

Horn's Common-Factor Parallel Analysis

Standalone verified Python analysis

Test: Horn's Common-Factor Parallel Analysis

Design: Principal-axis reduced-correlation eigenvalues compared with 95th-percentile random common eigenvalues.

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

Null hypothesis: No observed common-factor eigenvalue exceeds its random 95th-percentile counterpart.

Formula: Retain factor j when $\lambda_j(R \text{ with SMC diagonal}) > Q_{.95}[\lambda_j(\text{random reduced } R)]$.

Source rows: 649

Calculated metrics:

retained_factors: 2

replications: 200

first_observed_common_eigenvalue: 2.60059316685748

first_random_threshold: 0.20755363834842272

variables: 6

Independent reference values:

retained_factors: 2

replications: 200

first_observed_common_eigenvalue: 2.60059316685748

first_random_threshold: 0.20755363834842272

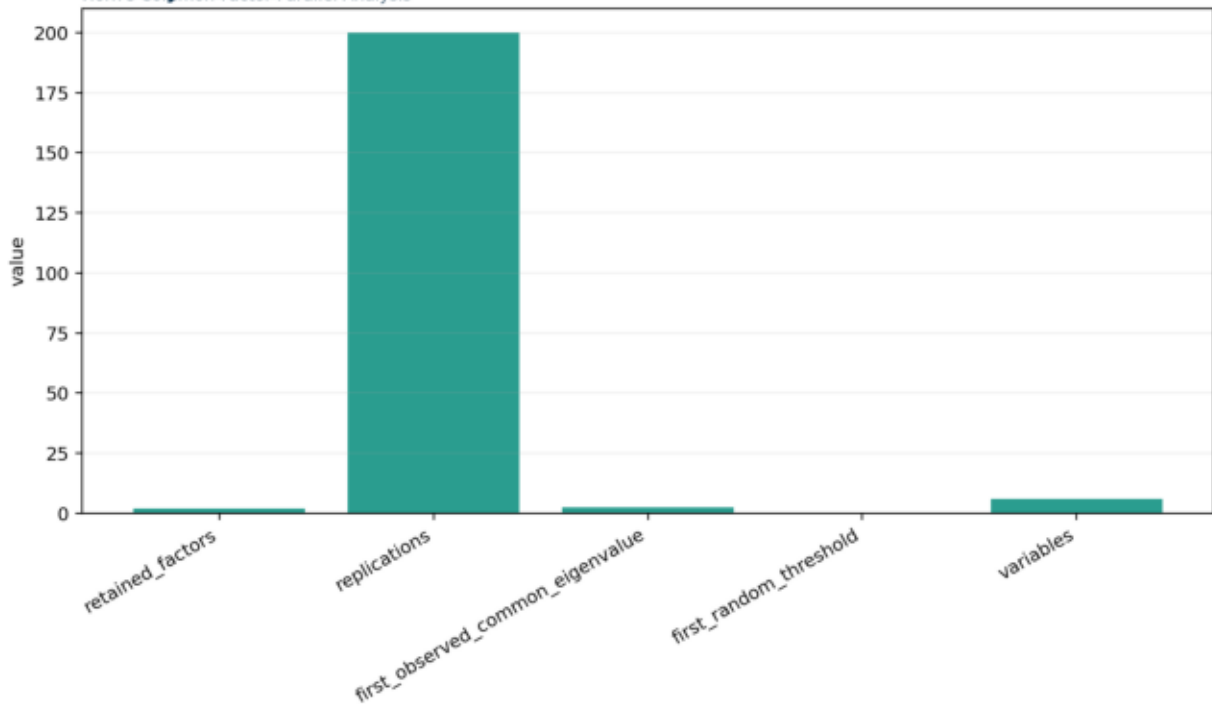
variables: 6

Interpretation:

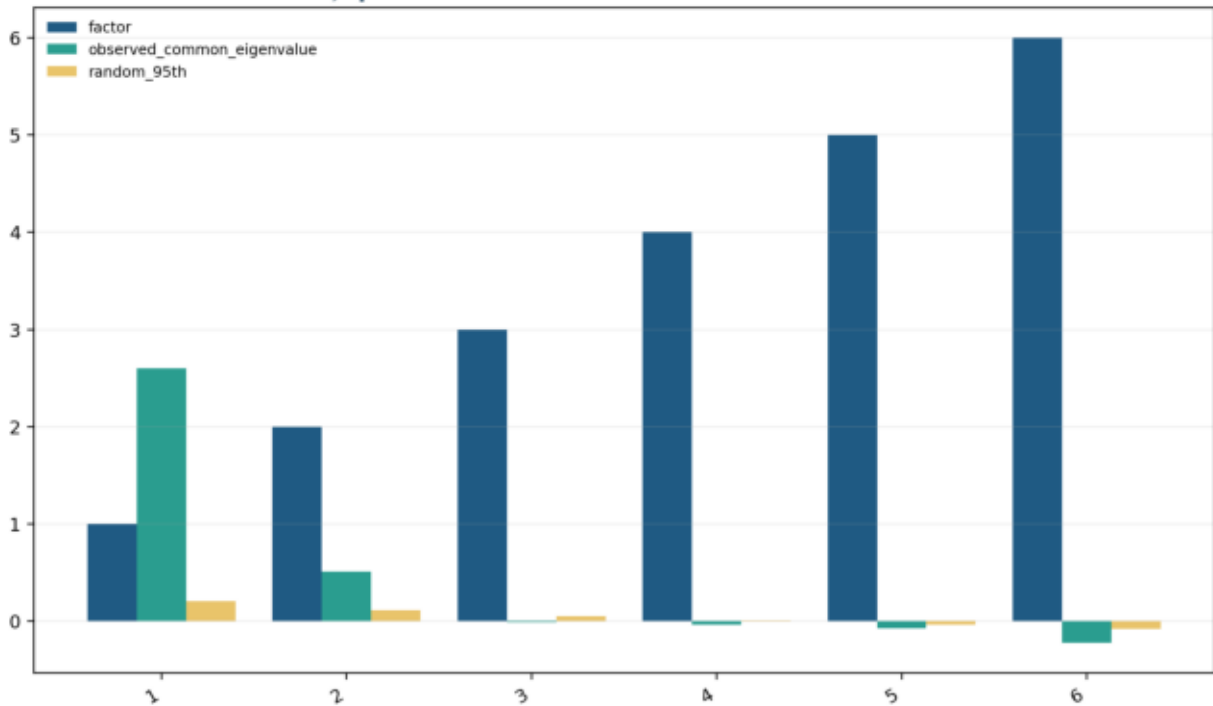
Horn's common-factor analysis uses SMC diagonals in both observed and random matrices.

Retained factors=2.

