

Subjectively Perceived Quality of Life

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Indicators of Subjectively Perceived Quality of Life

HealthCare

Transport

Culture

Housing

Security

Career

Salary

Education

Business

*“To which extent to you satisfy with
the following aspects of the life in
the place where you studied”*

(1-5 scale)

- **The aim:** to optimise Subjectively Perceived Quality of Life from statistical point of view
- **Methods:**
 - Correspondence analysis (gender and indicators)
 - PCA & Non-Linear PCA, Multidimensional scaling
 - Clustering

Correspondence analysis (gender and indicators)

Does gender have any influence on satisfaction level of life quality indicators?
 Seems that yes, and we have already seen it at MANOVA and Logreg steps

		Gender																																																																																																																																																																																																																																																																																																																																																																																																																										
		Male	Female	Sum																																																																																																																																																																																																																																																																																																																																																																																																																								
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Quite not satisfied		8.0	5.5	13.5	Quite not satisfied		10.6	6.2	16.8	Quite not satisfied		10.0	5.1	15.1	Quite not satisfied		5.6	3.9	9.5	Somehow satisfied, somehow no		21.6	11.4	33.0	Somehow satisfied, somehow no		20.5	12.2	32.6	Somehow satisfied, somehow no		19.3	11.3	30.6	Somehow satisfied, somehow no		15.3	9.1	24.4	Quite satisfied		17.6	12.6	30.2	Quite satisfied		14.1	10.1	24.2	Quite satisfied		14.8	10.8	25.5	Quite satisfied		19.2	13.2	32.4	Satisfied		8.5	7.0	15.5	Satisfied		8.1	5.2	13.3	Satisfied		10.6	8.9	19.5	Satisfied		17.1	11.1	28.2	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Transport					Security					Career					Business					Business				Not satisfied		3.6	1.9	5.5	Not satisfied		4.6	3.3	7.9	Not satisfied		4.9	2.9	7.8	Not satisfied		4.9	3.9	8.8	Not satisfied		8.2	6.5	14.8	Quite not satisfied		7.0	4.8	11.9	Quite not satisfied		7.8	5.5	13.3	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		8.2	6.5	14.8	Somehow satisfied, somehow no		16.1	9.7	25.8	Somehow satisfied, somehow no		19.5	11.2	30.7	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		18.2	11.9	30.1	Quite satisfied		17.7	12.1	29.8	Quite satisfied		18.9	12.0	30.9	Quite satisfied		17.1	10.3	27.4	Quite satisfied		18.0	9.5	27.5	Satisfied		16.4	10.6	27.0	Satisfied		10.1	7.2	17.2	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Culture					Career					Business					Business					Business				Not satisfied		4.4	2.0	6.4	Not satisfied		4.9	2.9	7.8	Not satisfied		4.9	3.9	8.8	Not satisfied		4.9	3.9	8.8	Not satisfied		8.2	6.5	14.8	Quite not satisfied		6.6	3.5	10.1	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		8.2	6.5	14.8	Somehow satisfied, somehow no		12.7	8.7	21.4	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		18.2	11.9	30.1	Quite satisfied		14.8	11.3	26.0	Quite satisfied		17.1	10.3	27.4	Quite satisfied		17.1	10.3	27.4	Quite satisfied		18.0	9.5	27.5	Satisfied		22.4	13.7	36.1	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0
Somehow satisfied, somehow no		21.6	11.4	33.0	Somehow satisfied, somehow no		20.5	12.2	32.6	Somehow satisfied, somehow no		19.3	11.3	30.6	Somehow satisfied, somehow no		15.3	9.1	24.4	Quite satisfied		17.6	12.6	30.2	Quite satisfied		14.1	10.1	24.2	Quite satisfied		14.8	10.8	25.5	Quite satisfied		19.2	13.2	32.4	Satisfied		8.5	7.0	15.5	Satisfied		8.1	5.2	13.3	Satisfied		10.6	8.9	19.5	Satisfied		17.1	11.1	28.2	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Transport					Security					Career					Business					Business				Not satisfied		3.6	1.9	5.5	Not satisfied		4.6	3.3	7.9	Not satisfied		4.9	2.9	7.8	Not satisfied		4.9	3.9	8.8	Not satisfied		8.2	6.5	14.8	Quite not satisfied		7.0	4.8	11.9	Quite not satisfied		7.8	5.5	13.3	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		8.2	6.5	14.8	Somehow satisfied, somehow no		16.1	9.7	25.8	Somehow satisfied, somehow no		19.5	11.2	30.7	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		18.2	11.9	30.1	Quite satisfied		17.7	12.1	29.8	Quite satisfied		18.9	12.0	30.9	Quite satisfied		17.1	10.3	27.4	Quite satisfied		18.0	9.5	27.5	Satisfied		16.4	10.6	27.0	Satisfied		10.1	7.2	17.2	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Culture					Career					Business					Business					Business				Not satisfied		4.4	2.0	6.4	Not satisfied		4.9	2.9	7.8	Not satisfied		4.9	3.9	8.8	Not satisfied		4.9	3.9	8.8	Not satisfied		8.2	6.5	14.8	Quite not satisfied		6.6	3.5	10.1	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		8.2	6.5	14.8	Somehow satisfied, somehow no		12.7	8.7	21.4	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		18.2	11.9	30.1	Quite satisfied		14.8	11.3	26.0	Quite satisfied		17.1	10.3	27.4	Quite satisfied		17.1	10.3	27.4	Quite satisfied		18.0	9.5	27.5	Satisfied		22.4	13.7	36.1	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0																				
Quite satisfied		17.6	12.6	30.2	Quite satisfied		14.1	10.1	24.2	Quite satisfied		14.8	10.8	25.5	Quite satisfied		19.2	13.2	32.4	Satisfied		8.5	7.0	15.5	Satisfied		8.1	5.2	13.3	Satisfied		10.6	8.9	19.5	Satisfied		17.1	11.1	28.2	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Transport					Security					Career					Business					Business				Not satisfied		3.6	1.9	5.5	Not satisfied		4.6	3.3	7.9	Not satisfied		4.9	2.9	7.8	Not satisfied		4.9	3.9	8.8	Not satisfied		8.2	6.5	14.8	Quite not satisfied		7.0	4.8	11.9	Quite not satisfied		7.8	5.5	13.3	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		8.2	6.5	14.8	Somehow satisfied, somehow no		16.1	9.7	25.8	Somehow satisfied, somehow no		19.5	11.2	30.7	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		18.2	11.9	30.1	Quite satisfied		17.7	12.1	29.8	Quite satisfied		18.9	12.0	30.9	Quite satisfied		17.1	10.3	27.4	Quite satisfied		18.0	9.5	27.5	Satisfied		16.4	10.6	27.0	Satisfied		10.1	7.2	17.2	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Culture					Career					Business					Business					Business				Not satisfied		4.4	2.0	6.4	Not satisfied		4.9	2.9	7.8	Not satisfied		4.9	3.9	8.8	Not satisfied		4.9	3.9	8.8	Not satisfied		8.2	6.5	14.8	Quite not satisfied		6.6	3.5	10.1	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		8.2	6.5	14.8	Somehow satisfied, somehow no		12.7	8.7	21.4	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		18.2	11.9	30.1	Quite satisfied		14.8	11.3	26.0	Quite satisfied		17.1	10.3	27.4	Quite satisfied		17.1	10.3	27.4	Quite satisfied		18.0	9.5	27.5	Satisfied		22.4	13.7	36.1	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0																																								
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Somehow satisfied, somehow no		16.1	9.7	25.8	Somehow satisfied, somehow no		19.5	11.2	30.7	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		18.2	11.9	30.1	Quite satisfied		17.7	12.1	29.8	Quite satisfied		18.9	12.0	30.9	Quite satisfied		17.1	10.3	27.4	Quite satisfied		18.0	9.5	27.5	Satisfied		16.4	10.6	27.0	Satisfied		10.1	7.2	17.2	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Culture					Career					Business					Business					Business				Not satisfied		4.4	2.0	6.4	Not satisfied		4.9	2.9	7.8	Not satisfied		4.9	3.9	8.8	Not satisfied		4.9	3.9	8.8	Not satisfied		8.2	6.5	14.8	Quite not satisfied		6.6	3.5	10.1	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		8.2	6.5	14.8	Somehow satisfied, somehow no		12.7	8.7	21.4	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		18.2	11.9	30.1	Quite satisfied		14.8	11.3	26.0	Quite satisfied		17.1	10.3	27.4	Quite satisfied		17.1	10.3	27.4	Quite satisfied		18.0	9.5	27.5	Satisfied		22.4	13.7	36.1	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0																																																																																																																																																																														
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Satisfied		16.4	10.6	27.0	Satisfied		10.1	7.2	17.2	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Culture					Career					Business					Business					Business				Not satisfied		4.4	2.0	6.4	Not satisfied		4.9	2.9	7.8	Not satisfied		4.9	3.9	8.8	Not satisfied		4.9	3.9	8.8	Not satisfied		8.2	6.5	14.8	Quite not satisfied		6.6	3.5	10.1	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		7.7	4.8	12.5	Quite not satisfied		8.2	6.5	14.8	Somehow satisfied, somehow no		12.7	8.7	21.4	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		18.2	11.9	30.1	Quite satisfied		14.8	11.3	26.0	Quite satisfied		17.1	10.3	27.4	Quite satisfied		17.1	10.3	27.4	Quite satisfied		18.0	9.5	27.5	Satisfied		22.4	13.7	36.1	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0																																																																																																																																																																																																																						
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Somehow satisfied, somehow no		12.7	8.7	21.4	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		16.5	9.3	25.8	Somehow satisfied, somehow no		18.2	11.9	30.1	Quite satisfied		14.8	11.3	26.0	Quite satisfied		17.1	10.3	27.4	Quite satisfied		17.1	10.3	27.4	Quite satisfied		18.0	9.5	27.5	Satisfied		22.4	13.7	36.1	Satisfied		14.7	11.7	26.4	Satisfied		11.5	7.3	18.8	Satisfied		11.5	7.3	18.8	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0	Sum		60.9	39.1	100.0																																																																																																																																																																																																																																																																																																																																								
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Satisfaction levels for Males and Females vary among life quality indicators

		HealthCare Transport Culture Housing Security Career Salary Education Business								
Satisfaction level	Gender	Male	50	61	105	64	68	85	50	68
Not satisfied	Male	71								
	Female	37	26	27	75	45	40	43	26	54
Quite not satisfied	Male	111	97	91	146	108	106	138	77	114
	Female	76	67	48	86	76	67	70	54	90
Somehow satisfied&no	Male	299	223	176	283	269	228	267	211	251
	Female	157	134	120	168	155	129	156	126	165
Quite satisfied	Male	243	245	204	195	261	236	204	266	249
	Female	174	167	156	140	166	143	149	182	131
Satisfied	Male	117	226	309	112	139	203	147	237	159
	Female	97	147	190	72	99	162	123	153	101

Correspondence analysis (gender and indicators)

		HealthCare						
Gender		Not satisfied	Quite not satisfied	Somehow satisfied, somehow no	Quite satisfied	Satisfied	Sum	
Male		5.1	8.0		21.6	17.6	8.5	60.9
Female		2.7	5.5		11.4	12.6	7.0	39.1
Sum		7.8	13.5		33.0	30.2	15.5	100.0
		Transport						
Gender		Not satisfied	Quite not satisfied	Somehow satisfied, somehow no	Quite satisfied	Satisfied	Sum	
Male		3.6	7.0		16.1	17.7	16.4	60.9
Female		1.9	4.8		9.7	12.1	10.6	39.1
Sum		5.5	11.9		25.8	29.8	27.0	100.0
		Culture						
Gender		Not satisfied	Quite not satisfied	Somehow satisfied, somehow no	Quite satisfied	Satisfied	Sum	
Male		4.4	6.6		12.7	14.8	22.4	60.9
Female		2.0	3.5		8.7	11.3	13.7	39.1
Sum		6.4	10.1		21.4	26.0	36.1	100.0
		Housing						
Gender		Not satisfied	Quite not satisfied	Somehow satisfied, somehow no	Quite satisfied	Satisfied	Sum	
Male		7.6	10.6		20.5	14.1	8.1	60.9
Female		5.4	6.2		12.2	10.1	5.2	39.1
Sum		13.0	16.8		32.6	24.2	13.3	100.0
		Security						
Gender		Not satisfied	Quite not satisfied	Somehow satisfied, somehow no	Quite satisfied	Satisfied	Sum	
Male		4.6	7.8		19.5	18.9	10.1	60.9
Female		3.3	5.5		11.2	12.0	7.2	39.1
Sum		7.9	13.3		30.7	30.9	17.2	100.0
		Career						
Gender		Not satisfied	Quite not satisfied	Somehow satisfied, somehow no	Quite satisfied	Satisfied	Sum	
Male		4.9	7.7		16.5	17.1	14.7	60.9
Female		2.9	4.8		9.3	10.3	11.7	39.1
Sum		7.8	12.5		25.8	27.4	26.4	100.0
		Salary						
Gender		Not satisfied	Quite not satisfied	Somehow satisfied, somehow no	Quite satisfied	Satisfied	Sum	
Male		6.2	10.0		19.3	14.8	10.6	60.9
Female		3.1	5.1		11.3	10.8	8.9	39.1
Sum		9.3	15.1		30.6	25.5	19.5	100.0
		Education						
Gender		Not satisfied	Quite not satisfied	Somehow satisfied, somehow no	Quite satisfied	Satisfied	Sum	
Male		3.6	5.6		15.3	19.2	17.1	60.9
Female		1.9	3.9		9.1	13.2	11.1	39.1
Sum		5.5	9.5		24.4	32.4	28.2	100.0
		Business						
Gender		Not satisfied	Quite not satisfied	Somehow satisfied, somehow no	Quite satisfied	Satisfied	Sum	
Male		4.9	8.2		18.2	18.0	11.5	60.9
Female		3.9	6.5		11.9	9.5	7.3	39.1
Sum		8.8	14.8		30.1	27.5	18.8	100.0

The chi square of independence between the two variables = 10.1138
(p-value = 0.03855368)

The chi square of independence between the two variables = 1.710934
(p-value = 0.7887305)

The chi square of independence between the two variables = 7.019646
(p-value = 0.1348537)

The chi square of independence between the two variables = 2.564295
(p-value = 0.633161)

The chi square of independence between the two variables = 2.375539
(p-value = 0.6670523)

The chi square of independence between the two variables = 6.095219
(p-value = 0.1921492)

The chi square of independence between the two variables = 11.24951
(p-value = 0.02389845)

The chi square of independence between the two variables = 1.863389
(p-value = 0.7608668)

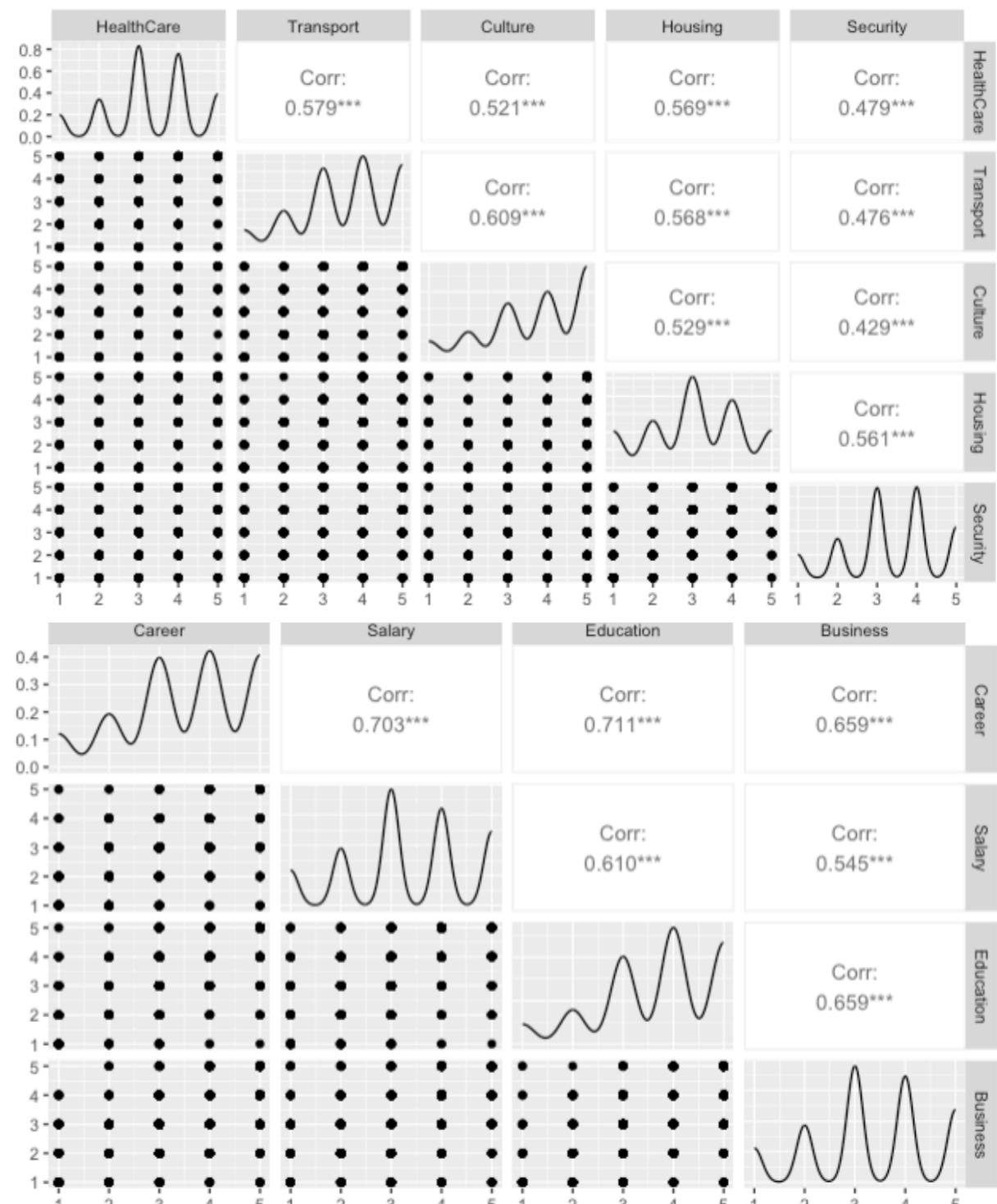
The chi square of independence between the two variables = 6.996165
(p-value = 0.136091)

Canonical correlation analysis

There are 2 «sets» of variables corresponding to ***social infrastructure*** and ***economical infrastructure***, and we might be interested in assessing the relationships between these sets of variables. So we want to find the linear functions of the variables in one set that maximally correlate with linear functions of variables in the other set.

