

The Pursuit of Happiness Factors

: What Factors Correlate More with Happiness?



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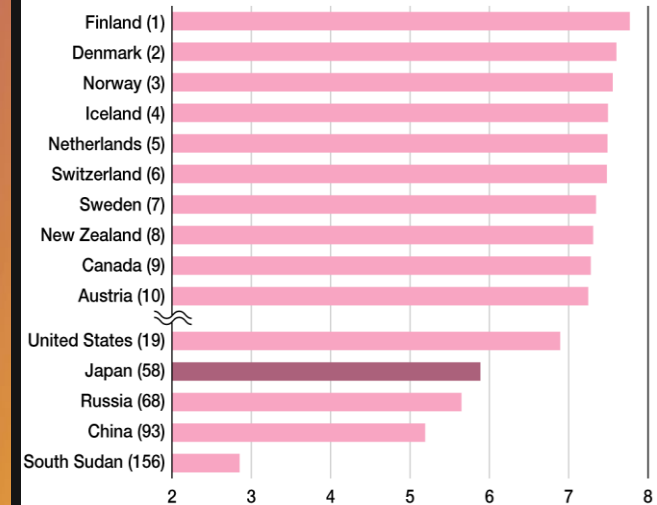
Motivation

- It all started with one report,
" *The World Happiness Report 2019* (Gallup)."
- Hmm.. Why some countries are happy and others are miserable? What factors correlate more with happiness?
- Wait, it's great for practicing what we've learned so far!

World Happiness Report 2019

MARCH 20, 2019
The World Happiness Report is a landmark survey of the state of global happiness that ranks 156 countries by how happy their citizens perceive themselves to be. This year's World Happiness Report focuses on happiness and the community: how happiness has evolved over the past dozen years, with a focus on the technologies, social norms, conflicts and government policies that have driven those changes.

2019 Ranking of Happiness by Country



Introduction

- 'The World Happiness Report' is a landmark survey of the state of global happiness that ranks **156 countries** by **how happy their citizens perceive themselves to be**.
- So, we tried to find important factors that are strongly correlated to the level of happiness among 11 indices:
 - 1) GDP per capita, 2) Healthy life expectancy,
 - 3) Social Support, 4) Freedom, 5) Generosity,
 - 6) Trust in government, 7) Unemployment Rate,
 - 8) Birth Rate, 9) Obesity Rate, 10) Population Density,
 - and 11) Weather
- "11 indices? Are you kidding?"
" Yeah.. They are Eleven.. And we did it!"

Data

"11 indices mean... Bunch of Data!!"

- Many websites were searched through....
: **Kaggle, WorldHappiness.report, CIA, Data.World, WorldBank, OECD, WorldEconomicForum, Gallup, etc.**
- Three APIs utilized...
: **World Bank API, OpenWeatherMap API, Google Maps**
- As a result,
Roughly **30 csv files** were downloaded and created...!

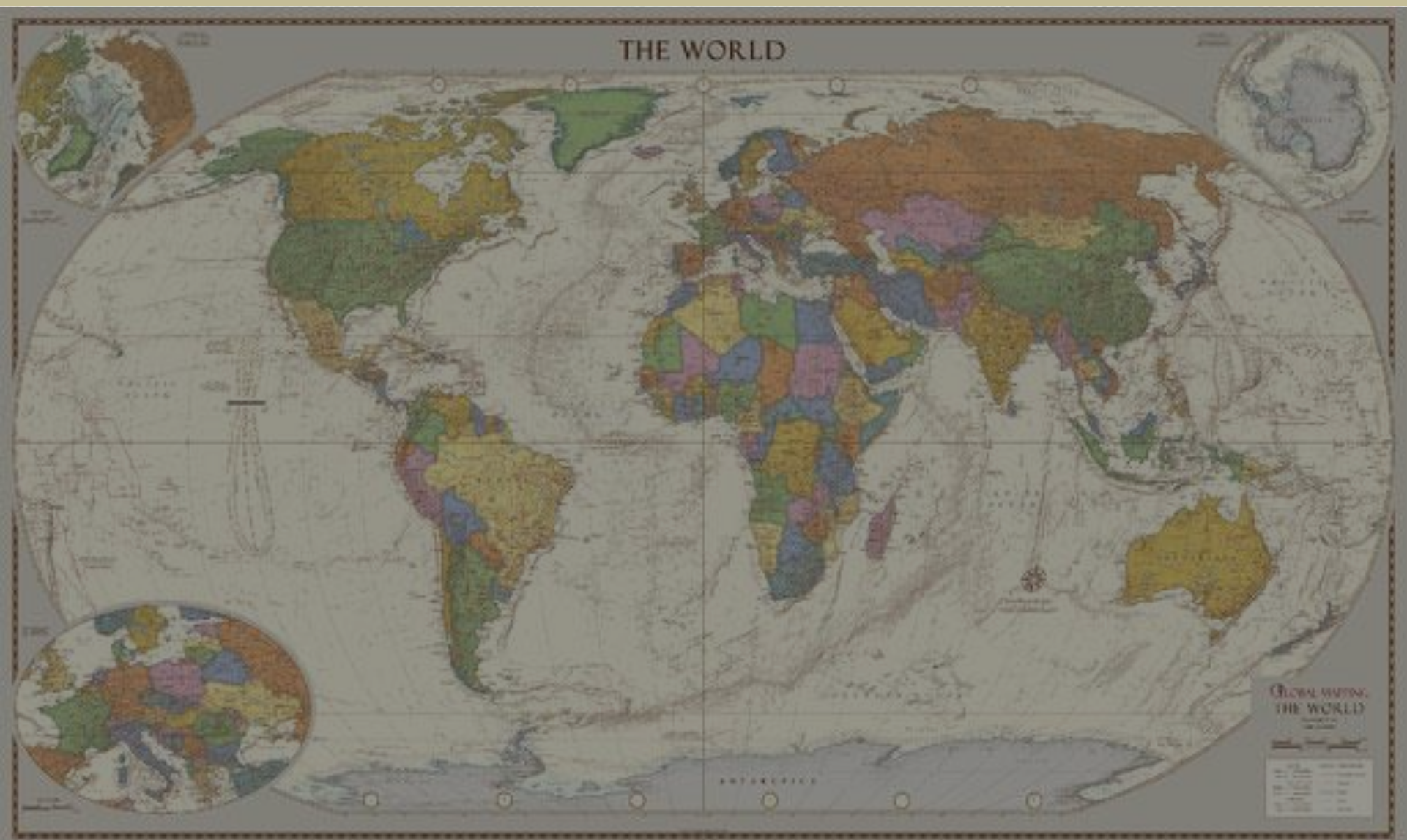
Data Clean Up & Exploration

- Data Clean Up & Format
: Pandas, Jupyter Notebook, Excel
- Data Analysis
: Matplotlib, SciPy, Numpy, Pandas,
Pandas.plotting(scatter matrix, table)
- Visualization
: Line Graph, Bar Graph, Pie Graph, Box Plot,
Scatter Plot, Scatter Matrix, Geographical Heatmap

Questions (contents)

- I** | What are the Characteristics of 'Happy' vs. 'Miserable' Countries?
- II** | What 'Factors' Correlate More With the Level of Happiness?
- III** | Why and How are the 'Top Two Factors' Strongly Related to Happiness?

I. What are the Characteristics of 'Happy' vs. 'Miserable' Countries?



How 'Happy' Are You??

