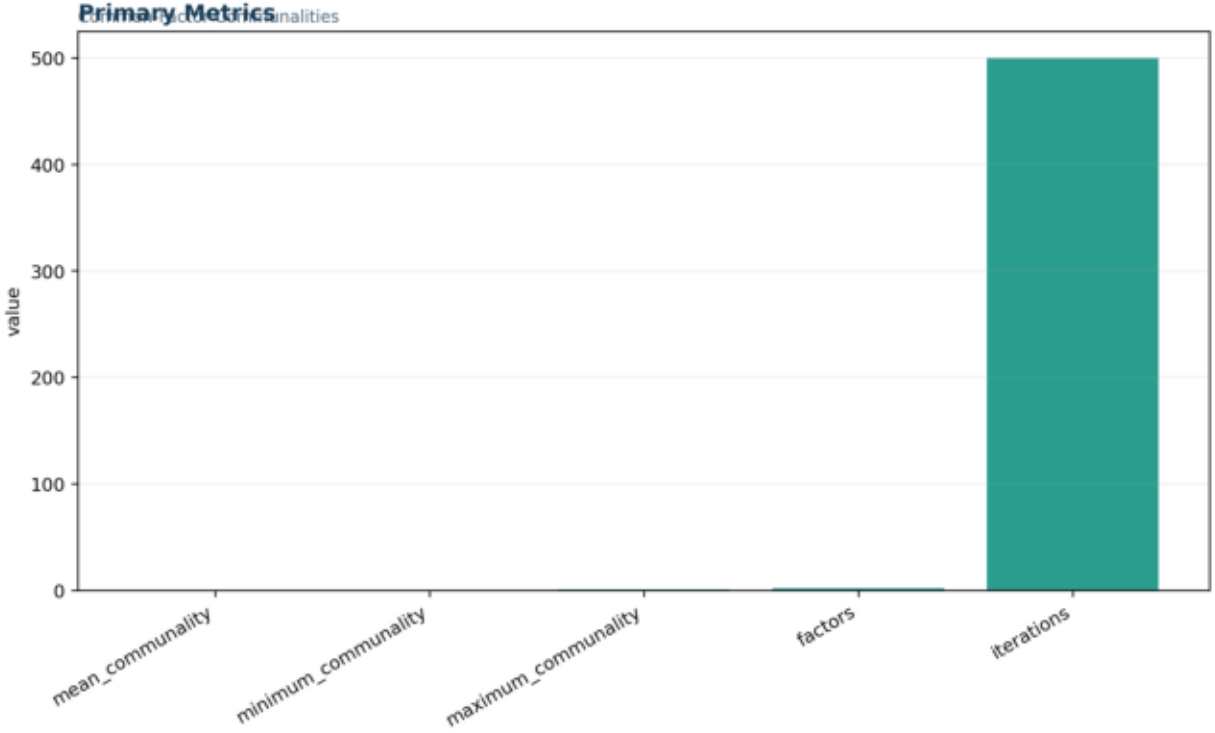
factors: 2

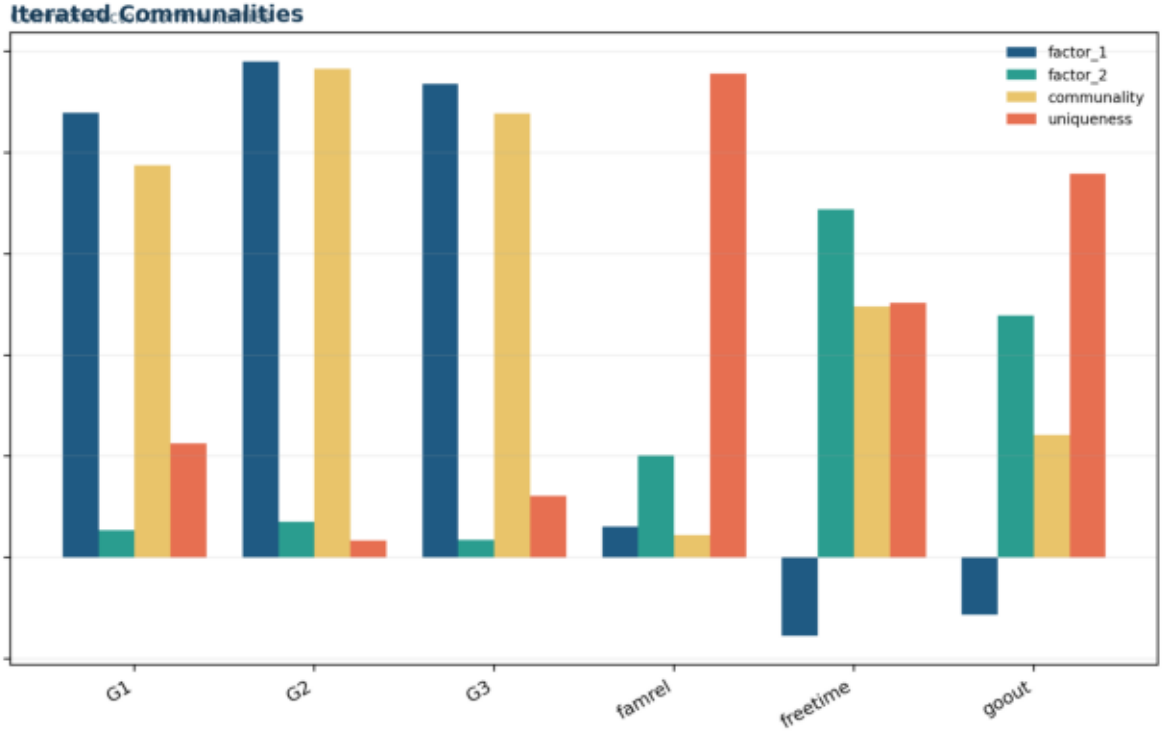