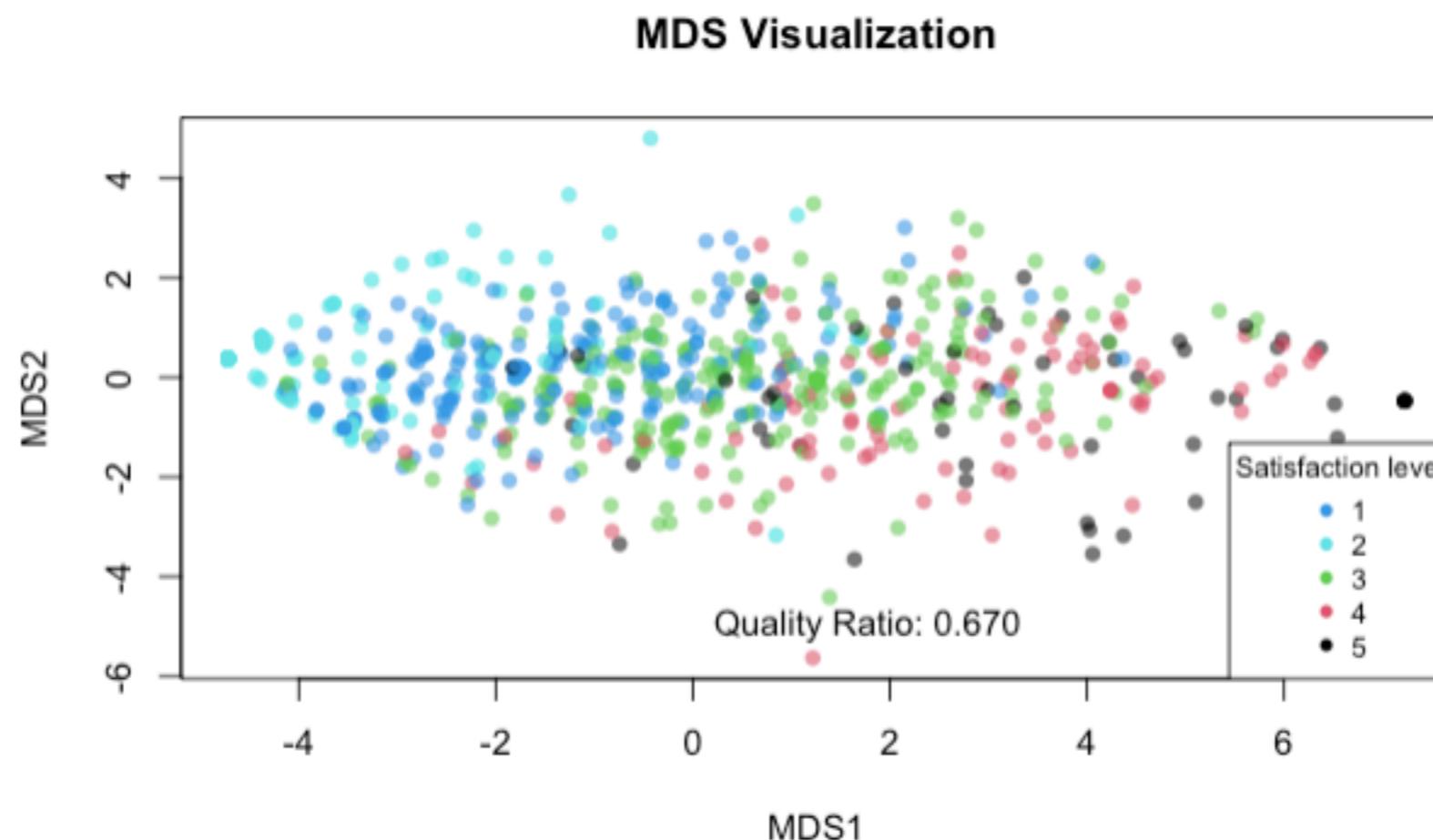
Tests of Canonical Dimensions					
Dim	Canonical_Corr	F_statistic	df1	df2	p_value
1	0.7198293	60.4284704	20	4554.676	0.0000000
2	0.1983840	5.8294334	12	3635.554	0.0000000
3	0.0969366	2.3602423	6	2750.000	0.0281599
4	0.0288329	0.5724357	2	1376.000	0.5642840

Standardized Canonical Coefficients			
Variable	Dim_1	Dim_2	Dim_3
HealthCare	-0.2576939	0.0688693	0.0078156
Transport	-0.1600523	-0.7717832	1.1175988
Culture	-0.5200579	-0.4726919	-1.0995345
Housing	-0.1367694	0.9256999	0.0351809
Security	-0.1632234	0.4322446	0.1172623
Career	-0.4185853	-1.2679507	0.0575686
Salary	-0.0516803	0.5480185	1.2580896
Education	-0.4596466	-0.1998430	-0.7130622
Business	-0.1969018	1.1665452	-0.3985529



Multidimensional scaling

At this step we want to explain structure or pattern amongst the subjectively perceived quality of life indicators: *Can we say that some of indicators seem alike or seem different from subjectively perceived satisfaction levels?*



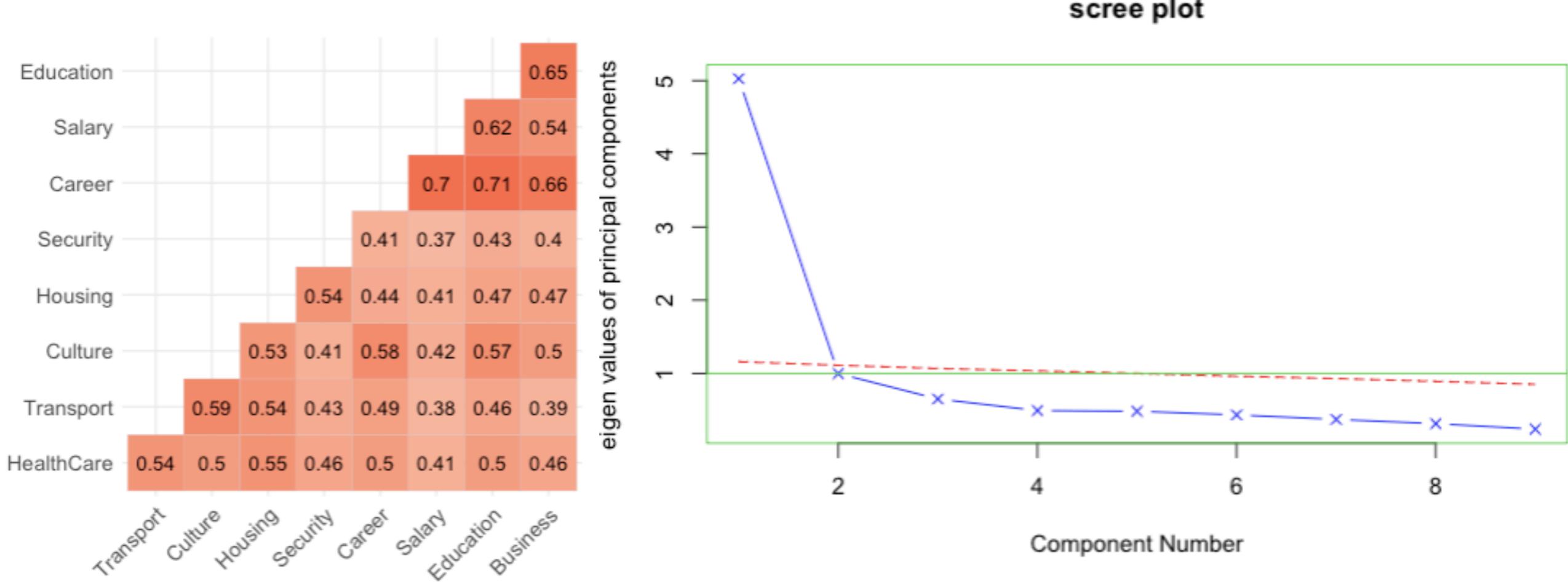
K = 2 (from CCorr and PCA insights)

K = 3; 9 also work

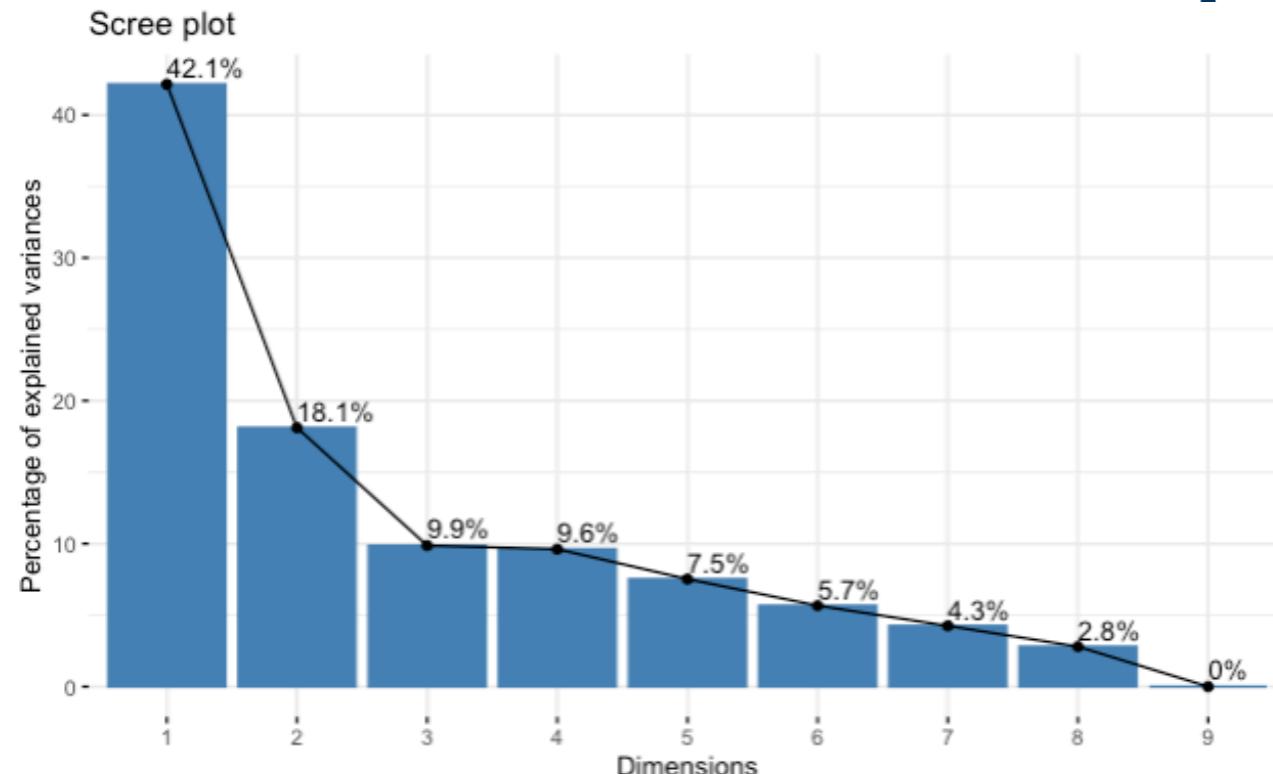
PCA

We want to describe the variation in set of correlated variables (*HealthCare*, *Culture*, *Transport*, *Housing*, *Security*, *Career*, *Salary*, *Education for kids*, *Business opportunities*) in terms of new uncorrelated variables, each of which is a linear combination of initial variables.

