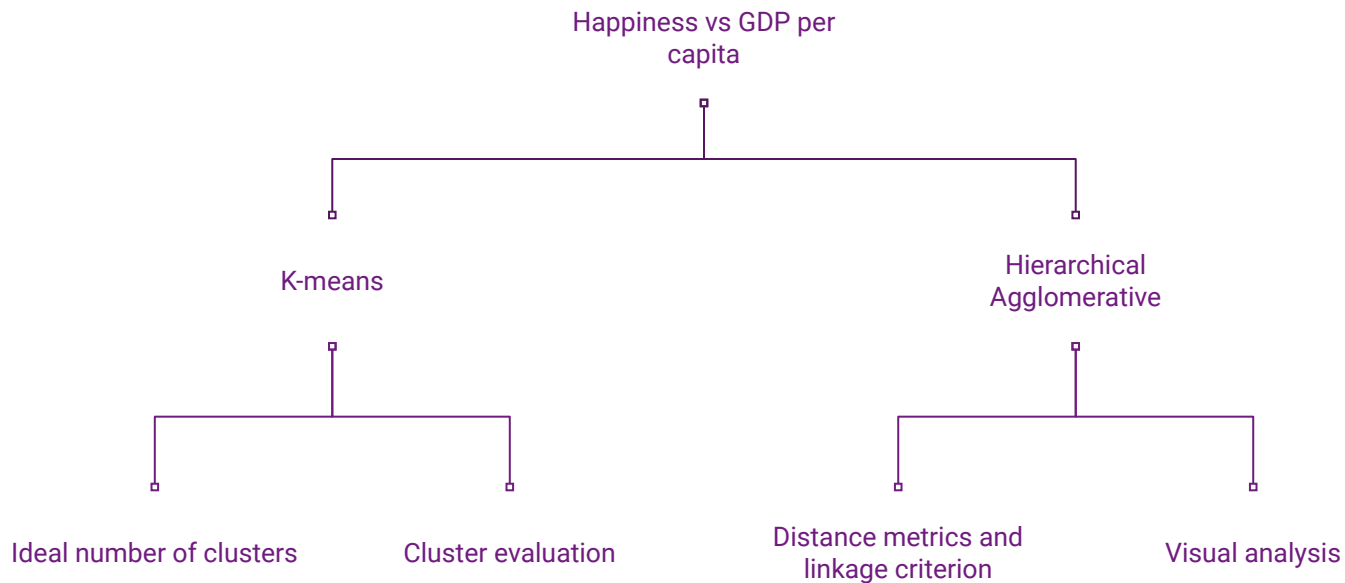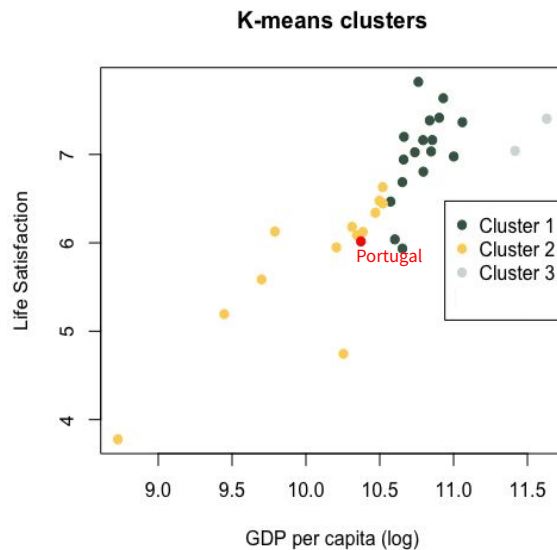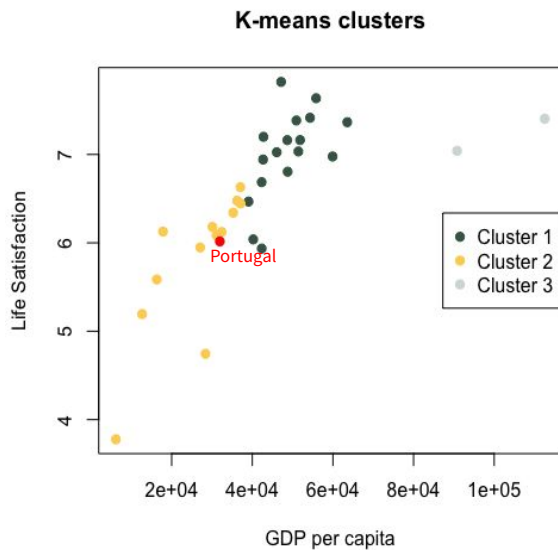# Use of Time per country Related to Life satisfaction

A Cluster, PCA and FA analysis.
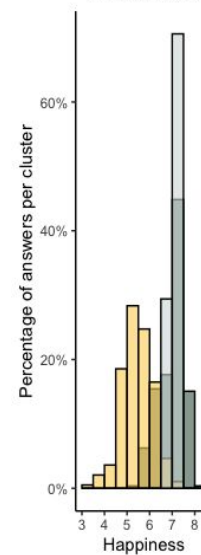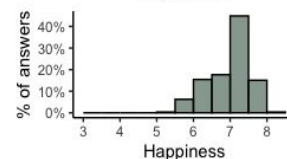
universidade
de aveiro