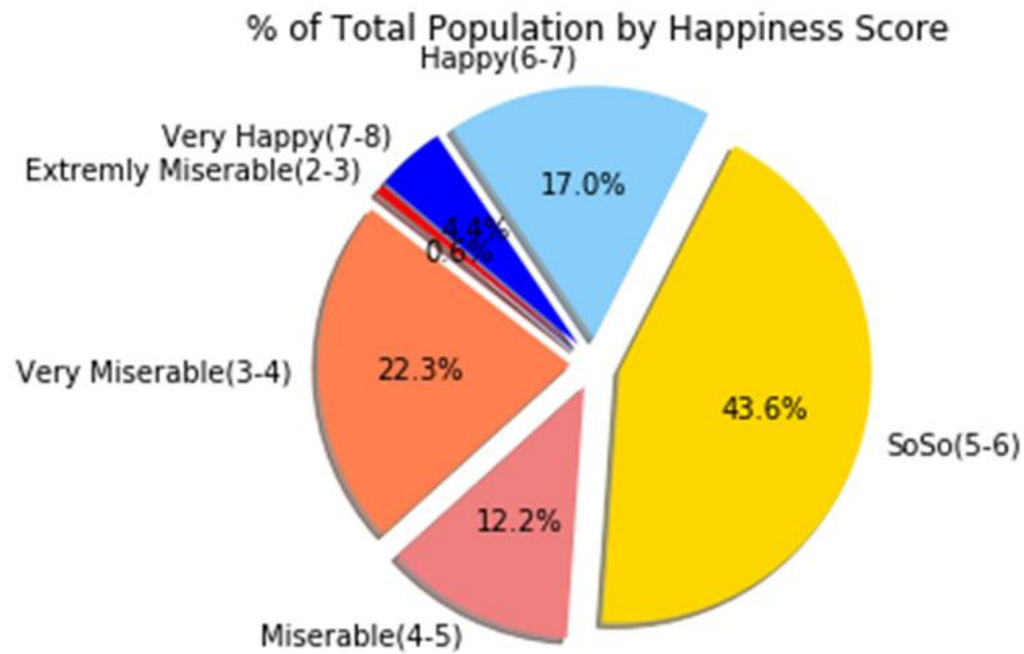
Let's start off with rating your current life on 1 to 10 scale.



What about the World?

Where do you belong?

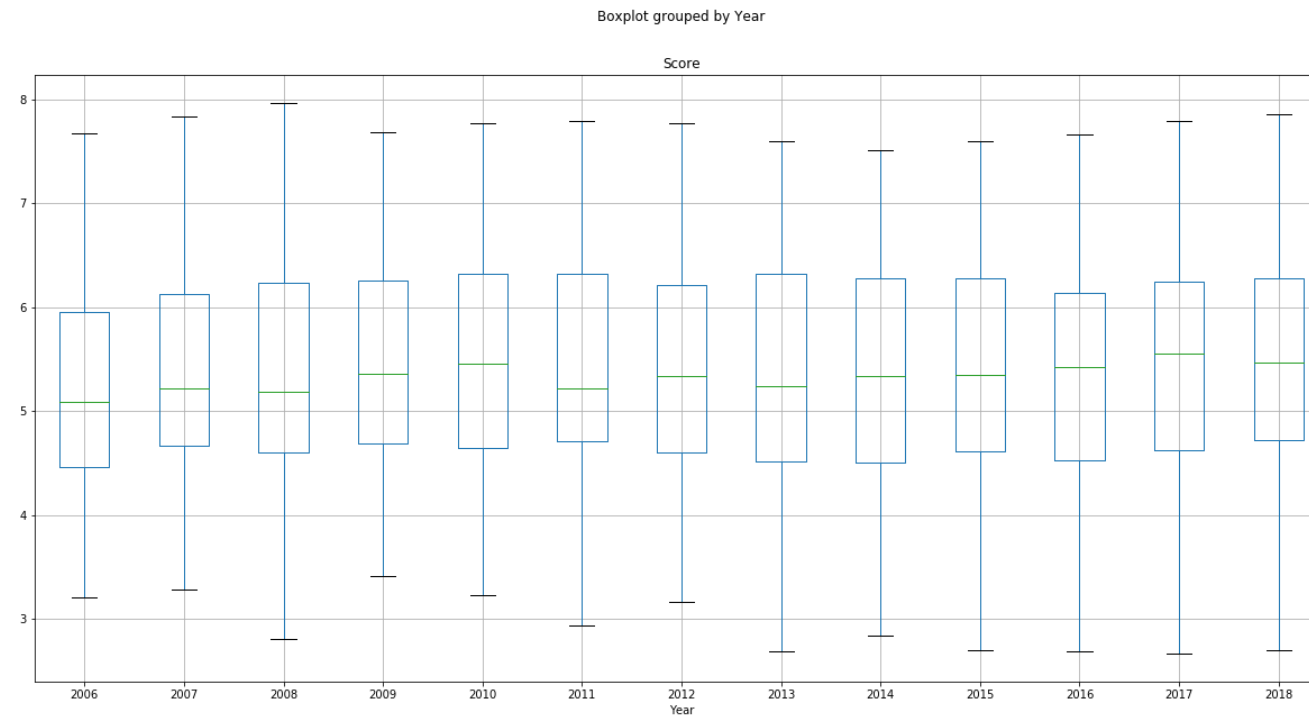
% of Total Population by Happiness Score



Global Happiness Trend

The overall happiness level hasn't changed a lot...

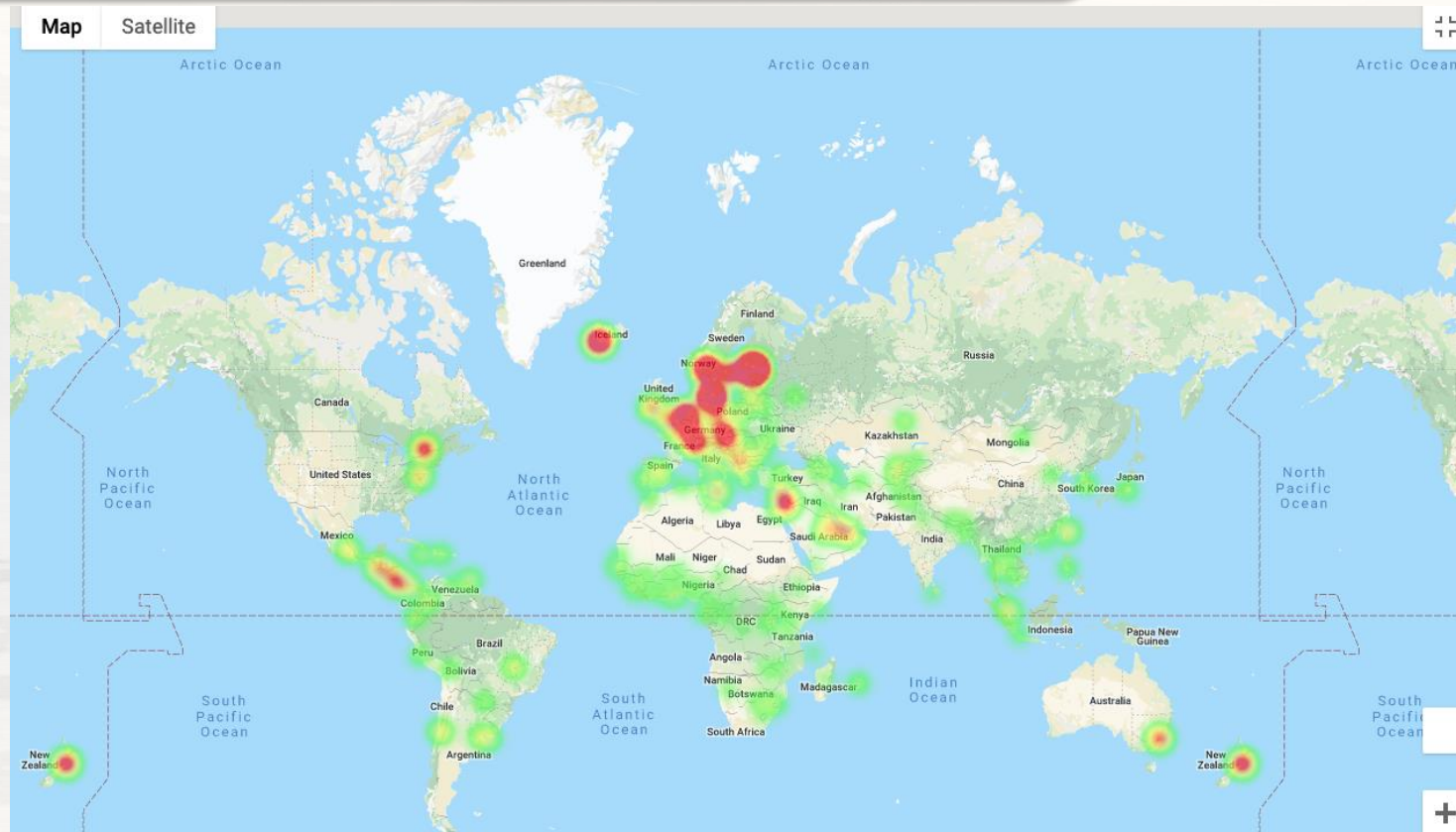
Happiness Scores Grouped by Year (2006 ~ 2018)



What are the 'Happiest' Countries?