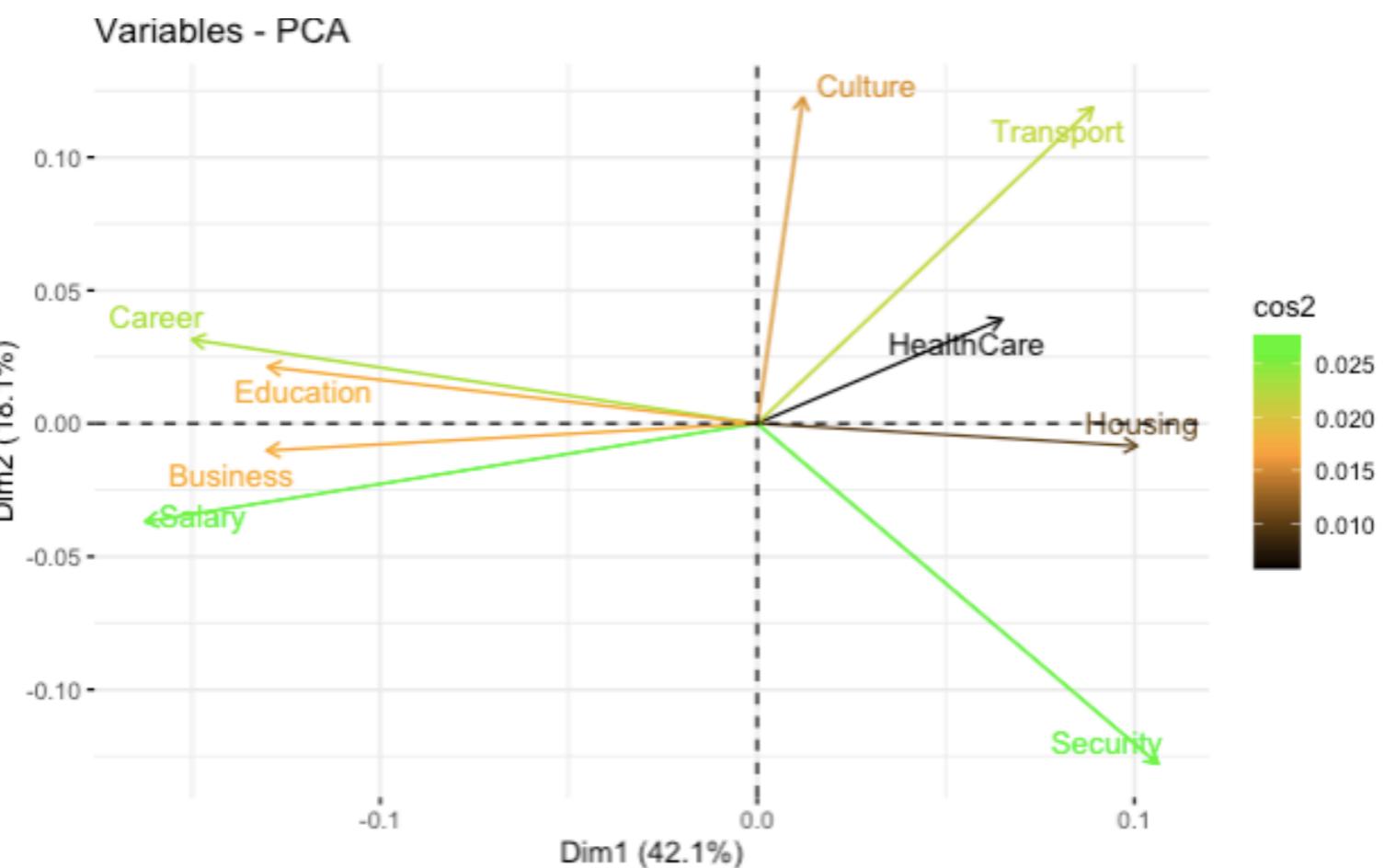
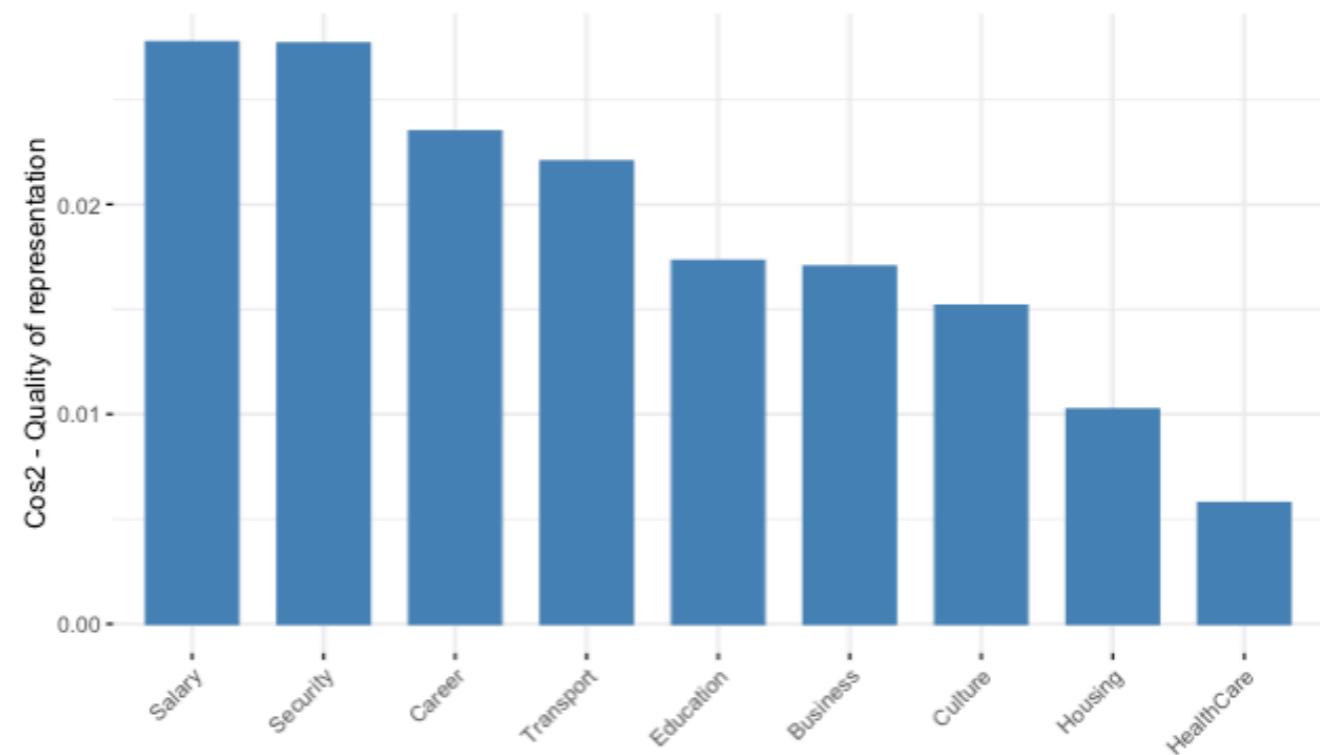
We assume that the first few components will account for a substantial proportion of the variation in the original variables and can be used to provide a convenient lower-dimensional summary of these variables that might prove useful for a variety of reasons.



PCA



Cos2 of variables to Dim-1-2



PCA : varimax rotation

	RC1 <S3: AsIs>	RC2 <S3: AsIs>
HealthCare	0.32	0.71
Transport	0.25	0.76
Culture	0.44	0.64
Housing	0.25	0.79
Security	0.20	0.71
Career	0.84	0.33
Salary	0.82	0.21
Education	0.78	0.37
Business	0.76	0.32

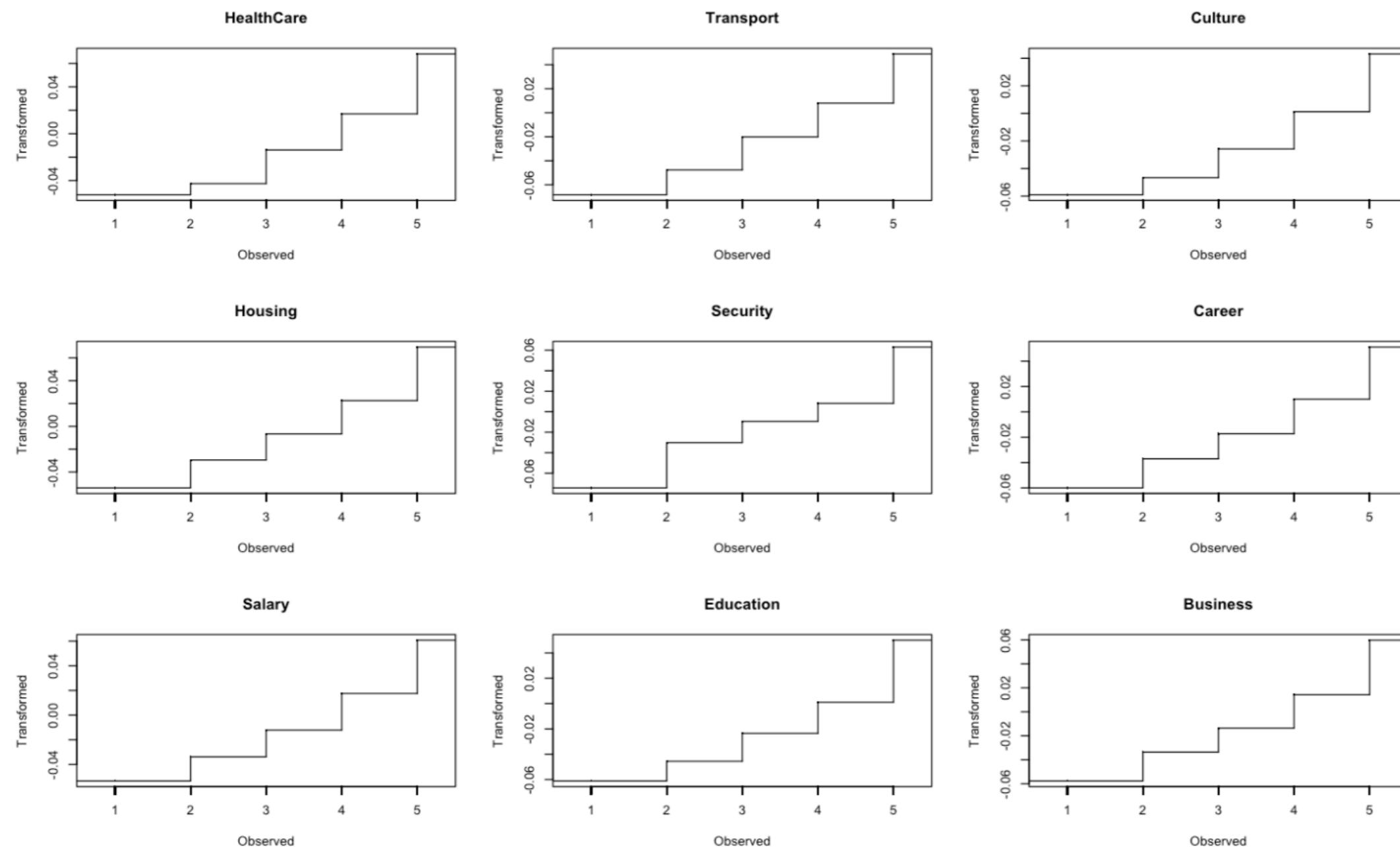
We also transform computed components into new ones for easier interpretation with the orthogonal «varimax» rotation, limiting the correlation between components.

Component 1: ***social infrastructure*** (Healthcare, Transport, Culture, Housing, Security)

Component 2: ***economical infrastructure*** (Career opportunities, Salary, Education for kids, Business opportunities)

NLPCA

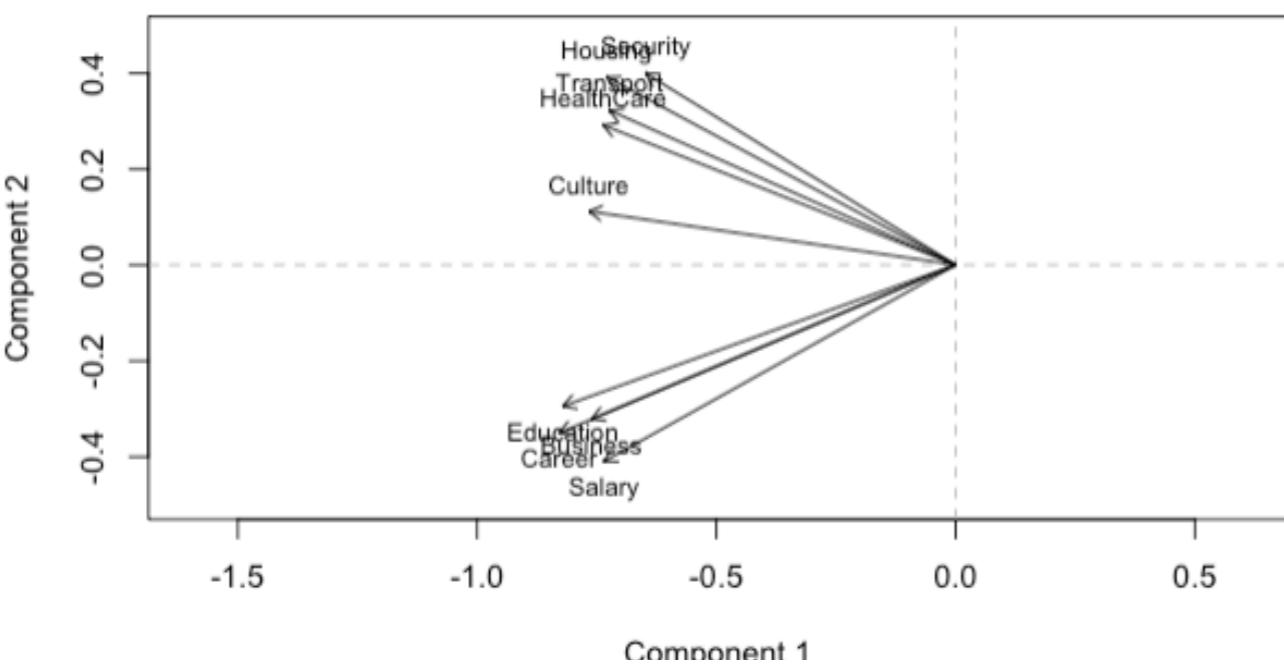
However, the subjectively perceived estimates of quality of life estimates are vulnerable to indicate the same distances between levels among the sample for different regions' characteristics. To cope with it we can assign quantitative values to quantitative scales.



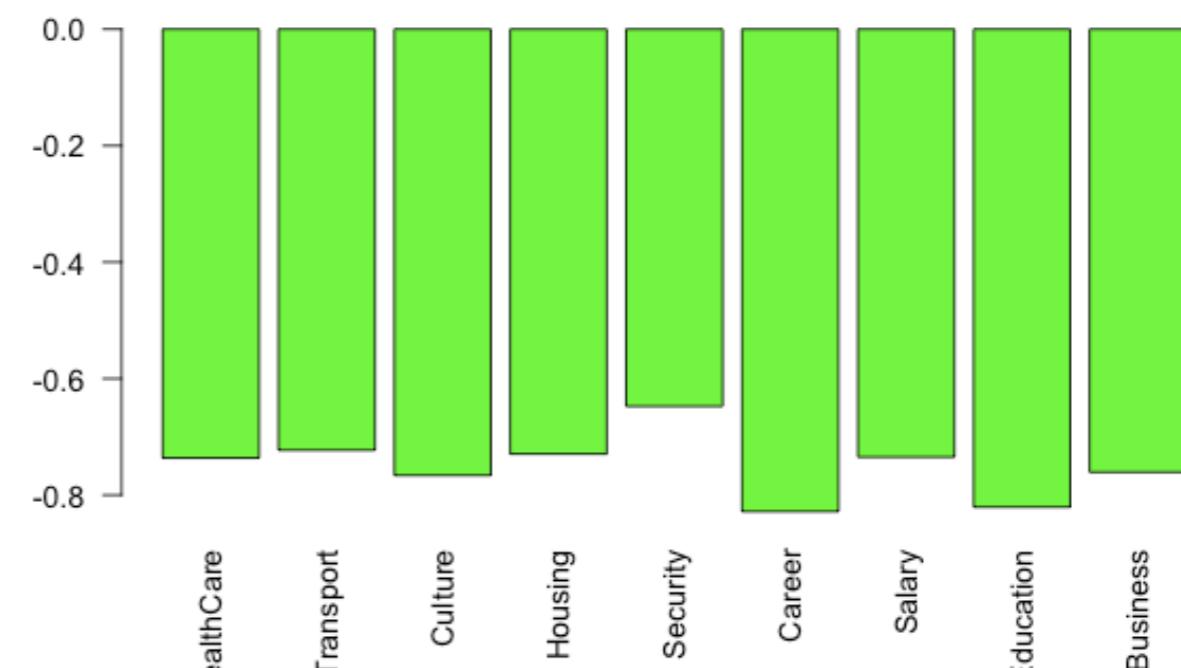
NLPCA

The component division is similar to classical PCA on the same data. The given components might be considered as ***life comfort*** (the 1st component) and ***professional & self-development*** (the 2nd component)

