Statistical Model of Countries' Happiness Scores

1 Introduction

A comprehension of people's ideologies can be made from the world. This model predicts the happiness score of any country considering factors like GDP, Life expectancy, Freedom, and Trust in government. This model pertains relevancy to those who wish to explore other countries, including governments and businesses to conduct foreign operations.

2 Previous Research

There has been a lot of previous research, but none right on point with this

3 Methodology

This research will be conducted using cross-section data from R. Graphical techniques will include histograms and scatterplots of the variables to determine the happiness score.

Functional specification

Eqn. 1 Happiness Score = f (GDP per capita, Freedom, Life Expectancy)

Eqn. 2 Happiness Score= $\alpha + \beta$ * GDP per capita + β * Freedom + β * Life Expectancy + e

Eqn. 3 Happiness Score = a + b * GDP per capita + b * Freedom + b * Life Expectancy + e

The current hypothesis states that the happiness score is affected by GDP per capita, Freedom, and Life Expectancy. Each of these independent variables – GDP per capita, Freedom, Life expectancy results in a positive correlation towards Happiness Score.

4 Results

Histograms

Fig 1. Histogram of Happiness Score

Symmetrical

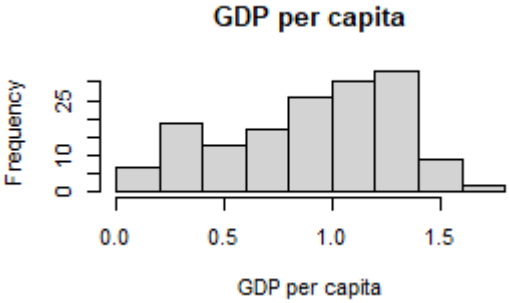

Fig.2. Histogram of GDP per capita

Symmetrical

Fig.3. Histogram of Life expectancy

Left skewed

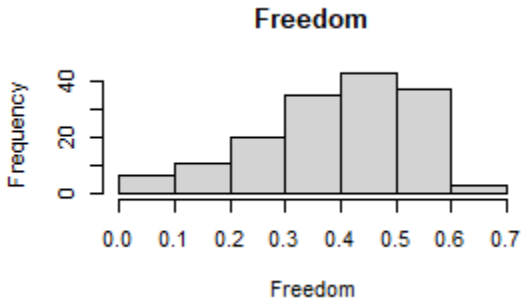

Fig.4. Histogram of Freedom

Left skewed

Histograms (cont'd)

