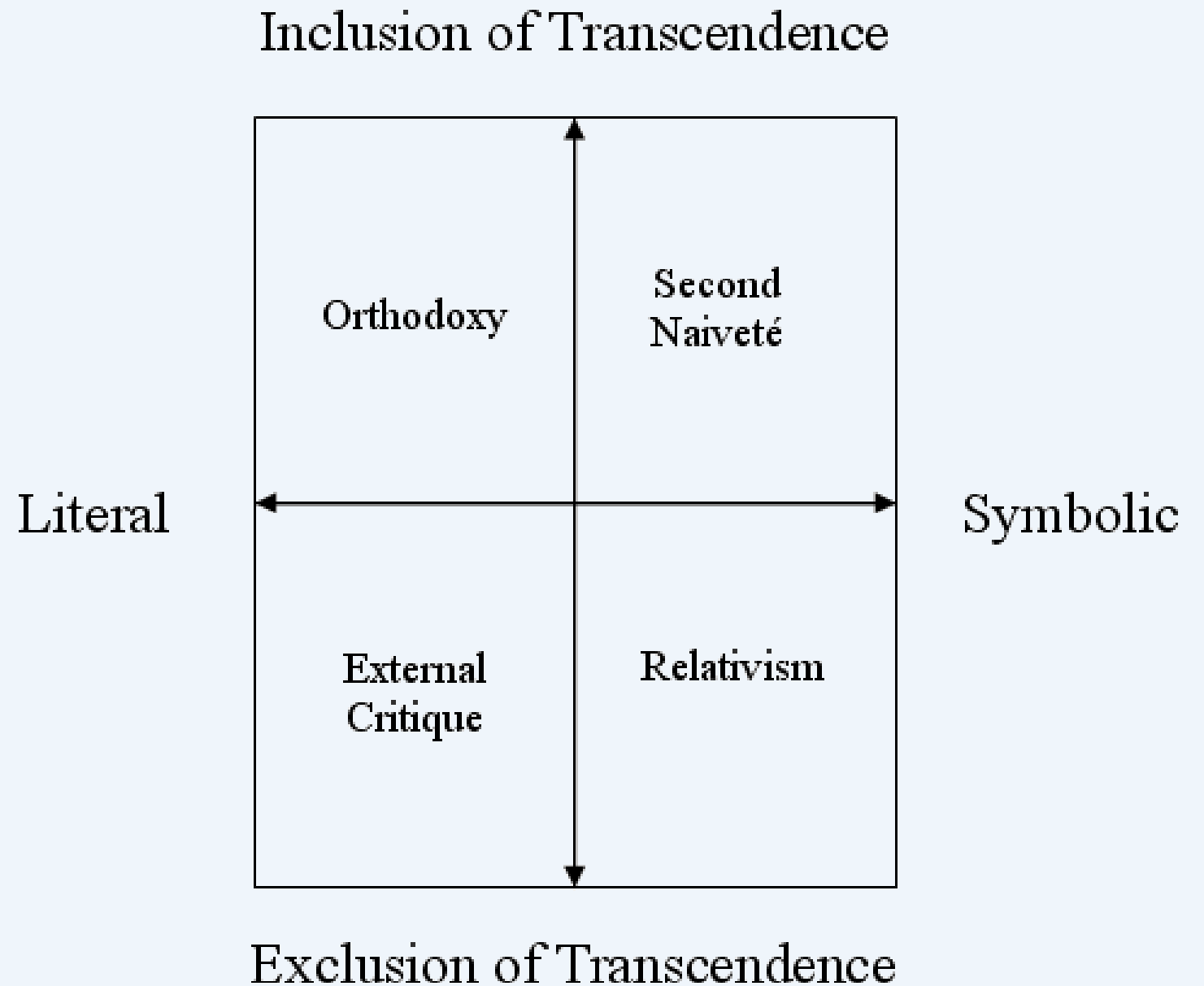


Validation of the seven-cluster structure of religiosity based on the Transcendence and Symbolism factors of the Post Critical Belief Scale



Virág Zábó, Bence Gergely, & András Vargha

Post Critical Belief Scale (PCBS) (Hutsebaut. 1996)



The two factors measure two basic pillars of religiosity:

- Transcendence (Tran)
- Symbolism (Symb)

Using theoretically standardized Tran and Symb as input variables our main goal is to explore main types of religiosity by means of cluster analysis.

Age statistics of our Sample

Sample size (n)	Mean (year)	SD (year)	Min. (year)	Max. (year)
506	26.6	9.8	18	62

Tran and Symb were computed from the four scales of PCBS by means of the factor regression coefficients obtained in Martos et al (2005).

Preliminary steps before Cluster Analysis

Check of normality:

Variable	Weight	Mean	SD	Skewness	Kurtosis
Tran	1	-0.40	1.28	-0.12	-0.82**
Symb	1	0.37	0.79	-0.14	-0.17

- This sample is somewhat lower in Tran and higher in Symb than the sample of Martos
- Correlation between Tran and Symb: $r = 0.189$

Check of nonlinearity with 2nd grade polynomial regression (Depvar = Symb, Indep = Tran)

Indep.	B coeff.	St.error	Stand. B	t-value	Signif.
Constant	0.737	0.039	.	18.77	0.0000***
Tran	-0.098	0.028	-0.159	-3.48	0.0005***
Tran ²	-0.226	0.017	-0.613	-13.47	0.0000***

Clear nonlinear relationship ($R^2 = 0.29$), which gives hope for a nontrivial cluster structure.

Outline of performed cluster analyses

- Variables were not standardized in order to obtain a comparable cluster structure to that obtained in Martos's sample
- Residual analysis: no outliers
- Hierarchical CA (Ward's method)
- Relocation for different cluster numbers
- Validation of cluster structures for different cluster numbers with MORI coefficients

Hierarchical cluster analysis

CL#	EESS%	Pointbis	XBmod	SilCoef	HCmean	HC range
10	89.85	0.323	0.632	0.632	0.235	0.15-0.44
9	88.70	0.327	0.590	0.628	0.261	0.15-0.49
8	87.16	0.356	0.597	0.638	0.296	0.15-0.49
7	85.43	0.380	0.727	0.630	0.335	0.18-0.45
6	83.12	0.383	0.683	0.634	0.387	0.18-0.71
5	79.45	0.413	0.573	0.627	0.471	0.27-0.71
4	73.44	0.504	0.671	0.628	0.607	0.27-0.74
3	65.56	0.541	0.786	0.711	0.785	0.27-0.97
2	52.27	0.530	0.781	0.757	1.087	0.97-1.17

- The quality coefficients (QCs) seem to be acceptable for $k > 3$.
- Large decrease of EESS% first after $k = 6$ (from 83% to 79%).
- Large increase of HCmax first after $k = 7$ (from 0.45 to 0.71).