João António - 76558
Luís Costa - 85044
Frederico Vieira - 98518
Tijan Bah -111910

Q1: Clustering

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Q1: Results

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Q1: Results

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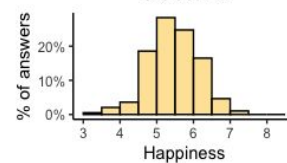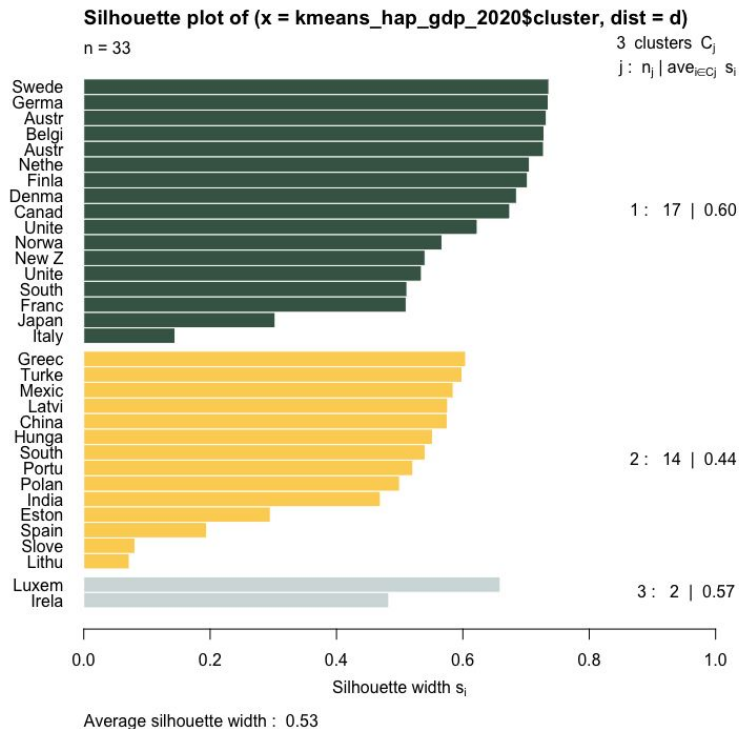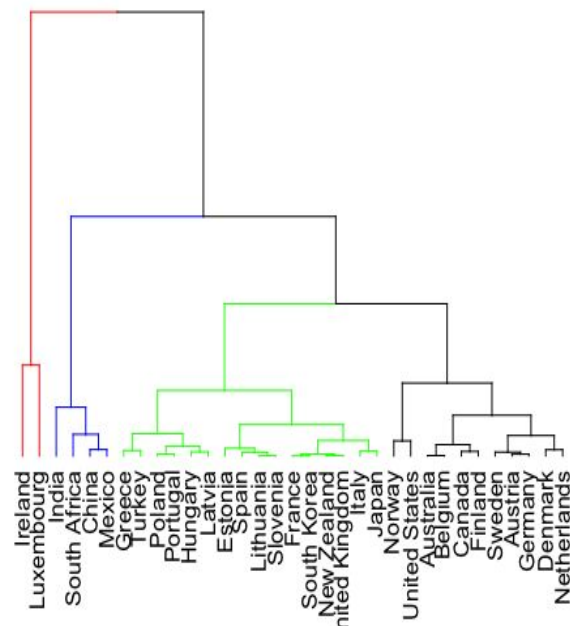
Q1: Unsuccessful attempts

K-means

Hierarc.

GDP

Dendogr.

Data points

Variables

Data points

Variables

Cluster the data points from the Time Use dataset using k-means.

Hierarchical clustering of the Time Use variables using Pearson correlation and furthest neighbour

Plot the data points based on their happiness and GDP

Plot a dendrogram of the clustered variables

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Q1: Conclusions

- Linear relationship between the increase in log of GDP per capita and Happiness.

- However, after a certain threshold money starts having less impact.

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Q2: Introduction

- Q2: What are the countries that are more similar in terms of time spent?

- We used Time_Use dataset.

- We used PCA and after it we used Clustering.

- We also wanted to know what Portugal could change to be a happier country?

