

# Write-Up Summary

## Write-up Objective:

Create a write-up summarizing your major findings. This should include a heading for each "question" you asked of your data, and under each heading, a short description of what you found and any relevant plots.

## Core Message:

According to the world happiness report there are several subjective well-being measures (SWB) that were studied. We wanted to examine the different factors to determine the correlation of each of these with overall happiness. We also wanted to see which of these is most likely to influence happiness.

## Research Questions:

1. Which **countries** had the lowest happiness score? highest happiness score? (data from 2017, 2018, and 2019).
2. Which of the measures of SWB (i.e., social support, healthy life expectancy, generosity, freedom to make life choices, GDP per capita, and perception of corruption) are most highly correlated with a higher happiness score?
3. Which of these measures are most likely to influence the happiness score?

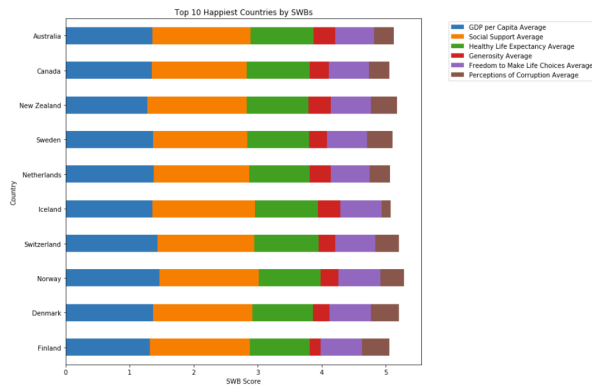
## Research Questions and Findings:

### 1. Over the past three years, which countries had the lowest happiness score? highest happiness score?

- Answer: The average over the last three years shows Finland as having the happiest overall score. Rounding out the top five is Denmark, Norway, Switzerland, and Iceland. Inversely, the lowest happiness scores fall on South Sudan, Afghanistan, and Central African Republic.
- Plots: Average Sorted DF-Top 10 (img 1.1) and Lowest 10 (img 1.2) and Stacked Bar Charts (img 1.3 and img 1.4)

	Country	Region	Score Average	GDP per Capita Average	Social Support Average	Healthy Life Expectancy Average	Generosity Average	Freedom to Make Life Choices Average	Perceptions of Corruption Average
0	Finland	Western Europe	7.736567	1.316667	1.559509	0.940424	0.171557	0.646439	0.421286
2	Denmark	Western Europe	7.600200	1.361667	1.555483	0.947778	0.259598	0.646680	0.437753
1	Norway	Western Europe	7.545333	1.466667	1.553058	0.965691	0.281662	0.653067	0.371700
4	Switzerland	Western Europe	7.508967	1.430667	1.515801	1.009511	0.262685	0.620318	0.369315
3	Iceland	Western Europe	7.497833	1.355333	1.605189	0.980281	0.356443	0.643327	0.133514
5	Netherlands	Western Europe	7.459300	1.372667	1.491215	0.950892	0.330439	0.602875	0.320523
8	Sweden	Western Europe	7.336833	1.365667	1.473783	0.969490	0.274943	0.627766	0.396355
7	New Zealand	North America and ANZ	7.310200	1.279667	1.548406	0.970046	0.340242	0.633597	0.410089
6	Canada	North America and ANZ	7.279367	1.341667	1.490797	0.985834	0.295843	0.627009	0.316901
9	Australia	North America and ANZ	7.240933	1.350667	1.532715	0.989536	0.339325	0.608626	0.309332