Relocations for $k = 3$ to 8

cl#	EESS%	Pointbis	XBmod	SilCoef	HCmean	CLdelta	GDI24	HC range
k=8	89.15	0.357	0.738	0.710	0.250	1.032	1.380	0.17-0.34
k=7	87.58	0.369	0.750	0.712	0.286	1.029	1.179	0.16-0.48
k=6	85.34	0.386	0.718	0.705	0.337	1.022	1.038	0.19-0.57
k=5	81.40	0.417	0.658	0.703	0.426	1.023	1.073	0.33-0.57
k=4	78.07	0.468	0.760	0.711	0.502	1.060	1.740	0.43-0.60
k=3	69.92	0.520	0.757	0.737	0.686	1.083	1.685	0.59-0.83

- Nice solutions in terms of all QCs for $k > 3$

Validations for $k = 3$ to 8 (100 random replications, correlated random normal control data, MORI values)

cl#	EESS%	Pointbis	XBmod	SilCoef	HCmean	CLdelta	GDI24
k=8	0.34	0.07	0.23	0.14	0.34	0.16	0.75
k=7	0.33	0.07	0.25	0.15	0.33	0.17	0.36
k=6	0.32	0.07	0.09	0.12	0.32	0.16	0.03
k=5	0.27	0.10	-0.08	0.12	0.27	0.18	0.01
k=4	0.27	0.15	0.31	0.11	0.27	0.24	0.59
k=3	0.24	0.19	0.35	0.21	0.24	0.27	0.48

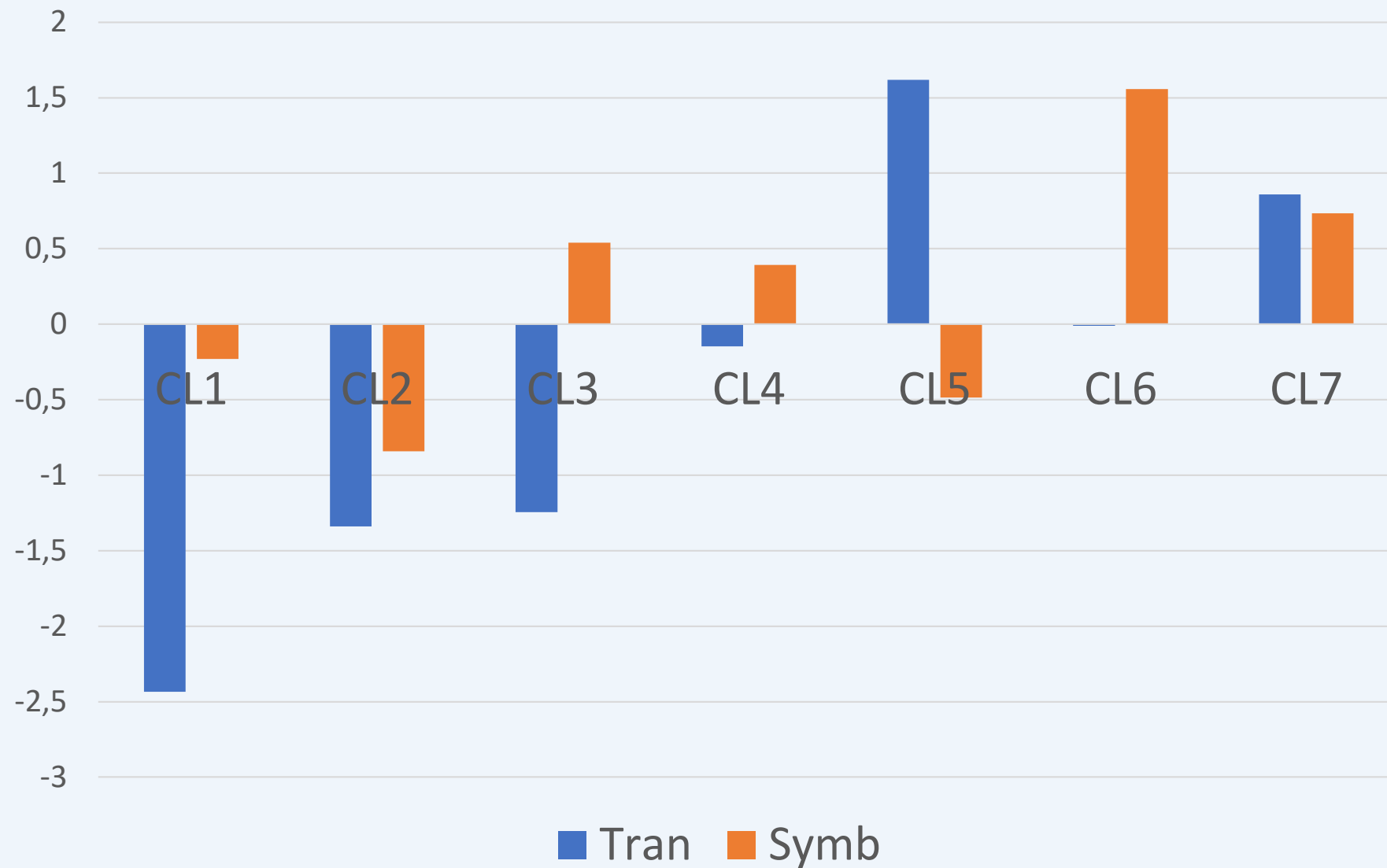
- Best solutions for $k = 7$ and $k = 8$ in terms of coherence QC's
- For smaller k 's ($k = 3$ and $k = 4$) nice MORI values for separation QCs

Pattern of unstandardized means for k = 7 (H = High, L = Low)