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Q2: PCA

- In the PCA it was necessary to know the number of Components we would study.
- For that we used Variance Explained Vs Number of Principal Components graphs.
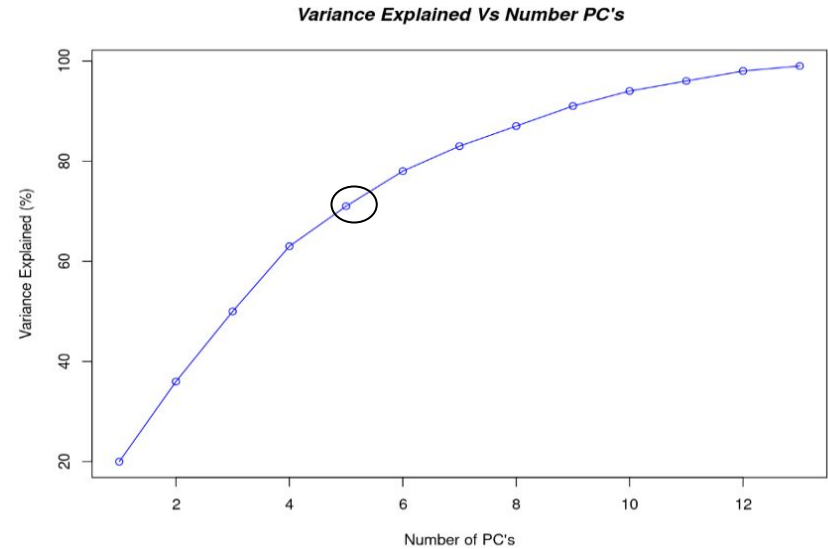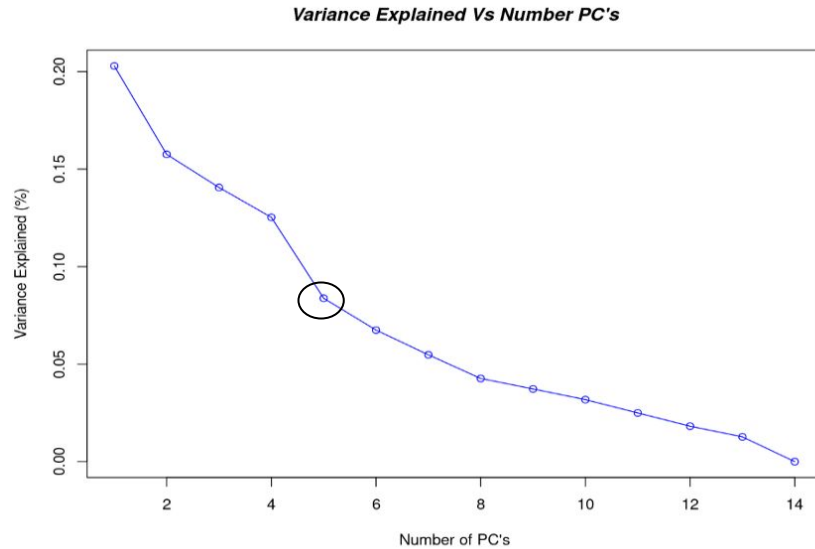
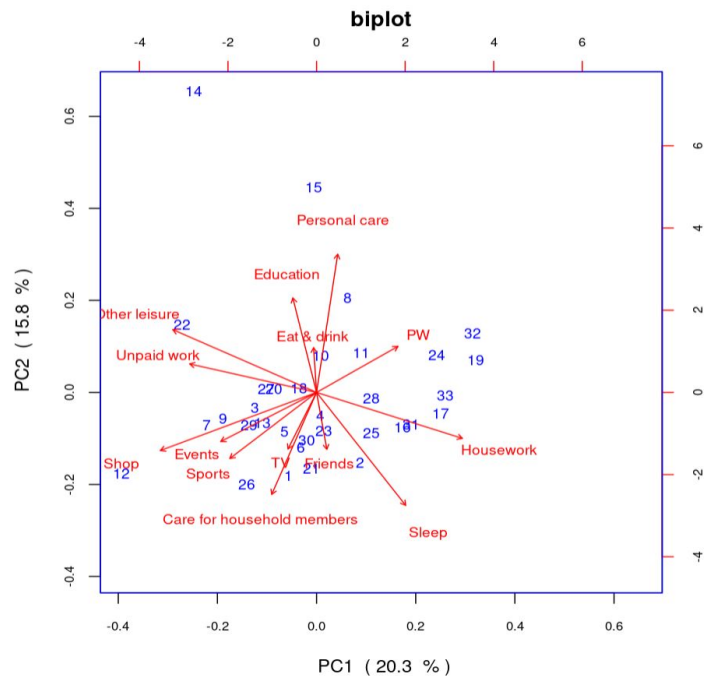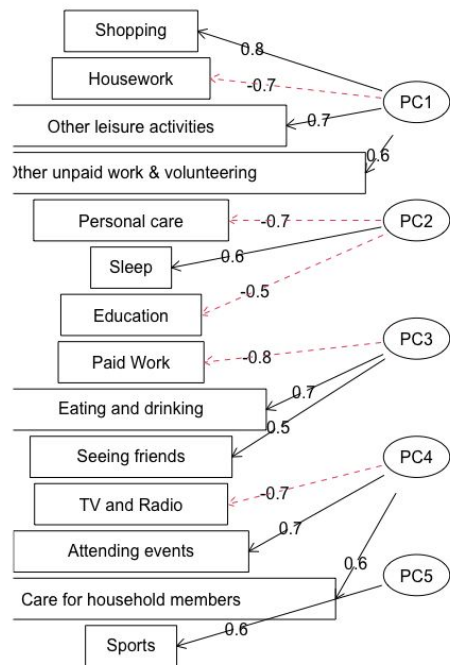All images from this slides were generated by the authors of the work

Q2: Results - PCA

Using PCA

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PC1	PC2	PC3	PC4	PC5
Hobbies + Tasks -	Sleep + Image -	Friends + Colleagues -	Outgoing + Home -	Sports

Number	Country
1	Australia
2	Austria
3	Belgium
4	Canada
5	Denmark
6	Estonia
7	Finland
8	France
9	Germany
10	Greece
11	Hungary
12	Ireland
13	Italy
14	Japan
15	Korea
16	Latvia
17	Lithuania
18	Luxembourg
19	Mexico
20	Netherlands
21	New Zealand
22	Norway
23	Poland
24	Portugal
25	Slovenia
26	Spain
27	Sweden
28	Turkey
29	UK
30	USA
31	China
32	India
33	South Africa

9

Q2: Results - Clustering after PCA

- We use the NbClust function of R.