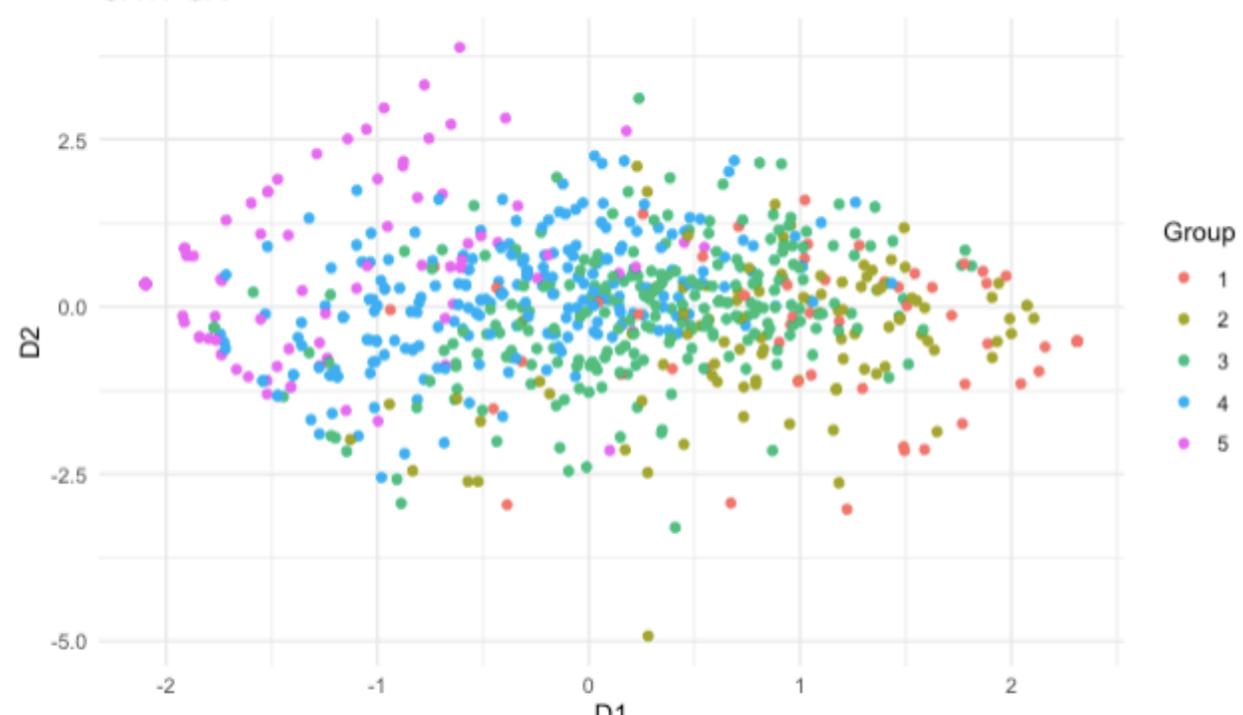
Loadings Plot



Contribution to PC1



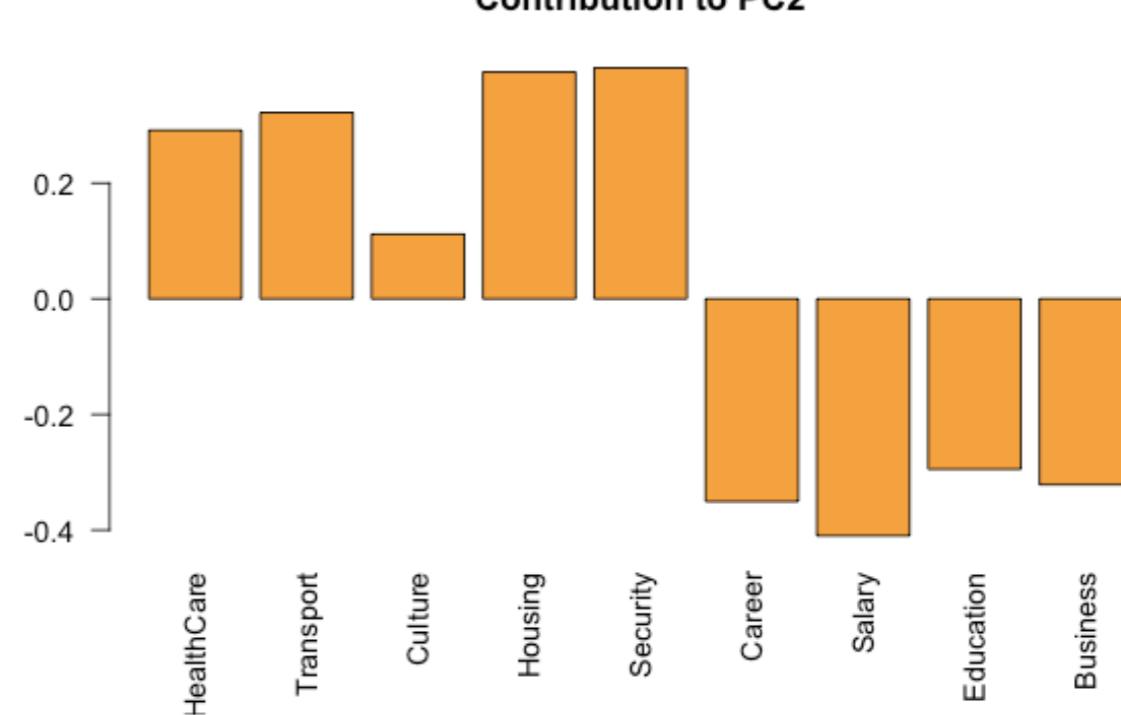
CATPCA



Group

- 1
- 2
- 3
- 4
- 5

Contribution to PC2



Data preparation for Clustering

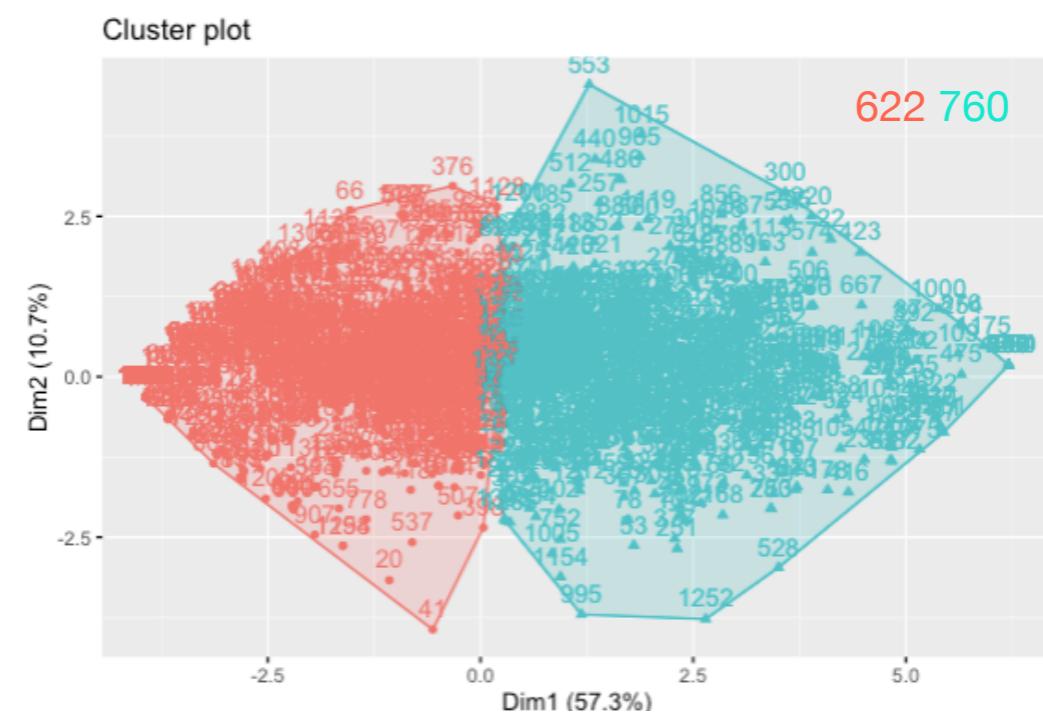
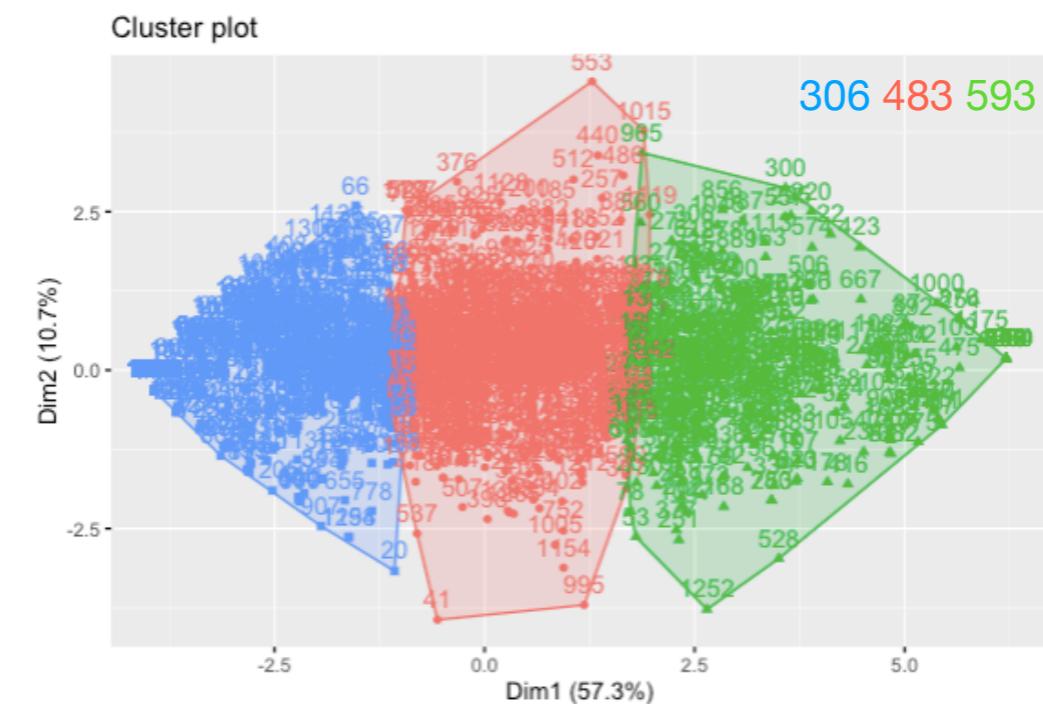
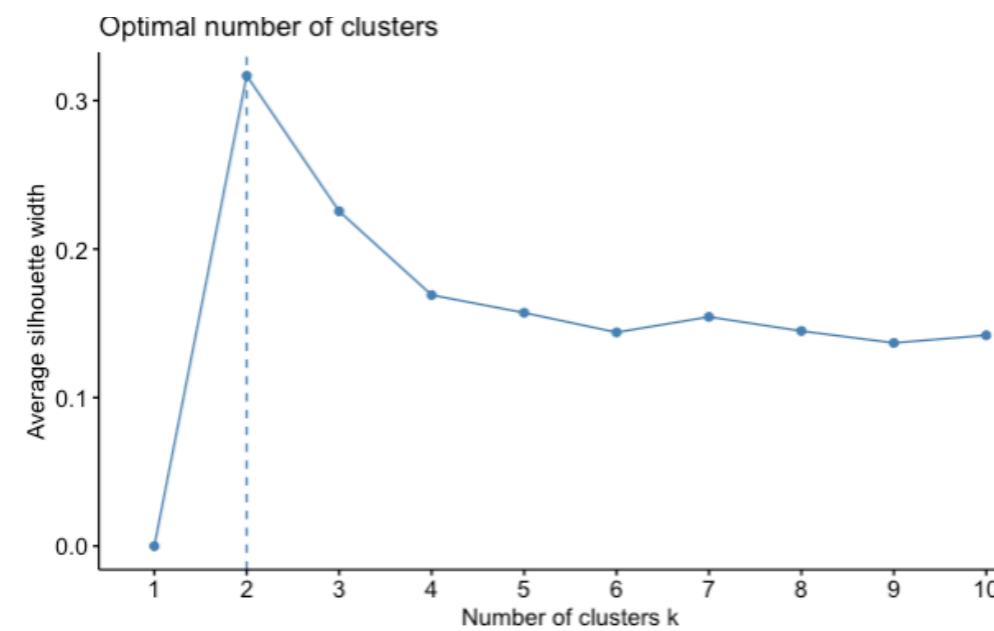
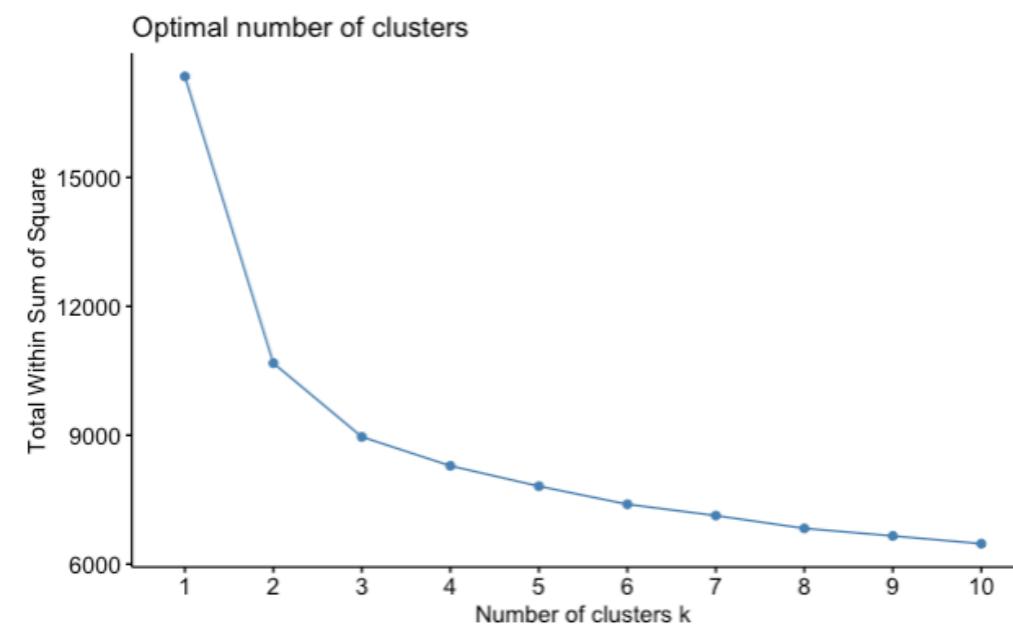
- **Sub-datasets:**
 1. initial indicators (pseudo-interval);
 2. indicators + control variables (categorical);
 3. PCA + control variables (categorical);
 4. NLPCA + control variables(categorical)
- **Dummy + scaling**

Specialisation: Economics, Social, Medicine, STEM, Natural Science
Income (recoded): poor, medium, high, rich
Gender: Female, Male



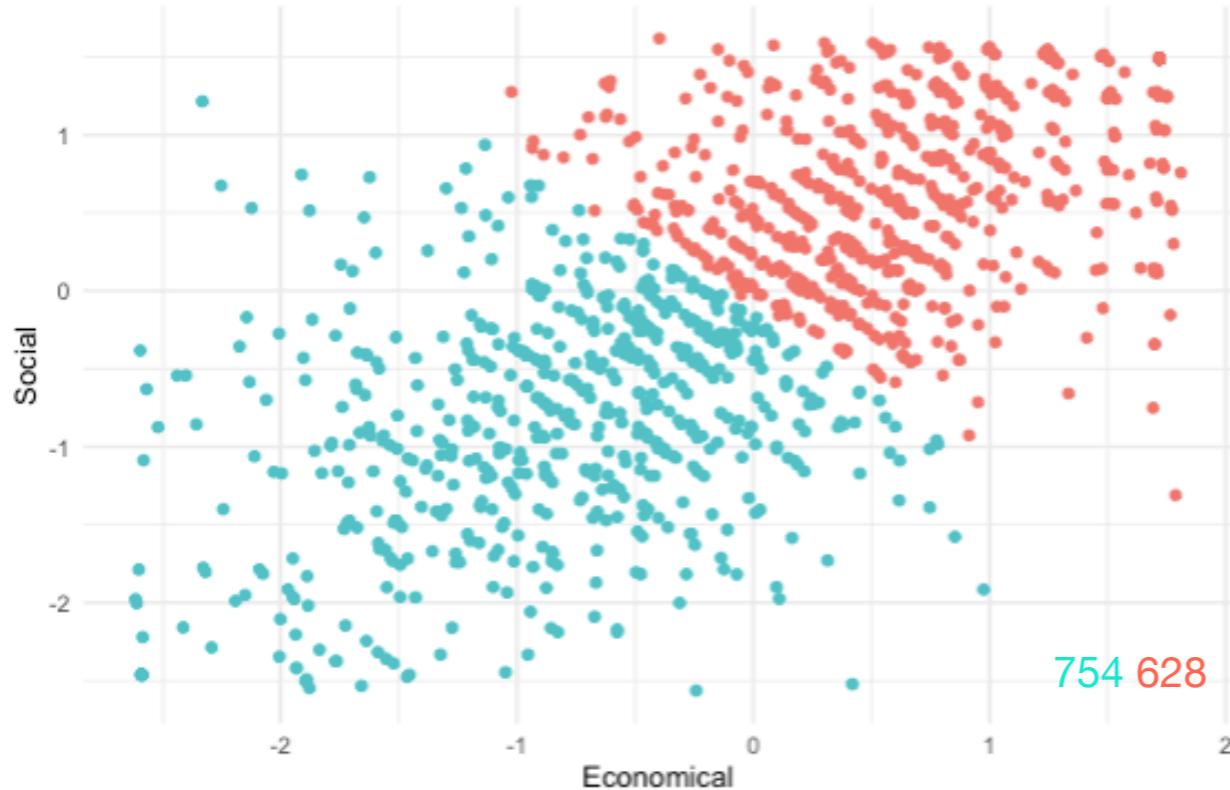
Clustering: KMeans (sat. levels) + kmmedoids

We want to discover groups of observations that are homogeneous and separated from other groups, identified by the assessment of the relative distances between points.

