
An Exploration of Freedom and Happiness

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Does Freedom Equal Happiness?

In this project we will compare and contrast a data set from the **Human Freedom Index** with a data set from the **World Happiness Report**, exploring the relationship between freedom and happiness.

Hypothesis and Motivation

Hypothesis:

We expect to find that the freedom index and the happiness index correlate with one another, and that some factors of freedom have a higher impact on happiness than others.

Motivation:

By studying the data, we hope to determine freedom factors that can be addressed to improve the well being of the world population. If we were benevolent world leaders, what would be the freedom factors we could change that would have the most impact on overall happiness?

Our Data Sources:

World Happiness Report (2019)

<https://worldhappiness.report/ed/2019/#read>

Human Freedom Index Dataset 1 (2018)

<https://www.cato.org/human-freedom-index-new>

Human Freedom Index Dataset 2 (2018)

https://www.kaggle.com/gsutters/the-human-freedom-index#hfi_cc_2018.csv

Our Three Questions

Q1. Compare our two datasets to find top countries based on combined happiness/freedom metrics. What are the countries with the highest and lowest scores?

Q2: Do personal freedom and economic freedom correlate equally with happiness, or is there a difference between the two? If there is a difference, which freedom has a higher correlation with happiness?

Q3: If there is a “winning” freedom, compare it with the happiness index to determine which variables "inside" that freedom have the highest impact on happiness.

WHY? Determine which countries are most helpful to study in our search for increased social wellbeing

WHY? Isolate the type of freedom that correlates higher with happiness to help focus our data exploration on most relevant data

WHY? We want to know: if we were policy makers, and we wanted to address specific issues to best increase the wellbeing of our people, which factors should we address?

Did we answer our questions? Let's see...



Data Search

To answer these questions, we need data on freedom and happiness. We need each dataset to be grouped similarly, ie: by country.

We'd also like our freedom data source to be different from our happiness source, making them independent.

Data Cleanup and Exploration

- Each data source provided csv files of all relevant data
- The latest data from CATO (freedom index) was from the year 2016, so all data is from that year. Other data was filtered out
- We were fortunate that each source organized by country, and used common country name, ie - "United Kingdom" instead of "United Kingdom of Great Britain and Northern Ireland"
- Because of that, we were able to read in the data from the csv files (using `Pandas.read_csv`) and merge the datasets by country

Separate dataframes -> Single dataframe

	Country	Personal Freedom	Economic Freedom
0	Netherlands	9.40	7.71
1	Norway	9.34	7.60
2	Sweden	9.33	7.44
3	Denmark	9.33	7.77
4	Finland	9.29	7.65

	Country	Human Freedom
0	Albania	7.568140
1	Algeria	5.135886
2	Angola	5.640662
3	Argentina	6.469848
4	Armenia	7.241402

	Country	Happiness score
0	Finland	7.769
1	Denmark	7.600
2	Norway	7.554
3	Iceland	7.494
4	Netherlands	7.488

	Personal Freedom	Economic Freedom	Happiness score	Human Freedom
Country				
Netherlands	9.40	7.71	7.49	8.55
Norway	9.34	7.60	7.55	8.47
Sweden	9.33	7.44	7.34	8.39
Denmark	9.33	7.77	7.60	8.55
Finland	9.29	7.65	7.77	8.47

Question 1: which countries score highest?

