Supplement 4: Multi-group cluster analyses

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4.1 Summary

Distinct social need fulfilment profiles were explored with Latent Class Analyses (LCA) in LatentGOLD (Vermunt & Magidson, 2005). LCA is particularly useful for cluster analyses with a small number of items and a relatively large sample size (Eid, Langeheine, & Diener, 2003). As only 16 participants fell in the oldest-old group, this group was excluded from all cluster analyses. We fitted various types of LCA models, each with 1 up to 10 clusters. For each model, the number of clusters was identified by selecting the model with the lowest BIC value. First, to examine cluster solutions for the general population, the three ordinal social need variables were clustered in the total sample and the weighted sample. Second, the same cluster analyses were performed for the five age groups separately. Third, three multi-group LCA's were performed to examine the differences between age groups in more detail. The first multi-group LCA has an equal number of clusters across all age groups, but the model parameters may differ across the age groups. This analysis gives insight into differences in cluster solutions between the different age groups. The second multi-group LCA is constrained insofar that the association between the latent classes and the social need variables is equal for all age groups, while the cluster sizes may differ across the age groups. In this way, the interpretation of the clusters is equal across the age groups, and we could examine if certain clusters are only present in specific age groups. The last multi-group LCA was most constrained because the equality constraints of the second model were applied extended with the constraint that the cluster sizes are equal across age groups. For this model, we took the same number of clusters as we had identified in the second model. A deviance test was applied to test whether the cluster sizes were equal across age groups. The multi-group LCA's were performed using both the weighted and unweighted sample.

LCA clustering of the social needs in the total sample in general did not reveal disharmonious clusters of need fulfilment. The 6-cluster model fitted best, given the lowest BIC value in both weighted and unweighted analyses with the total sample (Supplement 4.2). People in the clusters only scored generally lower or higher on all needs simultaneously, which indicates that there were no clusters of respondents with disharmonious need fulfilment profiles. Results were similar when all age groups were studied separately, thus lower or higher fulfilment in general, although the number of optimal clusters differed between 4 and 6 (Supplement 4.6). Thus, in these analyses the clusters differed only in their level of the fulfillment of all needs (low to high), and not in terms of different fulfilment levels between needs (one low, one high).

Multi-group LCA clustering of the social needs resulted mainly in clusters of generally low and high profiles of need fulfilment as well. The first multi-group LCA (equal number of clusters, with possibly different model parameters across age groups) revealed that the 4-cluster model fitted best for both the weighted and unweighted analyses. These 4-cluster solutions looked very similar for all age groups, with again only generally lower or higher scores on all social need fulfilments. The second multi-group LCA (with equal associations between latent classes and variables, with possibly varying cluster sizes across age groups) revealed that the 6-cluster and 9-cluster model provided the best fit, for the weighted and unweighted analyses, respectively. Comparing these models with and without equality constraints on the cluster sizes across the age groups (using the deviance test), revealed that the models with varying cluster sizes showed significantly better fit to the data ($\chi 2 = 142$; df = 20, $p < 0.0001$ and $\chi 2 = 340$; df = 32, $p < 0.0001$ for the weighted and unweighted analyses respectively). The models with varying cluster sizes are therefore interpreted below. Next to low and high cluster profiles, we also found clusters with relatively higher levels of affection need fulfilment (see Figure 3). These clusters were most common for emerging and young adults

Mean levels of social need fulfilment per cluster and percentages of age group members per cluster						
	Cl. 1 (41%)	Cl. 2 (22%)	Cl. 3 (16%)	Cl. 4 (10%)	Cl. 5 (10%)	Cl. 6 (1%)
Affection	6.17	4.69	3.79	7.77	5.82	2.29
Confirmation	6.39	4.98	3.77	7.94	5.08	1.52
Status	4.15	3.30	1.92	5.43	3.43	0.74
Emerging adult	0.40	0.03	0.23	0.09	**0.23**	0.02
young adult	0.35	0.13	0.16	0.10	**0.25**	0.01
middle adult	0.45	**0.27**	0.14	0.10	0.03	0.01
late adult	0.46	**0.27**	0.18	0.09	0.00	0.01
young old	0.39	**0.37**	0.11	0.12	0.00	0.02

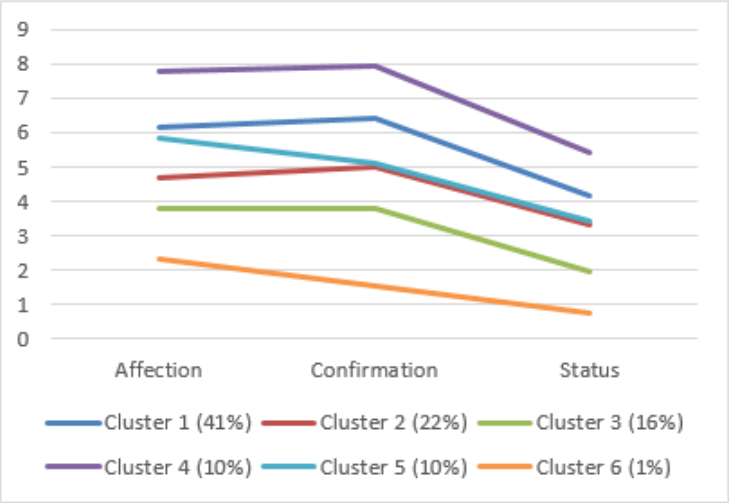


Figure 3. Average levels of social need fulfilment per cluster. Results of best-fitting 6-cluster analysis in the unrestricted multi-group LCA (weighted). Cluster 2 consists mainly of middle adults, late adults, and the young old, while cluster 5 mainly consists of emerging and young adults. More information on the analysis can be found in the Method section.

4.2 Latent Class Analyses (LCA) with the social needs in the total sample.

To examine cluster solutions for the general population, the three ordinal social need variables were clustered in the total sample and the weighted sample.

LCA clustering of the social needs in the total sample in general did not reveal disharmonious clusters of need fulfilment. The 6-cluster model fitted best, given the lowest BIC value in both weighted and unweighted analyses with the total sample. People in the clusters only scored generally lower or higher on all needs simultaneously, which indicates that there were no clusters of respondents with disharmonious need fulfilment profiles.

4.2.1 Unweighted cluster analyses with the social needs in the total sample

Table 4.2.1

Goodness-of-fit measures of the 10 investigated cluster models with the three social needs in the total sample (unweighted sample, N = 11,388)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2 [d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-Cluster	-63078	126408	27	8910	1179	<0.001	0.00
2-Cluster	-60188	120665	31	3129	1175	0.00	0.08
3-Cluster	-59398	119123	35	1550	1171	0.00	0.12
4-Cluster	-59178	118721	39	1110	1167	0.88	0.16
5-Cluster	-59108	118619	43	971	1163	1.00	0.19
6-Cluster	**-59074**	**118588**	**47**	**902**	**1159**	**1.00**	**0.21**
7-Cluster	-59058	118592	51	869	1155	1.00	0.21
8-Cluster	-59048	118610	55	849	1151	1.00	0.21
9-Cluster	-59031	118614	59	816	1147	1.00	0.24
10-Cluster	-59020	118630	63	795	1143	1.00	0.24

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.

[a] Log likelihood.

[b] Bayesian Information Criterion based on the log likelihood.

[c] Numbers of parameters in the model.

[d] Model Fit Likelihood ratio chi-squared statistic.

[e] Degrees of freedom in the model

[f] p-value of the L2.

[g] Classification errors.

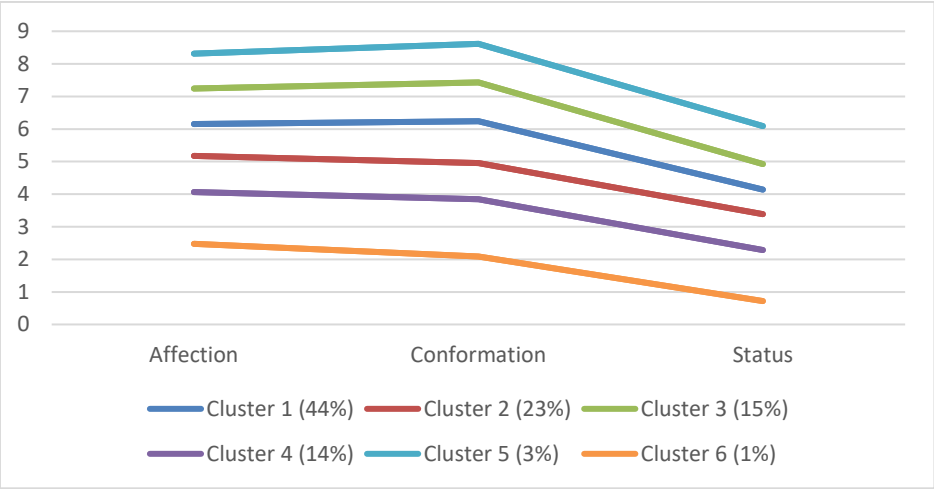


Figure 4.2.1. Average levels of social need fulfilment per cluster. Results of best-fitting 6-cluster analysis of the social needs in the total sample (unweighted).