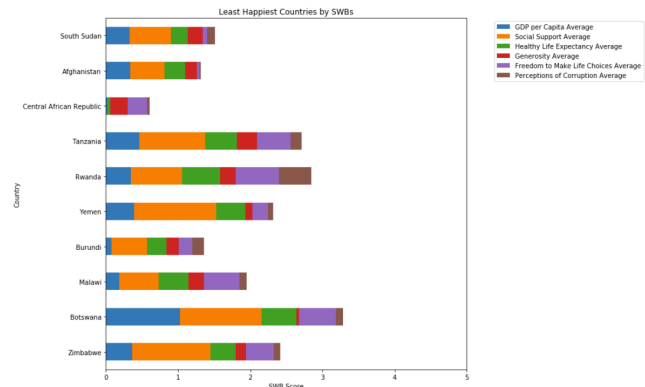
1.1



1.3

	Country	Region	Score Average	GDP per Capita Average	Social Support Average	Healthy Life Expectancy Average	Generosity Average	Freedom to Make Life Choices Average	Perceptions of Corruption Average
132	Zimbabwe	Sub-Saharan Africa	3.551400	0.360000	1.085278	0.352013	0.144783	0.381468	0.089643
134	Botswana	Sub-Saharan Africa	3.518967	1.025000	1.134898	0.483004	0.033469	0.507030	0.097829
135	Malawi	Sub-Saharan Africa	3.511667	0.187667	0.543789	0.415721	0.213728	0.487130	0.100211
143	Burundi	Sub-Saharan Africa	3.485100	0.078000	0.490525	0.273404	0.170801	0.186800	0.166002
139	Yemen	Middle East and North Africa	3.420800	0.390333	1.137826	0.407000	0.095230	0.210240	0.076117
138	Rwanda	Sub-Saharan Africa	3.351433	0.341000	0.709659	0.528794	0.217568	0.598363	0.446847
140	Tanzania	Sub-Saharan Africa	3.336733	0.462000	0.916225	0.440893	0.272514	0.469114	0.149294
142	Central African Republic	Sub-Saharan Africa	3.213967	0.024667	0.000000	0.038333	0.235504	0.274271	0.033755
133	Afghanistan	South Asia	3.133967	0.338000	0.470145	0.294017	0.161412	0.028333	0.020742
141	South Sudan	Sub-Saharan Africa	2.974533	0.326967	0.578760	0.226936	0.211978	0.062536	0.102719

1.2



1.4

## 2. Which of the measures of SWB (i.e., social support, healthy life expectancy, generosity, freedom to make life choices, GDP per capita, and perception of corruption) are most highly correlated with a higher happiness score?

\***Pearson's correlation coefficient (r)** is a measure of the strength of the association between the two variables.

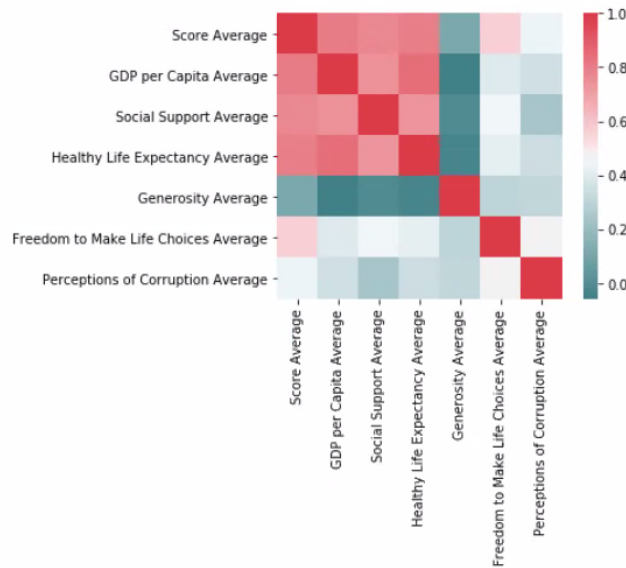
- Answer: We found that GDP had a highest correlation (at .807), Healthy Life Expectancy a close second (at 0.798), and Social Support was third (at 0.774)
- Plots: Pearson Comparison Chart (img 3.1). Other visualizations to show correlation and outliers (imgs 3.2, 3.3)

	Score Average	GDP per Capita Average	Social Support Average	Healthy Life Expectancy Average	Generosity Average	Freedom to Make Life Choices Average	Perceptions of Corruption Average
Score Average	1.000000	0.807388	0.774377	0.798818	0.112926	0.569723	0.439359
GDP per Capita Average	0.807388	1.000000	0.744840	0.848141	-0.058766	0.393532	0.352392
Social Support Average	0.774377	0.744840	1.000000	0.735922	-0.001536	0.449281	0.239814
Healthy Life Expectancy Average	0.798818	0.848141	0.735922	1.000000	-0.031951	0.412639	0.348450
Generosity Average	0.112926	-0.058766	-0.001536	-0.031951	1.000000	0.301899	0.316261
Freedom to Make Life Choices Average	0.569723	0.393532	0.449281	0.412639	0.301899	1.000000	0.461814
Perceptions of Corruption Average	0.439359	0.352392	0.239814	0.348450	0.316261	0.461814	1.000000