Cluster	Tran	Symb	CLsize	HC	HCstan	Mean(Tr, Symb)
CL1	L++	.	71	0.39	0.34	-1.33
CL2	L+	L	39	0.48	0.42	-1.09
CL3	L+	(H)	100	0.27	0.23	-0.35
CL4	.	.	85	0.26	0.23	0.12
CL5	H++	(L)	53	0.31	0.28	0.57
CL6	.	H++	71	0.27	0.24	0.77
CL7	H	H	87	0.16	0.14	0.80

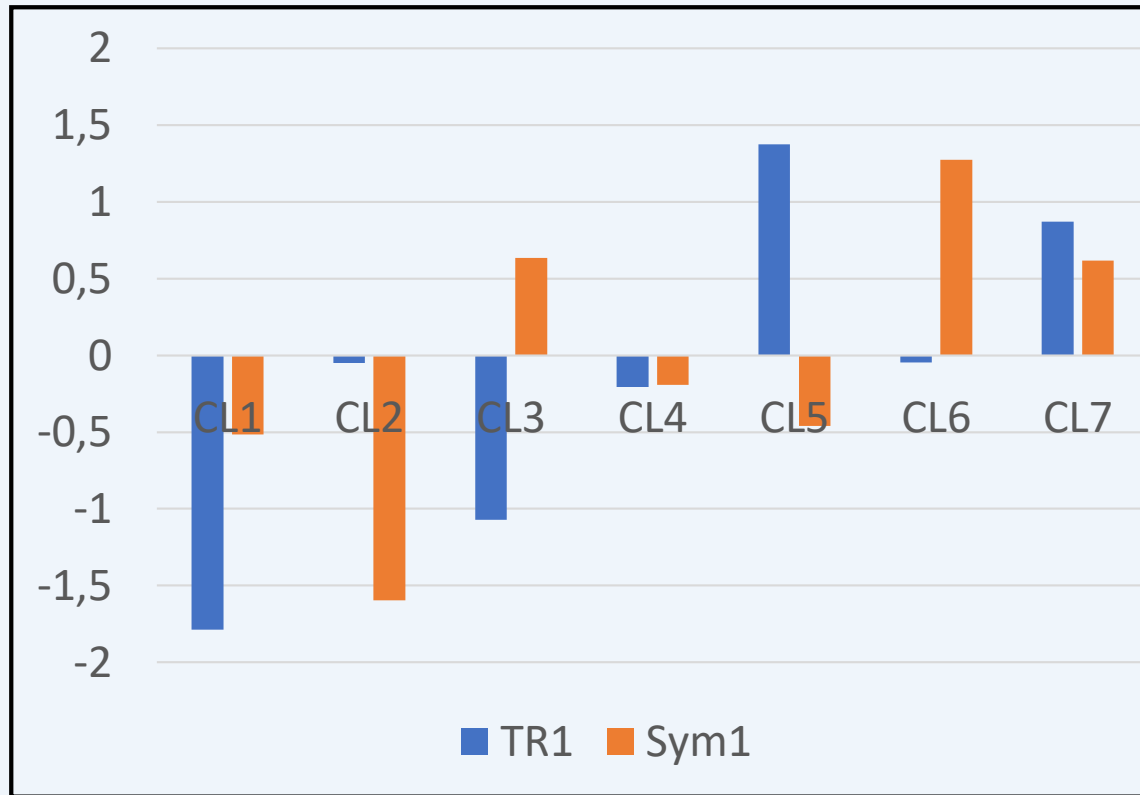
- Several nontrivial clusters: CL1, CL3, CL5, and CL6

Plot of cluster centroids



Comparison of Martos's and Zábó's factor structures: plots of cluster centroids

Martos's sample



Zábó's sample



- The only difference in CL2 (due to Tran- and Symb+ in Zábó's sample?)

Comparison of the corresponding centroids

Index	Martos	Zábó	ASED
1	CL7	CL7	0.007
2	CL5	CL5	0.028
3	CL3	CL3	0.029
4	CL6	CL6	0.037
5	CL1	CL2	0.166
6	CL4	CL4	0.179
7	CL1	CL1	0.241

- High similarity in four clusters (CL3, CL5, CL6, CL7)
- High stabilities in higher level clusters (CL5 to CL7)

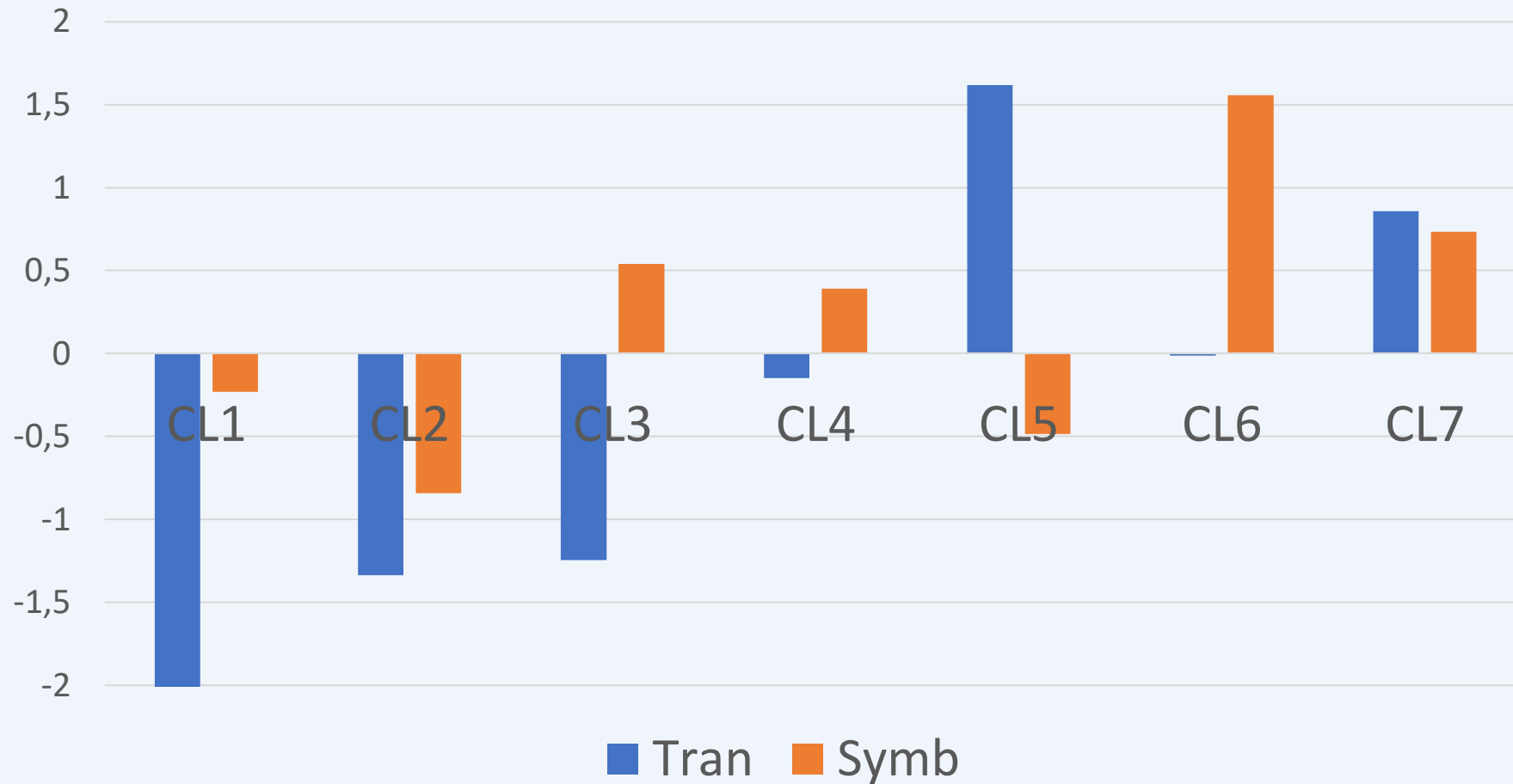
K-means analyses on three samples for k = 7