Table 4.2.2

Response patterns on the social needs per cluster

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Cluster Size	0.44	0.23	0.15	0.14	0.03	0.01
			Affection			
0	0.00	0.00	0.00	0.00	0.00	0.08
1	0.00	0.00	0.00	0.01	0.00	0.11
2	0.00	0.01	0.00	0.06	0.00	0.25
3	0.03	0.13	0.00	0.32	0.00	0.42
4	0.07	0.18	0.01	0.25	0.00	0.11
5	0.15	0.21	0.05	0.17	0.00	0.02
6	0.40	0.34	0.25	0.15	0.05	0.01
7	0.19	0.09	0.23	0.02	0.11	0.00
8	0.11	0.03	0.26	0.00	0.30	0.00
9	0.04	0.01	0.19	0.00	0.54	0.00
Mean	6.15	5.17	7.24	4.06	8.31	2.48
			Confirmation			
0	0.00	0.00	0.00	0.00	0.00	0.10
1	0.00	0.00	0.00	0.00	0.00	0.17
2	0.00	0.00	0.00	0.03	0.00	0.35
3	0.00	0.01	0.00	0.27	0.00	0.31
4	0.00	0.18	0.00	0.52	0.00	0.07
5	0.05	0.65	0.00	0.17	0.00	0.00
6	0.68	0.15	0.09	0.00	0.00	0.00
7	0.26	0.00	0.46	0.00	0.03	0.00
8	0.02	0.00	0.38	0.00	0.32	0.00
9	0.00	0.00	0.07	0.00	0.65	0.00
Mean	6.24	4.96	7.43	3.84	8.61	2.08
			Status			
0	0.00	0.02	0.00	0.12	0.00	0.54
1	0.02	0.06	0.01	0.17	0.00	0.27
2	0.06	0.12	0.03	0.21	0.00	0.11
3	0.30	0.40	0.17	0.36	0.05	0.07
4	0.23	0.21	0.19	0.10	0.09	0.01
5	0.17	0.11	0.21	0.03	0.16	0.00
6	0.18	0.07	0.30	0.01	0.39	0.00
7	0.02	0.01	0.06	0.00	0.12	0.00
8	0.01	0.00	0.03	0.00	0.10	0.00
9	0.00	0.00	0.01	0.00	0.09	0.00
Mean	4.14	3.39	4.92	2.28	6.09	0.72

4.2.2 Weighted cluster analyses with the social needs in the total sample

Table 4.2.3

Goodness-of-fit measures of the 10 investigated cluster models with the three social needs in the total sample (weighted sample, N = 11,293)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2 [d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-Cluster	-56815	113878	27	8633	1179	<0.001	0
2-Cluster	-54185	108655	31	3373	1175	<0.001	0.09
3-Cluster	-53539	107401	35	2082	1171	<0.001	0.14
4-Cluster	-53361	107082	39	1726	1167	<0.001	0.18
5-Cluster	-53298	106992	43	1599	1163	<0.001	0.22
6-Cluster	**-53276**	**106984**	**47**	**1555**	**1159**	**<0.001**	**0.27**
7-Cluster	-53266	107003	51	1536	1155	<0.001	0.28
8-Cluster	-53259	107025	55	1521	1151	<0.001	0.34
9-Cluster	-53245	107033	59	1493	1147	<0.001	0.33
10-Cluster	-53213	107007	63	1430	1143	<0.001	0.29

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.
[a] Log likelihood.
[b] Bayesian Information Criterion based on the log likelihood.
[c] Numbers of parameters in the model.
[d] Model Fit Likelihood ratio chi-squared statistic.
[e] Degrees of freedom in the model
[f] p-value of the L2.
[g] Classification errors.

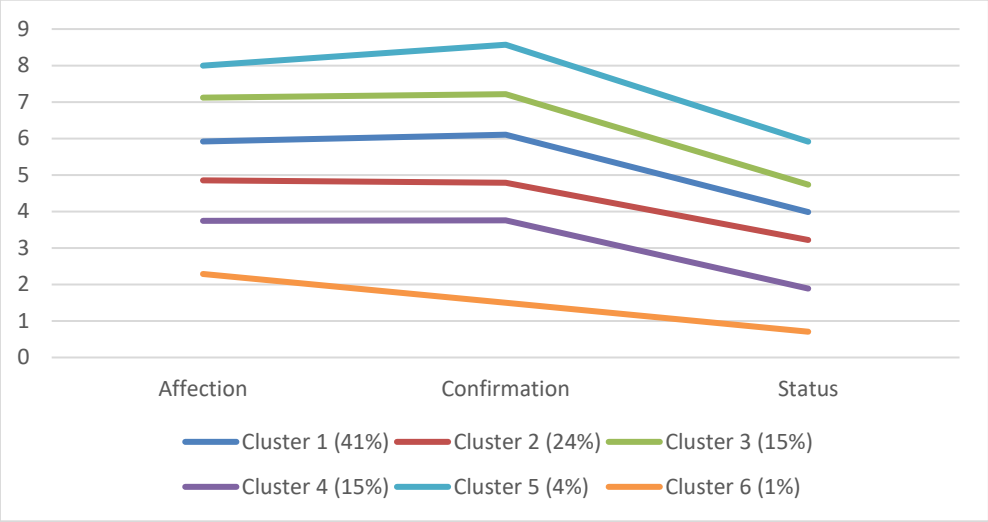


Figure 4.2.2. Average levels of social need fulfilment per cluster. Results of best-fitting 6-cluster analysis of the social needs in the total sample (weighted).

Table 4.2.4

Response patterns on the social needs per cluster

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Cluster Size	0.41	0.24	0.15	0.15	0.04	0.01
			Affection			
0	0.00	0.00	0.00	0.01	0.00	0.10
1	0.00	0.00	0.00	0.02	0.00	0.14
2	0.00	0.03	0.00	0.10	0.00	0.28
3	0.05	0.17	0.00	0.37	0.00	0.37
4	0.10	0.21	0.02	0.25	0.00	0.09
5	0.17	0.20	0.06	0.13	0.01	0.02
6	0.39	0.28	0.27	0.10	0.10	0.01
7	0.17	0.07	0.23	0.01	0.16	0.00
8	0.09	0.02	0.25	0.00	0.32	0.00
9	0.03	0.00	0.17	0.00	0.40	0.00
Mean	5.92	4.85	7.13	3.75	8.00	2.29
			Confirmation			
0	0.00	0.00	0.00	0.00	0.00	0.18
1	0.00	0.00	0.00	0.00	0.00	0.31
2	0.00	0.00	0.00	0.05	0.00	0.36
3	0.00	0.04	0.00	0.33	0.00	0.14
4	0.00	0.28	0.00	0.44	0.00	0.01
5	0.14	0.53	0.01	0.17	0.00	0.00
6	0.61	0.15	0.18	0.01	0.00	0.00
7	0.22	0.00	0.46	0.00	0.04	0.00
8	0.02	0.00	0.31	0.00	0.34	0.00
9	0.00	0.00	0.05	0.00	0.62	0.00
Mean	6.11	4.79	7.22	3.76	8.57	1.50
			Status			
0	0.01	0.03	0.00	0.19	0.00	0.55
1	0.03	0.07	0.01	0.22	0.00	0.27
2	0.08	0.15	0.04	0.22	0.01	0.11
3	0.31	0.39	0.20	0.28	0.06	0.06
4	0.22	0.19	0.20	0.07	0.10	0.01
5	0.17	0.10	0.21	0.02	0.18	0.00
6	0.15	0.06	0.27	0.01	0.39	0.00
7	0.02	0.01	0.05	0.00	0.12	0.00
8	0.01	0.00	0.02	0.00	0.09	0.00
9	0.00	0.00	0.01	0.00	0.06	0.00
Mean	3.98	3.22	4.74	1.89	5.92	0.71

4.3 Multi-group LCA (1): Model parameters may differ across the age groups

The first multi-group LCA examined the best cluster solution averaged over all cluster analyses for the age groups separately. Here, the clusters were different for all age groups, so this method gives an idea of how different the cluster solutions are for the different age groups.

Multi-group LCA clustering of the social needs again resulted mainly in clusters of generally high and low profiles of need fulfilment. When using the first multi-group LCA, in order to compare the best-fitting cluster solution for all age groups, the 4-cluster model fitted best for both the weighted and unweighted analyses. These 4-cluster solutions looked very similar for all age groups, with again only generally higher or lower scores on social need fulfilment.

4.3.1 Unweighted multi-group LCA (1): Model parameters may differ across the age groups

Table 4.3.1

Goodness-of-fit measures of the 10 investigated cluster models in the multi-group LCA where the model parameters may differ across age groups (unweighted sample, N = 11,388)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2[d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-cluster	-62884	127030	135	10937	5166	<0.001	0
2-cluster	-59927	121303	155	5024	5146	0.89	0.08
3-cluster	-59107	119850	175	3384	5126	1	0.12
4-cluster	**-58852**	**119528**	**195**	**2874**	**5106**	**1**	**0.15**
5-cluster	-58785	119580	215	2740	5086	1	0.20
6-cluster	-58737	119671	235	2643	5066	1	0.21
7-cluster	-58701	119786	255	2571	5046	1	0.23
8-cluster	-58658	119886	275	2484	5026	1	0.25
9-cluster	-58637	120032	295	2443	5006	1	0.26

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.

[a] Log likelihood.

[b] Bayesian Information Criterion based on the log likelihood.