The Lucky Ones are Finland, Denmark, Norway, Iceland, Netherlands, Switzerland, Sweden, New Zealand, Canada, Austria, Australia...

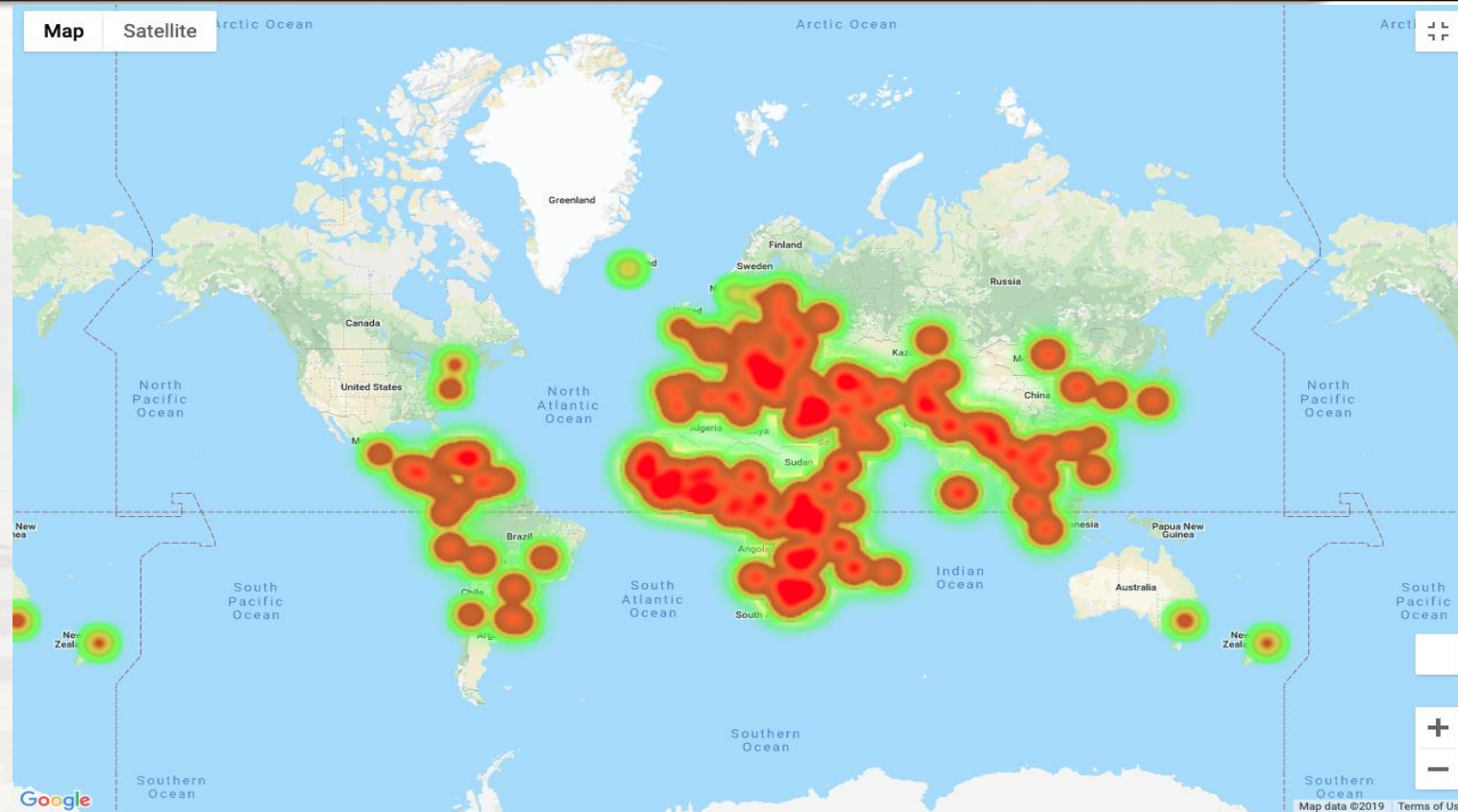
Happiest Countries in the World (Capital Cities)



What are the most 'Miserable' Countries?

They are South Sudan, Central African Republic, Afghanistan, Tanzania, Rwanda, Yemen, Malawi, Syria, Botswana, Haiti, Zimbabwe, Brundi...

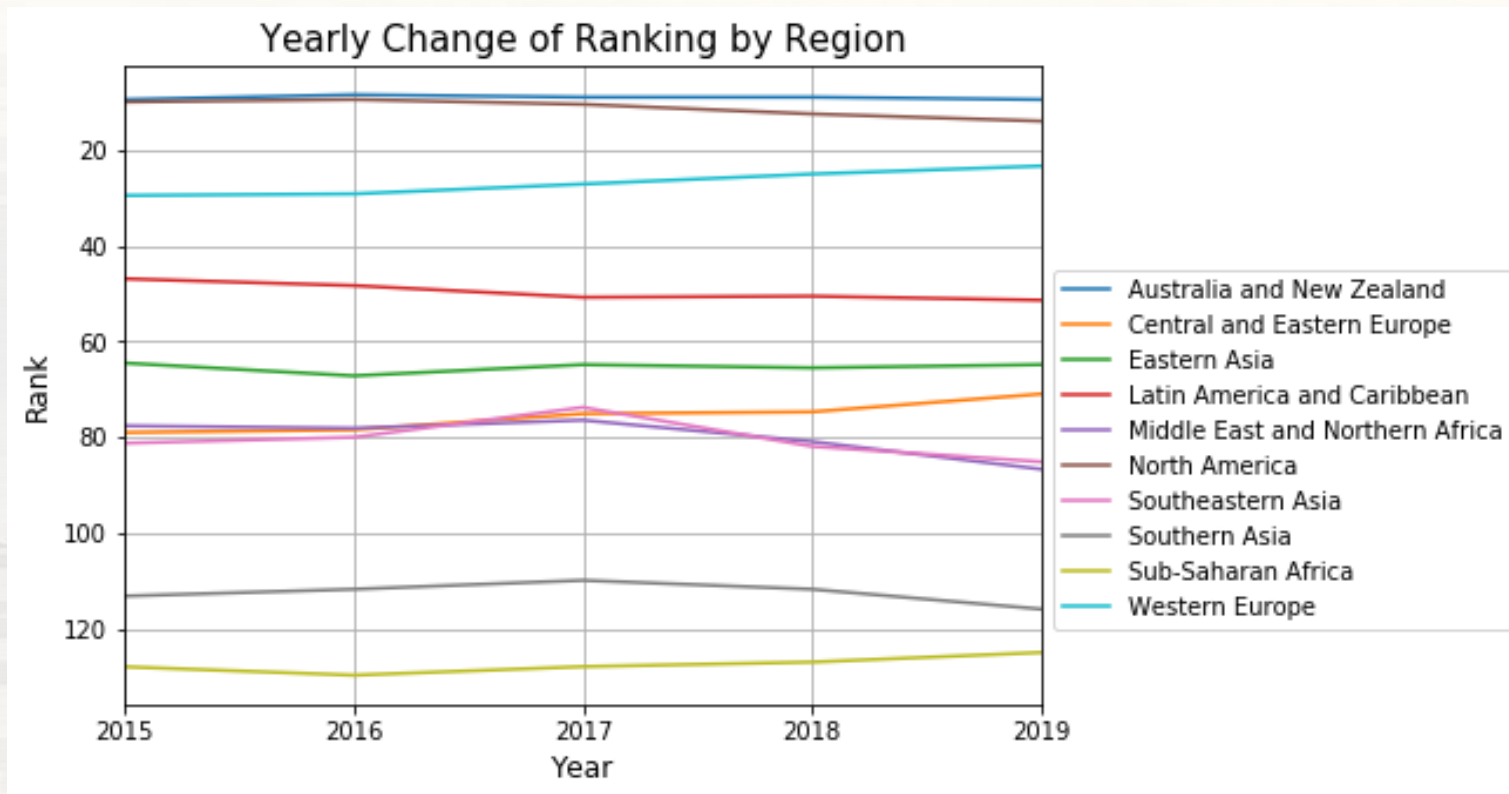
Most Miserable Countries in the World (Capital Cities)