Sample	EESS%	Pointbis	XBmod	SilCoef	HCmean	CLdelta	GDI24	HC range
Zábó, N=572	87.58	0.369	0.750	0.712	0.286	1.029	1.179	0.16-0.48
Martos N=1312	83.89	0.39	0.747	0.682	0.323	1.01	1.135	0.20-0.56
Total, N=1818	84.61	0.383	0.736	0.689	0.329	1.084	1.123	0.20-0.55

Validation with MORI values on three samples for $k = 7$ (correlated random normal control data, rep = 100)

Sample	EESS%	Pointbis	XBmod	SilCoef	HCmean	CLdelta	GDI24
Zábó (N=572)	0.33	0.07	0.25	0.15	0.33	0.17	0.36
Martos (N=1312)	0.27	0.07	0.18	0.11	0.27	0.17	-0.12
Total (N=1818)	0.29	0.07	0.10	0.14	0.29	0.16	-0.11

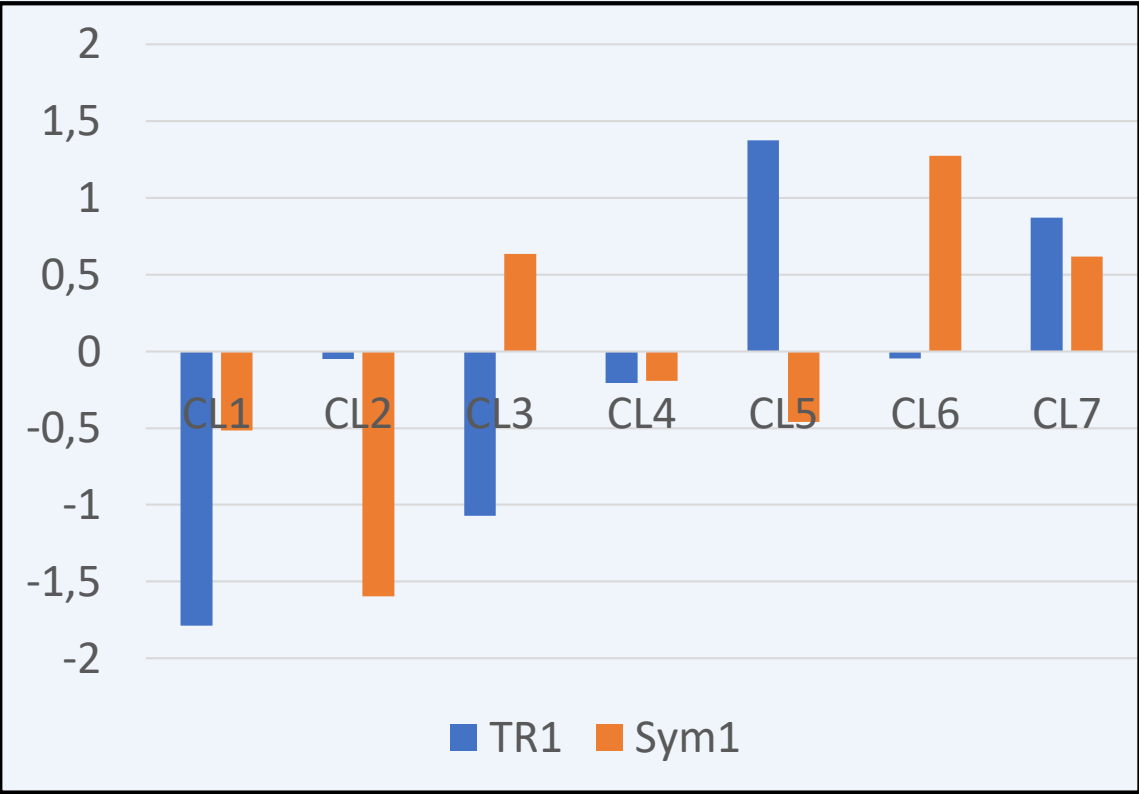
Plot of cluster centroids (N = 1818)