- We get number 5 as the ideal number of clusters.

- We use Kmeans function to create clusters.

Silhouette plot of (x = dados2G$cluster, dist = D)

n = 33   5 clusters C_j
$j : n_j | ave_{i \in C_j} s_i$

Cluster	values
1 :	11 | 0.15
2 :	1 | 0.00
3 :	2 | 0.12
4 :	12 | 0.13
5 :	7 | -0.14

Silhouette width s_i

Average silhouette width : 0.08
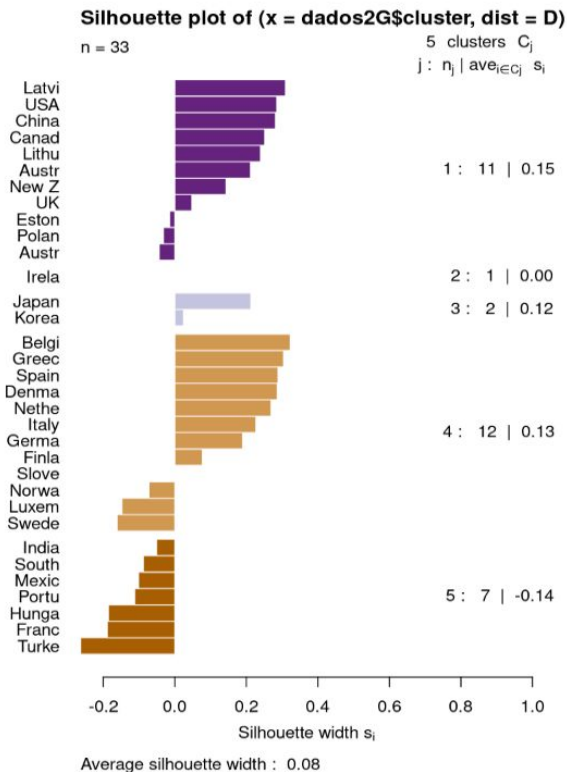
Q2: Conclusion

- Portugal should dedicate :
    - Less time in tasks;
    - Less time leisure activities;
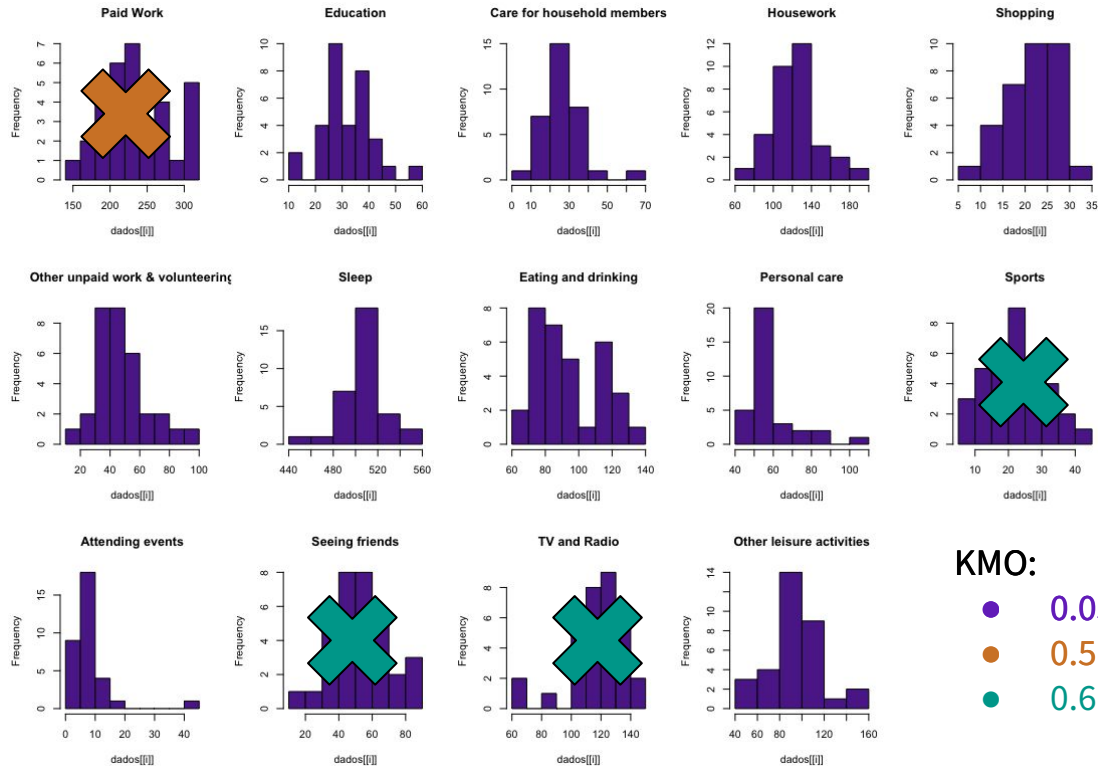   - Change mindset in terms of work and education;