Regional Trend

But, Look at all the differences by region!

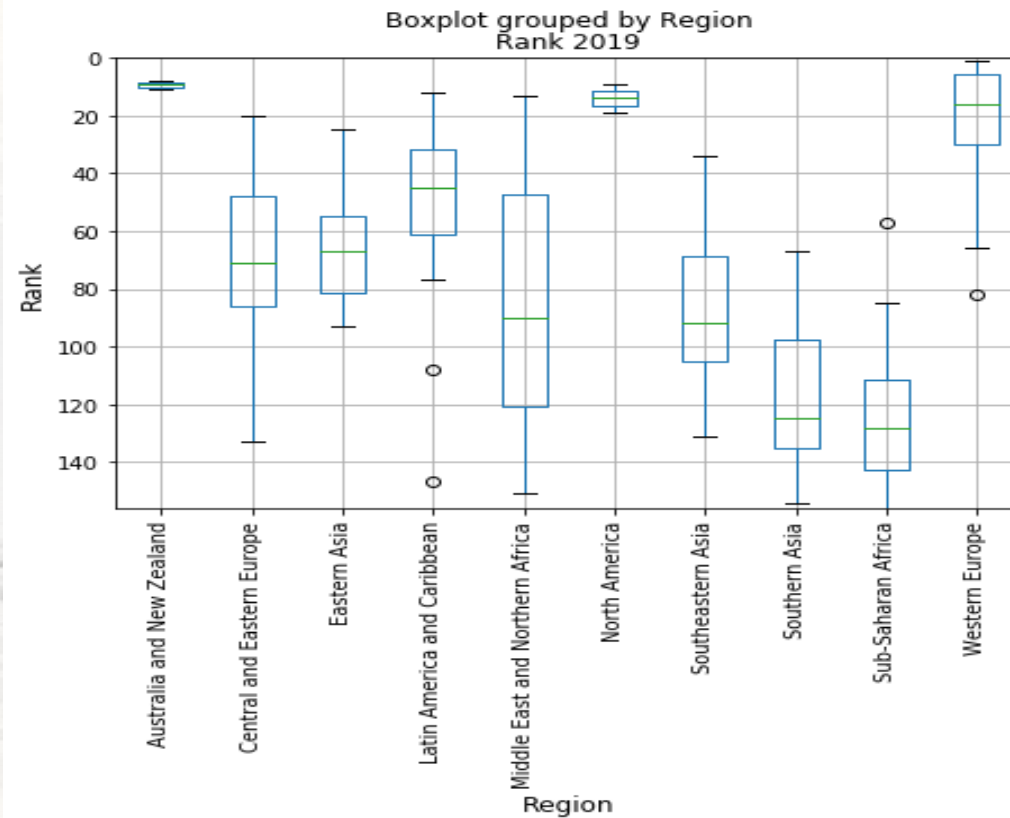
Yearly Change of Ranks by Region



Regional Variance in 2019

Variances also differ by region!