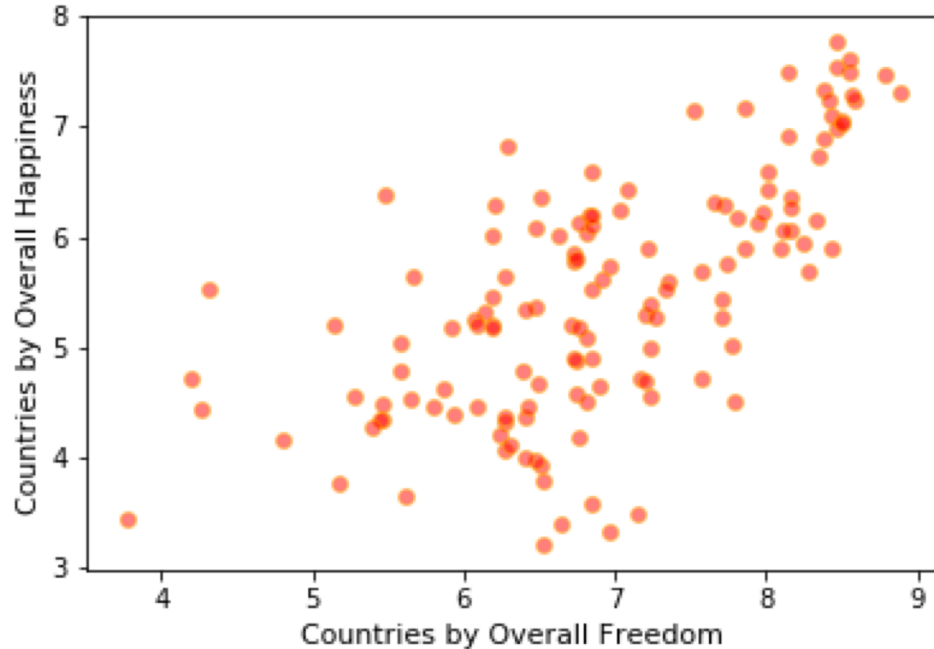
Compare our two datasets to find top countries based on combined happiness/freedom metrics. What are the countries with the highest and lowest scores?

WHAT WE DID:

- *Plotted freedom and happiness scores*
- *Merged datasets for a combined “freedom+happiness” score*
- *Sorted by combined scores and plotted highest- and lowest-scoring countries*

Freedom and Happiness plotted by country:

Appears to be a correlation...



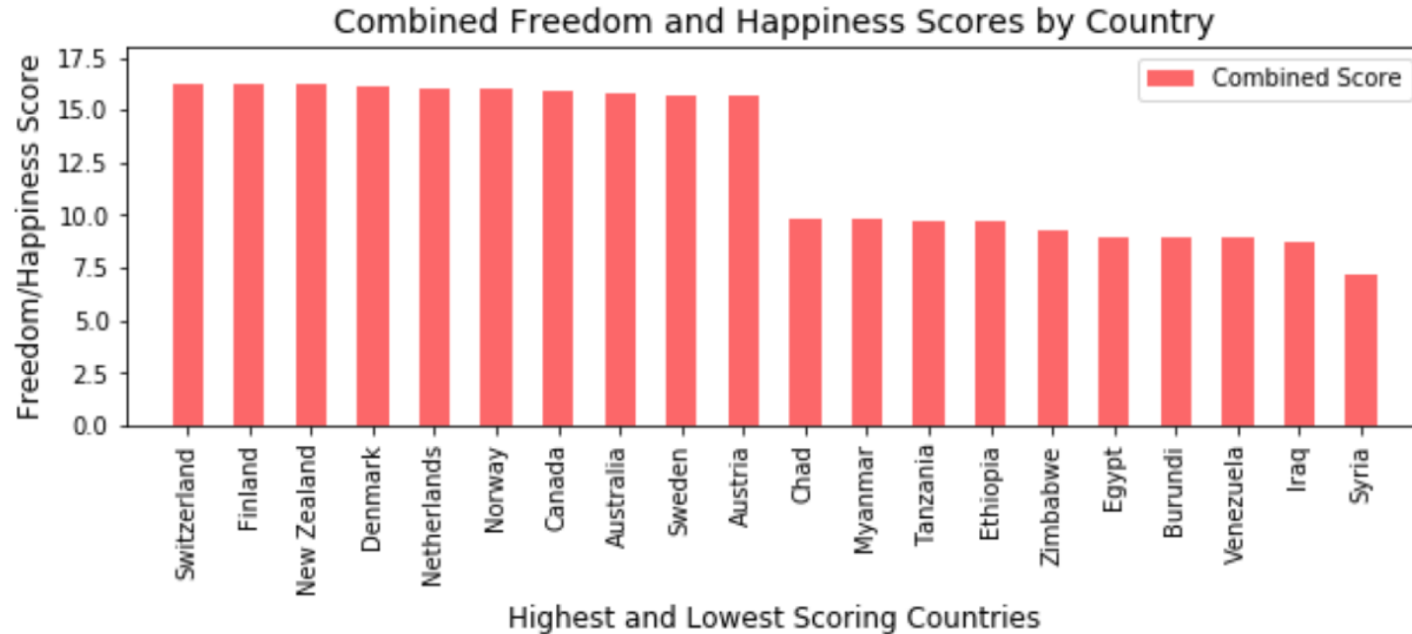
Merged datasets for combined freedom+happiness score