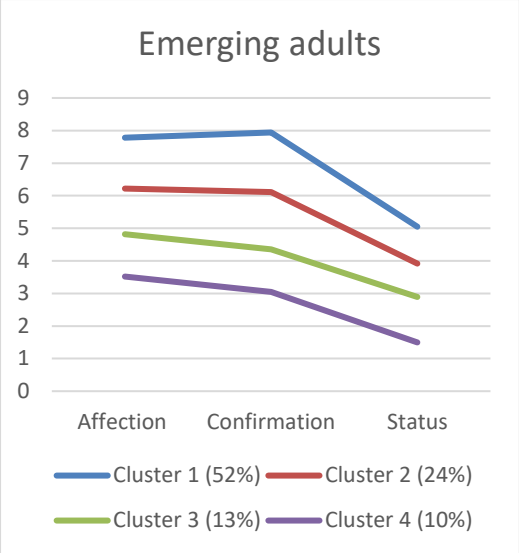
[c] Numbers of parameters in the model.

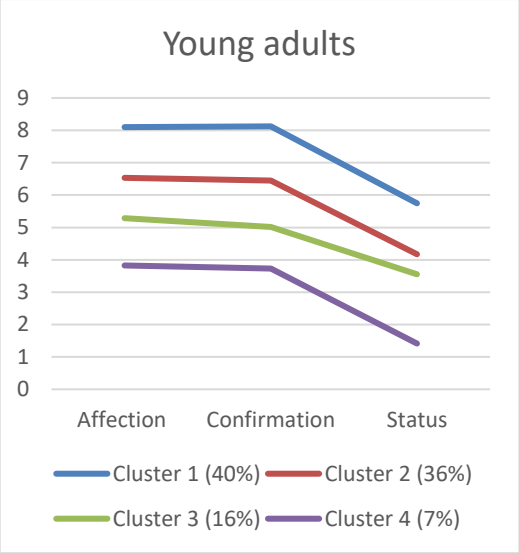
[d] Model Fit Likelihood ratio chi-squared statistic.

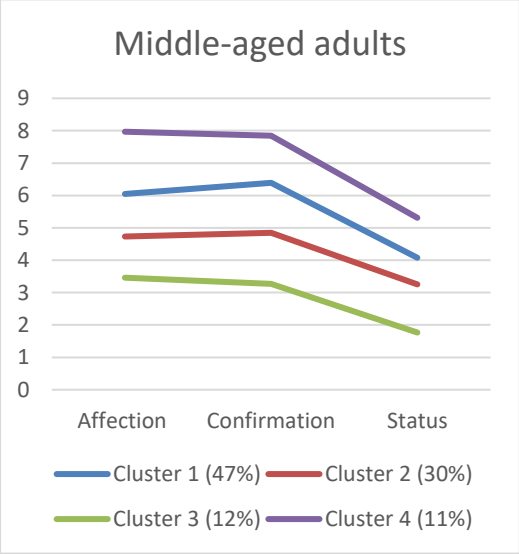
[e] Degrees of freedom in the model

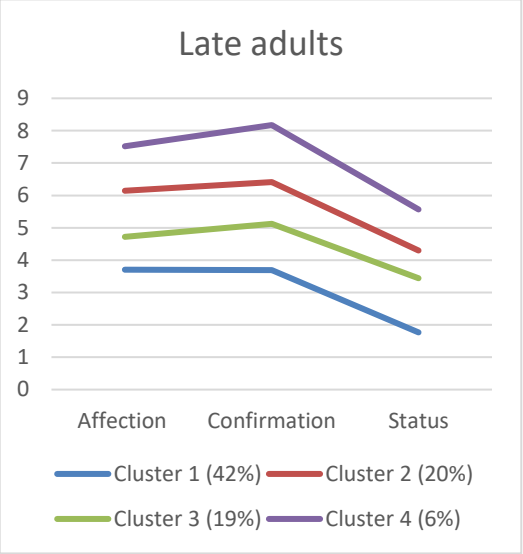
[f] p-value of the L2.

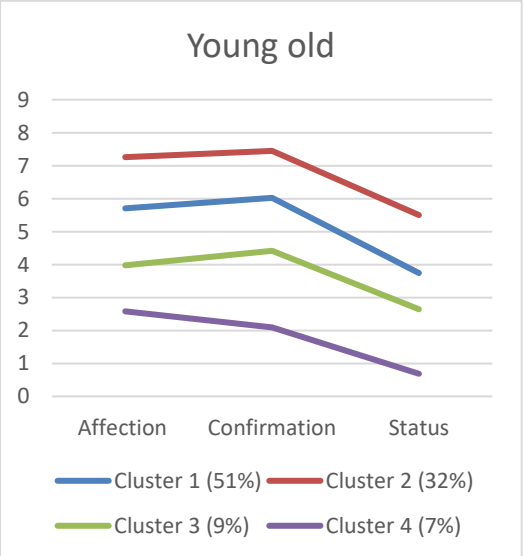
[g] Classification errors.


Emerging adults
9
8
7
6
5
4
3
2
1
0
Affection
Confirmation
Status
Cluster 1 (52%)
Cluster 2 (24%)
Cluster 3 (13%)
Cluster 4 (10%)


Young adults
9
8
7
6
5
4
3
2
1
0
Affection
Confirmation
Status
Cluster 1 (40%)
Cluster 2 (36%)
Cluster 3 (16%)
Cluster 4 (7%)


Middle-aged adults
9
8
7
6
5
4
3
2
1
0
Affection
Confirmation
Status
Cluster 1 (47%)
Cluster 2 (30%)
Cluster 3 (12%)
Cluster 4 (11%)


Late adults
9
8
7
6
5
4
3
2
1
0
Affection
Confirmation
Status
Cluster 1 (42%)
Cluster 2 (20%)
Cluster 3 (19%)
Cluster 4 (6%)


Young old
9
8
7
6
5
4
3
2
1
0
Affection
Confirmation
Status
Cluster 1 (51%)
Cluster 2 (32%)
Cluster 3 (9%)
Cluster 4 (7%)

4.3.2 Weighted multi-group LCA (1): Model parameters may differ across the age groups

Table 4.3.2

Goodness-of-fit measures of the 10 investigated cluster models in the multi-group LCA where the model parameters may differ across age groups (weighted sample, N = 11,293)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2[d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-Cluster	-56586	114418	135	12475	5166	<0.001	0
2-Cluster	-53902	109232	155	7105	5146	<0.001	0.09
3-Cluster	-53229	108072	175	5760	5126	<0.001	0.13
4-Cluster	**-52997**	**107791**	**195**	**5295**	**5106**	**<0.001**	**0.17**
5-Cluster	-52926	107835	215	5154	5086	<0.001	0.19
6-Cluster	-52857	107880	235	5015	5066	<0.001	0.19
7-Cluster	-52753	107856	255	4807	5046	<0.001	0.19
8-Cluster	-52757	108049	275	4816	5026	0.98	0.25
9-Cluster	-52697	108113	295	4695	5006	1	0.28
10-Cluster	-52673	108249	315	4647	4986	1	0.31

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.

[a] Log likelihood.

[b] Bayesian Information Criterion based on the log likelihood.

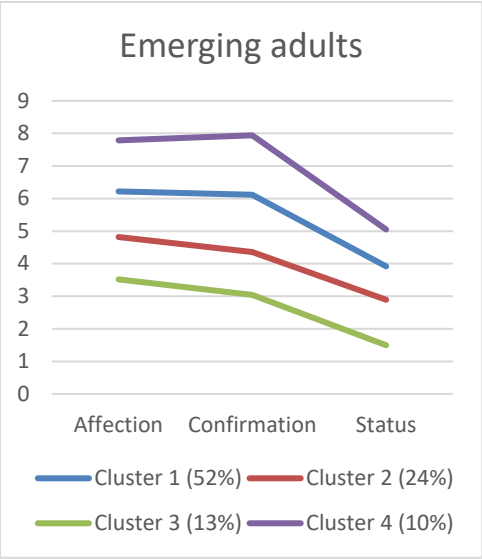
[c] Numbers of parameters in the model.

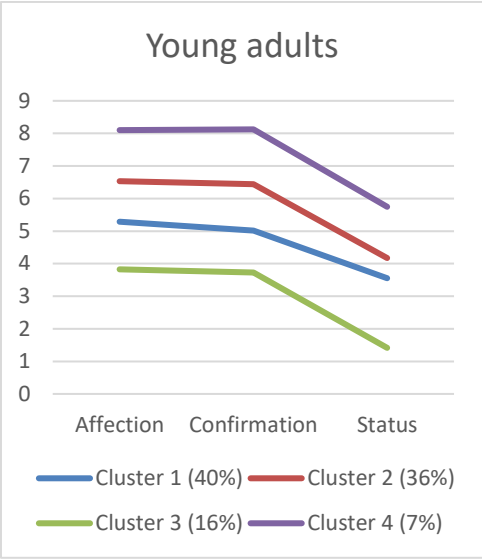
[d] Model Fit Likelihood ratio chi-squared statistic.

