Social milieus and social integration. From theoretical considerations to an empirical model.

Olaf Groh-Samberg · Tim Schröder · Anne Speer

Online Appendix

Table S1: Results of the Latent Class Analysis, nine-class solution: milieu-specific estimates of the milieu indicators

Milieus		1	2	3	4	5	6	7	8	9	Overall
	Size	0.1697	0.0717	0.0783	0.099	0.0418	0.1043	0.084	0.1656	0.1855	
Equalized household income quintile groups, in percent (inc)	1. quintile	0.0709	0.1312	0.1064	0.1745	0.1427	0.2324	0.2701	0.2731	0.2731	0.1958
	2. quintile	0.129	0.1872	0.1657	0.2185	0.1963	0.2503	0.266	0.267	0.267	0.2204
	3. quintile	0.1769	0.2014	0.1946	0.2062	0.2034	0.2033	0.1974	0.1968	0.1968	0.1955
	4. quintile	0.2272	0.2029	0.214	0.1823	0.1975	0.1546	0.1372	0.1359	0.1359	0.1715
	5. quintile	0.3959	0.2773	0.3193	0.2186	0.2601	0.1594	0.1294	0.1272	0.1272	0.2168
Highest educational degree (educ)	low	0.0759	0.1112	0.2048	0.2519	0.3959	0.4079	0.4046	0.4453	0.5767	0.3357
	intermediate	0.2692	0.3071	0.3604	0.3718	0.3687	0.3664	0.367	0.3577	0.3094	0.3339
	high	0.6548	0.5817	0.4348	0.3763	0.2354	0.2257	0.2283	0.197	0.1139	0.3305
Status		0.74	0.66	0.62	0.54	0.49	0.42	0.4	0.39	0.33	0.5
Human Values Scale. Means of person-centered value items = difference from person-mean of 21 items ranging from 1 "not like me at all" to 5 "very much like me"											
Universalism											
3. He/she thinks it is important that every person in the world be treated equally. He/she believes everyone should have equal opportunities in life.	peqopt	0.7659	1.3875	0.5166	1.4101	-2.0847	0.7417	0.9265	0.387	0.8041	0.6909
8. It is important to him/her to listen to people who are different from him/her. Even when he/she disagrees with them, he/she still wants to understand them.	pudrst	0.7221	1.407	0.3579	1.3312	-0.0054	0.8218	0.9246	0.1818	0.6551	0.6981
19. He/she strongly believes that people should care for nature. Looking after the environment is important to him/her.	penv	0.6762	1.1989	0.1338	1.3178	0.477	0.6712	0.9067	0.142	0.7047	0.6621
Benevolence											
12. It's very important to him/her to help the people around him/her. He/she wants to care for other people.	phlppl	0.7587	1.0513	0.3058	1.38	0.7475	1.0747	1.1601	0.3542	0.9254	0.8359
18. It is important to him/her to be loyal to his/her friends. He/she wants to devote himself/herself to people close to him/her.	plylfr	1.3257	1.6439	1.2661	1.7538	0.9506	1.3168	1.4165	0.5717	1.0708	1.2051
Conformity											
9. He/she believes that people should do what they're told. He/she thinks people should follow rules at all times, even when no-one is watching.	pfrule	-1.0121	-1.7577	-1.6981	-1.3588	-0.6178	-1.8116	-0.3025	-0.4083	-0.0155	-0.8252
16. It is important to him/her always to behave properly. He/she wants to avoid doing anything people would say is wrong.	pbhprp	-0.2213	-1.1861	-1.3763	-0.3778	-0.0692	-0.7391	-0.7636	-0.0522	-0.3664	-0.2185