And sorted by combined score:

	Country	Personal Freedom	Economic Freedom	Happiness score	Human Freedom	Combined Score
9	Switzerland	9.19	8.39	7.48	8.79	16.27
4	Finland	9.29	7.65	7.77	8.47	16.24
5	New Zealand	9.28	8.49	7.31	8.89	16.20
3	Denmark	9.33	7.77	7.60	8.55	16.15
0	Netherlands	9.40	7.71	7.49	8.55	16.04

The top-10 (and bottom-10) scoring countries:

Concatenated head and tail of our combined/sorted dataframe



Question 1: discussion of findings

Did you find what you expected to find?

Basically, yes. We expected to see a correlation between freedom and happiness, and to see a degree of difference between highest and lowest scoring countries.

What inferences or general conclusions can you draw from your analysis?

- Regional patterns, ex: highest-ranking countries concentrated in Scandinavia and Northern Europe
- Lowest scores in countries experiencing political/economic conflict; we assume that's a contributing factor...but is it?
- Appears to be a correlation between freedom and happiness
- Question: is the difference between highest and lowest scores significant??

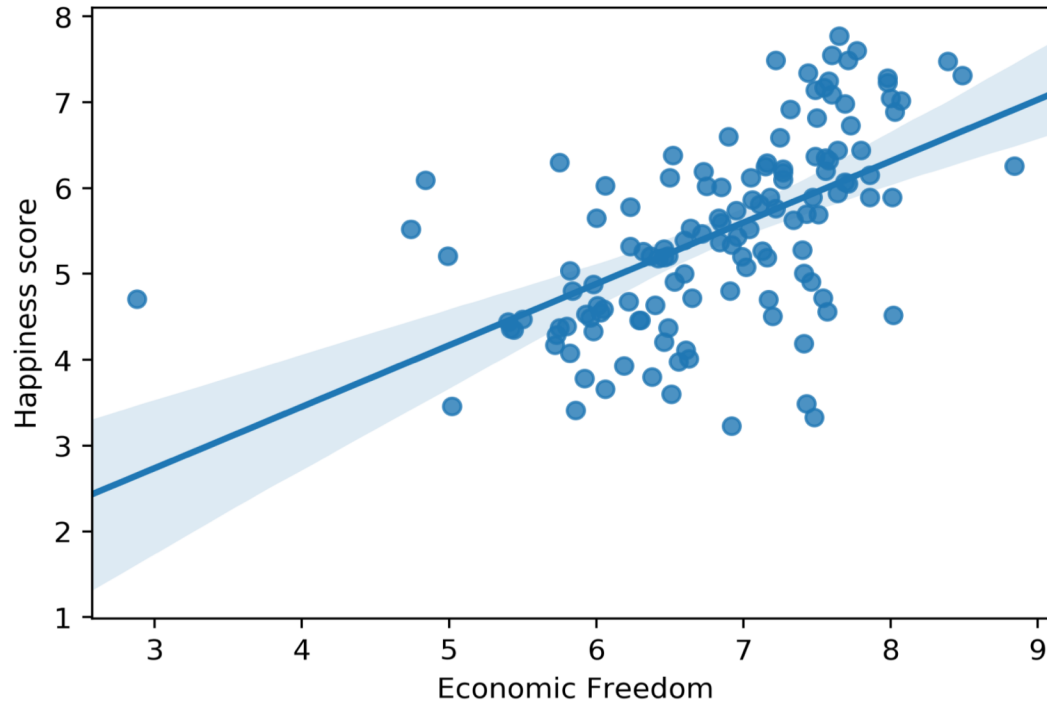
Question 2: which freedom type correlates more?