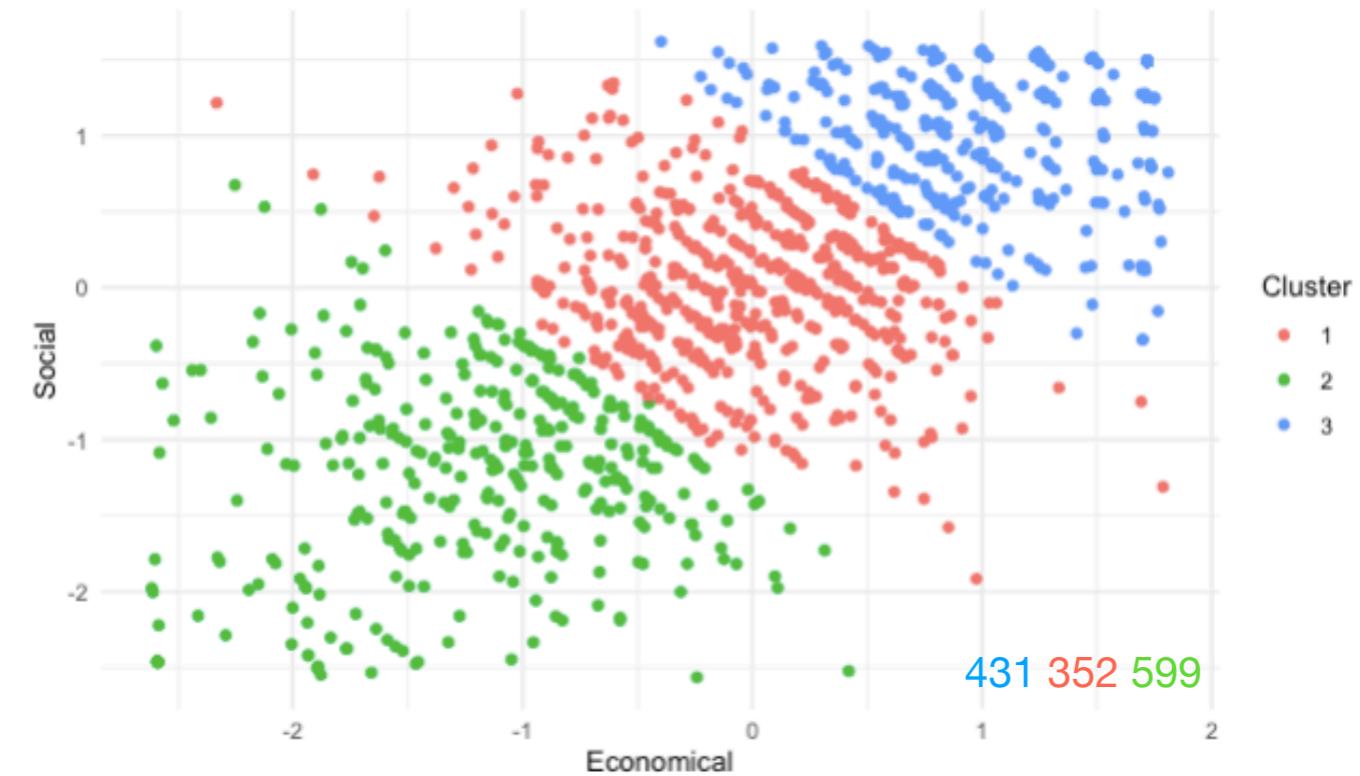


Clustering (KMeans + kmmedoids): satisfaction levels + PCA(NL)

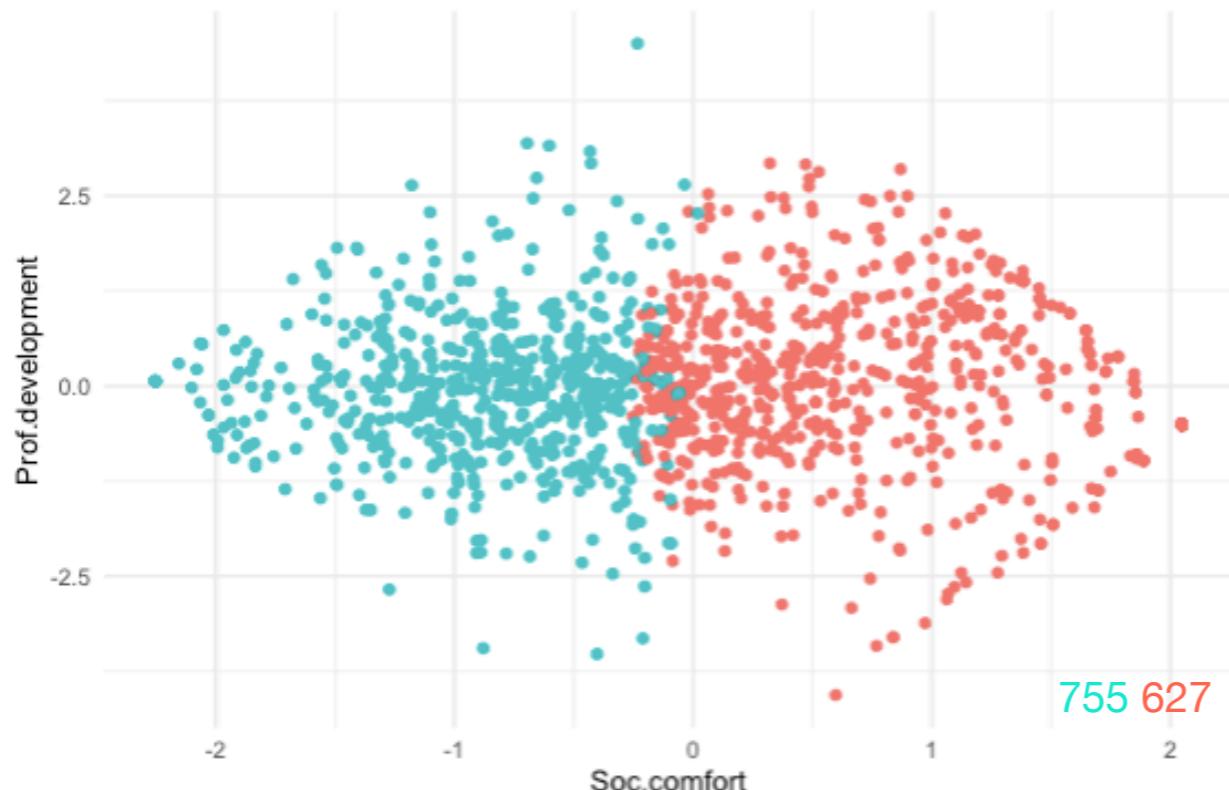
Cluster Scatter Plot with PCA Components



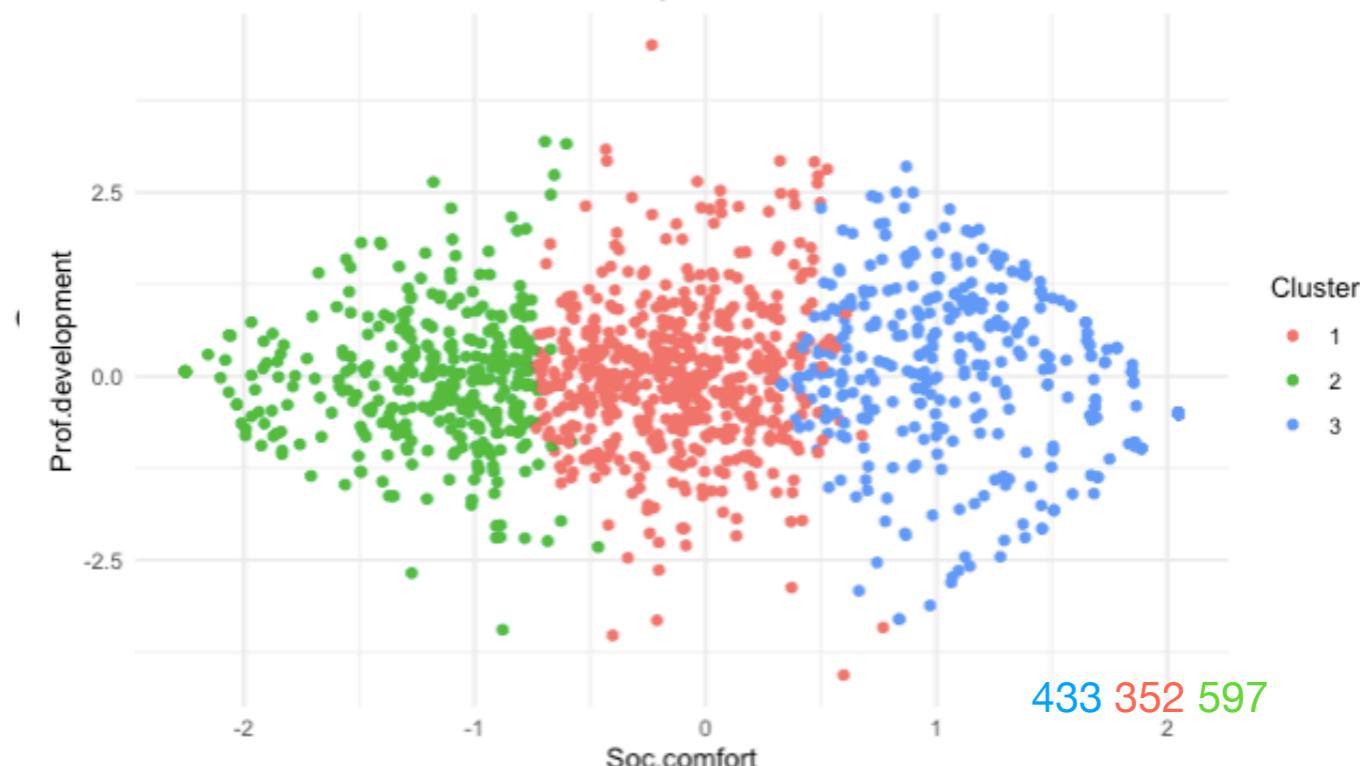
Cluster Scatter Plot with PCA Components



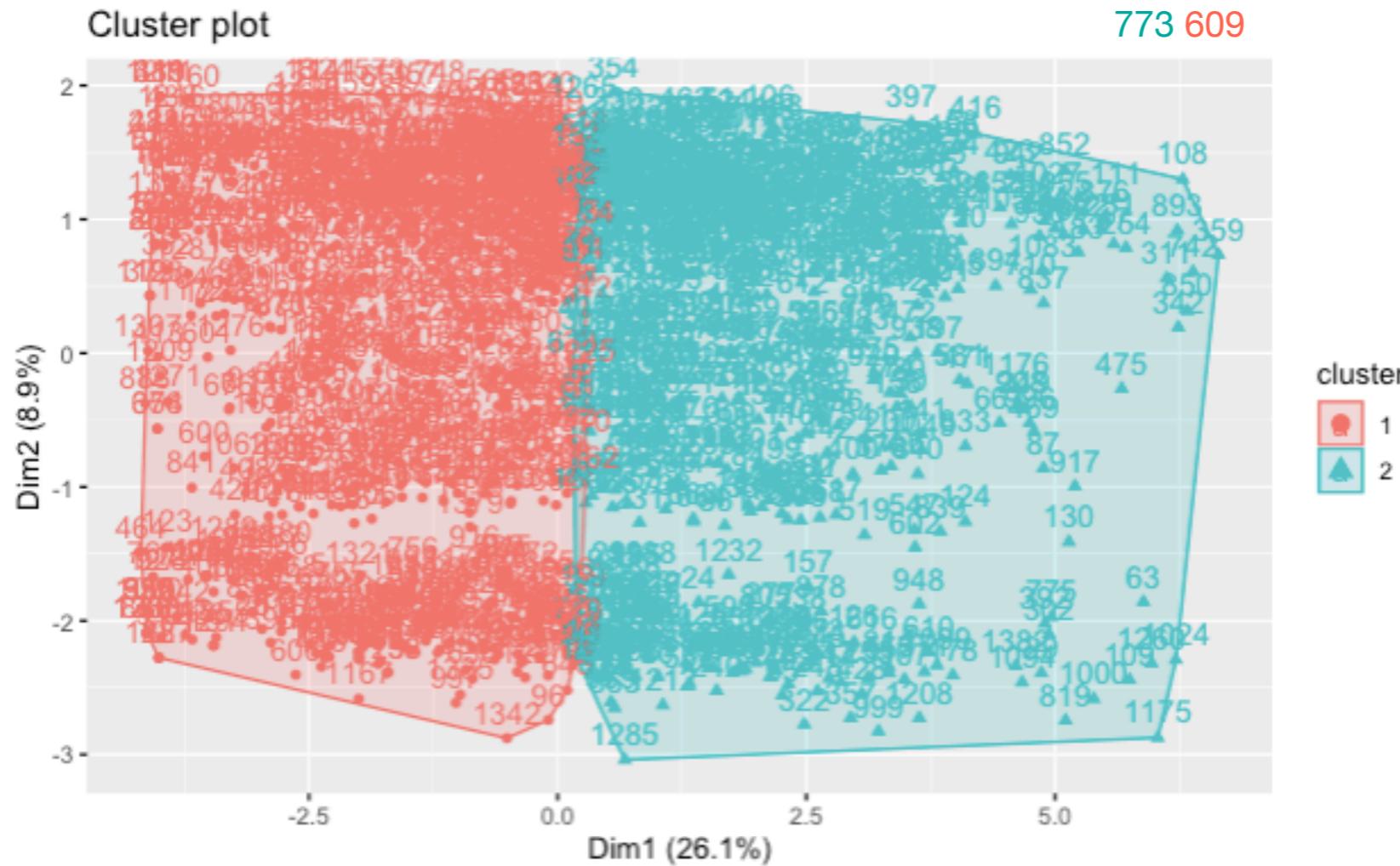
Cluster Scatter Plot with PCA Components