iterations: 500

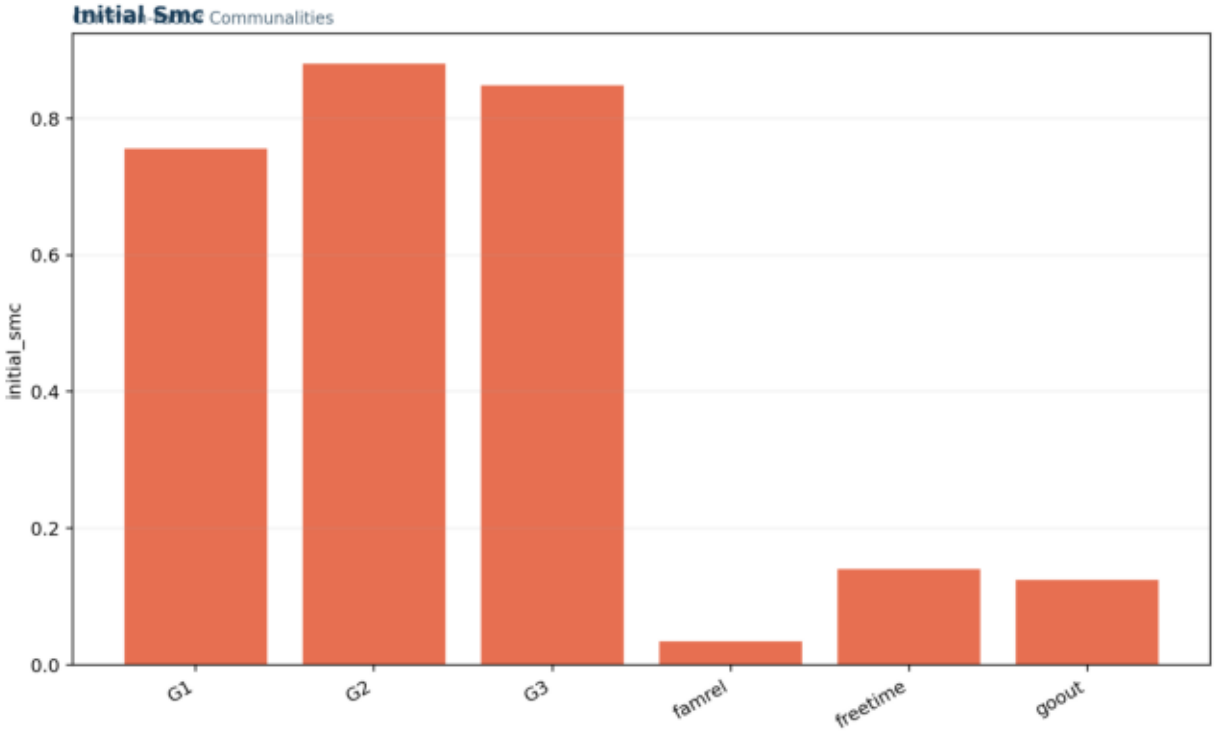
Interpretation:

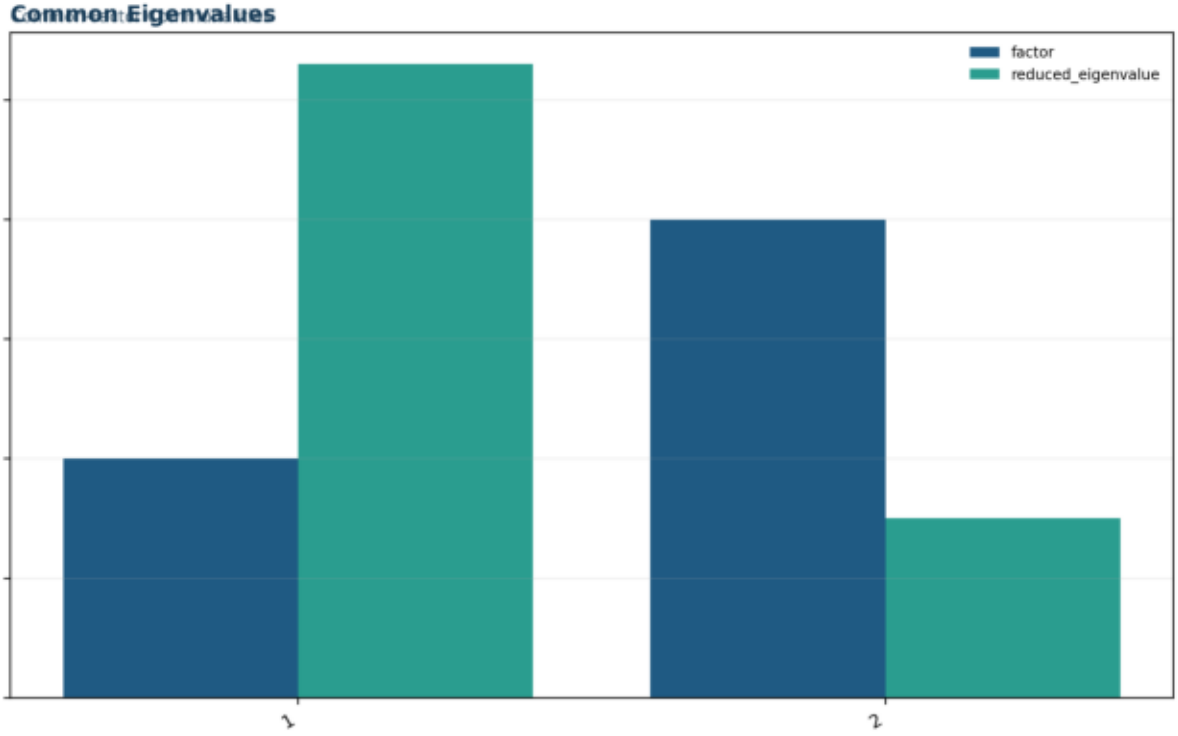
Principal-axis communalities iterate from squared multiple correlations.