Tradition										
9. It is important to him/her to be humble and modest. He/she tries not to draw attention to himself/herself.	pmodst	-0.168	0.1426	1.4549	0.8993	0.0458	0.2929	0.8277	0.0671	0.7661	0.1695
20. Tradition is important to him/her. He/she tries to follow the customs handed down by his/her religion or his/her family.	ptrad	-0.3046	-1.0215	-0.7038	-0.0096	-0.1598	-0.6934	-0.4997	-0.0467	-0.4556	-0.1279
Security										
5. It is important to him/her to live in secure surroundings. He/she avoids anything that might endanger his/her safety.	psafe	0.4944	-1.4148	-0.8675	0.1303	0.8847	0.1129	1.047	0.2138	0.7954	0.2471
14. It is important to him/her that the government ensures his/her safety against all threats. He/she wants the state to be strong so it can defend its citizens.	pstrgv	0.3639	-0.9659	0.1744	0.5613	0.6307	0.6349	0.8185	0.4312	0.9163	0.4645
Power										
17. It is important to him/her to get respect from others. He/she wants people to do what he/she says.	prspot	-0.2193	-1.0474	-0.2943	-1.1589	-0.0828	-1.566	-0.5098	-0.4668	-1.0769	-0.7369
2. It is important to him/her to be rich. He/she wants to have a lot of money and expensive things.	prich	-1.3769	-2.005	-0.7241	-1.9693	-1.4375	-2.0731	-1.8723	-0.9572	-2.1936	-1.6283
Achievement										
4. It is important to him/her to show his/her abilities. He/she wants people to admire what he/she does.	pshabt	-0.3932	-0.7549	-0.0161	-1.3367	-0.321	-1.1907	-0.9471	-0.2506	-1.5241	-0.796
13. Being very successful is important to him/her. He/she likes to impress other people.	psuces	-0.1192	-0.7353	-0.39	-0.9676	-0.2757	-0.8847	-0.5098	-0.0981	-0.9063	-0.3733
Hedonism										
10. Having a good time is important to him/her. He/she likes to "spoil" himself.	pgdtim	0.4279	0.7699	1.0129	-0.1962	0.5352	1.0968	-1.2224	0.2972	0.4773	0.3595
21. He/she seeks every chance he/she can to have fun. It is important to him/her to do things that give him/her pleasure.	pfun	-0.6861	-0.1133	-0.6126	-1.2645	-0.0764	-0.6072	-1.6219	-0.059	-0.2294	-0.2945
Stimulation										
6. He/she likes surprises and is always looking for new things to do. He/she thinks it is important to do lots of different things in life.	pdiff	-0.6949	-0.7932	-0.4655	-0.4486	-0.0319	-0.5693	-1.2169	-0.0492	-0.2726	-0.1719
15. He/she looks for adventures and likes to take risks. He/she wants to have an exciting life.	padvnt	-1.8333	-0.0129	-0.0301	-1.8938	-1.6038	-0.7572	-2.4004	-0.9155	-2.3418	-1.4291
Self-Direction										
1. Thinking up new ideas and being creative is important to him/her. He/she likes to do things in his/her own original way.	pcrtiv	0.377	1.2077	0.8001	0.7905	0.4761	0.5571	0.3225	0.0827	-0.0735	0.3967

11. It is important to him/her to make his/her own decisions about what he/she does. He/she likes to be free to plan and to choose his/her activities for himself.	pfree	0.8787	1.4455	1.0693	1.4074	1.0091	1.2184	0.3849	0.395	0.6965	0.8721
Self-transcendence (mean of universalism+benevolence)		0.85	1.34	0.52	1.44	0.02	0.93	1.07	0.33	0.83	0.82
Self-enhancement (mean of power+achievement)		-0.47	-1.14	-0.16	-1.36	-0.39	-1.43	-0.96	-0.39	-1.43	-0.88
Openness (mean of hedonism+stimulation+self-direction)		-0.26	0.72	0.67	-0.27	0.05	0.55	-0.96	-0.02	-0.29	-0.04
Conservation (mean of conformity+tradition+security)		-0.14	-1.08	-0.99	-0.03	0.2	-0.37	0.71	0.01	0.55	-0.05
Self-transcendence minus self-enhancement		1.32	2.47	0.68	2.8	0.41	2.35	2.03	0.72	2.26	1.7
Openness minus conservation		-0.11	1.81	1.65	-0.24	-0.14	0.92	-1.67	-0.03	-0.84	0