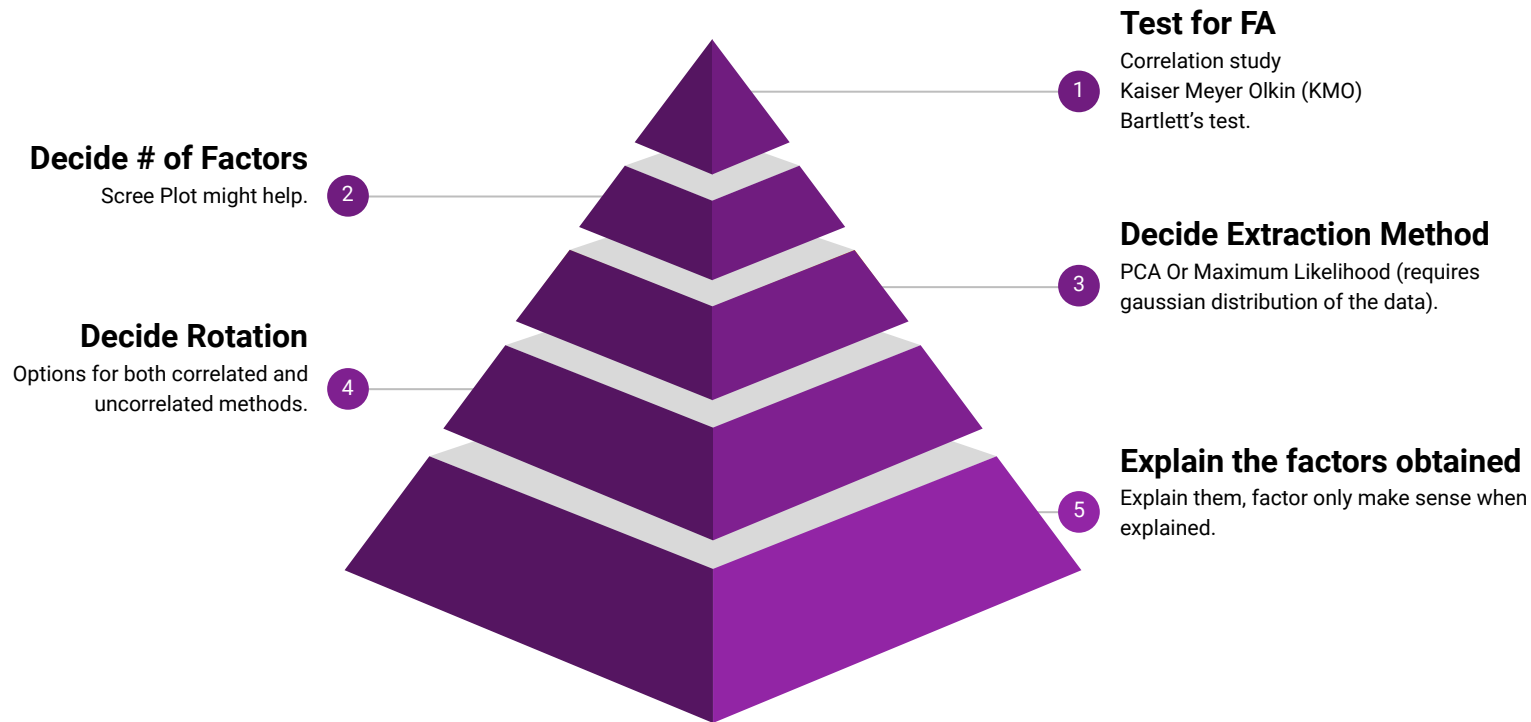| PC1	PC2	PC3	PC4	PC5
Hobbies + Tasks -	Sleep + Image -	Friends + Colleagues -	Outgoing + Home -	Sports

All images from this slides were generated by the authors of the work

Q3: FA on time use

KMO:
- 0.05
- 0.5
- 0.6

Q3: Factorial Analysis

Test for FA
Correlation study
Kaiser Meyer Olkin (KMO)
Bartlett's test.
1

Decide # of Factors
Scree Plot might help.
2

Decide Extraction Method
PCA Or Maximum Likelihood (requires gaussian distribution of the data).
3

Decide Rotation
Options for both correlated and uncorrelated methods.
4

Explain the factors obtained
Explain them, factor only make sense when explained.
5

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Q3: Factors

Using PCA

Maximum Likelihood

Factor 2 **Sense of community**	**Factor 4** **Egoism (+)** **Altruism (-)**
Factor 1 **Chores (-)** **Hobbies (+)**	**Factor 3** **How other view us**