Q2: Do personal freedom and economic freedom correlate equally with happiness, or is there a difference between the two? If there is a difference, which freedom has a higher correlation with happiness?

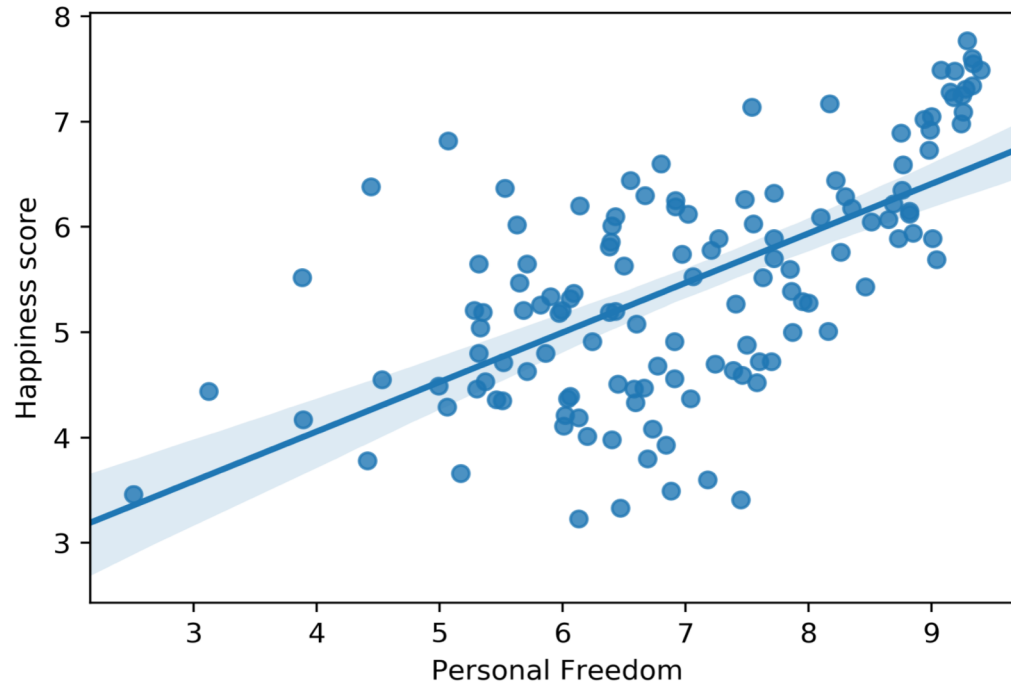
WHAT WE DID:

- Made scatterplots with regression lines to visualize the data.
- Ran three statistical tests to evaluate which had a higher correlation.

Economic Freedom and Happiness



Personal Freedom and Happiness



Question 2: discussion of findings

Data Analysis:

- Ordinary Least Squares
- Spearman's Rho
- Kendall's tau-b

Findings:

Most tests appeared inconclusive, with the exception of the Kendall's tau-b, which showed more correlation between economic freedom and happiness. That generalized inference makes sense intuitively from looking at the scatterplots.