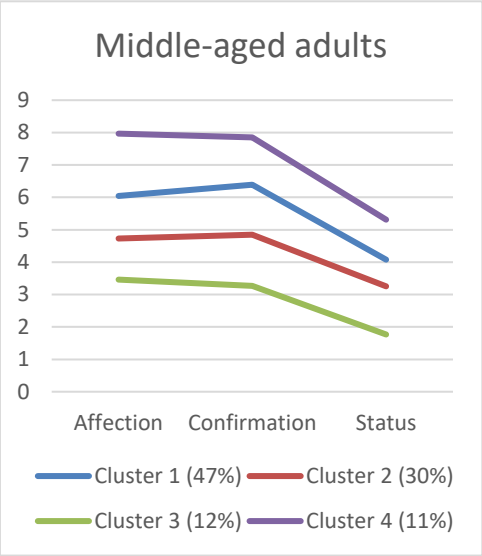
[e] Degrees of freedom in the model

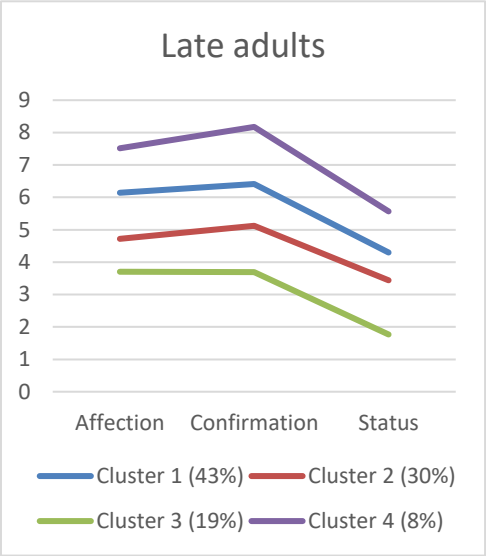
[f] p-value of the L2.

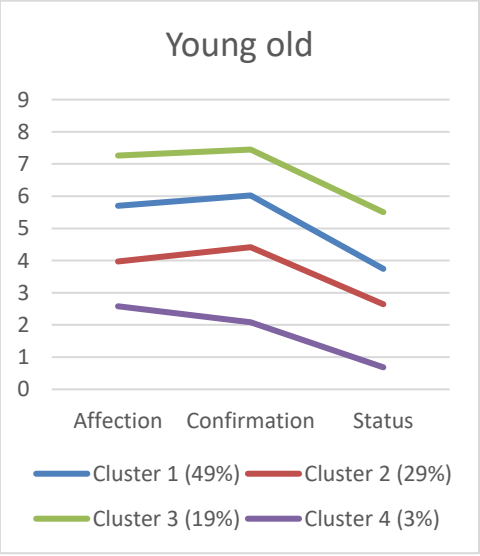
[g] Classification errors.


Emerging adults
9
8
7
6
5
4
3
2
1
0
Affection
Confirmation
Status
Cluster 1 (52%)
Cluster 2 (24%)
Cluster 3 (13%)
Cluster 4 (10%)


Young adults
9
8
7
6
5
4
3
2
1
0
Affection
Confirmation
Status
Cluster 1 (40%)
Cluster 2 (36%)
Cluster 3 (16%)
Cluster 4 (7%)


Middle-aged adults
9
8
7
6
5
4
3
2
1
0
Affection
Confirmation
Status
Cluster 1 (47%)
Cluster 2 (30%)
Cluster 3 (12%)
Cluster 4 (11%)


Late adults
9
8
7
6
5
4
3
2
1
0
Affection
Confirmation
Status
Cluster 1 (43%)
Cluster 2 (30%)
Cluster 3 (19%)
Cluster 4 (8%)


Young old
9
8
7
6
5
4
3
2
1
0
Affection
Confirmation
Status
Cluster 1 (49%)
Cluster 2 (29%)
Cluster 3 (19%)
Cluster 4 (3%)

4.4 Multi-group LCA (2): Cluster sizes may differ across the age groups

The second multi-group LCA was an unrestricted model where the cluster profiles were allowed to differ in size per age-group. The whole sample was thus divided in the same clusters, but the percentage of people in the clusters differed per age group. In this way we could examine if certain clusters are only (or mostly) present for specific age groups.

In the second multi-group LCA (looking for one cluster solution for all age groups, allowing for a different percentage of age group members per cluster), the 6-cluster and 9-cluster model provided the best fit for the weighted and unweighted sample respectively. Here we found, next to high and low cluster profiles, also clusters with relatively higher levels of affection and lower levels of status fulfilment (see Figure 3). These clusters were most common for emerging and young adults.

4.4.1 Unweighted multi-group LCA (2): Cluster sizes may differ across the age groups

Table 4.4.1

Goodness-of-fit measures of the 10 investigated cluster models in the multi-group LCA where the cluster sizes may differ across age groups (unweighted sample, N = 11,388)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2[d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-cluster	-63078	126408	27	11325	5274	<0.001	0
2-cluster	-60179	120684	35	5526	5266	0.01	0.08
3-cluster	-59389	119180	43	3947	5258	1	0.12
4-cluster	-59160	118797	51	3489	5250	1	0.15
5-cluster	-59054	118660	59	3278	5242	1	0.24
6-cluster	-59010	118646	67	3189	5234	1	0.28
7-cluster	-58948	118597	75	3065	5226	1	0.29
8-cluster	-58908	118593	83	2986	5218	1	0.31
9-cluster	**-58863**	**118576**	**91**	**2895**	**5210**	**1**	**0.31**
10-cluster	-58837	118599	99	2842	5202	1	0.32
11-cluster	-58822	118645	107	2814	5194	1	0.32

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.

[a] Log likelihood.

[b] Bayesian Information Criterion based on the log likelihood.

[c] Numbers of parameters in the model.

[d] Model Fit Likelihood ratio chi-squared statistic.

[e] Degrees of freedom in the model

[f] p-value of the L2.

[g] Classification errors.

Table 4.4.2

Cluster profiles of the best-fitting 9-cluster model in the multi-group LCA where the cluster sizes may differ across age groups

Age group	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7	Cluster 8	Cluster 9
emerging adult	0.22	0.12	**0.16**	**0.22**	0.05	0.03	**0.14**	0.04	0.02
young adult	0.25	0.16	**0.17**	**0.19**	0.04	0.02	**0.12**	0.04	0.01
middle adult	**0.41**	0.21	**0.10**	**0.06**	**0.12**	0.05	0.00	0.04	0.01
late adult	**0.47**	0.23	0.05	0.00	**0.12**	**0.11**	0.00	0.02	0.01
young old	**0.44**	0.28	0.02	0.00	**0.08**	**0.14**	0.00	0.02	0.01

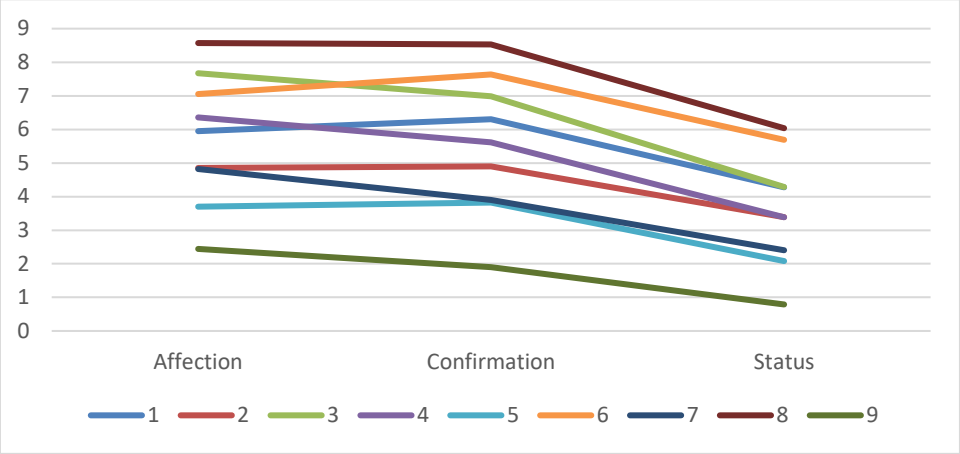


Figure 4.4.1. Average levels of social need fulfilment per cluster. Results of best-fitting 9-cluster analysis of the multi-group LCA with different cluster sizes across age groups (unweighted).

Table 4.4.3

Response patterns on the social needs per cluster

Cluster	1	2	3	4	5	6	7	8	9	Overall
Size	0.36	0.20	0.11	0.09	0.09	0.06	0.05	0.03	0.01	
					Affection					
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00
1	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.11	0.00
2	0.00	0.02	0.00	0.00	0.09	0.00	0.02	0.00	0.25	0.02
3	0.03	0.17	0.00	0.01	0.40	0.00	0.17	0.00	0.42	0.09
4	0.08	0.22	0.00	0.04	0.26	0.01	0.22	0.00	0.10	0.11
5	0.17	0.23	0.02	0.12	0.14	0.05	0.23	0.00	0.02	0.15
6	0.44	0.29	0.15	0.42	0.09	0.29	0.29	0.01	0.01	0.31
7	0.18	0.06	0.22	0.23	0.01	0.27	0.06	0.06	0.00	0.15
8	0.08	0.01	0.34	0.13	0.00	0.26	0.01	0.28	0.00	0.11
9	0.02	0.00	0.26	0.04	0.00	0.12	0.00	0.65	0.00	0.07
Mean	5.95	4.85	7.67	6.36	3.70	7.06	4.82	8.57	2.44	5.82
					Confirmation					
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00
2	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.41	0.01
3	0.00	0.02	0.00	0.00	0.29	0.00	0.25	0.00	0.25	0.04
4	0.00	0.23	0.00	0.03	0.50	0.00	0.51	0.00	0.03	0.12
5	0.06	0.59	0.01	0.37	0.17	0.00	0.20	0.00	0.00	0.20
6	0.62	0.16	0.28	0.57	0.01	0.08	0.01	0.00	0.00	0.35
7	0.28	0.00	0.46	0.04	0.00	0.35	0.00	0.06	0.00	0.18
8	0.04	0.00	0.22	0.00	0.00	0.41	0.00	0.34	0.00	0.07
9	0.00	0.00	0.03	0.00	0.00	0.15	0.00	0.60	0.00	0.03
Mean	6.30	4.90	6.98	5.61	3.82	7.64	3.90	8.53	1.90	5.82
					Status					
0	0.00	0.02	0.00	0.02	0.15	0.00	0.10	0.00	0.51	0.03
1	0.01	0.05	0.01	0.05	0.20	0.00	0.16	0.00	0.28	0.05
2	0.05	0.12	0.05	0.12	0.21	0.01	0.20	0.00	0.12	0.09
3	0.28	0.41	0.28	0.41	0.33	0.07	0.38	0.05	0.08	0.30
4	0.23	0.21	0.23	0.21	0.08	0.12	0.11	0.09	0.01	0.19
5	0.19	0.11	0.19	0.11	0.02	0.19	0.03	0.17	0.00	0.14
6	0.20	0.07	0.20	0.07	0.01	0.40	0.01	0.41	0.00	0.15
7	0.03	0.01	0.03	0.01	0.00	0.10	0.00	0.12	0.00	0.02
8	0.01	0.00	0.01	0.00	0.00	0.07	0.00	0.09	0.00	0.01
9	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.07	0.00	0.01
Mean	4.28	3.39	4.29	3.39	2.08	5.69	2.40	6.04	0.79	3.85