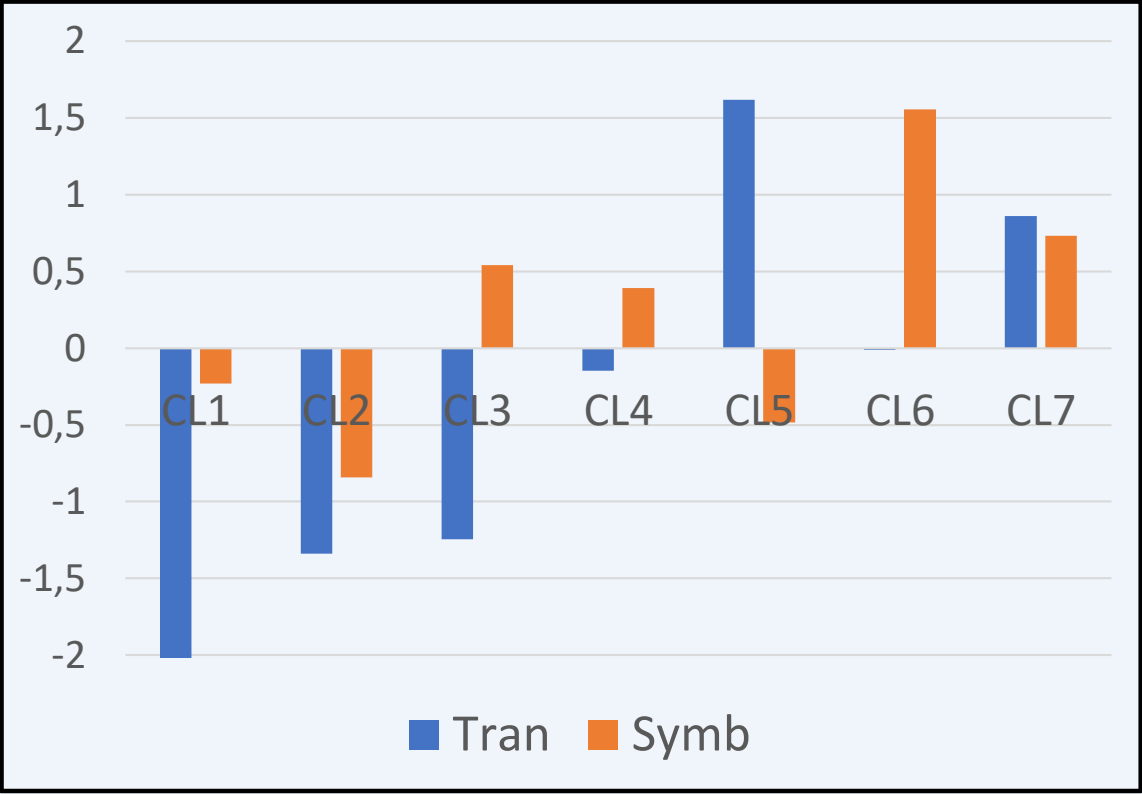
CL1, CL2, CL4 are similar to those of Zábó, not to those of Martos