Source: ESS 8, 2016, weighted data, n=2470, own calculations

Technical details on the Latent Class Analysis

We conducted an LCA with four Bayesian priors which prevent model nonidentification but do not have a significant impact on the results (Vermunt and Magidson 2016, p. 50). In consequence of using priors, Posterior Mode estimation is applied instead of Maximum Likelihood. We use the Latent GOLD® 6.0 default algorithms (Expectation Maximation in combination with Newton-Raphson) for maximizing the Log-Posterior function and run the model with 400 starting values to reach the global maximum with high certainty. For deciding on the number of classes, we consult information criteria and assess the candidates with a good fit based on theoretical grounds, as recommended by Nylund-Gibson and Choi (2018). The Vuong-Lo-Mendell-Rubin adjusted likelihood ratio test (VLMR-LRT), which compares the fit improvement between two adjacent class solutions, was not further consulted because it did not get insignificant for any considered class solution. The information criteria are based on the Log-Posterior of the specific class solutions and inform about the goodness of fit: The lower, the better the model (see online Appendix B). The AIC and AIC3 penalize for the number of parameters and often produce solutions with a large number of classes in large samples. Since our sample is relatively large, we prefer the CAIC, BIC, and SABIC which additionally penalize for sample size (Vermunt and Magidson 2016). The SABIC, however, penalizes sample size only to a very low extent and therefore doesn't reach a minimum within the class solutions up to 20 classes which we consider meaningfully interpretable. The CAIC and BIC reach a minimum at 13 and 14 classes, respectively. We inspect the 13-class and 14-class solutions closer, find that they are highly similar, and hence prefer the more parsimonious model. Additionally, the relative fit improvement can be consulted for finding the best class solution (Nylund-Gibson and Choi 2018). It is high for three, six, nine, and 13 classes for all information criteria. Thus, we compare the 13-class to its nearest neighbour with a good relative fit improvement, the nine-class solution. Overall, similar milieus are identified. The 13-class solution provides a more nuanced differentiation of the milieus (see online Appendix B). This reveals some interesting heterogeneity in the upper and lower classes, but it also produces some smaller milieus within the middle class which strongly resemble each other. We finally choose the nine-class solution as the more parsimonious model, better suited for analyzing the general milieu landscape. The 13-class solution may be consulted for more specific milieu differentiations in future research (see online Appendix C). Beyond the chosen milieu model, we conducted robustness checks regarding validity and sensitivity. Overall, results were highly stable when somewhat different methods were used. An exception to this is the transformation of the Schwartz values: results differed significantly when no person-centering was applied or when the person-centered values were further divided by the individual's standard deviation. We refrained from using these transformations because the former does not consider individual response styles and relative value priorities and the latter neglects meaningful individual differences in variances of value ratings (Schwartz 2020). Moreover, we did not reduce the relatively high impact of the 21 value indicators on the milieu solution by using variable weights. This procedure produced considerable side effects which are not been investigated well yet. Furthermore, the LCA was not based on factor or index scores of the value indicators to reduce their impact, because reliability was low, factor analytic fit in the German sample of the ESS was insufficient, and because these procedures did not result in a considerably lower relative impact of the values on the milieu solution.

References

Nylund-Gibson, Karen, and Andrew Young Choi. 2018. Ten Frequently Asked Questions about Latent Class Analysis. Translational Issues in Psychological Science 4: 440-461.

Schwartz, Shalom H.. 2020. Computing Scores for the 10 Human values. https://www.europeansocialsurvey.org/docs/methodology/ESS_computing_human_values_scale.pdf. Accessed 15 Juni 2022.

Vermunt, Jeroen K., and Jay Magidson. 2016. Technical Guide for Latent GOLD 5.1: Basic, Advanced, and Syntax. Belmont, MA: Statistical Innovations.