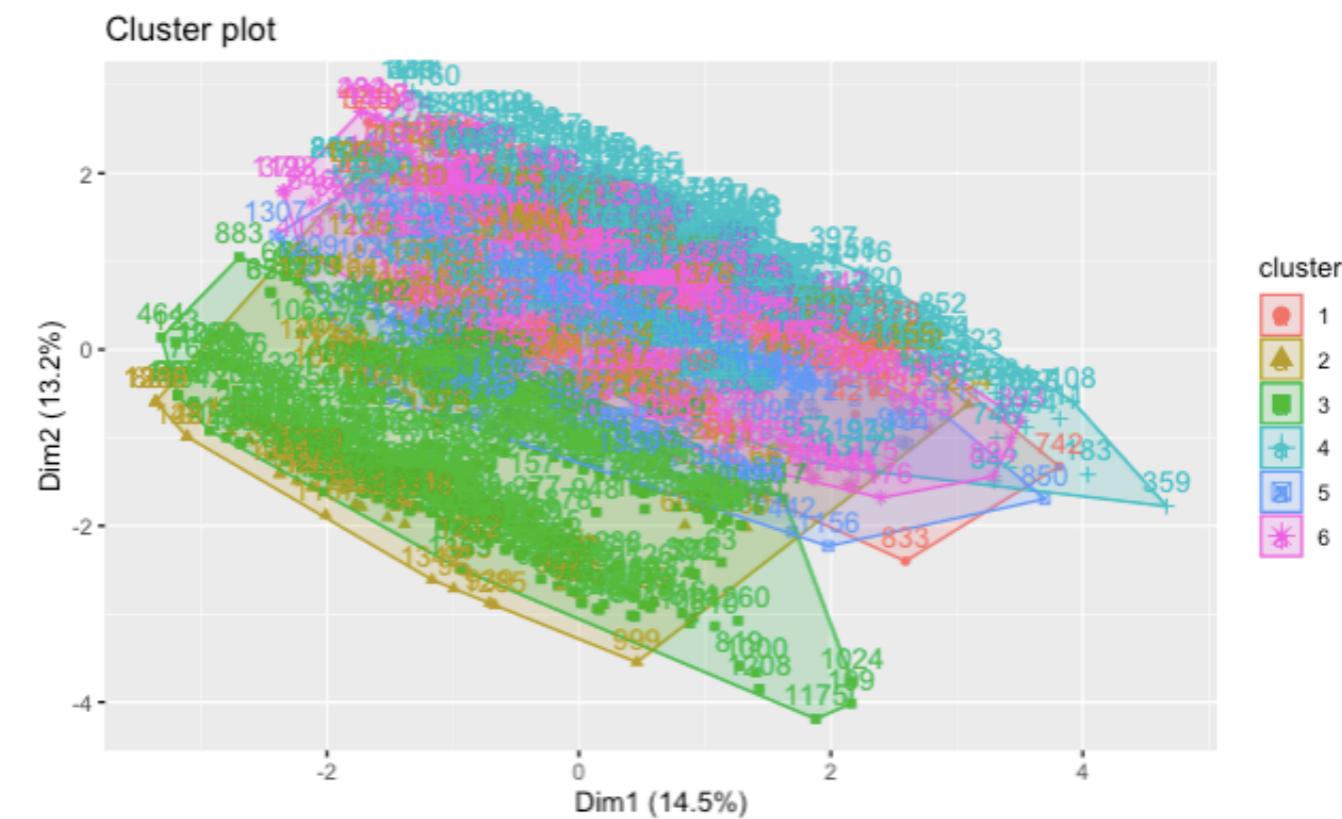
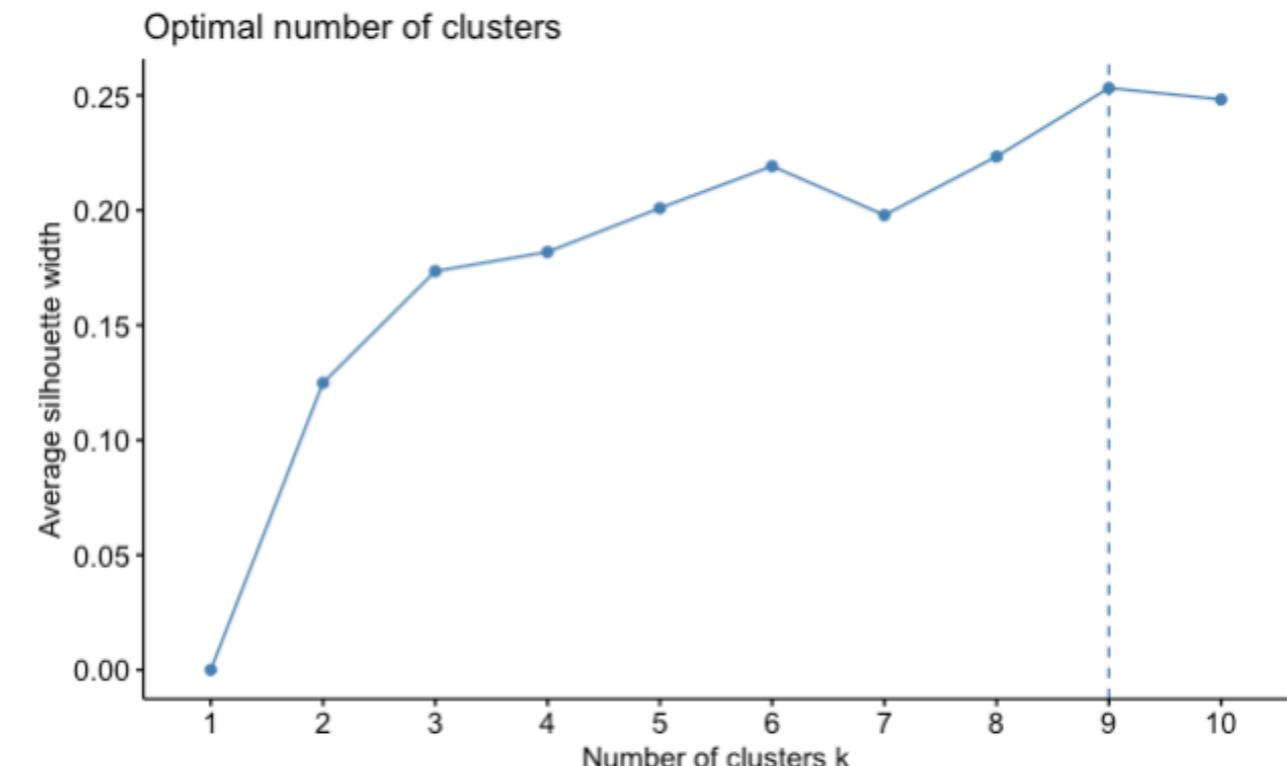
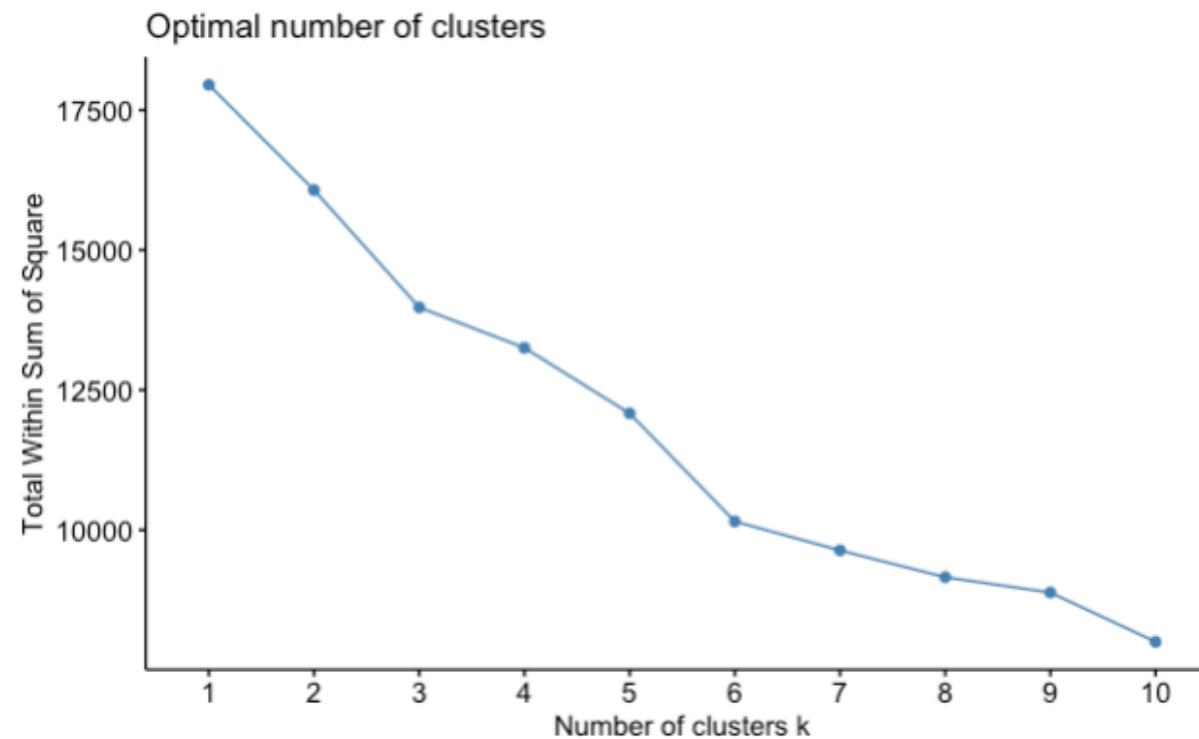
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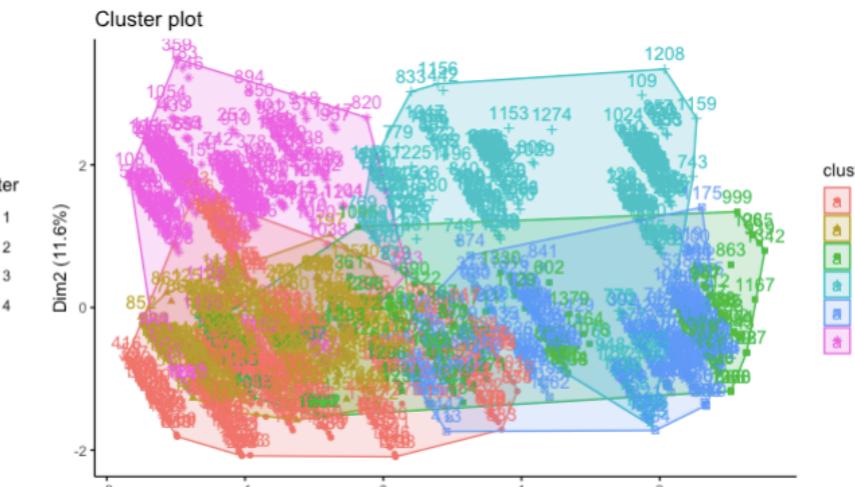
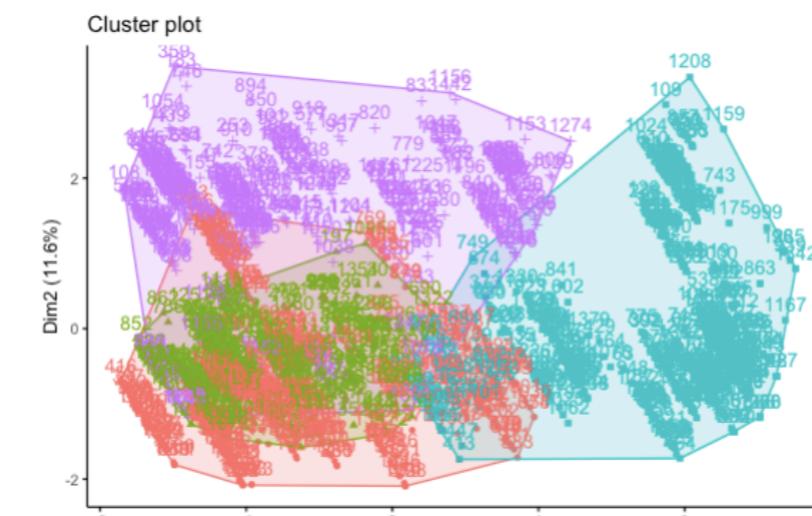
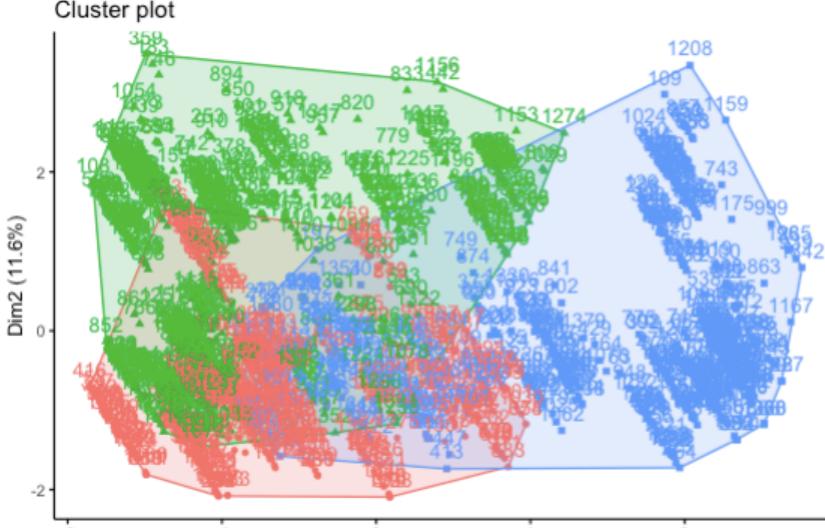
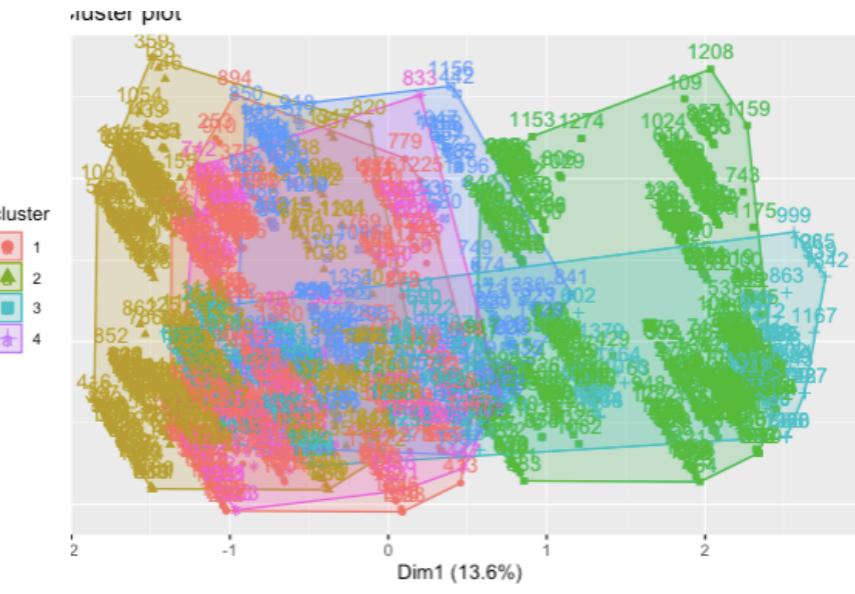
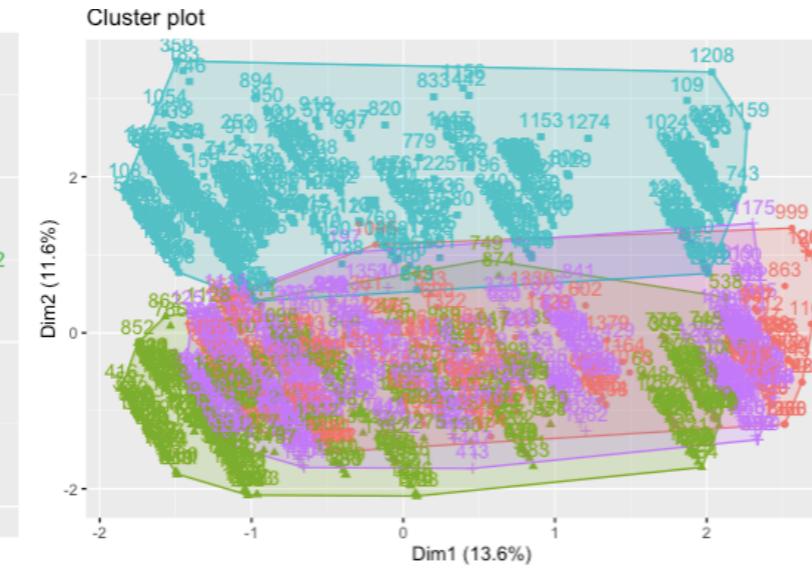
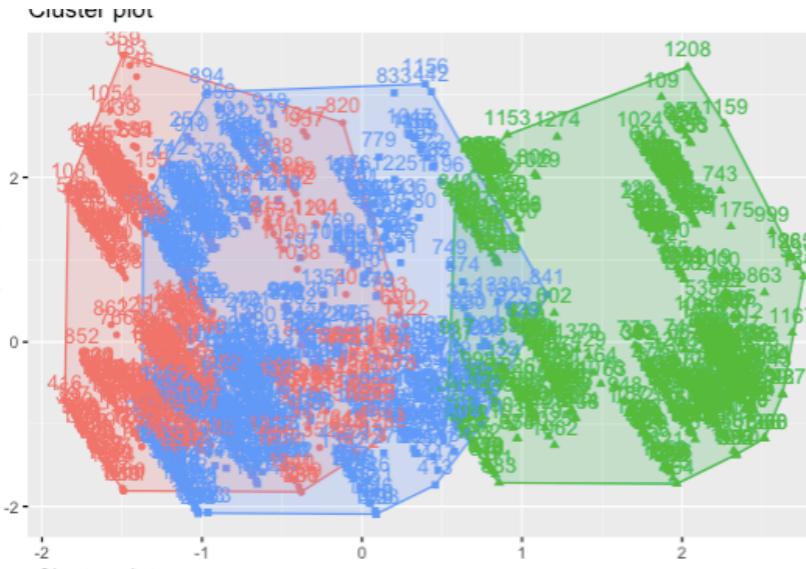
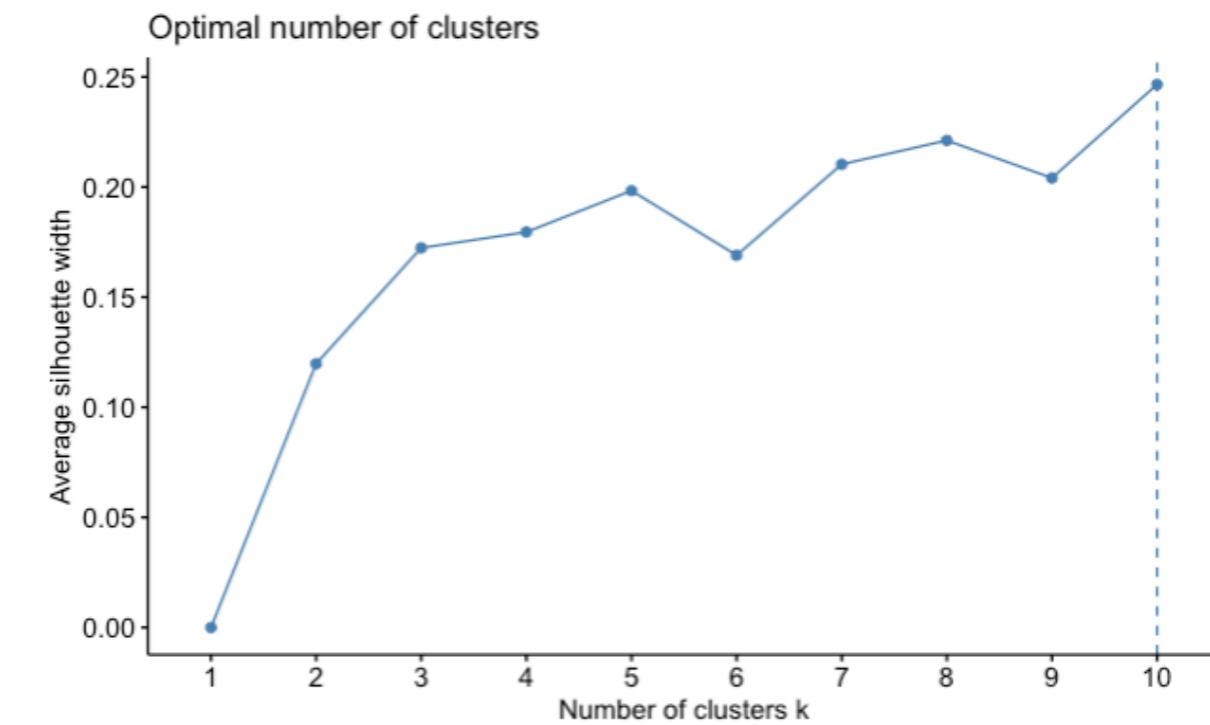
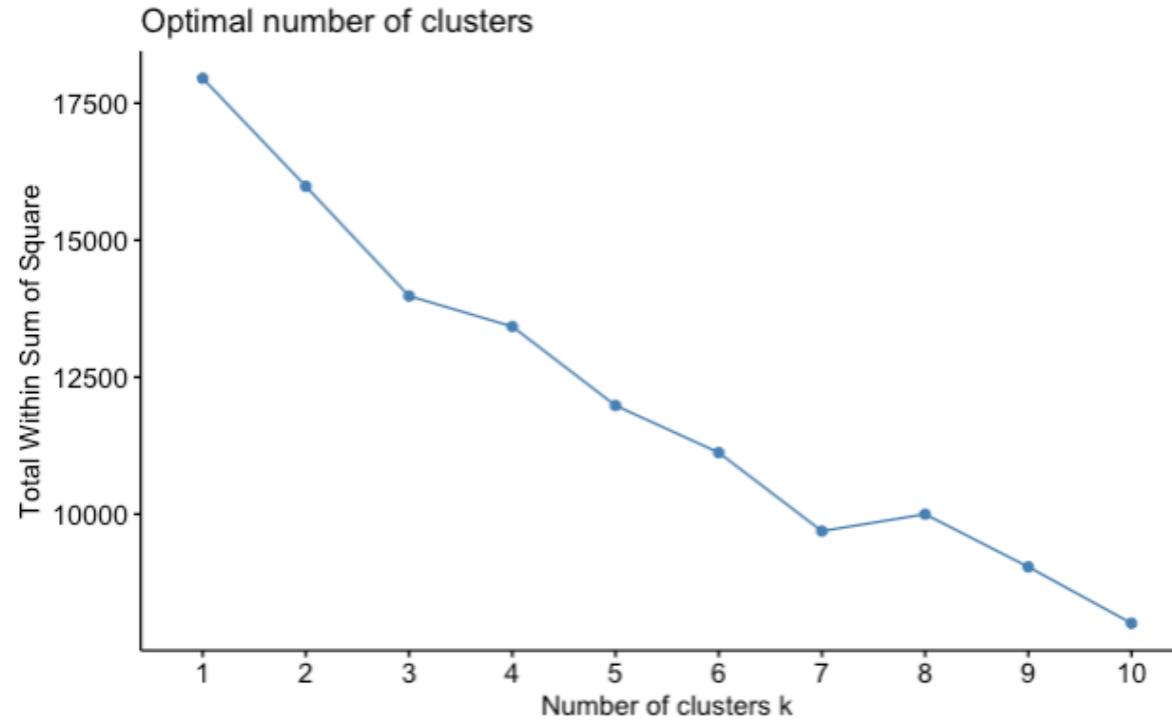
Clustering(KMeans+kmedoids): sat.levels + controls