Comparison of Martos's and Zábó's factor structures: plots of cluster centroids

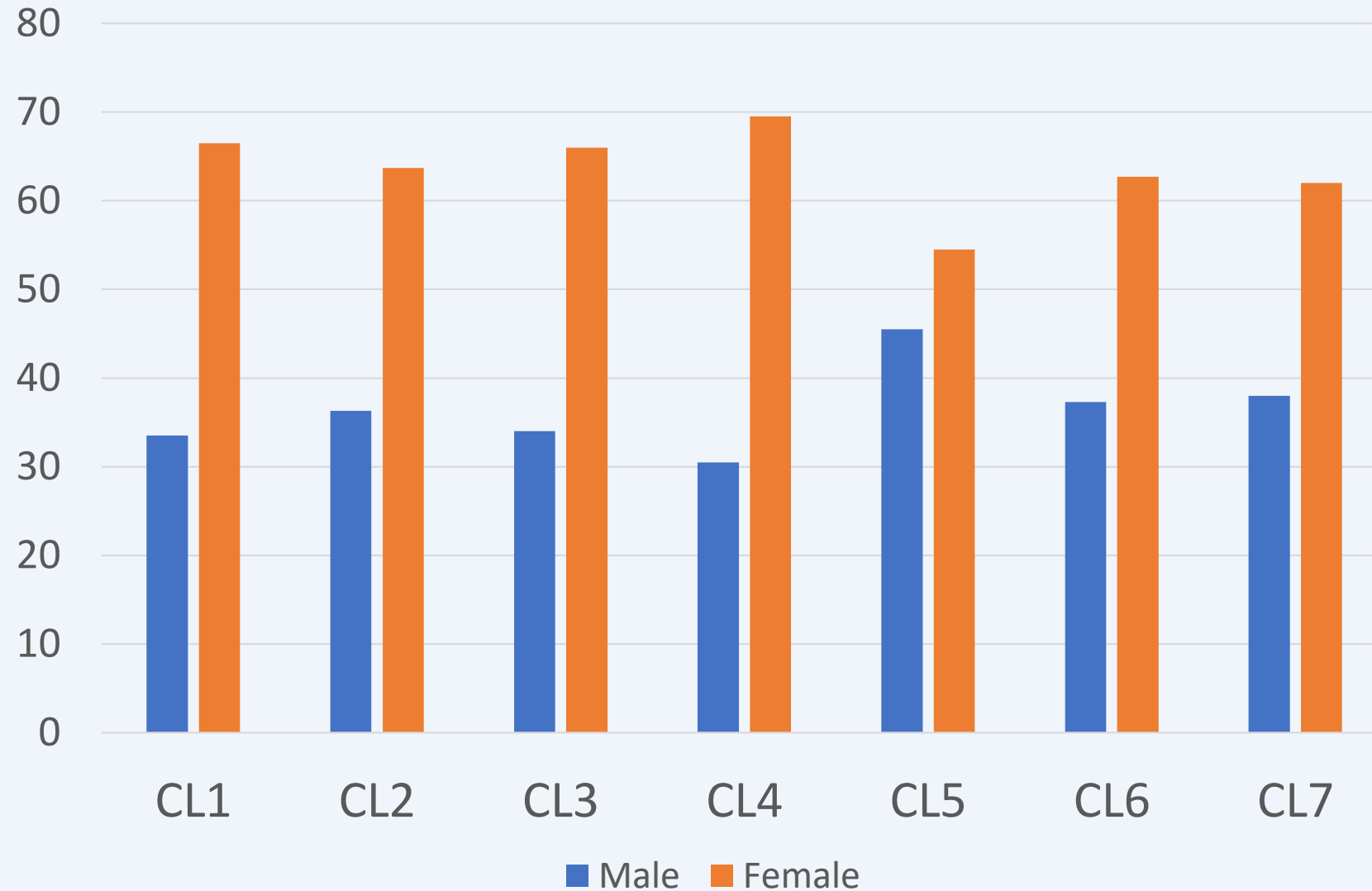
Martos's sample



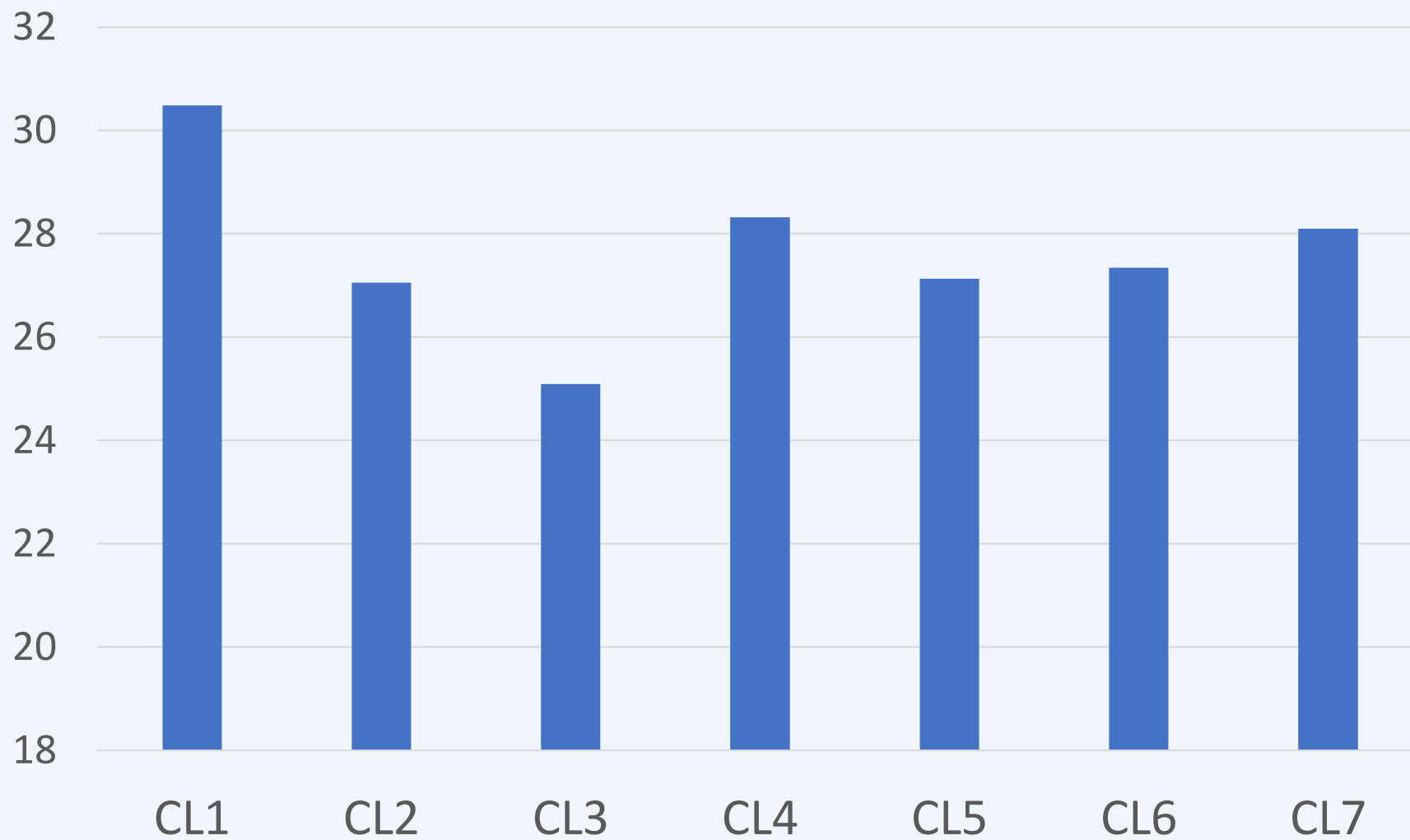
Zábó's sample



Percentage of males and females in the 7 clusters (N = 1818)