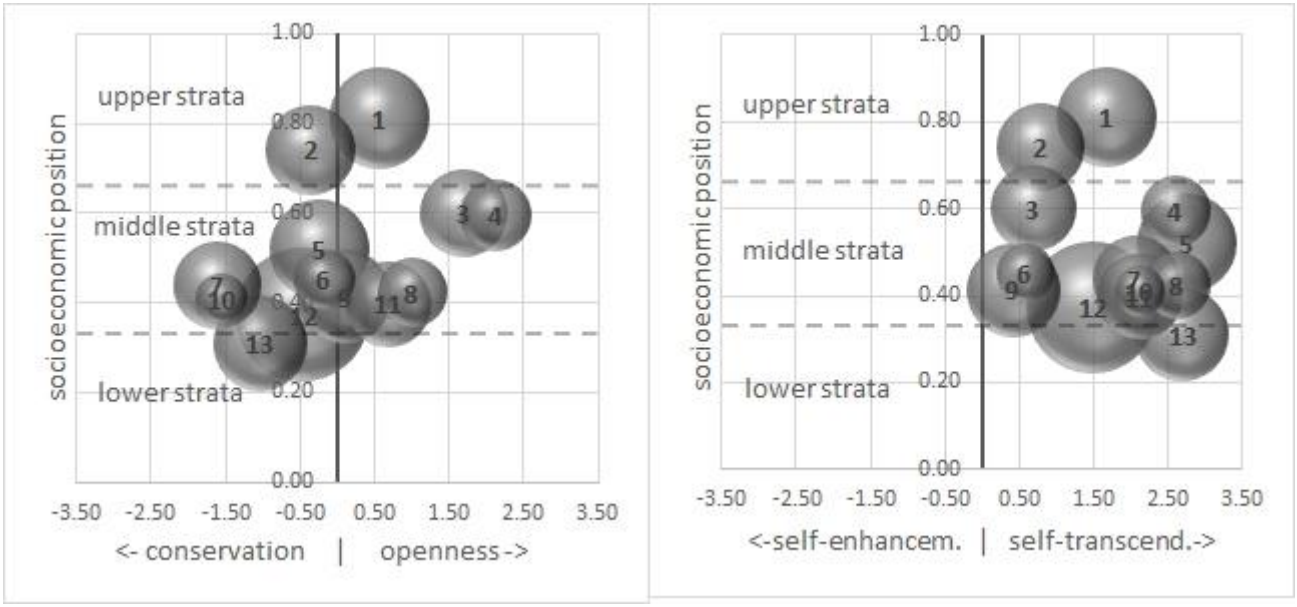
Table S2: Latent Class Analysis, model summary

No. of milieus	LL	BIC(LL)	AIC(LL)	AIC3(LL)	CAIC(LL)	SABIC(LL)	No. para-meters	p-value VLMR-Test	Entropy R^2
1	-83410.772	167195.979	166917.544	166965.544	167243.979	167043.471	48		1.000
2	-81990.520	164542.692	164125.041	164197.041	164614.692	164313.931	72	0.000	0.743
3	-81157.158	163063.184	162506.316	162602.316	163159.184	162758.170	96	0.000	0.749
4	-80835.963	162608.011	161911.926	162031.926	162728.011	162226.743	120	0.000	0.725
5	-80567.289	162257.882	161422.579	161566.579	162401.882	161800.360	144	0.000	0.736
6	-80305.086	161920.693	160946.172	161114.172	162088.693	161386.917	168	0.000	0.742
7	-80128.136	161754.009	160640.272	160832.272	161946.009	161143.980	192	0.000	0.736
8	-79960.331	161605.616	160352.661	160568.661	161821.616	160919.333	216	0.000	0.738
9	-79791.866	161455.904	160063.733	160303.733	161695.904	160693.368	240	0.000	0.751
10	-79651.322	161362.032	159830.644	160094.644	161626.032	160523.242	264	0.000	0.760
11	-79519.648	161285.903	159615.297	159903.297	161573.903	160370.859	288	0.000	0.764
12	-79390.659	161215.141	159405.318	159717.318	161527.141	160223.843	312	0.000	0.769
13	-79274.789	161170.619	159221.578	159557.578	161506.619	160103.067	336	0.000	0.772
14	-79179.497	161167.252	159078.995	159438.995	161527.252	160023.447	360	0.001	0.775
15	-79089.886	161175.246	158947.772	159331.772	161559.246	159955.188	384	0.014	0.777

Source: ESS8, 2016, weighted data, n=2470, own calculations

Note: LL=Log-Likelihood; BIC=Bayesian Information Criterion; AIC=Akaike Information Criterion; AIC3=Akaike Information Criterion 3; CAIC=Consistent Akaike Information Criterion; SABIC=sample size adjusted BIC; VLMR-Test=Vuong-Lo-Mendel-Rubin Test

Fig. S1.: Latent Class Analysis, 13-class solution



Source: ESS 8, 2016, weighted data, n=2470, own calculations

Table S3: Bivariate correlations between milieu indicators

	Income	Education	Openness	Conservation	Self-Transcendence
Education	0.320 ***				
Openness	0.069 **	0.067 ***			
Conservation	-0.144 ***	-0.248 ***	-0.732 ***		
Self-Transcendence	0.022 n.s.	0.118 ***	-0.160 ***	-0.151 ***	
Self-Enhancement	0.093 ***	0.152 ***	-0.082 ***	-0.337 ***	-0.491 ***

Source: ESS8, 2016, weighted data, own calculations

Note: 21 value items are condensed to the four higher-order value dimensions for ease of interpretation. *** p<=0.01; ** p<=0.05; n.s. – not significan