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Q3: Cluster after FA

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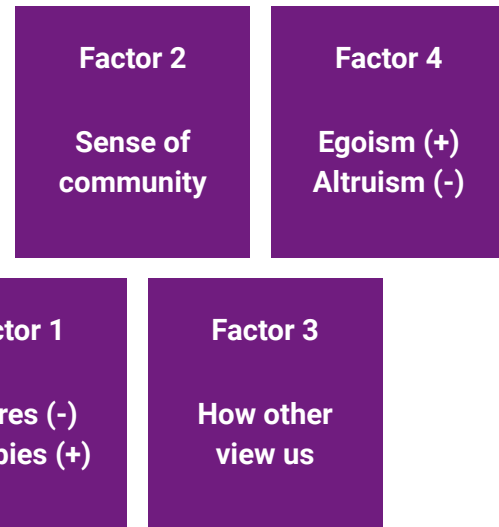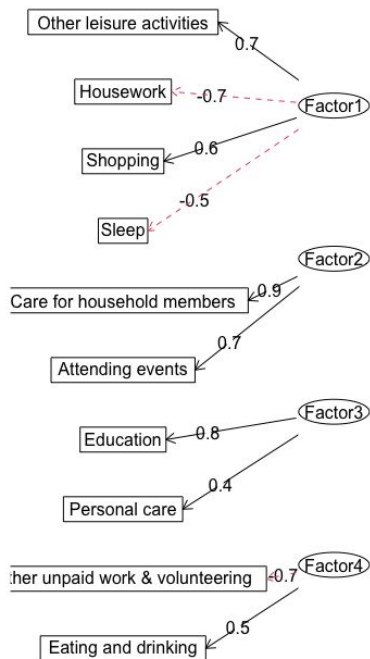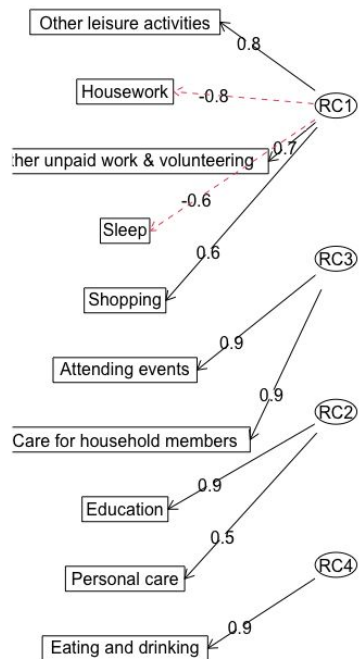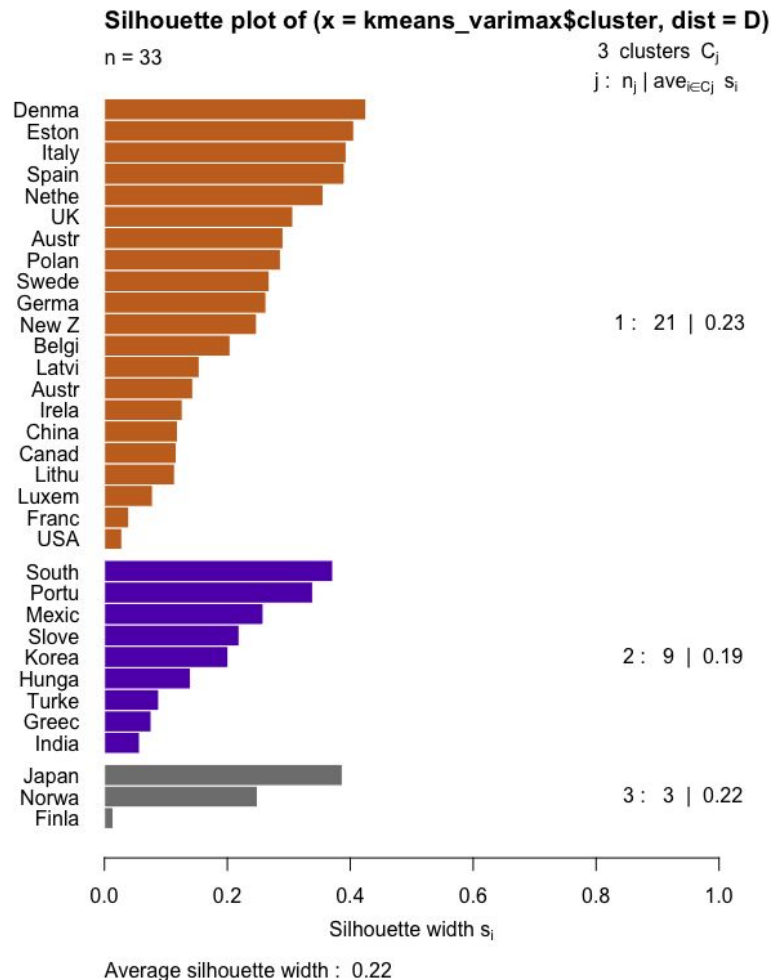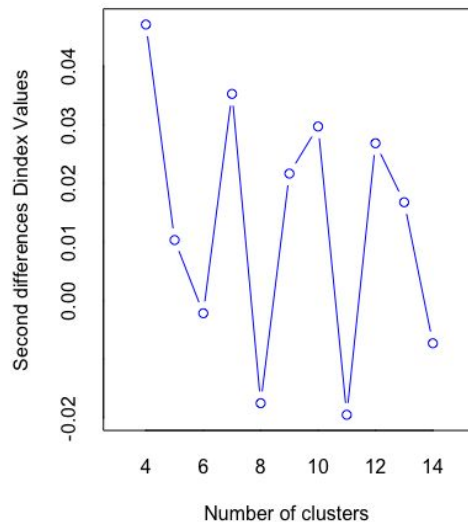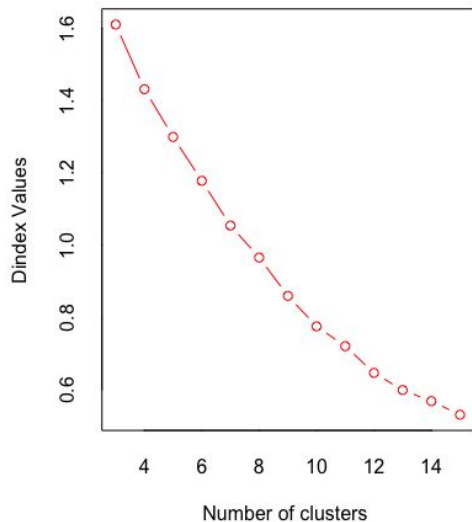
Q3: Conclusions