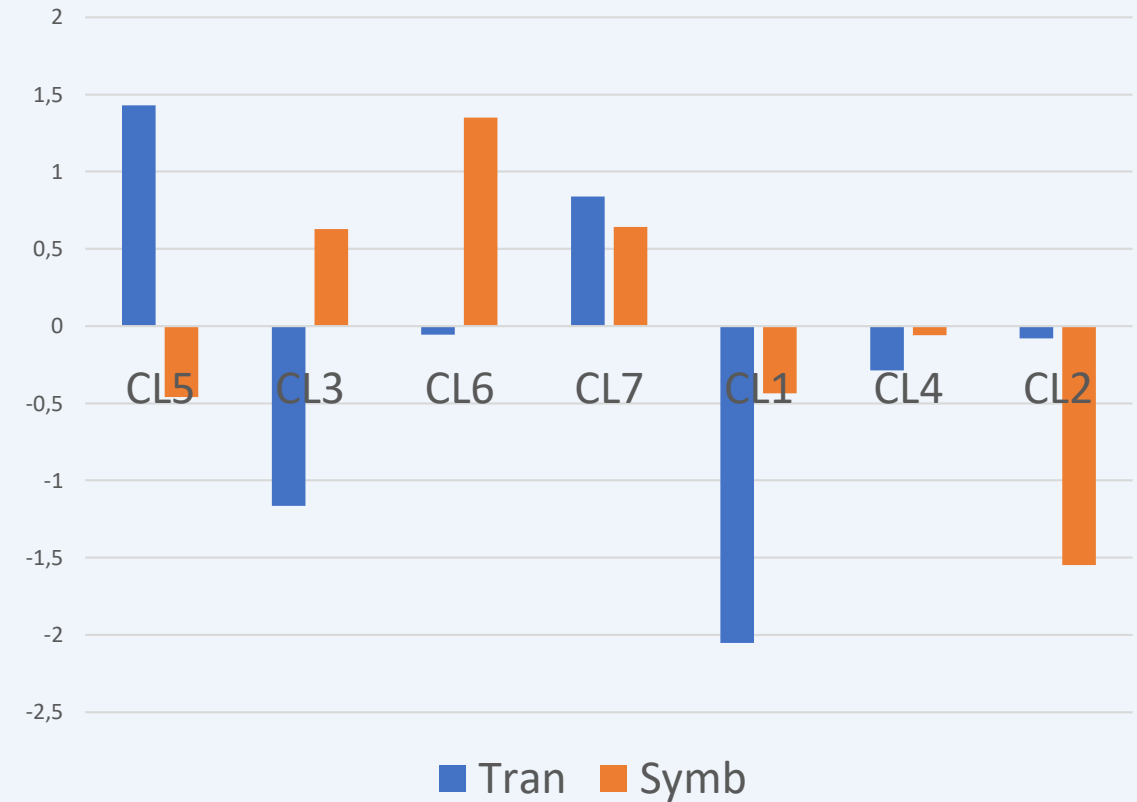
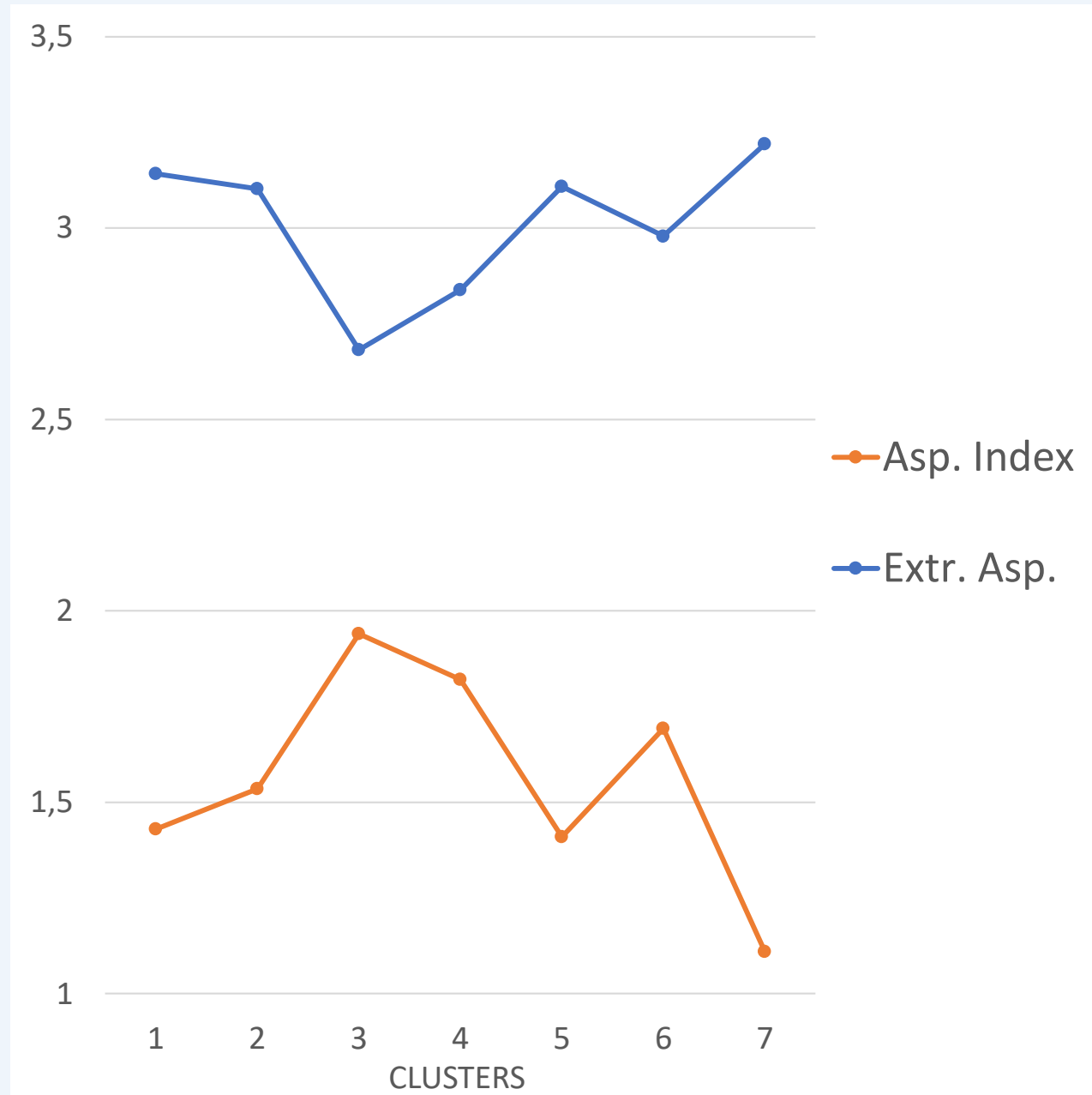
Age means of the 7 clusters (N = 1818)



The 7-cluster solution in view of some external variables (N = 506)