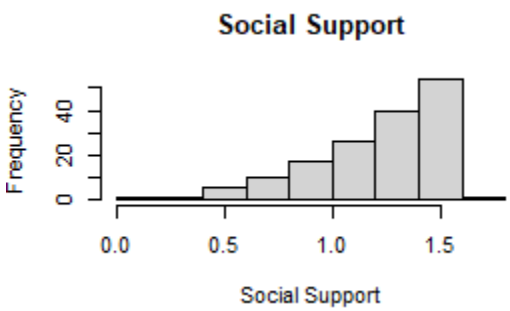

Fig. 5. Histogram of Social Support

Left skewed

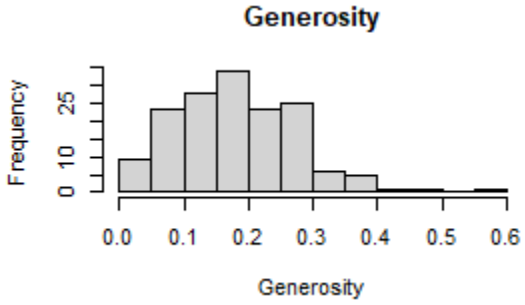

Fig. 6. Histogram of Generosity

Right skewed

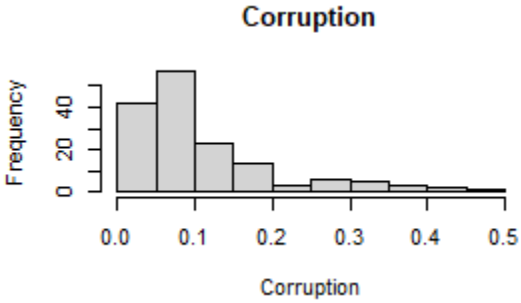

Fig.7. Histogram of Corruption

Right skewed

Scatterplots

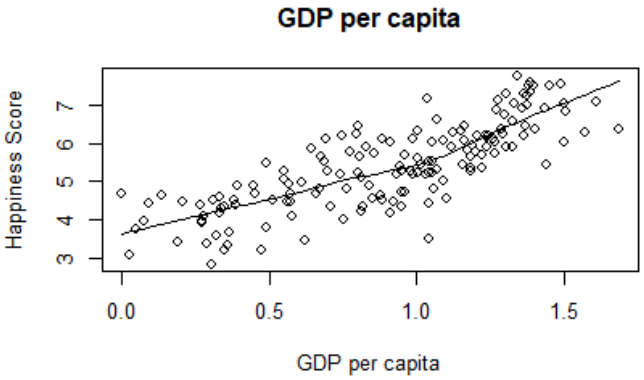

Fig. 8 Scatterplot of GDP per capita

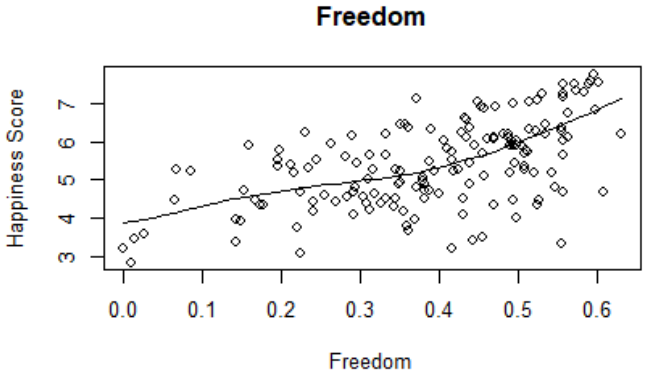

Fig.9. Scatterplot of Freedom

Positive - Strong - Linear

Non-Heteroscedastic

No outlier

Correlation Coefficient: 0.79

Positive - Strong - Linear

Non-Heteroscedastic

No outlier

Correlation Coefficient: 0.57

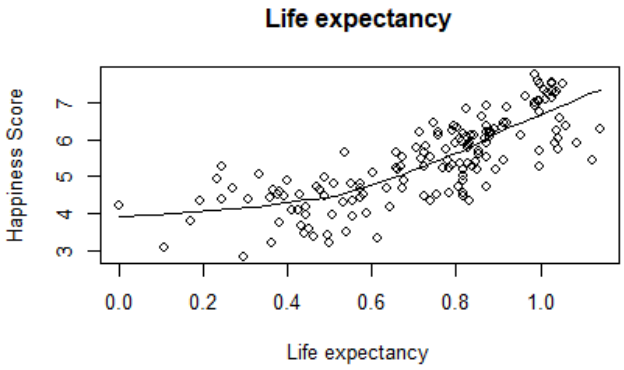

Fig. 10. Scatterplot of Life Expectancy

Positive - Strong – Linear

Non-Heteroscedastic

No outlier

Correlation Coefficient: 0.78

Figures 1-7 display the histograms containing each independent variable: GDP per capita, Life Expectancy, Freedom, Social Support, Generosity, and Corruption.

Figures 8-10 displays the scatterplots associated with the independent variables applying to the functional specification: GDP per capita, Freedom, and Life Expectancy. The respective correlation coefficient is displayed along with the trend information.

Table 1 Descriptive Statistics

	name	obs	max	min	mean	median	mode	std	skew	kurt
1	Score	156	8	3	5	5	5	1	0	2
2	GDP.per.capita	156	2	0	1	1	1	0	0	2
3	Social.support	156	2	0	1	1	1	0	-1	4
4	Healthy.life.expectancy	156	1	0	1	1	1	0	-1	3
5	Freedom.to.make.life.choices	156	1	0	0	0	1	0	-1	3
6	Generosity	156	1	0	0	0	0	0	1	4
7	Perceptions.of.corruption	156	0	0	0	0	0	0	2	5

Fig. 11. Descriptive Statistics Table

Table 2 Correlation Matrix

	Score	GDP.per.capita	Social.support	Healthy.life.expectancy	Freedom.to.make.life.choices
Score	1.00	0.79	0.78	0.78	0.57
GDP.per.capita	0.79	1.00	0.75	0.84	0.38
Social.support	0.78	0.75	1.00	0.72	0.45
Healthy.life.expectancy	0.78	0.84	0.72	1.00	0.39
Freedom.to.make.life.choices	0.57	0.38	0.45	0.39	1.00
Generosity	0.08	-0.08	-0.05	-0.03	0.27
Perceptions.of.corruption	0.39	0.30	0.18	0.30	0.44

	Generosity	Perceptions.of.corruption
Score	0.08	0.39
GDP.per.capita	-0.08	0.30
Social.support	-0.05	0.18
Healthy.life.expectancy	-0.03	0.30
Freedom.to.make.life.choices	0.27	0.44
Generosity	1.00	0.33
Perceptions.of.corruption	0.33	1.00

Fig. 12. Correlation Matrix Table

Table 3 Regression Results

```
Residuals:
     Min       1Q   Median       3Q      Max
-0.58974 -0.07924  0.01316  0.09991  0.45588

Coefficients:
                                Estimate Std. Error t value Pr(>|t|)
(Intercept)                    7.1222182  0.1226360  58.076  < 2e-16 ***
obs                           -0.0236693  0.0005693 -41.573  < 2e-16 ***
GDP.per.capita                 0.0174644  0.0660351   0.264  0.79178
Healthy.life.expectancy        0.0157402  0.1048728   0.150  0.88090
Freedom.to.make.life.choices   0.2947151  0.1093741   2.695  0.00785 **
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.1622 on 151 degrees of freedom
Multiple R-squared:  0.9793,    Adjusted R-squared:  0.9788
F-statistic:  1787 on 4 and 151 DF,  p-value: < 2.2e-16
```

Fig. 13. Regression Results

F- statistic revealed to be 1787 with an adjusted R-squared of 0.98%. The null hypothesis suggested Happiness score will increase as each independent variable increases as well. The alternate hypothesis agrees with the null. GDP per capita, Life Expectancy, and Freedom had a positive correlation toward the dependent variable, Happiness Score.

5 Conclusion

In determining the happiness of a countries' score, the independent variable used: GDP per capita, Freedom, and Life Expectancy were successful. The null assumption was satisfied. The independent variables contributed positively to the happiness score. This research can be improved with additional independent variables like Social Support, Generosity, and Corruption.

6 Bibliography

Kaggle

7 Appendix One

World Happiness Report - 2019

8 Appendix Two

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