4.4.2 Weighted multi-group LCA (2): Cluster sizes may differ across the age groups

Table 4.4.4

Goodness-of-fit measures of the 10 investigated cluster models in the multi-group LCA where the model parameters may differ across age groups (weighted sample, N = 11,293)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2[d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-Cluster	-56815	113878	27	12931	5274	<0.001	0
2-Cluster	-54182	108686	35	7665	5266	<0.001	0.09
3-Cluster	-53532	107461	43	6366	5258	<0.001	0.14
4-Cluster	-53334	107138	51	5969	5250	<0.001	0.18
5-Cluster	-53275	107094	59	5852	5242	<0.001	0.25
6-Cluster	**-53205**	**107028**	**67**	**5712**	**5234**	**<0.001**	**0.24**
7-Cluster	-53171	107034	75	5645	5226	<0.001	0.31
8-Cluster	-53141	107047	83	5583	5218	0.00	0.34
9-Cluster	-53111	107061	91	5524	5210	0.00	0.33
10-Cluster	-53092	107097	99	5486	5202	0.00	0.34

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.

[a] Log likelihood.

[b] Bayesian Information Criterion based on the log likelihood.

[c] Numbers of parameters in the model.

[d] Model Fit Likelihood ratio chi-squared statistic.

[e] Degrees of freedom in the model

[f] p-value of the L2.

[g] Classification errors.

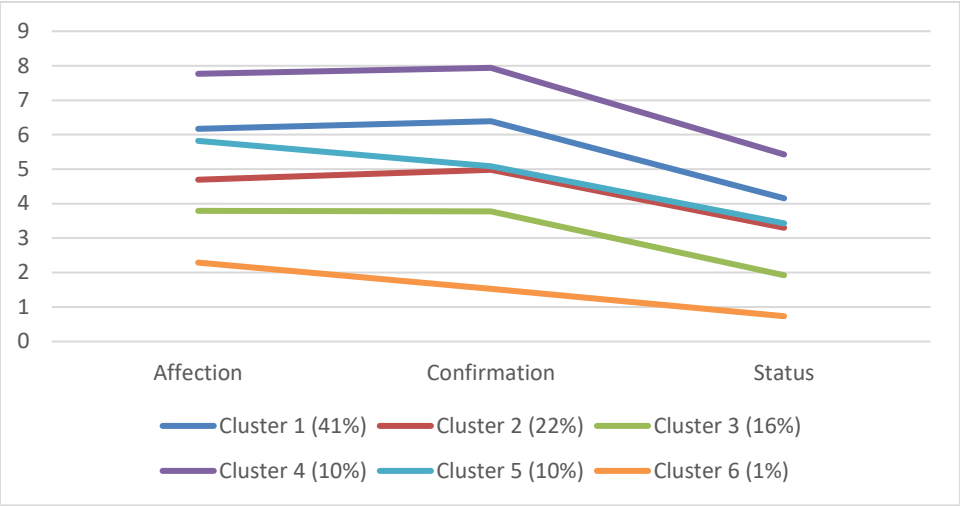


Figure 4.4.2. Average levels of social need fulfilment per cluster. Results of best-fitting 6-cluster analysis of the multi-group LCA with different cluster sizes across age groups (weighted).

Table 4.4.5

Cluster profiles of the best-fitting 6-cluster model in the multi-group LCA where the cluster sizes may differ across age groups

	Cluster 1 (41%)	Cluster 2 (22%)	Cluster 3 (16%)	Cluster 4 (10%)	Cluster 5 (10%)	Cluster 6 (1%)
Affection	6.17	4.69	3.79	7.77	5.82	2.29
confirmation	6.39	4.98	3.77	7.94	5.08	1.52
status	4.15	3.30	1.92	5.43	3.43	0.74
emerging adult	0.40	0.03	0.23	0.09	**0.23**	0.02
young adult	0.35	0.13	0.16	0.10	**0.25**	0.01
middle adult	0.45	**0.27**	0.14	0.10	**0.03**	0.01
late adult	0.46	**0.27**	0.18	0.09	0.00	0.01
young old	0.39	**0.37**	0.11	0.12	0.00	0.02

Table 4.4.6

Response patterns on the social needs per cluster

Cluster	1	2	3	4	5	6	Overall
Size	0.41	0.22	0.16	0.10	0.10	0.01	
			Affection				
0	0.00	0.00	0.00	0.00	0.00	0.10	0.00
1	0.00	0.00	0.02	0.00	0.00	0.14	0.01
2	0.00	0.03	0.10	0.00	0.00	0.28	0.03
3	0.03	0.20	0.36	0.00	0.05	0.37	0.12
4	0.07	0.23	0.25	0.00	0.11	0.09	0.13
5	0.15	0.21	0.14	0.02	0.18	0.02	0.15
6	0.39	0.26	0.11	0.15	0.39	0.01	0.29
7	0.19	0.06	0.01	0.19	0.16	0.00	0.13
8	0.12	0.02	0.00	0.31	0.08	0.00	0.09
9	0.05	0.00	0.00	0.33	0.03	0.00	0.05
Mean	6.17	4.69	3.79	7.77	5.82	2.29	5.54
			Confirmation				
0	0.00	0.00	0.00	0.00	0.00	0.17	0.00
1	0.00	0.00	0.00	0.00	0.00	0.30	0.00
2	0.00	0.00	0.05	0.00	0.00	0.37	0.01
3	0.00	0.03	0.33	0.00	0.02	0.14	0.06
4	0.00	0.22	0.44	0.00	0.18	0.01	0.14
5	0.06	0.51	0.17	0.00	0.51	0.00	0.21
6	0.55	0.24	0.01	0.05	0.28	0.00	0.31
7	0.32	0.01	0.00	0.25	0.01	0.00	0.16
8	0.06	0.00	0.00	0.42	0.00	0.00	0.07
9	0.00	0.00	0.00	0.28	0.00	0.00	0.03
Mean	6.39	4.98	3.77	7.94	5.08	1.52	5.63
			Status				
0	0.01	0.03	0.18	0.00	0.02	0.54	0.05
1	0.02	0.07	0.22	0.00	0.06	0.27	0.07
2	0.07	0.14	0.22	0.01	0.13	0.12	0.11
3	0.29	0.39	0.29	0.10	0.38	0.07	0.30
4	0.22	0.20	0.07	0.14	0.20	0.01	0.18
5	0.18	0.11	0.02	0.20	0.12	0.00	0.13
6	0.18	0.07	0.01	0.36	0.08	0.00	0.13
7	0.03	0.01	0.00	0.09	0.01	0.00	0.02
8	0.01	0.00	0.00	0.06	0.00	0.00	0.01
9	0.00	0.00	0.00	0.03	0.00	0.00	0.00
Mean	4.15	3.30	1.92	5.43	3.43	0.74	3.62

4.5 Multi-group LCA (3): Equality of cluster sizes across age groups

The last multi-group LCA was the most constrained one, having the same equality constraints as the second plus the constrained that the cluster sizes are equal across age groups. For this model, we took the same number of clusters as identified for the second model. A deviance test was applied to test whether the cluster sizes are equal across age groups.

4.5.1 Unweighted multi-group LCA (3): Equality of cluster sizes across age groups

Table 4.5.1

Goodness-of-fit measures of the 9-cluster model in the multi-group LCA with equality of cluster sizes across age groups (unweighted sample, N = 11,388)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2 [d]	*df*[e]	*p*-value[f]	Class.Err[g]
9-cluster	-59033	118618	59	3236	5242	1	0.24

[a] Log likelihood.
[b] Bayesian Information Criterion based on the log likelihood.
[c] Numbers of parameters in the model.
[d] Model Fit Likelihood ratio chi-squared statistic.
[e] Degrees of freedom in the model
[f] p-value of the L2.
[g] Classification errors.

Comparing the third multi-group model (where cluster sizes differ across age groups) with its constrained version with equality constraints on the cluster sizes across the age group, using the deviance test, revealed that the model with varying cluster sizes fits significantly better ($\chi2 = 340$; df = 32, $p < 0.0001$).