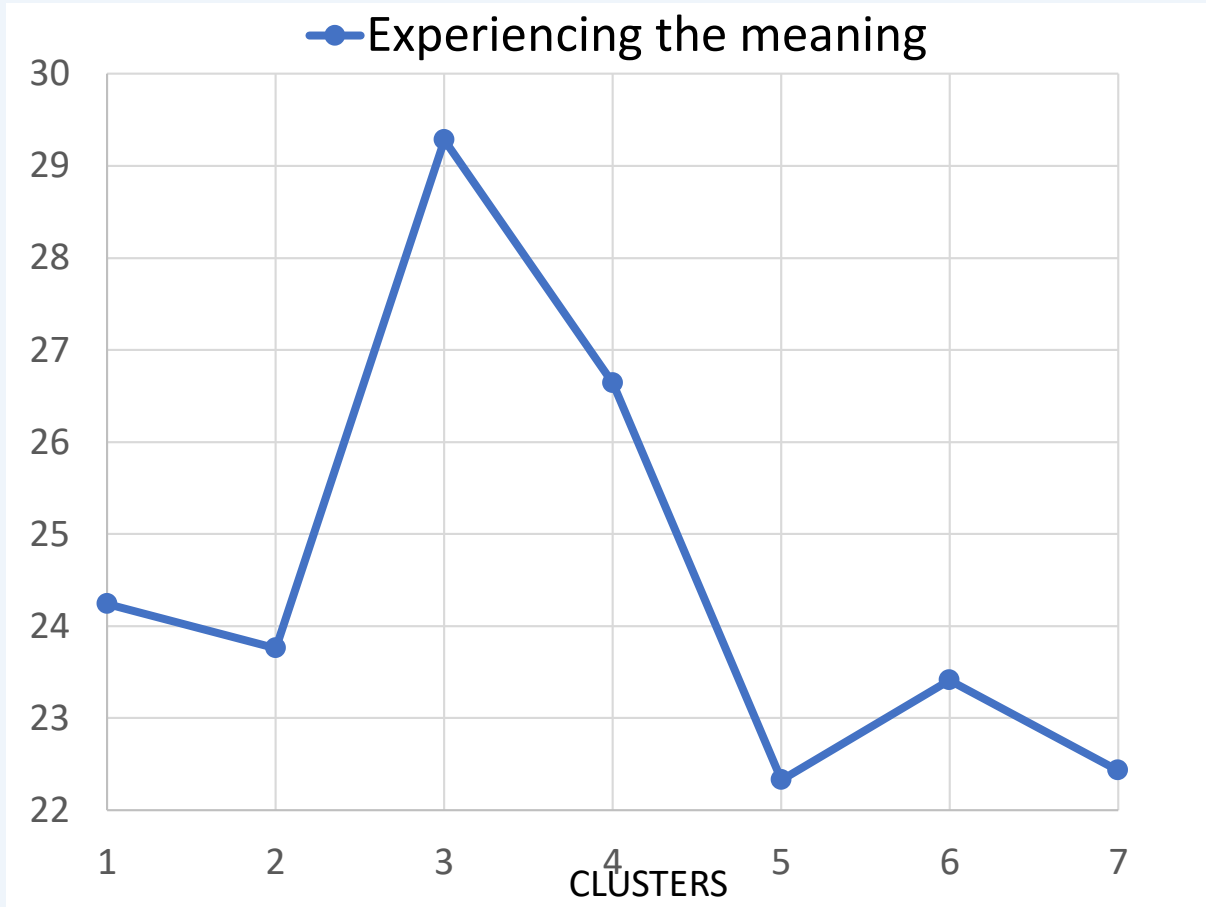
- attachment (ECR-RS)
- aspirations (Aspiration Index)
- search and presence of meaning in life (MLQ-H)
- mental health (MET)

The 7-cluster solution in view of aspirations (N = 506)

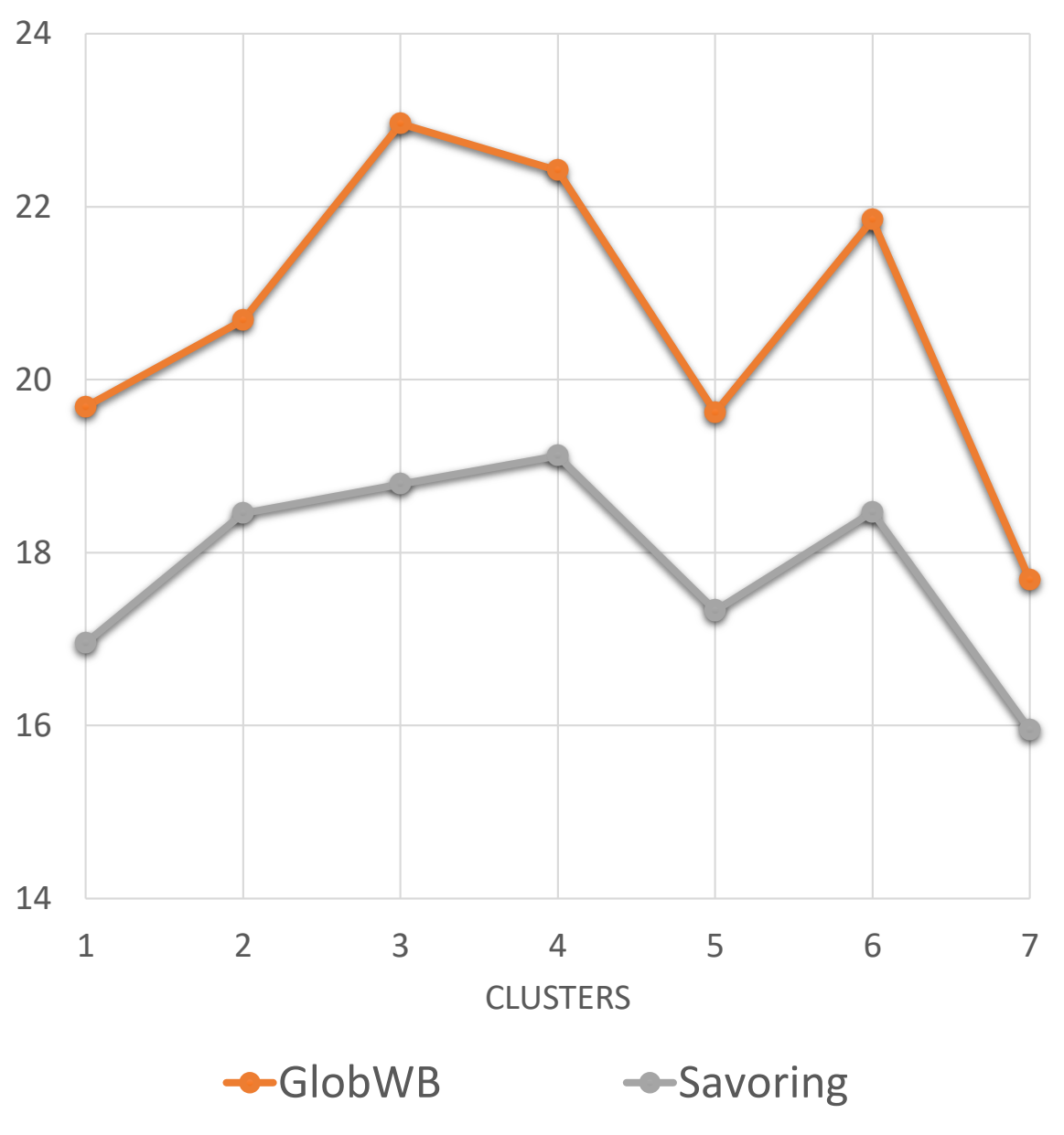


The 7-cluster solution in view of meaning in life

(N = 506)



The 7-cluster solution in the view of mental health (N= 506)



Thanks for your attention!