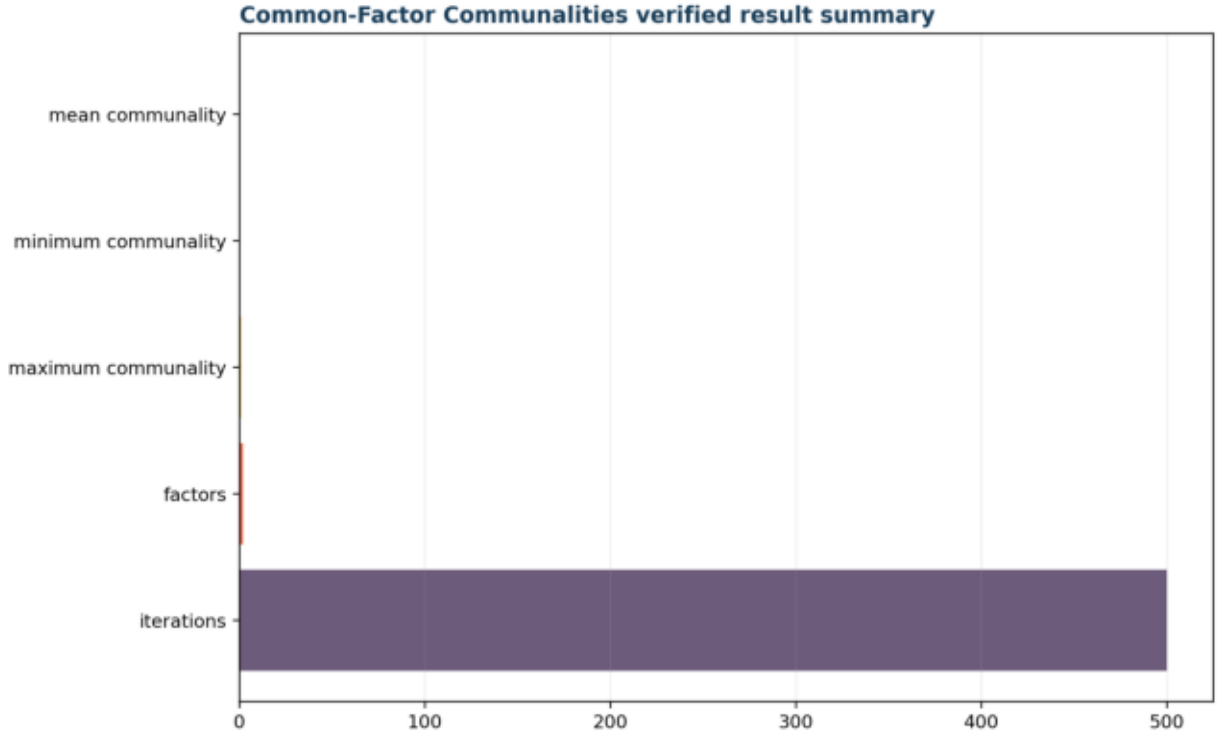
Mean final communality=0.566843 after 500 iterations.


Primary Metrics
Communalities
value
500
400
300
200
100
0
mean_communality
minimum_communality
maximum_communality
factors
iterations


Iterated Communalities
factor_1
factor_2
communality
uniqueness
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
G1
G2
G3
famrel
freetime
goout


Initial Smc
Communalities
initial_smc
0.0
0.2
0.4
0.6
0.8
G1
G2
G3
famrel
freetime
goout


Common Eigenvalues
factor
reduced_eigenvalue
2.5
2.0
1.5
1.0
0.5
0.0
1
2


Common-Factor Communalities verified result summary
mean communality
minimum communality
maximum communality
factors
iterations
0
100
200
300
400
500

Primary Metrics

metric	value
mean_communality	0.566843
minimum_communality	0.0446442
maximum_communality	0.965905
factors	2
iterations	500

Iterated Communalities

item	factor_1	factor_2	communality	uniqueness
G1	0.878645	0.053824	0.774915	0.225085
G2	0.980285	0.0703304	0.965905	0.034095
G3	0.936209	0.0343263	0.877666	0.122334
famrel	0.061336	0.202193	0.0446442	0.955356
freetime	-0.155005	0.687273	0.496371	0.503629
goout	-0.11343	0.478213	0.241554	0.758446

Initial Smc

item	initial_smc
G1	0.755357
G2	0.880171
G3	0.84854
famrel	0.0343086
freetime	0.139871
goout	0.124503

Common Eigenvalues

factor	reduced_eigenvalue
1	2.65012
2	0.750936