4.5.2 Weighted multi-group LCA (3): Equality of cluster sizes across age groups

Table 4.5.2

Goodness-of-fit measures of the 6-cluster model in the multi-group LCA with equality of cluster sizes across age groups (weighted sample, N = 11,293)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2 [d]	*df*[e]	*p*-value[f]	Class.Err[g]
6-Cluster	-53276	106984	47	5853	5254	<0.001	0.27

[a] Log likelihood.
[b] Bayesian Information Criterion based on the log likelihood.
[c] Numbers of parameters in the model.
[d] Model Fit Likelihood ratio chi-squared statistic.
[e] Degrees of freedom in the model
[f] p-value of the L2.
[g] Classification errors.

Comparing the third multi-group model (where cluster sizes differ across age groups) with its constrained version with equality constraints on the cluster sizes across the age group, using the deviance test, revealed that the model with varying cluster sizes fits significantly better ($\chi2 = 142$; df = 20, $p < 0.0001$).

4.6 Latent Class Analyses with the social needs per age group

Results were similar when all age groups were studied separately, thus lower or higher fulfilment in general, although the number of optimal clusters differed between 4 and 6. Thus, in these analyses the clusters differed only in their level of the fulfillment of all needs (low to high), and not in terms of different fulfilment levels between needs (one low, one high).

4.6.1 Emerging adults

Table 4.6.1

Goodness-of-fit measures of the 10 investigated cluster models with the three social needs for emerging adults only (unweighted sample, N = 1,494)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2[d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-cluster	-8499	17196	27	1583	972	<0.001	0
2-cluster	-8160	16546	31	904	968	0.93	0.09
3-cluster	-8051	16359	35	687	964	1	0.12
4-cluster	**-8022**	**16330**	**39**	**629**	**960**	**1**	**0.15**
5-cluster	-8012	16339	43	609	956	1	0.17
6-cluster	-8000	16345	47	586	952	1	0.20
7-cluster	-7992	16357	51	568	948	1	0.21
8-cluster	-7983	16370	55	552	944	1	0.20
9-cluster	-7982	16397	59	550	940	1	0.24
10-cluster	-7973	16408	63	532	936	1	0.24

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.
[a] Log likelihood.
[b] Bayesian Information Criterion based on the log likelihood.
[c] Numbers of parameters in the model.
[d] Model Fit Likelihood ratio chi-squared statistic.
[e] Degrees of freedom in the model
[f] p-value of the L2.
[g] Classification errors.

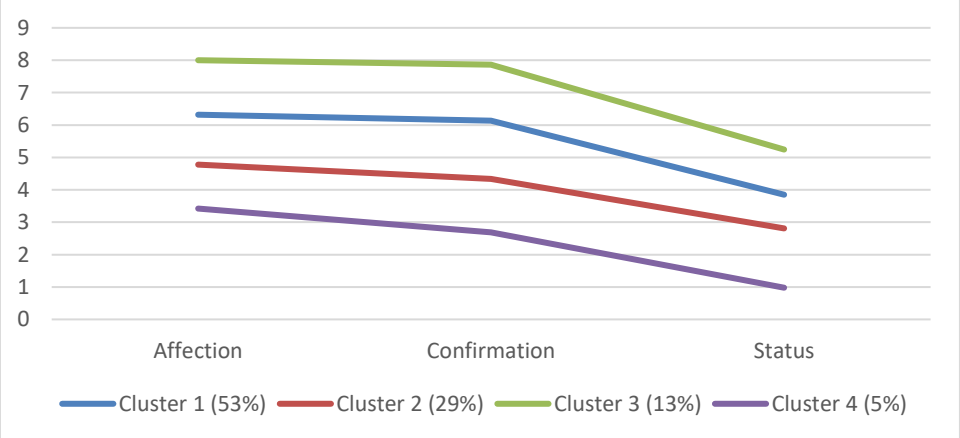


Figure 4.6.1. Average levels of social need fulfilment per cluster. Results of best-fitting 4-cluster analysis of the social needs in emerging adults (unweighted).

Table 4.6.2

Response patterns on the social needs per cluster

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Overall
Size	0.53	0.29	0.13	0.05	
			Affection		
0	0.00	0.00	0.00	0.01	0.00
1	0.00	0.01	0.00	0.06	0.00
2	0.00	0.04	0.00	0.16	0.02
3	0.02	0.17	0.00	0.35	0.08
4	0.06	0.21	0.00	0.22	0.10
5	0.14	0.23	0.01	0.12	0.15
6	0.36	0.25	0.09	0.07	0.28
7	0.22	0.07	0.17	0.01	0.16
8	0.14	0.02	0.33	0.00	0.12
9	0.05	0.00	0.39	0.00	0.08
Mean	6.32	4.78	8.00	3.42	5.96
			Confirmation		
0	0.00	0.00	0.00	0.04	0.00
1	0.00	0.00	0.00	0.11	0.01
2	0.00	0.02	0.00	0.23	0.02
3	0.00	0.15	0.00	0.39	0.06
4	0.01	0.38	0.00	0.19	0.12
5	0.16	0.38	0.00	0.04	0.20
6	0.56	0.07	0.05	0.00	0.33
7	0.24	0.00	0.26	0.00	0.16
8	0.03	0.00	0.45	0.00	0.08
9	0.00	0.00	0.24	0.00	0.03
Mean	6.13	4.34	7.87	2.68	5.68
			Status		
0	0.01	0.06	0.00	0.44	0.04
1	0.04	0.11	0.01	0.28	0.07
2	0.10	0.20	0.03	0.16	0.12
3	0.31	0.36	0.14	0.10	0.29
4	0.24	0.17	0.18	0.02	0.20
5	0.17	0.07	0.22	0.00	0.14
6	0.10	0.03	0.23	0.00	0.09
7	0.02	0.00	0.08	0.00	0.02
8	0.01	0.00	0.05	0.00	0.01
9	0.01	0.00	0.07	0.00	0.01
Mean	3.85	2.81	5.24	0.98	3.60

4.6.2 Young adults

Table 4.6.3

Goodness-of-fit measures of the 10 investigated cluster models with the three social needs for young adults only (unweighted sample, N = 2,712)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2 [d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-cluster	-15026	30265	27	2391	972	<0.001	0
2-cluster	-14372	28989	31	1083	968	0.01	0.09
3-cluster	-14190	28657	35	720	964	1	0.12
4-cluster	-14134	28577	39	608	960	1	0.17
5-cluster	**-14105**	**28550**	**43**	**550**	**956**	**1**	**0.23**
6-cluster	-14099	28569	47	537	952	1	0.24
7-cluster	-14094	28590	51	527	948	1	0.33
8-cluster	-14090	28615	55	520	944	1	0.32
9-cluster	-14086	28638	59	511	940	1	0.34
10-cluster	-14083	28663	63	504	936	1	0.36

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.
[a] Log likelihood.
[b] Bayesian Information Criterion based on the log likelihood.
[c] Numbers of parameters in the model.
[d] Model Fit Likelihood ratio chi-squared statistic.
[e] Degrees of freedom in the model
[f] p-value of the L2.
[g] Classification errors.

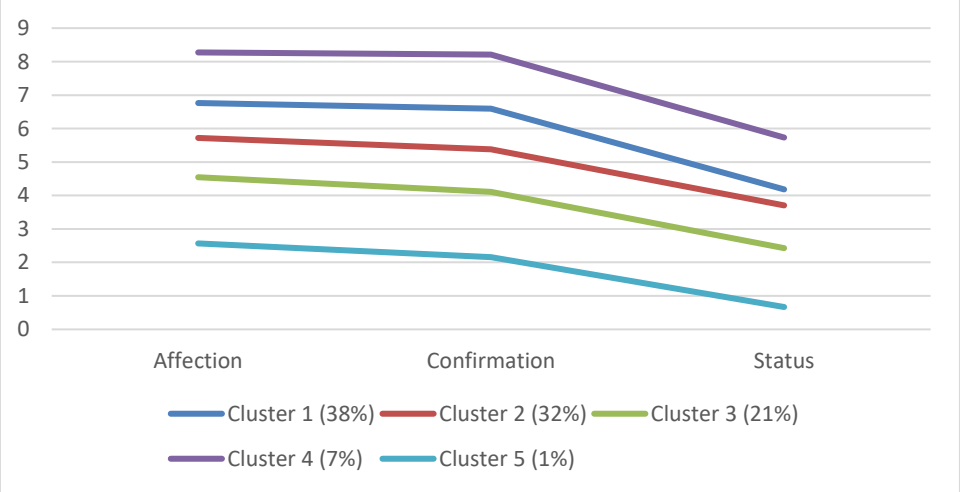


Figure 4.6.2. Average levels of social need fulfilment per cluster. Results of best-fitting 5-cluster analysis of the social needs in young adults (unweighted).