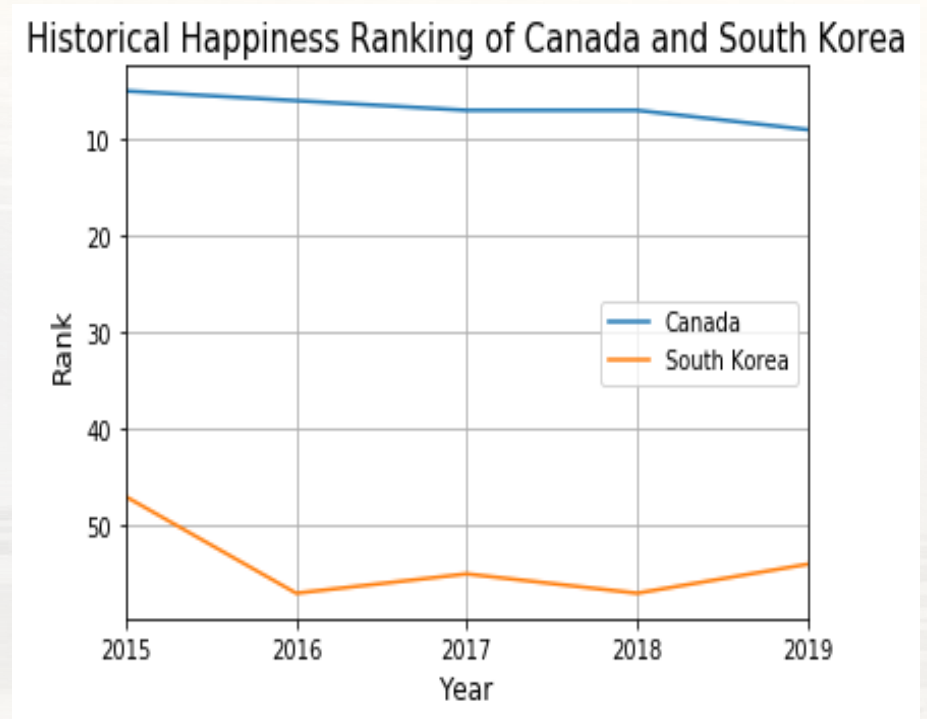
Boxplot Grouped by Region Rank 2019



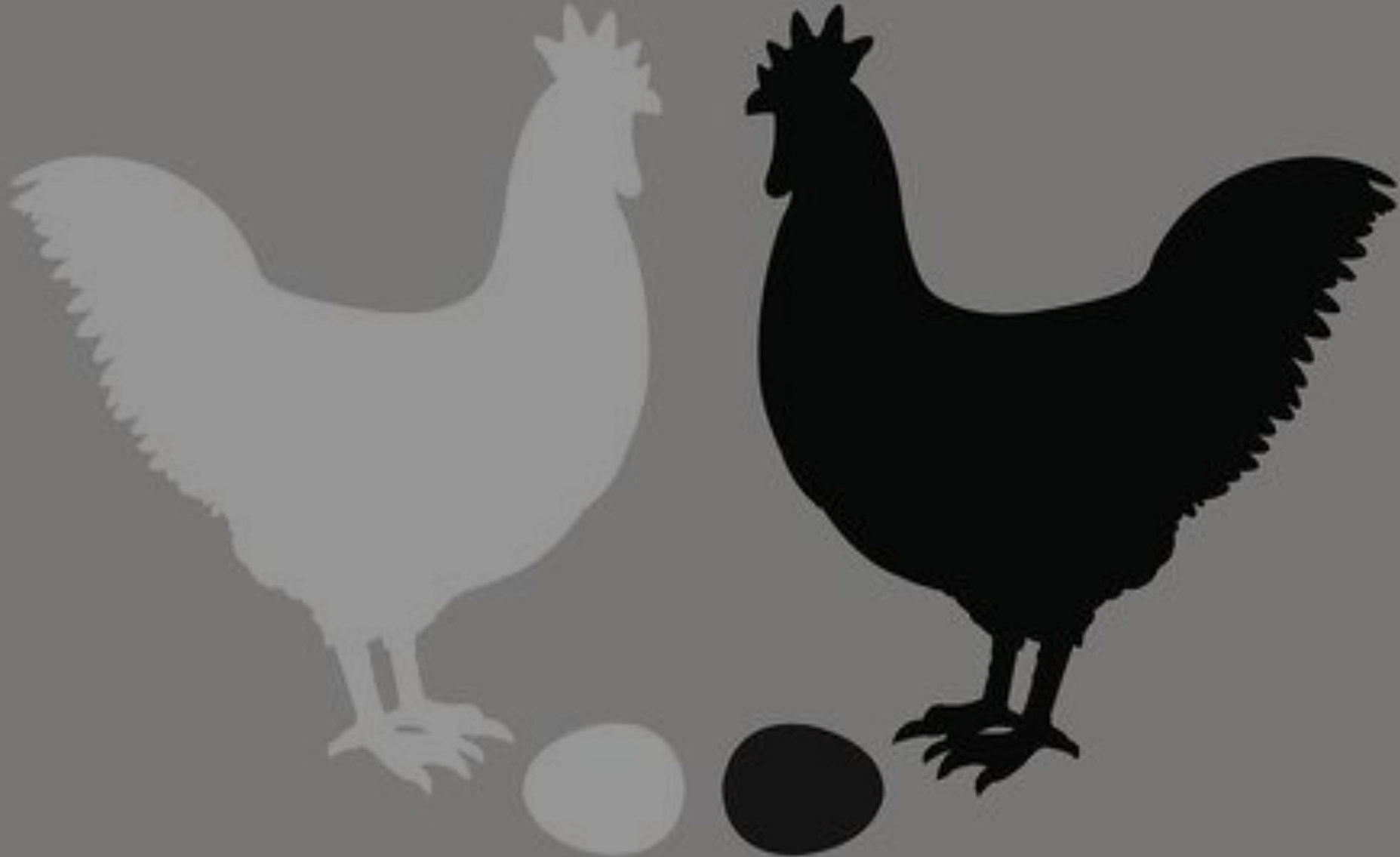
Any Specific Interest?

Want to know more about each country?

Happiness Level Trend of Canada and South Korea



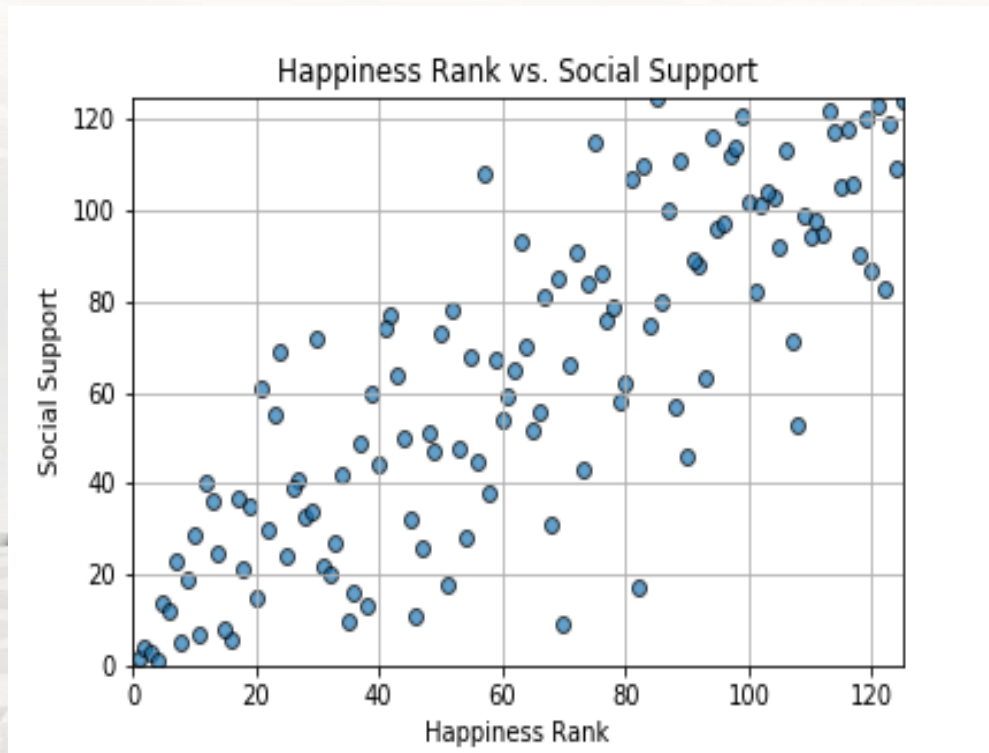
II. What 'Factors' Correlate More With the Level of Happiness?



Factor Correlation Analysis

Social Support and Life Expectancy are highly correlated with Happiness

1) Social Support



2) Healthy Life Expectancy



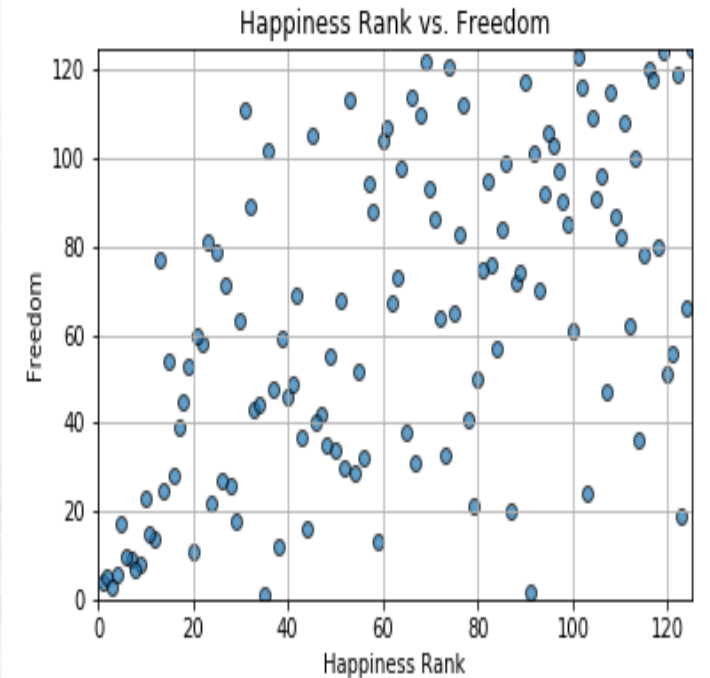
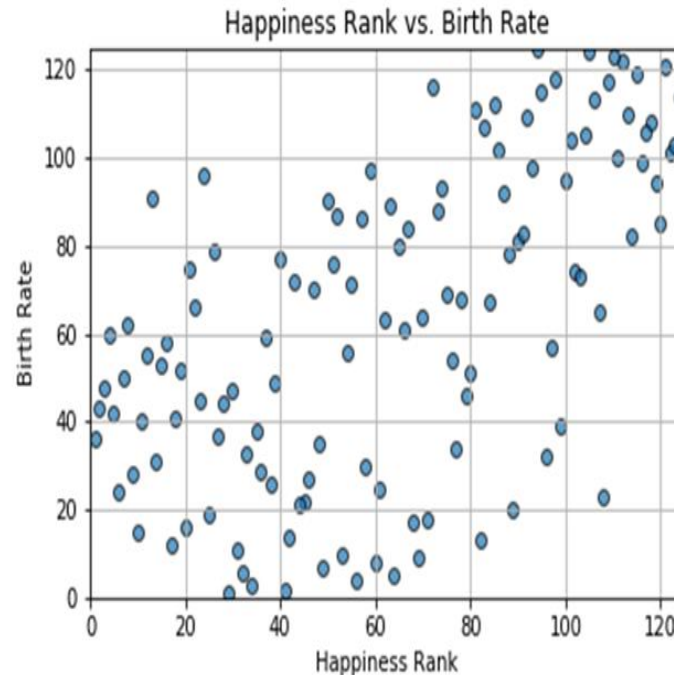
Factor Correlation Analysis