Reduce Factor 1

- Change the mindset about responsibilities;
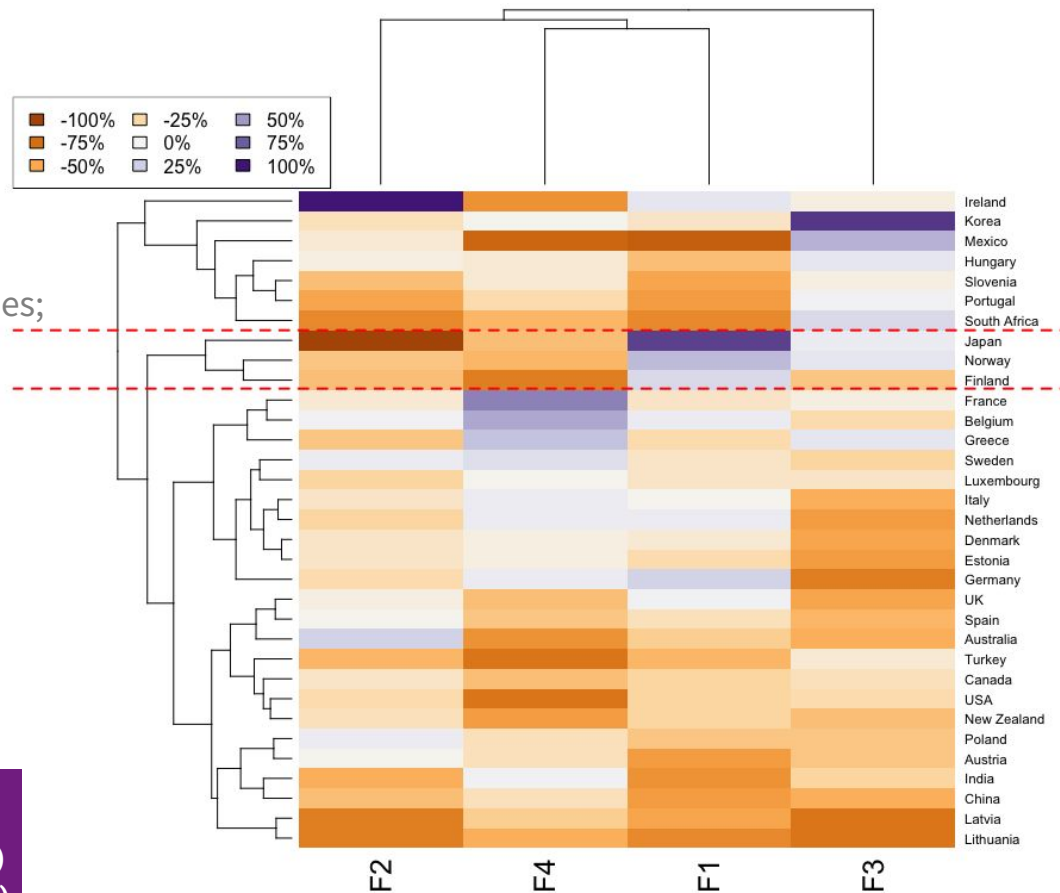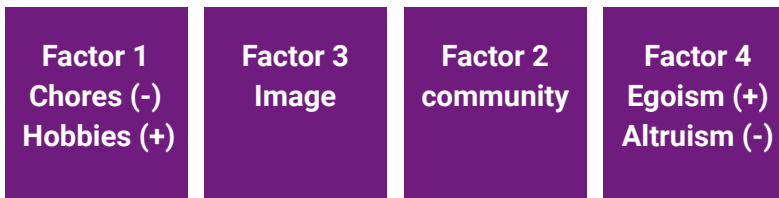- Increase our hobbies