Table 4.6.4

Response patterns on the social needs per cluster

	Cluster1	Cluster2	Cluster3	Cluster4	Cluster5
Size	0.38	0.32	0.21	0.07	0.01
		Affection			
0	0.00	0.00	0.00	0.00	0.09
1	0.00	0.00	0.00	0.00	0.08
2	0.00	0.00	0.03	0.00	0.23
3	0.01	0.06	0.23	0.00	0.45
4	0.03	0.11	0.23	0.00	0.12
5	0.09	0.19	0.21	0.00	0.03
6	0.34	0.40	0.23	0.05	0.01
7	0.23	0.14	0.04	0.11	0.00
8	0.20	0.07	0.01	0.32	0.00
9	0.10	0.02	0.00	0.51	0.00
Mean	6.76	5.72	4.55	8.27	2.57
		Confirmation			
0	0.00	0.00	0.00	0.00	0.12
1	0.00	0.00	0.00	0.00	0.11
2	0.00	0.00	0.02	0.00	0.36
3	0.00	0.00	0.18	0.00	0.31
4	0.00	0.08	0.47	0.00	0.09
5	0.01	0.46	0.29	0.00	0.01
6	0.49	0.44	0.03	0.02	0.00
7	0.40	0.01	0.00	0.16	0.00
8	0.09	0.00	0.00	0.41	0.00
9	0.01	0.00	0.00	0.41	0.00
Mean	6.59	5.38	4.11	8.21	2.15
		Status			
0	0.00	0.01	0.09	0.00	0.56
1	0.02	0.04	0.16	0.00	0.28
2	0.06	0.10	0.21	0.01	0.10
3	0.29	0.36	0.37	0.07	0.05
4	0.25	0.24	0.12	0.13	0.00
5	0.18	0.14	0.03	0.18	0.00
6	0.17	0.10	0.01	0.35	0.00
7	0.03	0.01	0.00	0.11	0.00
8	0.01	0.00	0.00	0.10	0.00
9	0.00	0.00	0.00	0.04	0.00
Mean	4.18	3.70	2.43	5.73	0.67

4.6.3 Middle-aged adults

Table 4.6.5

Goodness-of-fit measures of the 10 investigated cluster models with the three social needs for middle-aged adults only (unweighted sample, N = 3,708)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2 [d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-cluster	-20400	41021	27	3434	972	<0.001	0
2-cluster	-19413	39080	31	1460	968	<0.001	0.07
3-cluster	-19124	38536	35	883	964	0.97	0.12
4-cluster	-19037	38394	39	707	960	1	0.14
5-cluster	**-19015**	**38384**	**43**	**665**	**956**	**1**	**0.15**
6-cluster	-19009	38404	47	652	952	1	0.21
7-cluster	-19001	38422	51	637	948	1	0.28
8-cluster	-18980	38412	55	595	944	1	0.29
9-cluster	-18968	38421	59	570	940	1	0.30
10-cluster	-18962	38442	63	559	936	1	0.30

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.
[a] Log likelihood.
[b] Bayesian Information Criterion based on the log likelihood.
[c] Numbers of parameters in the model.
[d] Model Fit Likelihood ratio chi-squared statistic.
[e] Degrees of freedom in the model
[f] p-value of the L2.
[g] Classification errors.

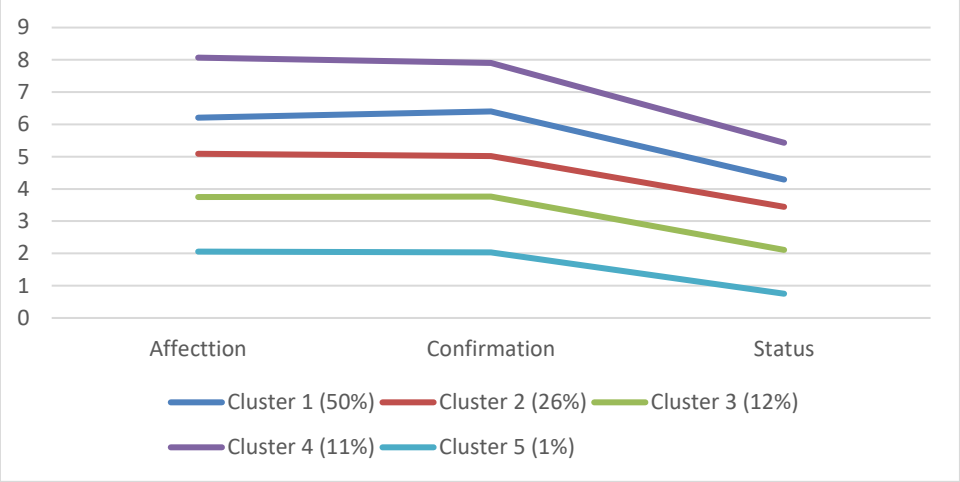


Figure 4.6.3. Average levels of social need fulfilment per cluster. Results of best-fitting 5-cluster analysis of the social needs in middle-aged adults (unweighted).

Table 4.6.6

Response patterns on the social needs per cluster

		Cluster1	Cluster2	Cluster3	Cluster4	Cluster5
Size		0.50	0.26	0.12	0.11	0.01
			Affection			
	0	0.00	0.00	0.00	0.00	0.14
	1	0.00	0.00	0.02	0.00	0.19
	2	0.00	0.01	0.08	0.00	0.25
	3	0.02	0.13	0.39	0.00	0.35
	4	0.07	0.19	0.26	0.00	0.07
	5	0.14	0.21	0.13	0.01	0.01
	6	0.41	0.33	0.10	0.08	0.00
	7	0.20	0.08	0.01	0.15	0.00
	8	0.12	0.03	0.00	0.34	0.00
	9	0.04	0.00	0.00	0.42	0.00
Mean		6.21	5.09	3.75	8.07	2.06
			Confirmation			
	0	0.00	0.00	0.00	0.00	0.12
	1	0.00	0.00	0.00	0.00	0.14
	2	0.00	0.00	0.03	0.00	0.37
	3	0.00	0.01	0.31	0.00	0.32
	4	0.00	0.17	0.51	0.00	0.05
	5	0.03	0.63	0.14	0.00	0.00
	6	0.61	0.20	0.00	0.06	0.00
	7	0.30	0.00	0.00	0.25	0.00
	8	0.06	0.00	0.00	0.41	0.00
	9	0.00	0.00	0.00	0.28	0.00
Mean		6.40	5.02	3.76	7.91	2.03
			Status			
	0	0.00	0.02	0.15	0.00	0.53
	1	0.02	0.05	0.20	0.00	0.27
	2	0.05	0.11	0.19	0.01	0.11
	3	0.29	0.41	0.35	0.11	0.08
	4	0.21	0.20	0.08	0.13	0.01
	5	0.17	0.11	0.02	0.19	0.00
	6	0.22	0.09	0.01	0.40	0.00
	7	0.02	0.01	0.00	0.08	0.00
	8	0.01	0.00	0.00	0.05	0.00
	9	0.00	0.00	0.00	0.03	0.00
Mean		4.29	3.44	2.11	5.43	0.75

4.6.4 Late adults

Table 4.6.7

Goodness-of-fit measures of the 10 investigated cluster models with the three social needs for late adults only (unweighted sample, N = 2,580)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2 [d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-cluster	-14042	28297	27	2459	972	<0.001	0
2-cluster	-13309	26862	31	993	968	0.28	0.07
3-cluster	-13137	26548	35	648	964	1	0.13
4-cluster	**-13078**	**26463**	**39**	**531**	**960**	**1**	**0.15**
5-cluster	-13072	26481	43	518	956	1	0.15
6-cluster	-13064	26497	47	502	952	1	0.15
7-cluster	-13055	26512	51	485	948	1	0.25
8-cluster	-13054	26540	55	482	944	1	0.37
9-cluster	-13044	26551	59	462	940	1	0.23
10-cluster	-13028	26550	63	430	936	1	0.17

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.
[a] Log likelihood.
[b] Bayesian Information Criterion based on the log likelihood.
[c] Numbers of parameters in the model.
[d] Model Fit Likelihood ratio chi-squared statistic.
[e] Degrees of freedom in the model
[f] p-value of the L2.
[g] Classification errors.

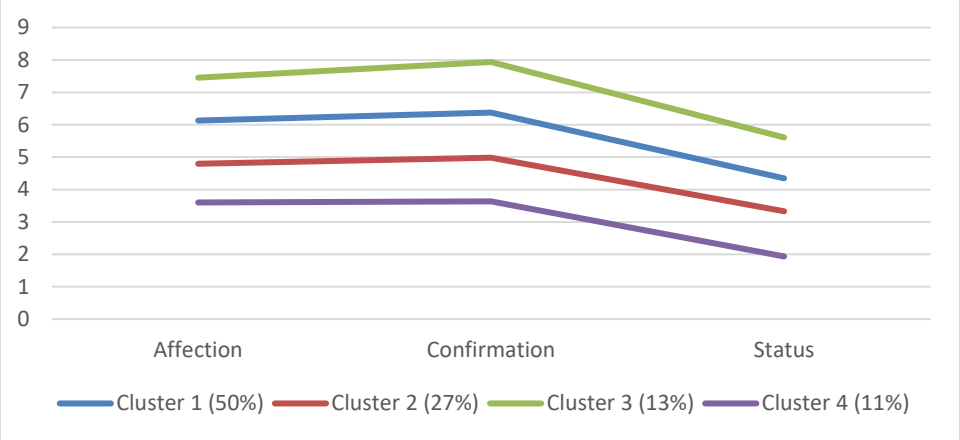


Figure 4.6.4. Average levels of social need fulfilment per cluster. Results of best-fitting 4-cluster analysis of the social needs in late adults (unweighted).