GDP, Birth Rate, and Freedom are moderately correlated with Happiness

3) GDP per Capita

4) Birth Rate

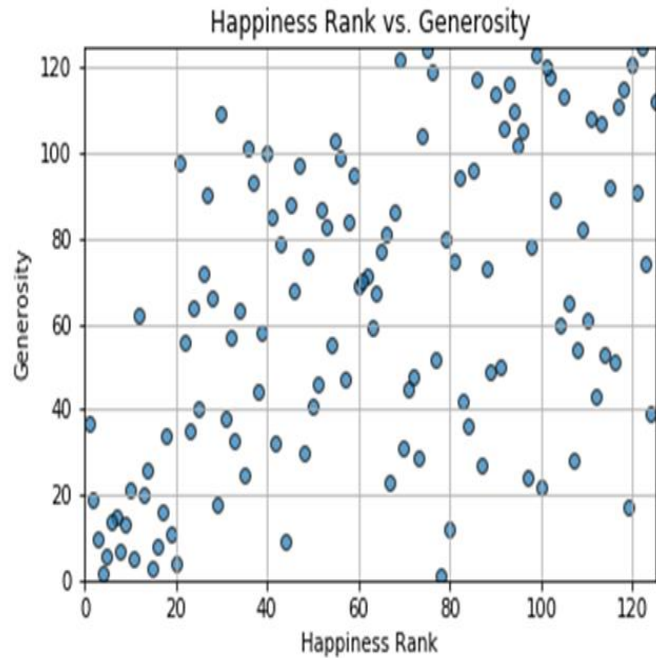
5) Freedom



Factor Correlation Analysis

Generosity, Obesity, Unemployment show low correlation with Happiness

6) Generosity



7) Obesity Rate



8) Unemployment Rate



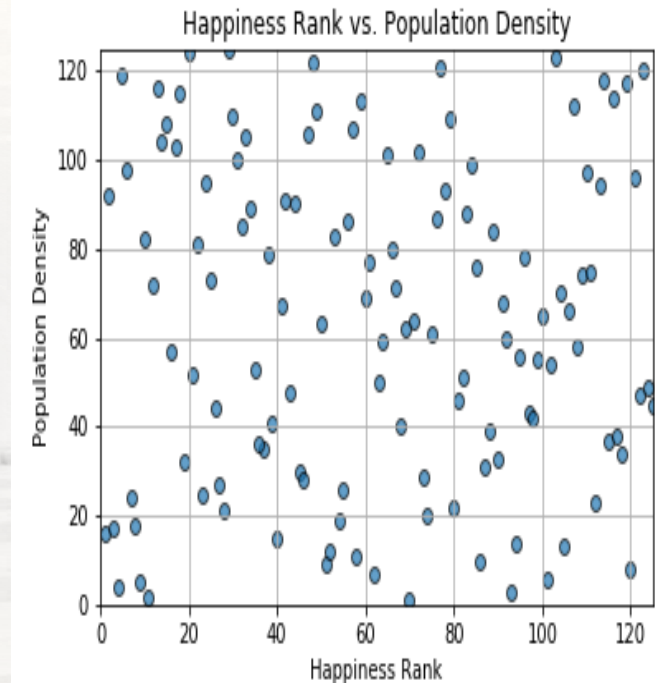
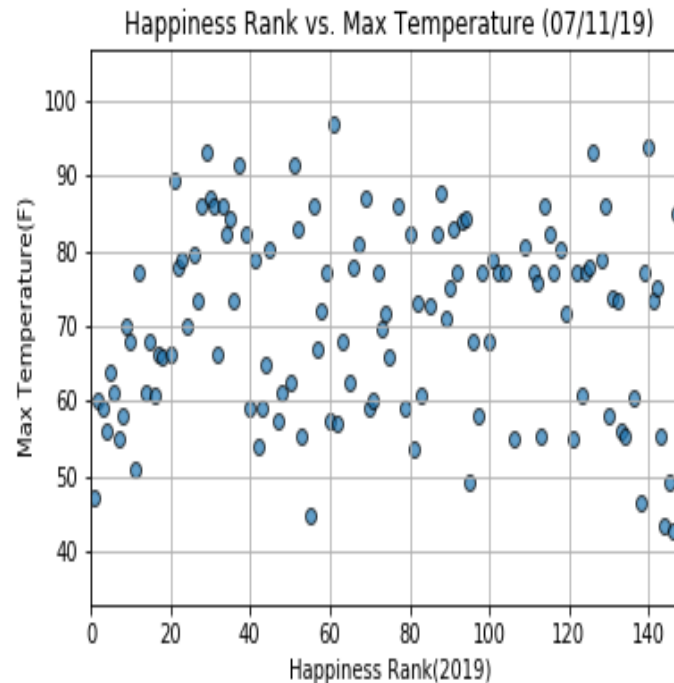
Factor Correlation Analysis

Obviously, Thanos is wrong!! Look at the Population Density!

9) Trust in Government

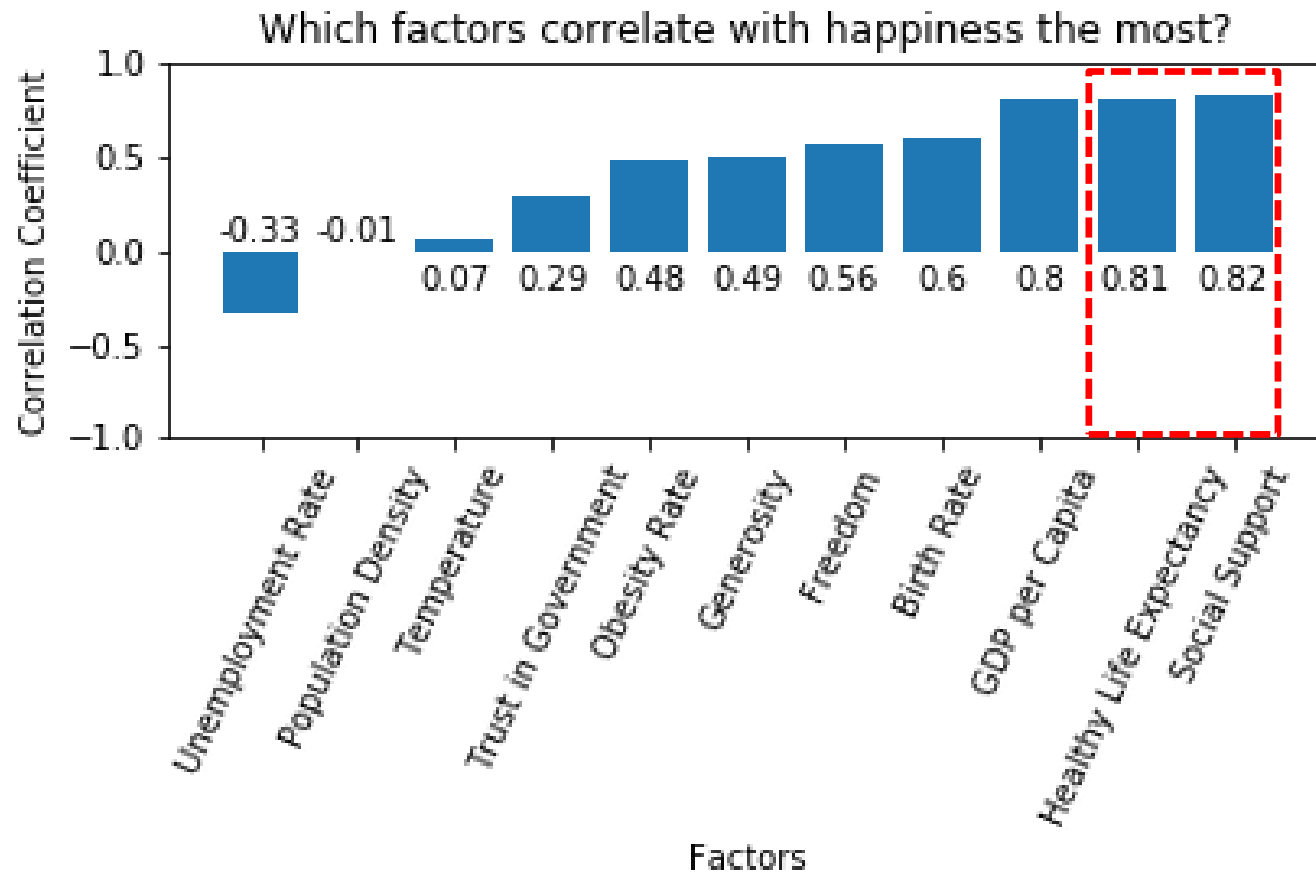
10) Temperature

11) Population Density



Correlation Coefficient Summary

Tada! Here come all the numbers!