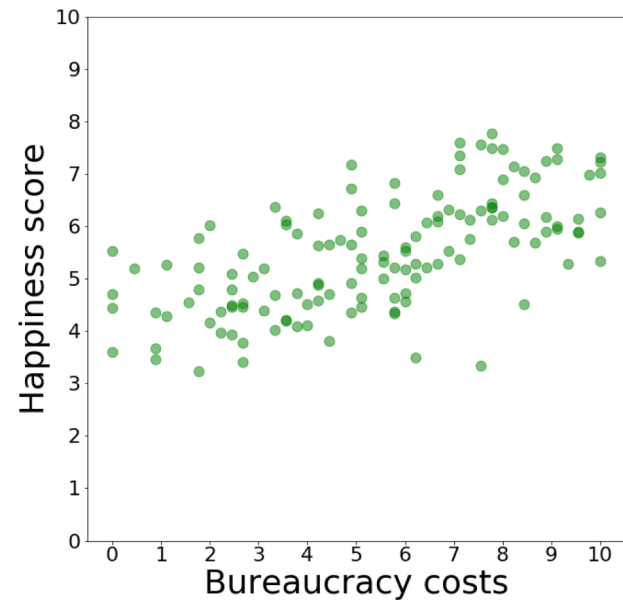
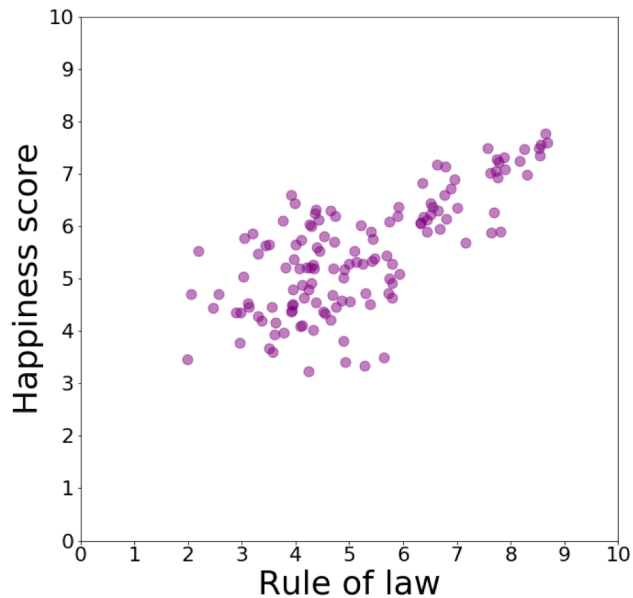
Question 3: find factors with highest impact on happiness

Q3: If there is a “winning” freedom, compare it with the happiness index to determine which variables "inside" that freedom have the highest impact on happiness. If we were to address a specific issue, what should we address?

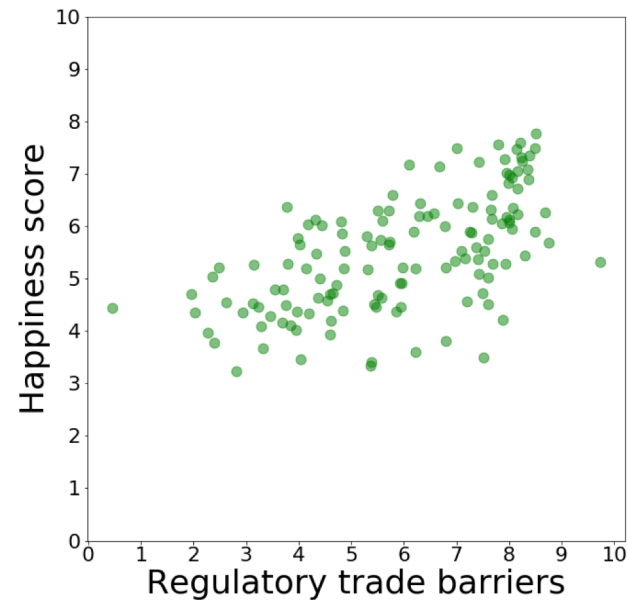
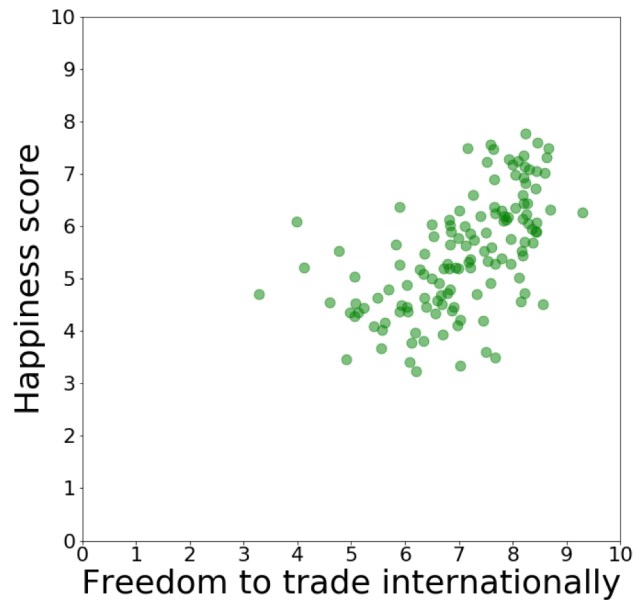
WHAT WE DID:

- Ran Spearman Rho and Kendall Tau analyses on each sub-category of economic freedom.
- Ran the same tests on personal freedom sub-categories, just to see if one of them were #1 overall

Top 4 Scatter Plots



Top 4 - continued



Conclusions on Question 3:

Data Analysis:

Spearman Rho

Kendall Tau-b

Discuss your findings:

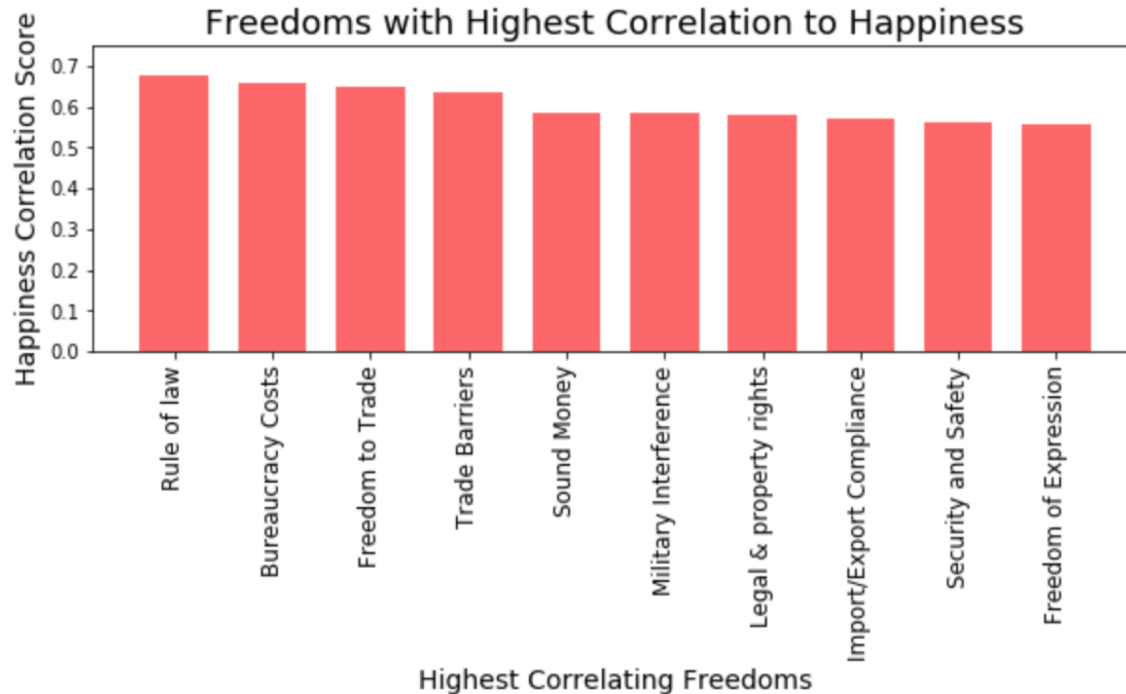
Tests produced similar results. We found that Rule of Law is the sub-category that most correlates with Happiness Scores. That is listed as a personal freedom. However, as we might expect given the findings from Question 2, economic freedoms dominate the Top Ten.

P-Values from Spearman Rho for the top 5 factors ranged from $3.91e-19$ to $1.08e-13$

Correlation result for top 5 factors ranged from 0.675 to 0.586

Overview: Freedoms that correlate most with happiness

Economic freedoms dominate the top ten:



Post Mortem: conclusions and future questions

Overall conclusions:

- Economic Freedom tentatively correlates more strongly with happiness than personal freedom
- The “top ten” correlating freedoms are somewhat surprising, relating to law, trade, money, etc. rather than personal and social freedoms one might expect as they are so highly regarded in our society. Related to this, Syria ranked last on each Top 5 correlating freedom, but was not last in overall happiness score

What would you research next, if you had two more weeks?

- To help ourselves be benevolent rulers, we would need to drill down into the “winning” freedoms and determine what they’re made of, to be able to recommend policy decisions for highest benefit.
- Research the countries with highest combined scores to parse out any statistically significant relationships within those combinations
- Focus on the United States, to see if the correlating freedoms rank similarly.