Table 4.6.8

Response patterns on the social needs per cluster

	Cluster1	Cluster2	Cluster3	Cluster4
Cluster Size	0.50	0.27	0.13	0.11
		Affection		
0	0.00	0.00	0.00	0.01
1	0.00	0.00	0.00	0.01
2	0.00	0.02	0.00	0.09
3	0.03	0.19	0.00	0.44
4	0.07	0.22	0.01	0.25
5	0.15	0.21	0.03	0.12
6	0.43	0.28	0.21	0.07
7	0.20	0.06	0.24	0.01
8	0.10	0.01	0.28	0.00
9	0.03	0.00	0.23	0.00
Mean	6.13	4.80	7.46	3.60
		Confirmation		
0	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.02
2	0.00	0.00	0.00	0.04
3	0.00	0.01	0.00	0.32
4	0.00	0.21	0.00	0.53
5	0.03	0.58	0.00	0.09
6	0.60	0.20	0.03	0.00
7	0.34	0.00	0.26	0.00
8	0.03	0.00	0.47	0.00
9	0.00	0.00	0.25	0.00
Mean	6.38	4.98	7.94	3.64
		Status		
0	0.00	0.02	0.00	0.17
1	0.01	0.05	0.00	0.22
2	0.04	0.12	0.01	0.22
3	0.29	0.45	0.09	0.33
4	0.21	0.19	0.12	0.06
5	0.19	0.10	0.20	0.01
6	0.21	0.06	0.39	0.00
7	0.03	0.00	0.09	0.00
8	0.01	0.00	0.06	0.00
9	0.00	0.00	0.05	0.00
Mean	4.35	3.33	5.61	1.93

4.6.5 Young old

Table 4.6.9

Goodness-of-fit measures of the 10 investigated cluster models with the three social needs for the young old only (unweighted sample, N = 894)

Model	LL[a]	BIC (LL)[b]	N_{par}[c]	L^2 [d]	*df*[e]	*p*-value[f]	Class.Err[g]
1-cluster	-4901	9985	27	1044	868	<0.001	0
2-cluster	-4659	9529	31	561	864	1	0.09
3-cluster	-4590	9418	35	423	860	1	0.13
4-cluster	**-4568**	**9400**	**39**	**378**	**856**	**1**	**0.14**
5-cluster	-4562	9417	43	368	852	1	0.27
6-cluster	-4557	9433	47	356	848	1	0.22
7-cluster	-4552	9451	51	347	844	1	0.22
8-cluster	-4549	9471	55	340	840	1	0.22
9-cluster	-4550	9501	59	343	836	1	0.32
10-cluster	-4545	9518	63	333	832	1	0.28

The best fitting model, i.e. with the lowest BIC value, is indicated in bold face.
[a] Log likelihood.
[b] Bayesian Information Criterion based on the log likelihood.
[c] Numbers of parameters in the model.
[d] Model Fit Likelihood ratio chi-squared statistic.
[e] Degrees of freedom in the model
[f] p-value of the L2.
[g] Classification errors.

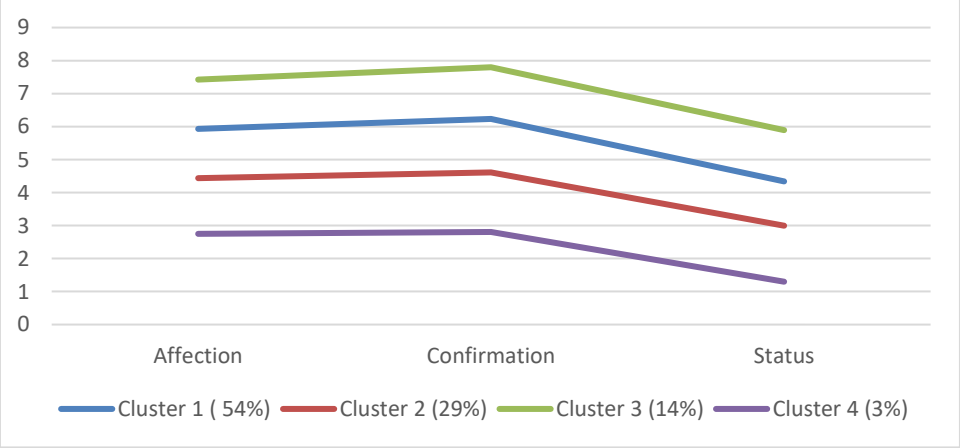


Figure 4.6.5. Average levels of social need fulfilment per cluster. Results of best-fitting 4-cluster analysis of the social needs in the young old (unweighted).

Table 4.6.10

Response patterns on the social needs per cluster

		Cluster1	Cluster2	Cluster3	Cluster4
Size		0.54	0.29	0.14	0.03
			Affection		
	0	0.00	0.00	0.00	0.03
	1	0.00	0.00	0.00	0.05
	2	0.00	0.05	0.00	0.31
	3	0.03	0.22	0.00	0.41
	4	0.09	0.26	0.01	0.15
	5	0.18	0.21	0.04	0.04
	6	0.45	0.22	0.24	0.01
	7	0.15	0.03	0.21	0.00
	8	0.08	0.01	0.27	0.00
	9	0.03	0.00	0.25	0.00
Mean		5.93	4.43	7.43	2.75
			Confirmation		
	0	0.00	0.00	0.00	0.04
	1	0.00	0.00	0.00	0.07
	2	0.00	0.00	0.00	0.25
	3	0.00	0.06	0.00	0.38
	4	0.01	0.37	0.00	0.24
	5	0.14	0.44	0.00	0.03
	6	0.52	0.12	0.06	0.00
	7	0.28	0.00	0.29	0.00
	8	0.05	0.00	0.44	0.00
	9	0.00	0.00	0.21	0.00
Mean		6.23	4.61	7.80	2.81
			Status		
	0	0.00	0.03	0.00	0.33
	1	0.01	0.07	0.00	0.27
	2	0.04	0.17	0.00	0.20
	3	0.26	0.46	0.03	0.17
	4	0.24	0.18	0.08	0.02
	5	0.21	0.07	0.19	0.00
	6	0.20	0.03	0.46	0.00
	7	0.03	0.00	0.15	0.00
	8	0.00	0.00	0.05	0.00
	9	0.00	0.00	0.04	0.00
Mean		4.34	3.00	5.89	1.30

4.7 Scripts LatentGold: Specifications Cluster analyses

4.7.1 Script for LCA with the social needs in the total sample

```
options
  algorithm
    tolerance=1e-008 emtolerance=0.01 emiterations=250 nriterations=50 ;
  startvalues
    seed=0 sets=16 tolerance=1e-005 iterations=200;
  bayes
    categorical=1 variances=1 latent=1 poisson=1;
  montecarlo
    seed=0 sets=0 replicates=500 tolerance=1e-008;
  quadrature  nodes=10;
  missing  includeall;
  output
    parameters  betaopts=wl standarderrors profile probmeans=posterior
    bivariateresiduals iterationdetails estimatedvalues;
variables
  dependent affection ordinal. confirmation ordinal. status ordinal ;
  latent
    Cluster nominal 1 ;
equations
  Cluster <- 1;
  affection <- 1 + Cluster ;
  confirmation <- 1 + Cluster ;
  status <- 1 + Cluster ;
```

4.7.2 Script for weighted LCA

The code needed to use the weights based on education, age, and gender is presented in bold face.

```
options
  <similar as above>
variables
  caseweight weight ;
  dependent affection ordinal. confirmation ordinal. status ordinal ;
  latent
    Cluster nominal 1 ;
equations
  <similar as above. depending on cluster model>
```

4.7.3 Script for Multi-group LCA (1): Model parameters may differ across the age groups

LCA models are defined for each age group separately, but model determines what is the best cluster solution averaged over all the separate cluster analyses.

```
options
  <similar as above>
variables
independent age_cat nominal;
  dependent affection ordinal. confirmation ordinal. status ordinal ;
  latent
    Cluster nominal 1 ;
equations
  Cluster <- 1 | age_cat;
  affection <- 1 | age_cat + Cluster | age_cat;
  confirmation <- 1 | age_cat + Cluster | age_cat;
  status <- 1| age_cat + Cluster | age_cat;
```

4.7.4 Script for Multi-group LCA (2): Unrestricted on cluster size per age group

LCA models are defined for all age groups, but cluster size is allowed to differ between age groups.

```
options
  <similar as above>
variables
independent age_cat nominal;
  dependent affection ordinal. confirmation ordinal. status ordinal ;
  latent
    Cluster nominal 1 ;
equations
  Cluster <- 1 | age_cat;
  affection <- 1 + Cluster ;
  confirmation <- 1 + Cluster ;
  status <- 1 + Cluster ;
```

4.7.5 Script for Multi-group LCA (3): Equality of cluster sizes across age groups

LCA models are defined for the total sample, where the cluster sizes should be similar for every age group.

```
options
  <similar as above>
variables
independent age_cat nominal;
  dependent affection ordinal. confirmation ordinal. status ordinal ;
  latent
    Cluster nominal 1 ;
equations
  Cluster <- 1;
  affection <- 1 + Cluster ;
  confirmation <- 1 + Cluster ;
  status <- 1 + Cluster ;
```

4.7.6 Scripts for LCA with the social needs per age group

LCA models are defined for each age group separately.

```
options
  <similar as above>
variables
  select age_cat = 1 ;
  dependent affection ordinal. confirmation ordinal. status ordinal ;
  latent
    Cluster nominal 1 ;
equations
  Cluster <- 1;
  affection <- 1 + Cluster ;
  confirmation <- 1 + Cluster ;
  status <- 1 + Cluster ;
```