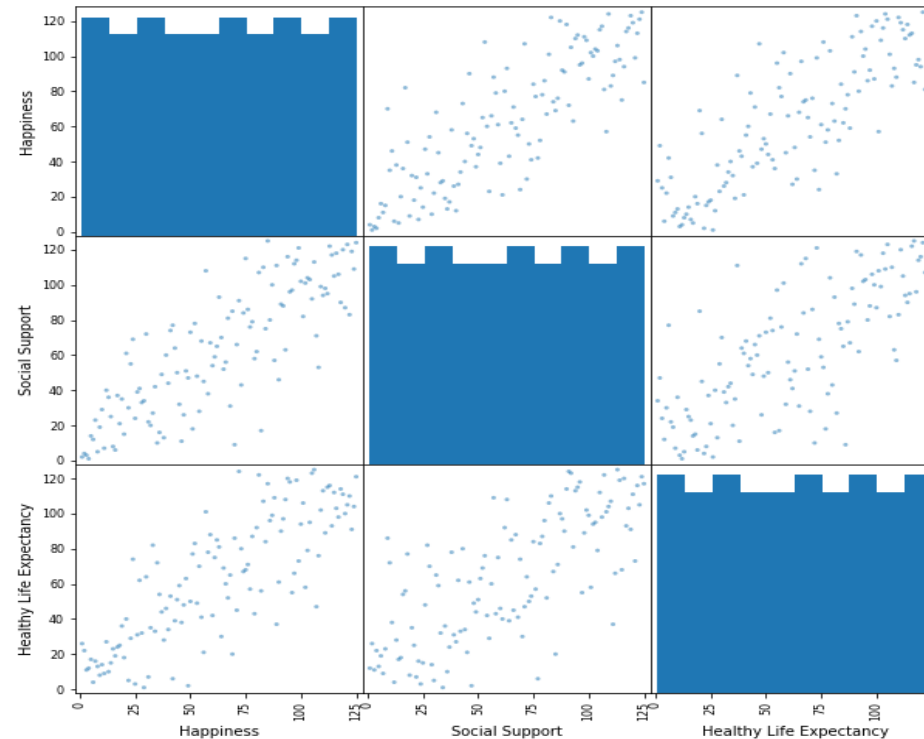
III. Why and How are the ‘Top Two Factors’ Strongly Related to Happiness?



Delving into the Top Two

The top two factors and happiness itself are strongly correlated with each other!

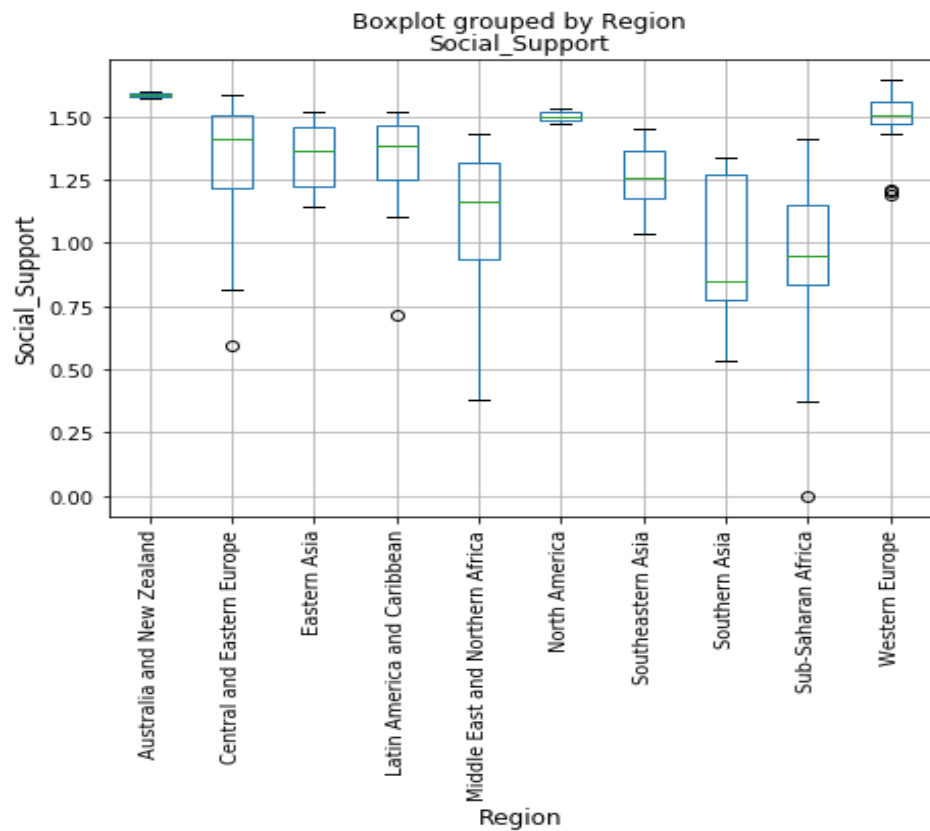
Scatter Matrix (Happiness, Social Support, and Life Expectancy)



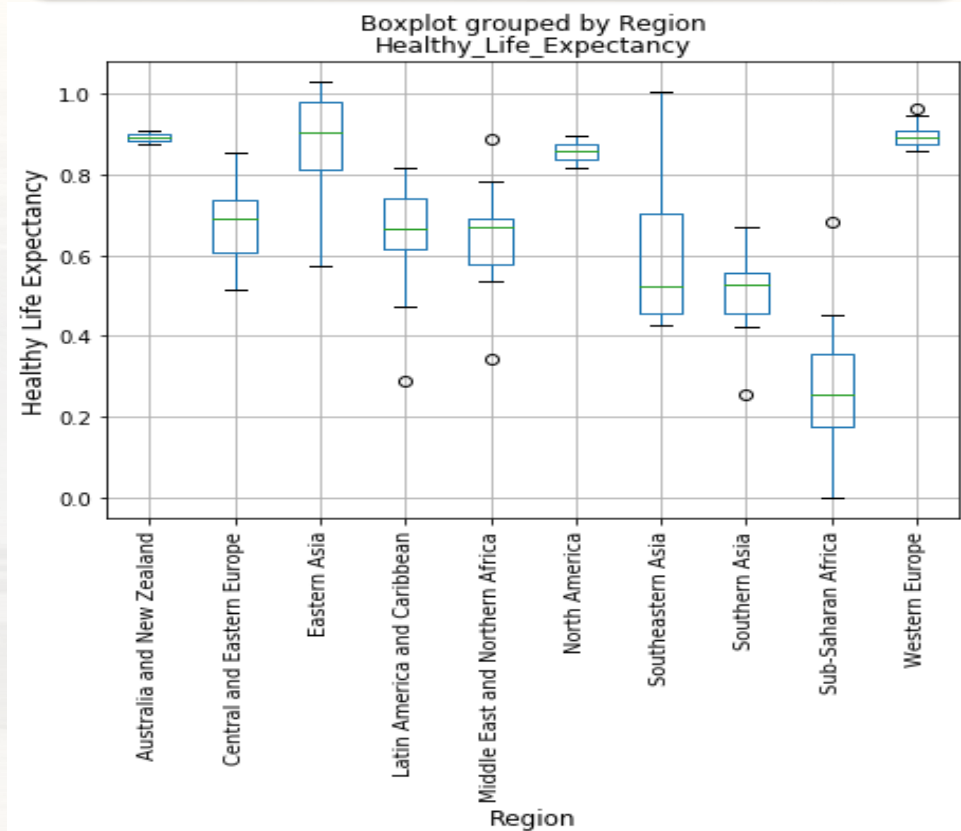
Delving into the Top Two

But, just like the happiness ranks, the top two factors show regional differences!