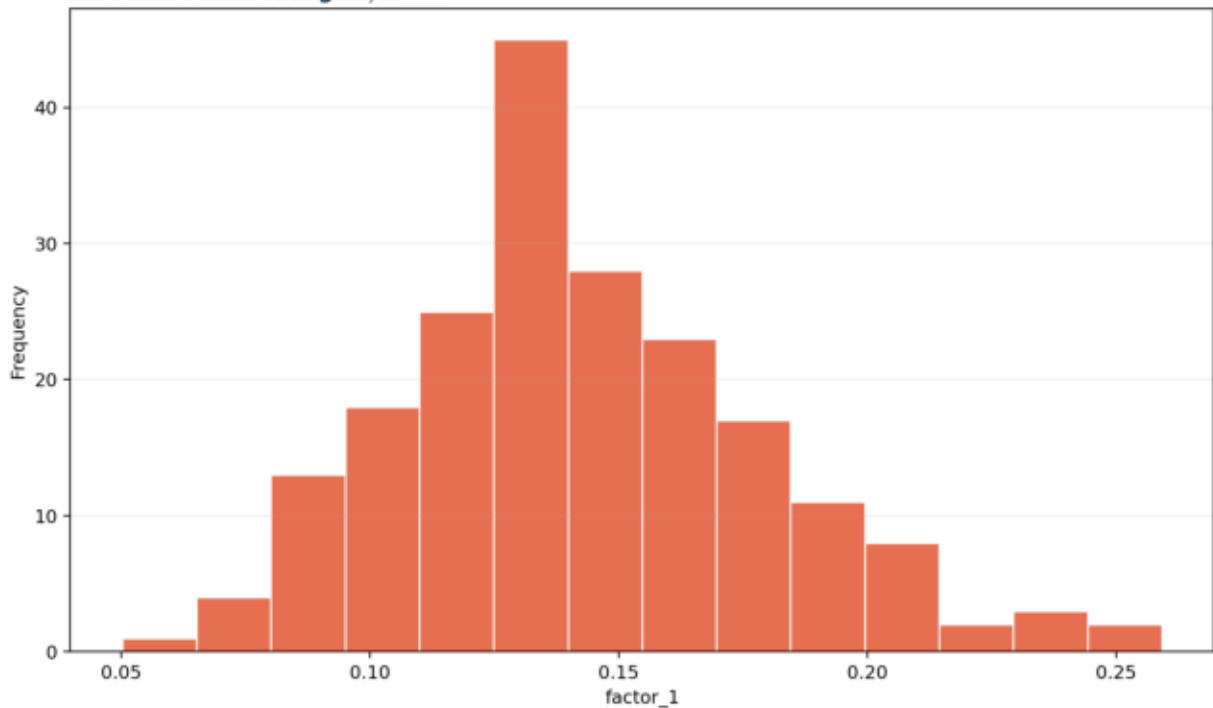
Primary Metrics



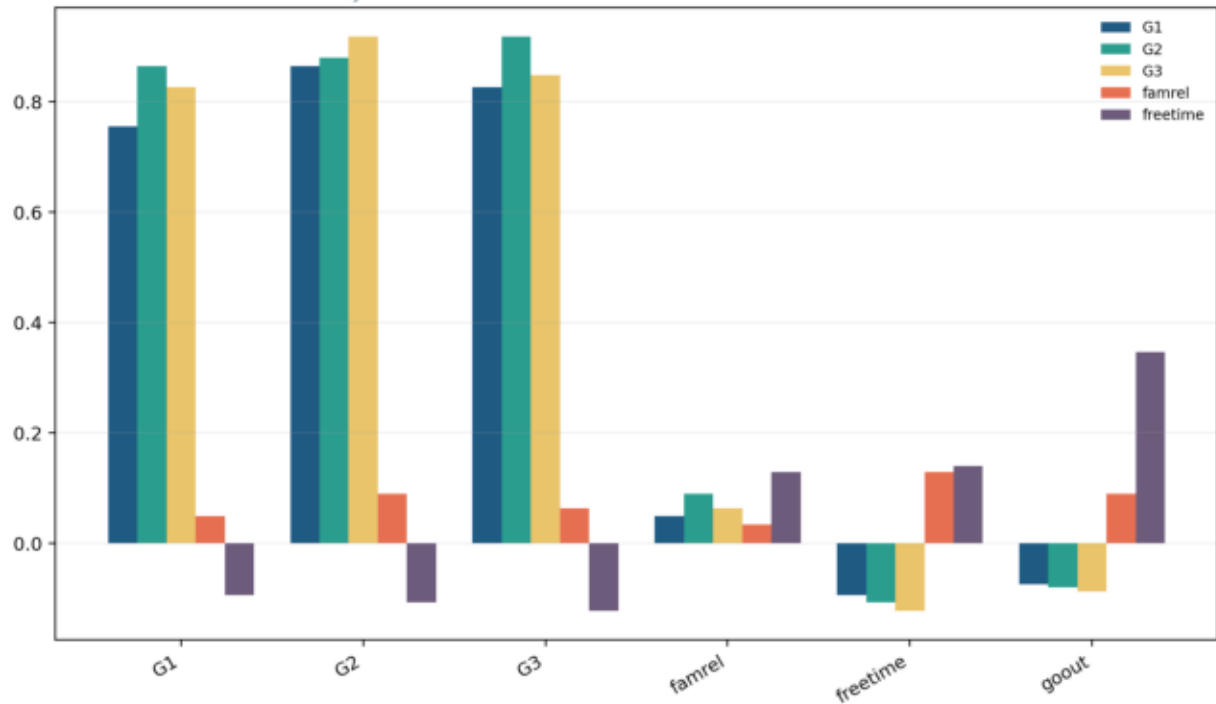
Horn Common Factor Analysis



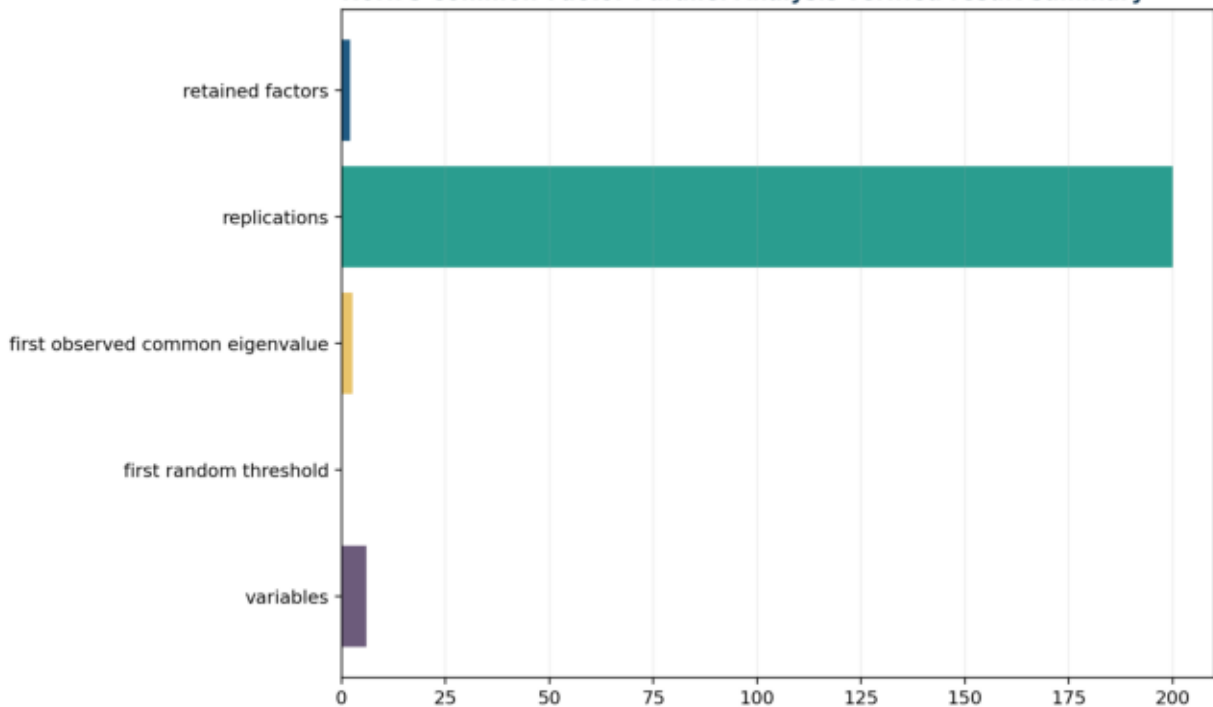
Random Common Eigenvalues



Reduced Correlation Matrix



Horn's Common-Factor Parallel Analysis verified result summary



Primary Metrics

metric	value
retained_factors	2
replications	200
first_observed_common_eigenvalue	2.60059
first_random_threshold	0.207554
variables	6

Horn Common Factor Comparison

factor	observed_common_eigenvalue	random_95th	retain
1	2.60059	0.207554	True
2	0.511941	0.112325	True
3	-0.00756759	0.0538423	False
4	-0.0329006	0.00844102	False
5	-0.0705391	-0.035546	False
6	-0.218777	-0.0778437	False

Random Common Eigenvalues

factor_1	factor_2	factor_3	factor_4	factor_5	factor_6
0.110257	0.101235	0.000977386	-0.0170015	-0.057598	-0.101946
0.19813	0.0672431	0.0219613	-0.0322011	-0.0591063	-0.132779
0.131574	0.0566342	0.00824095	-0.0168218	-0.0609807	-0.0874158
0.223476	0.105204	0.00795628	-0.0278106	-0.0862456	-0.138828
0.240483	0.131285	-0.00634296	-0.0299076	-0.071928	-0.161882
0.140969	0.0828214	0.0202669	-0.00300477	-0.0730831	-0.120951
0.128387	0.10766	0.0321099	0.00289907	-0.0936822	-0.123614
0.0945147	0.0546923	0.0120833	-0.00967832	-0.0464103	-0.083928
0.195431	0.070564	0.0167857	-0.0271321	-0.0691833	-0.125004
0.128821	0.0853997	0.0219411	-0.0298365	-0.0623361	-0.104524