Clustering(KMeans+kmedoids): PCA + controls



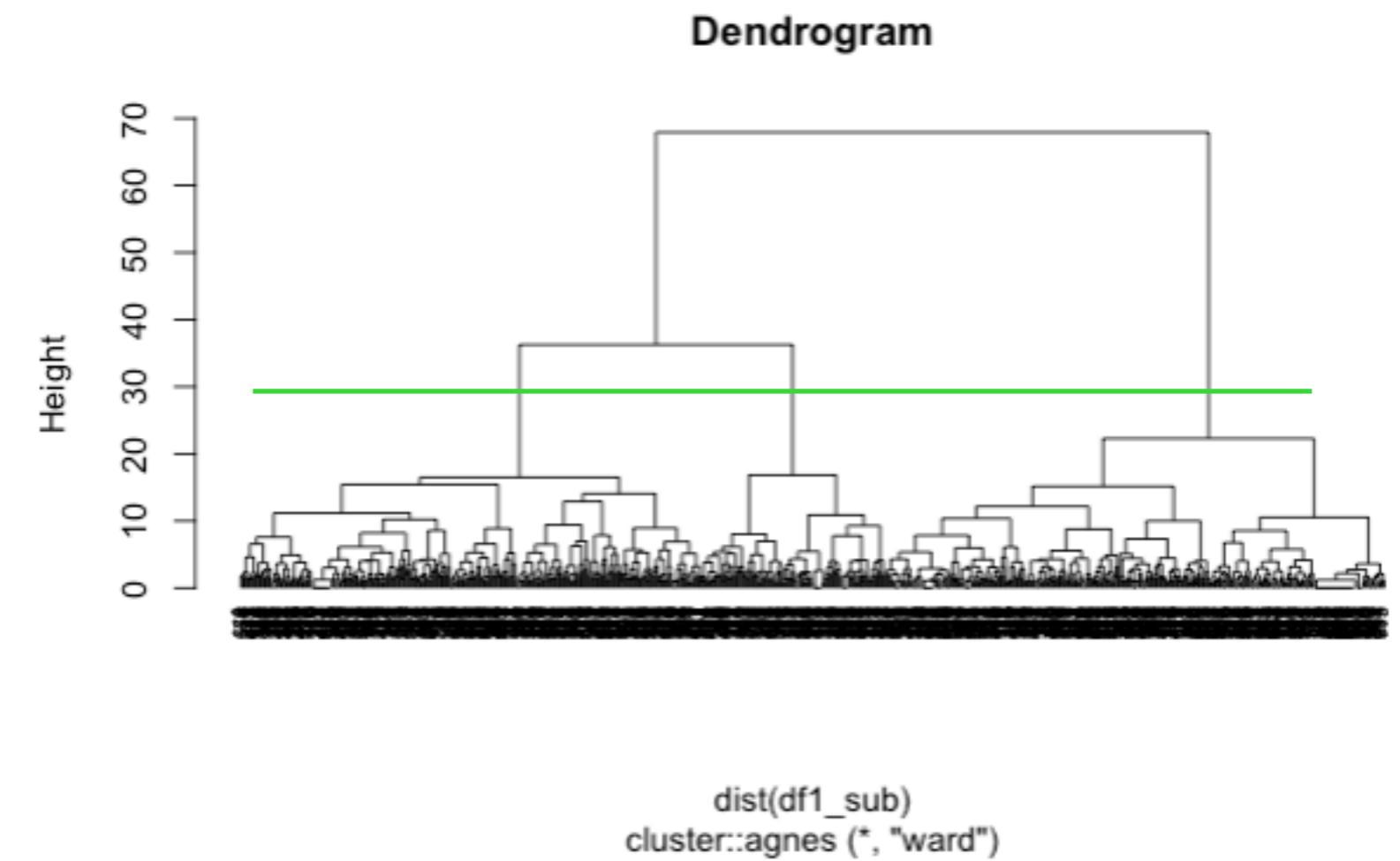
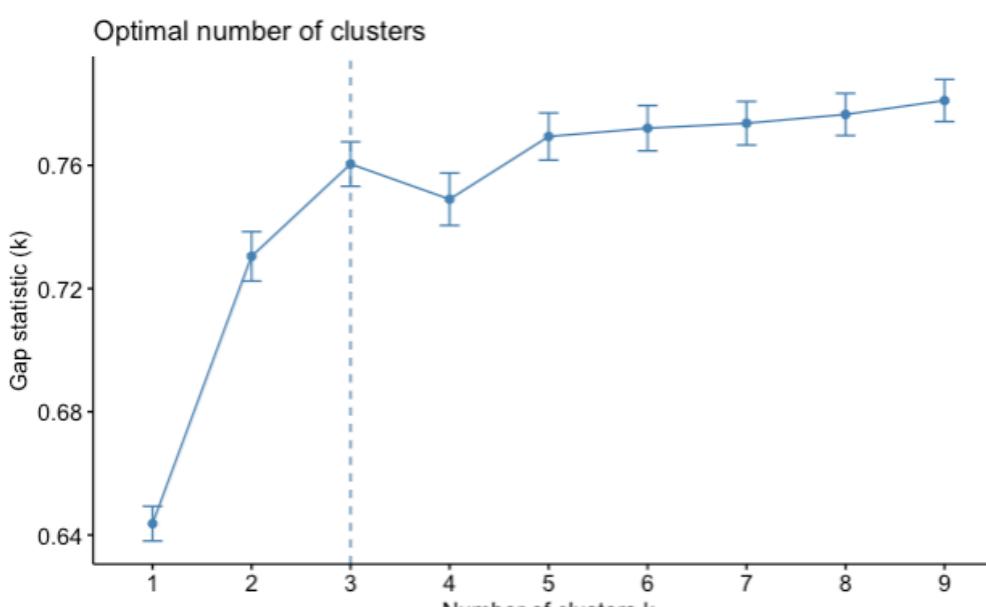
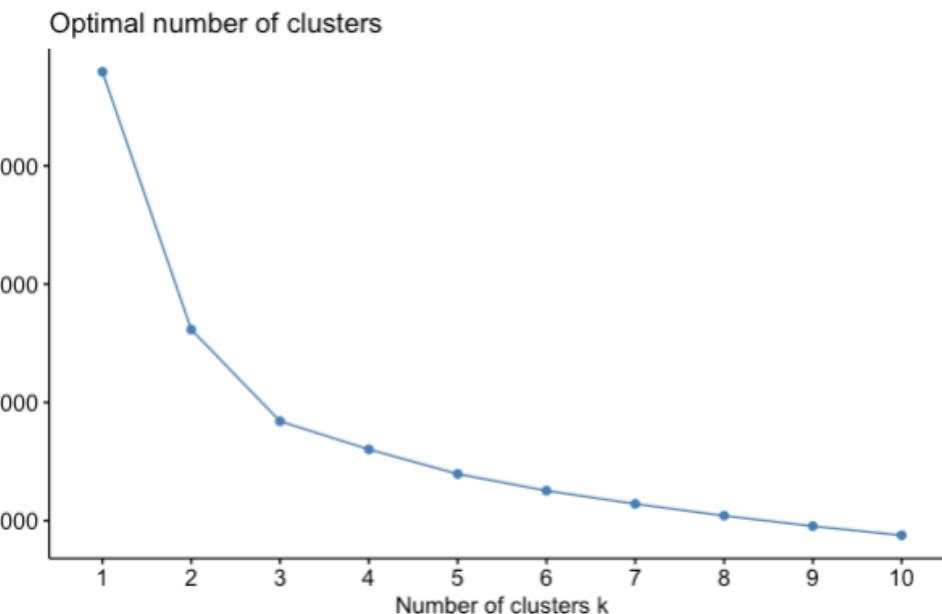
Clustering(KMeans+kmedoids): NLPCA + controls



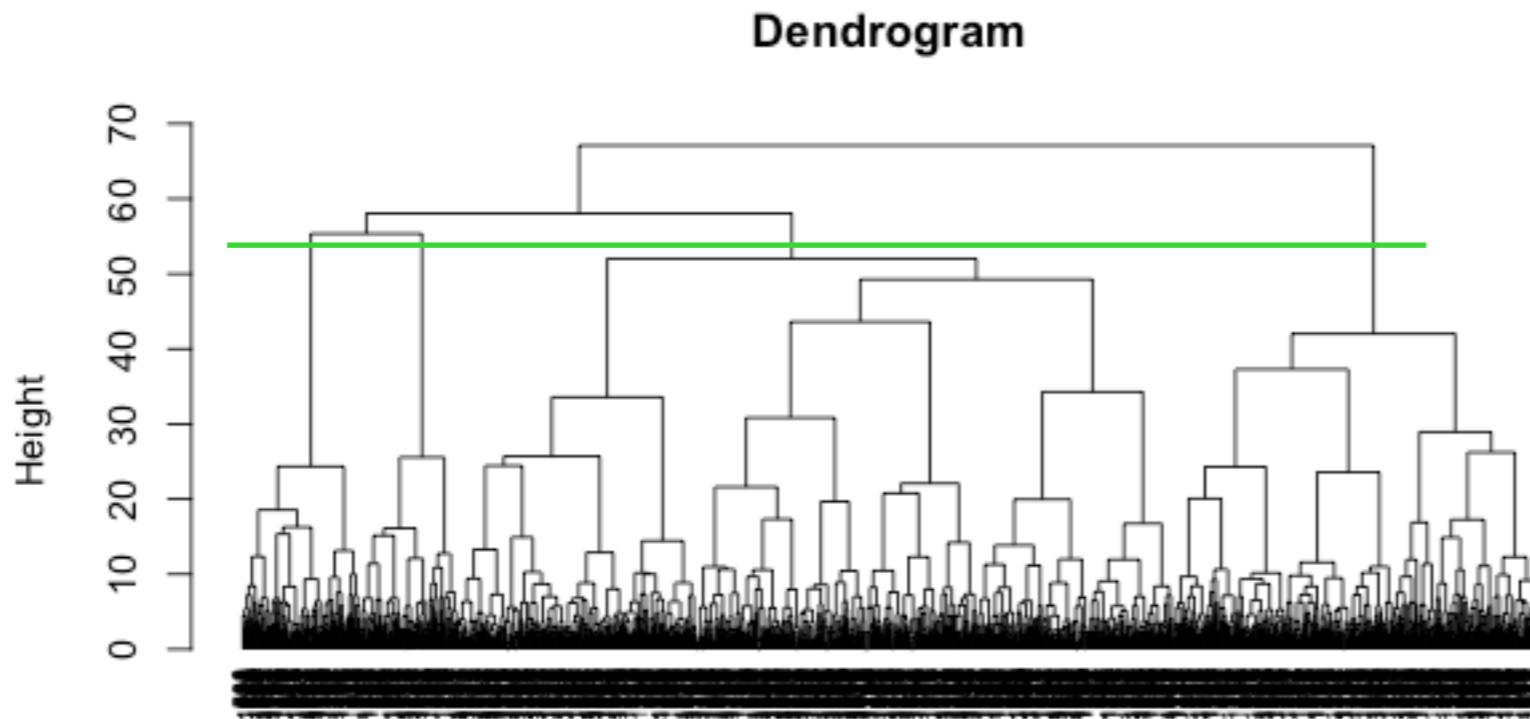
Clustering (Hierarchical): sat.levels

Agglomerative hierarchical clustering techniques produce partitions by a series of successive fusions of the n individuals into groups. It's based on distance matrix which can be calculated with Euclidean distances due to from the raw data may not be sensible when the variables are on very different scales.

The agglomerative coefficient for each clustering linkage method has been calculated, as a result, Ward's method better suits to data.