Social Support by Region (2018)



Life Expectancy by Region (2018)



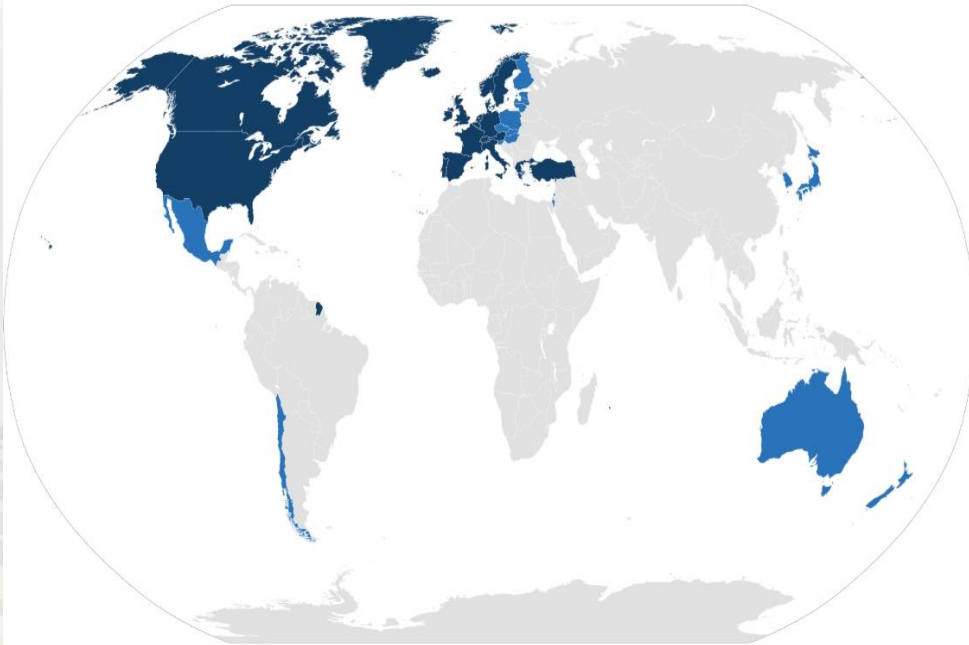
Delving into the Top Two – OECD Countries

Hmm.... I see your suspicious eyes...

Let's focus on OECD countries and check the two factors out...

OECD Countries

Among 24 indicators...!



'Air pollution', 'Dwellings without basic facilities', 'Educational attainment',
'Employees working very long hours', 'Employment rate',
'Feeling safe walking alone at night', 'Homicide rate',
'Household net adjusted disposable income', 'Household net wealth',
'Housing expenditure', 'Labor market insecurity', 'Life expectancy',
'Life satisfaction', 'Long-term unemployment rate', 'Personal earnings',
'Quality of support network', 'Rooms per person', 'Self-reported health',
'Stakeholder engagement for developing regulations', 'Student skills',
'Time devoted to leisure and personal care', 'Voter turnout',
'Water quality', 'Years in education'

Delving into the Top Two – OECD Countries

And here they are! What do you think about the result?

Above 0.5 Coefficient Factors

Factor	Coefficient
Life satisfaction	0.97
Personal earnings	0.83
Household net adjusted disposable income	0.71
Self-reported health	0.68
Rooms per person	0.64
Voter turnout	0.62
Quality of support network	0.61
Water quality	0.58
Feeling safe walking alone at night	0.57
Life expectancy	0.53
Dwellings without basic facilities	-0.66

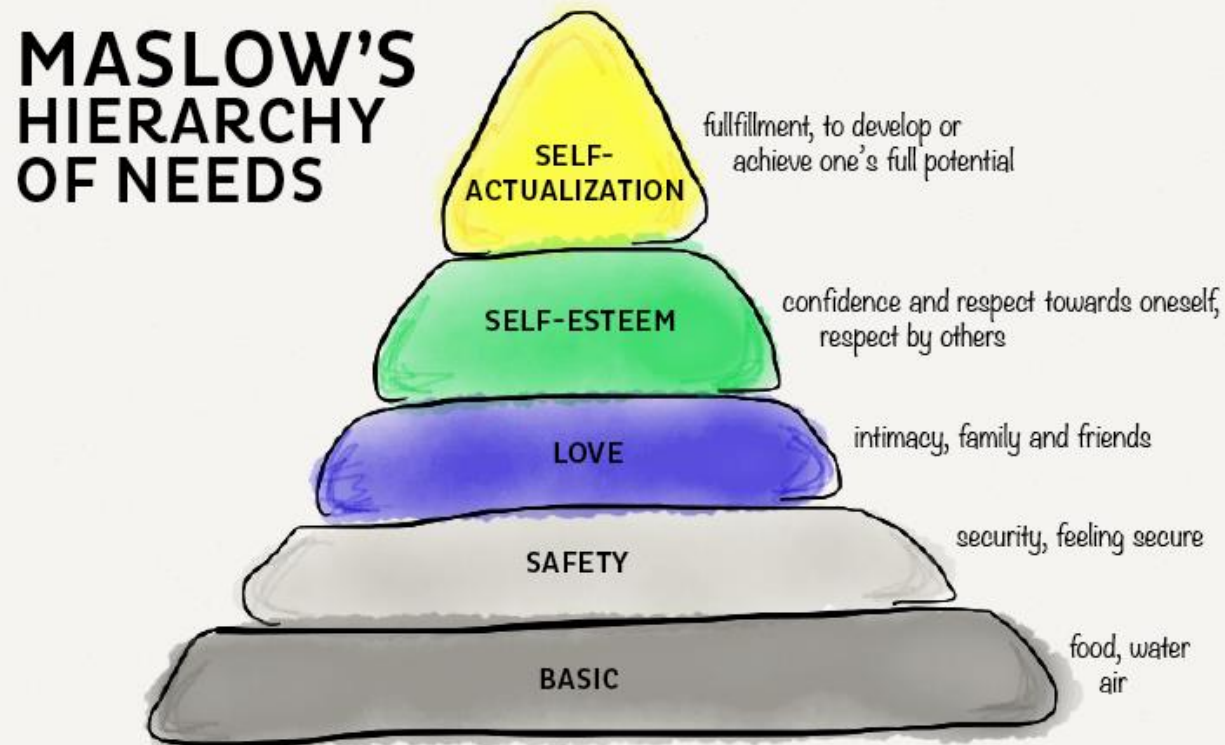
Below 0.5 Coefficient Factors

Factor	Coefficient
Housing expenditure	0.41
Household net wealth	0.37
Years in education	0.31
Employees working very long hours	0.28
Employment rate	0.27
Time devoted to leisure and personal care	0.24
Student skills	0.16
Educational attainment	0.02
Stakeholder engagement for developing regulations	-0.2
Labour market insecurity	-0.28
Air pollution	-0.33
Long-term unemployment rate	-0.34
Homicide rate	-0.35

Delving into the Top Two

This old psychological theory might tell you something...

Maslow's Hierarchy of Needs





Questions?

Thank you!