0.0501738	0.0418397	-0.00244241	-0.0087003	-0.027187	-0.0464882
0.178279	0.083961	0.0427645	-0.0222914	-0.0876925	-0.130492
0.0758118	0.054747	0.00943387	-0.0138897	-0.0409275	-0.0696882
0.178913	0.0846914	0.0239547	-0.0444632	-0.0603262	-0.124205
0.112814	0.0875723	0.0194423	0.000478215	-0.0699594	-0.111822
0.128491	0.0503366	0.0239055	0.0113251	-0.0539477	-0.121984
0.0936946	0.0714449	0.0240625	-0.00778282	-0.0562501	-0.0976801
0.182397	0.0998248	0.00528576	-0.0323996	-0.0754303	-0.118561
0.207369	0.126766	0.05378	-0.0589354	-0.0805469	-0.155009
0.164212	0.0918721	-0.0105658	-0.0308337	-0.0558361	-0.109618
0.141621	0.0711948	0.0291238	-0.0309962	-0.0739343	-0.0963568
0.11307	0.0695571	0.031358	-0.010886	-0.0600543	-0.108632
0.0988725	0.0574204	0.020809	-0.0127563	-0.0608793	-0.0798576
0.0927211	0.0739579	0.00468012	-0.0156015	-0.0186668	-0.109794
0.151319	0.039931	-0.00396079	-0.0115607	-0.0586077	-0.0839673
0.14164	0.11842	-0.00871515	-0.0330437	-0.0658481	-0.104014

Reduced Correlation Matrix

item	G1	G2	G3	famrel	freetime	goout
G1	0.755357	0.864982	0.826387	0.0487946	-0.0944966	-0.0740526
G2	0.864982	0.880171	0.918548	0.0895878	-0.106678	-0.0794692
G3	0.826387	0.918548	0.84854	0.0633611	-0.122705	-0.0876407
famrel	0.0487946	0.0895878	0.0633611	0.0343086	0.129216	0.0897066
freetime	-0.0944966	-0.106678	-0.122705	0.129216	0.139871	0.346352
goout	-0.0740526	-0.0794692	-0.0876407	0.0897066	0.346352	0.124503