Decrease Factor 4

- Be more altruistic;

| Factor 1 Chores (-) Hobbies (+) | Factor 3 Image | Factor 2 community | Factor 4 Egoism (+) Altruism (-) |

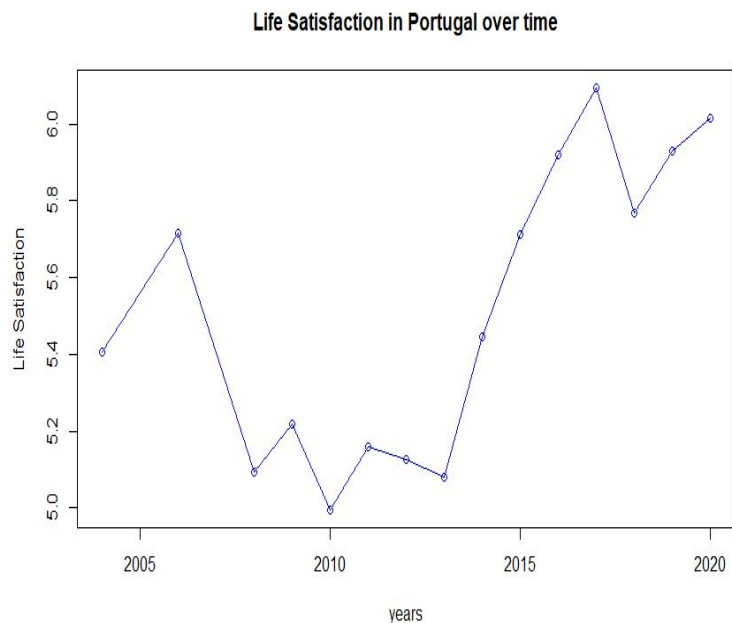All images from this slides were generated by the authors of the work

Q4.1: Introduction

- Evolution of life satisfaction in Portugal ?

- Columns and rows extraction for life satisfaction and years.

- R plot command is used.

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Q4.1: Results

Life Satisfaction in Portugal over time

- Minimum life satisfaction is 4.834 in 2010

- Maximum life satisfaction is 6.234 in 2017

- 2007 to 2009 world recession could be a factor that reduce life satisfaction.

- 2008 outbreak of acute norovirus gastroenteritis in Proto could also be another factor.

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Q4.2: Introduction

- Life satisfaction in other countries?

- We choose 6 countries from 6 different continent.

- Columns and rows extraction for life satisfaction and years for 6 countries.

- Time series is used for the graphing.

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Q4.2: Results

Life Satisfaction over time in different countries
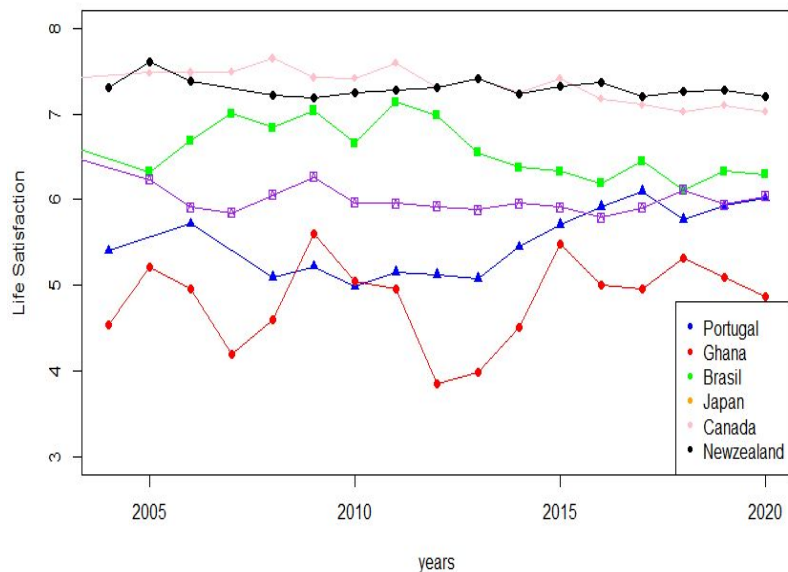
- Canada has the highest and Ghana has the lowest life satisfaction.
- Global recession reduced life satisfaction in most of the countries except Ghana.
- Ghanian life satisfaction might depend on social well being.
- Covid19 period might be a factor for reduction of life satisfaction.

Portugal	Ghana	Brasil	Japan	Canada	New Zealand
Europe	Africa	South America	Asia	North America	Australia

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Q4: Conclusions

- Outbreak and global crises can reduce life satisfaction.

- Life satisfaction can depend on social well being.

- Life satisfaction is a self assessment.

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Final Work Conclusions

From Q1

- Increasing the GDP to at least the threshold level
- Money is not the only factor for happiness

From Q2

- Change the mentality about the work
- Set goals
- Less time on tasks and leisure activities

From Q3

- + altruistic
- - negative about possible chores
- + hobbies

From Q4

- Life satisfaction depend one's assessment of it.