Clustering (Hierarchical): all data



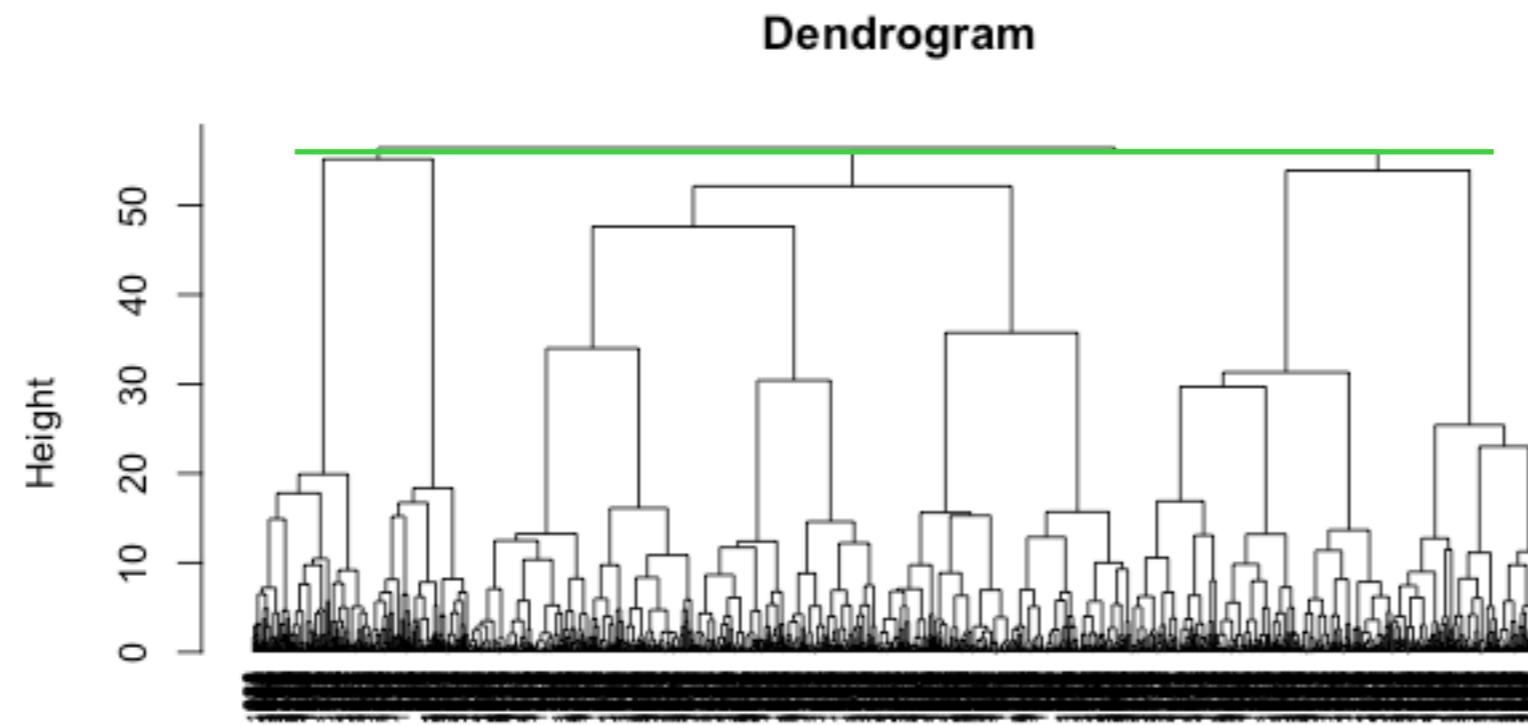
1st cluster: relocated unsatisfied with region of study male graduates from Natural Science with poor family's income

2nd cluster: relocated satisfied with region of study female graduates from Economics or STEM with medium family's income

3d cluster: stayed completely unsatisfied with region of study female graduates from Social Science with high family's income

4th cluster: stayed somehow satisfied with region of study male graduates from Medicine with high family's income

Clustering (Hierarchical): PCA + controls

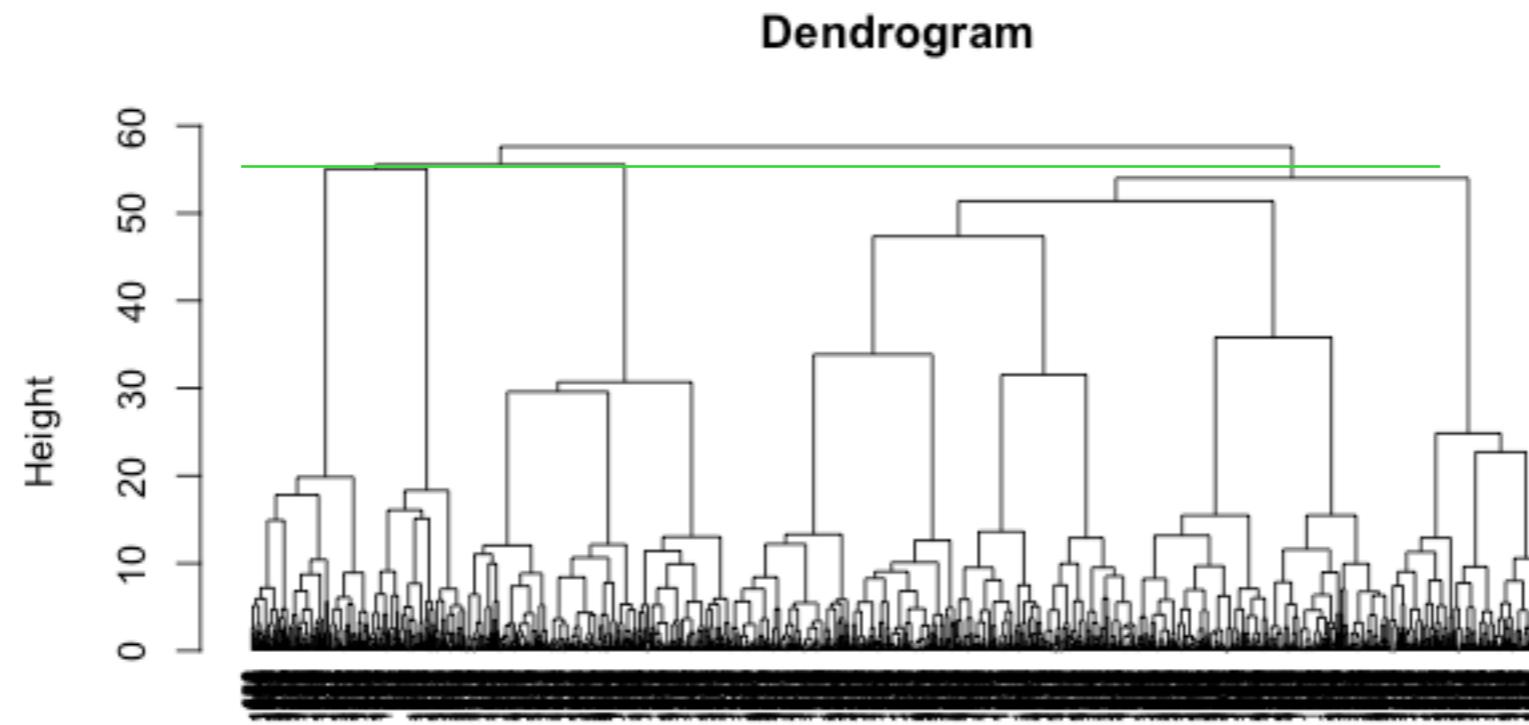


1st cluster: less satisfied with social factor and more satisfied with economical factor
male graduates from Natural or Medicine studies

2nd cluster: not really satisfied with social and economical factors male graduates from
Economics or STEM with poor or medium family's income

3d cluster: completely unsatisfied with region of study female graduates from Social
Science with high or rich family's income

Clustering (Hierarchical): NLPCA + controls

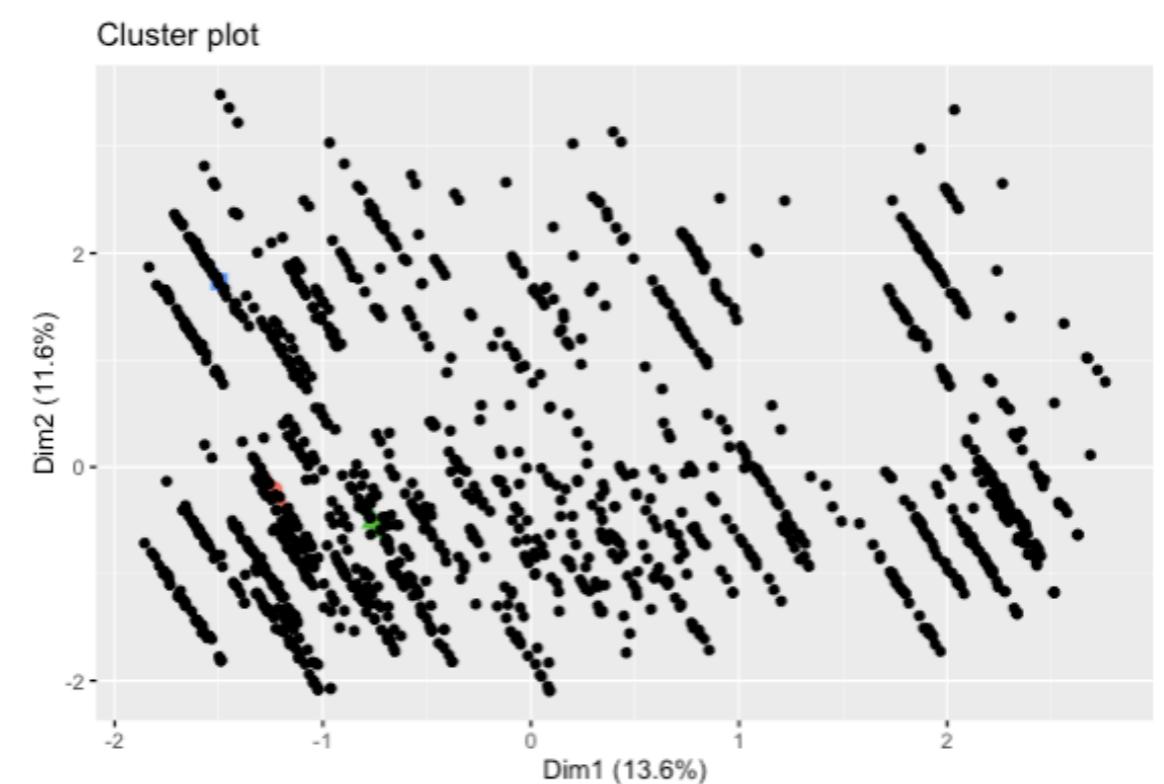
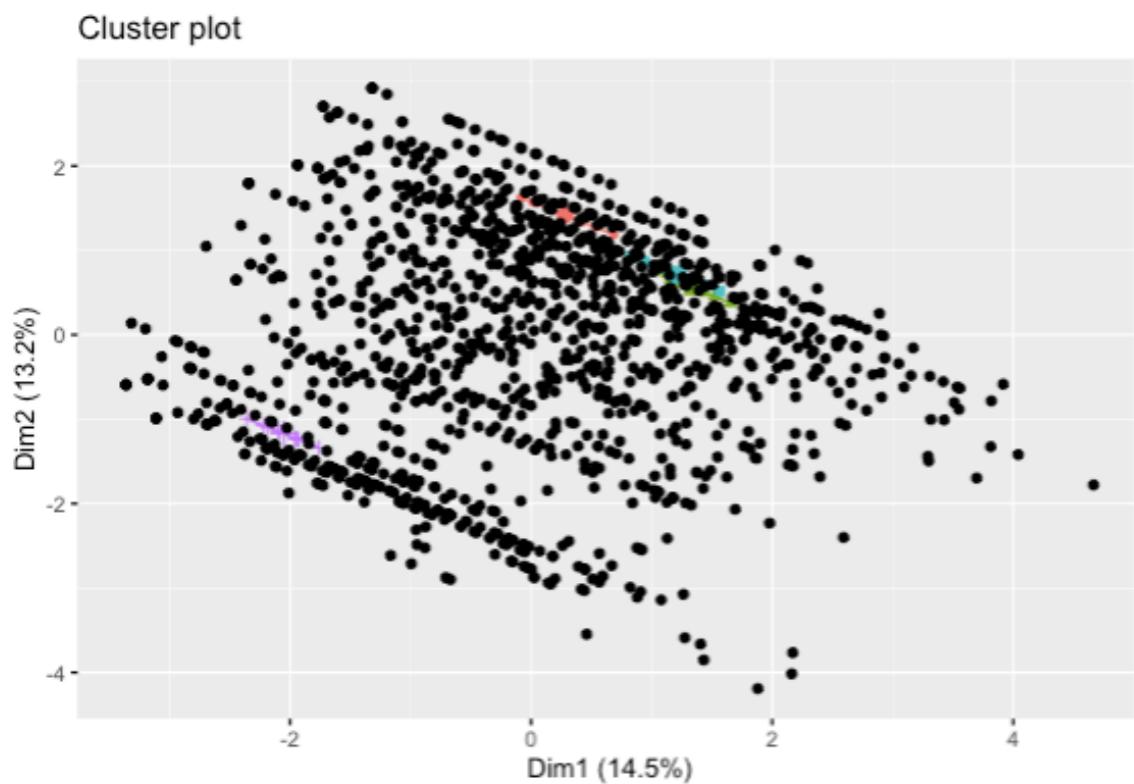
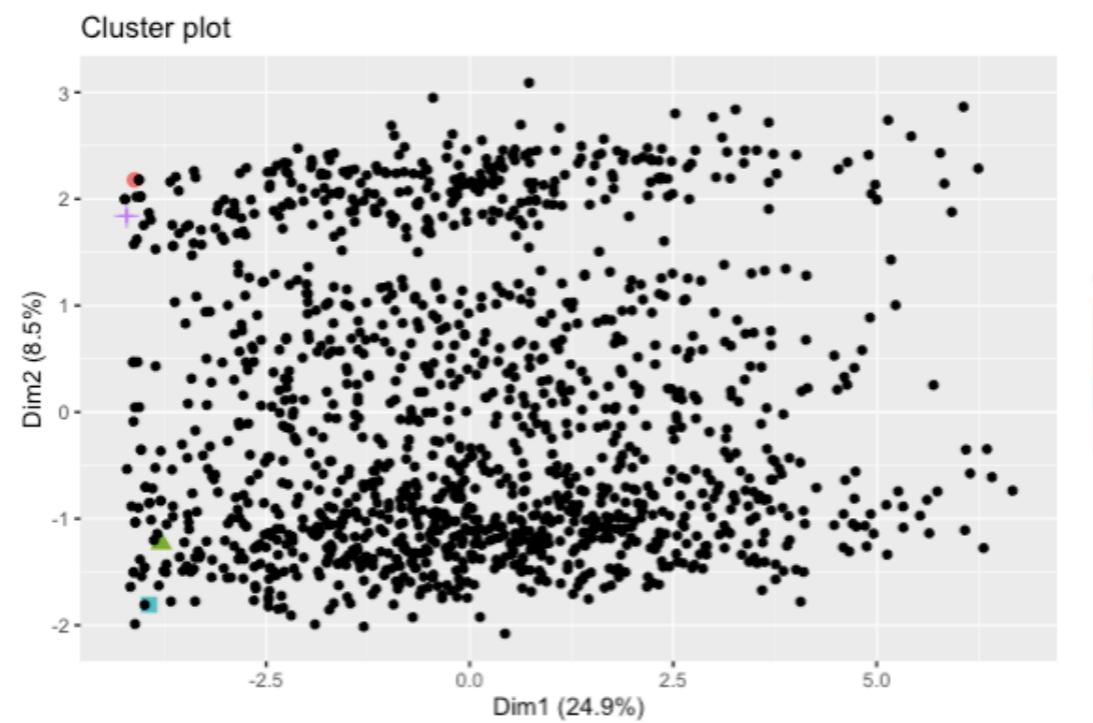


1st cluster: not really satisfied with life comfort and self-development factors graduates from Natural or Medicine studies with high family's income

2nd cluster: somehow satisfied with life comfort and self-development factors male graduates from Economics or STEM with rich family's income

3d cluster: less satisfied with life comfort factor and more satisfied with self-development factor male graduates from Social studies with poor family's income

Clustering: DBSCAN



Clustering: model-based

The approach to clustering is based on probability distribution. The best model is EEE (ellipsoidal, equal volume, shape, and orientation) with 7 components