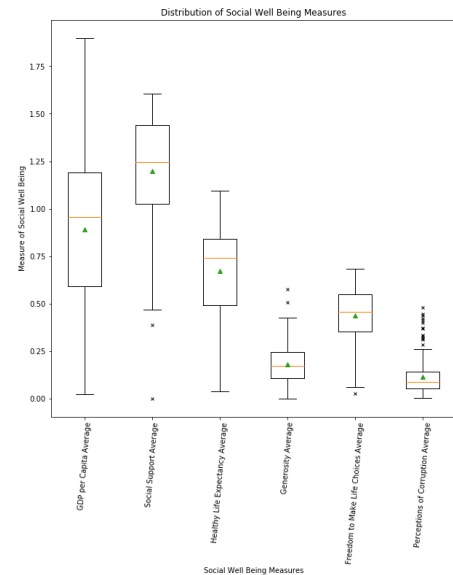
3.1

	Coefficient r	
	Positive	Negative
<b>Strong</b>	1 to 0.8	-0.8 to -1
<b>Moderate</b>	0.8 to 0.5	-0.5 to -0.8
<b>Weak</b>	0.5 to 0.3	-0.3 to -0.5
<b>No Correlation</b>	0.3 to 0	0 to -0.3

Key



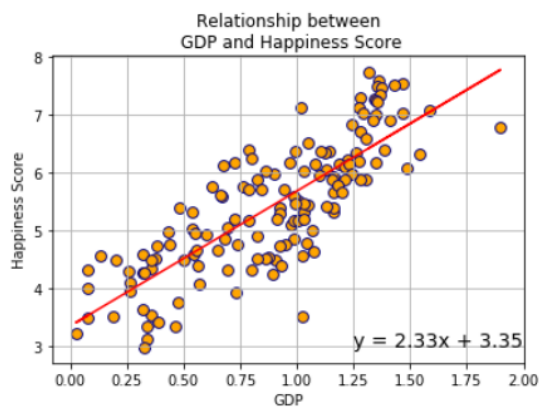
3.2



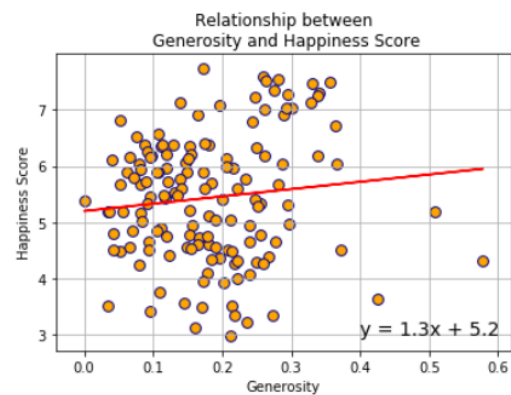
3.3

### 3. How do the measures of SWB influence the happiness score?

- Answer: We found that GDP per capita, Social Support, Health Life Expectancy, Freedom to make Life Choice, and Perception of Corruption had a significant effect on the Happiness score. Generosity was not significant.
- Plots: Scatterplots of SWBs with Happiness w/ their regression (4.1 and 4.2), p-value and r-squared chart (img 4.4), Teshanee's magnificent OLS Regression Results (img 4.3)



4.1



4.2

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OLS Regression Results
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Dep. Variable:      Score Average      R-squared:      0.792
Model:              OLS               Adj. R-squared: 0.783
Method:             Least Squares      F-statistic:    86.82
Date:               Tue, 21 Jul 2020    Prob (F-statistic): 3.23e-44
Time:               21:41:13           Log-Likelihood: -107.11
No. Observations:   144               AIC:           228.2
Df Residuals:       137               BIC:           249.0
Df Model:           6
Covariance Type:    nonrobust
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                    coef    std err          t      Pr>|t|    [0.025    0.975]
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const                1.8296      0.211      8.661      0.000      1.412      2.247
GDP per Capita Average 0.8945      0.230      3.893      0.000      0.440      1.349
Social Support Average 1.0368      0.243      4.272      0.000      0.557      1.517
Healthy Life Expectancy Average 1.1017      0.358      3.076      0.003      0.393      1.810
Generosity Average    0.7055      0.499      1.415      0.159     -0.281      1.692
Freedom to Make Life Choices Average 1.3344      0.387      3.446      0.001      0.569      2.100
Perceptions of Corruption Average 0.9328      0.525      1.776      0.078     -0.106      1.971
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Omnibus:            10.019   Durbin-Watson:       1.787
Prob(Omnibus):      0.007   Jarque-Bera (JB):     10.131
Skew:               -0.575   Prob(JB):             0.00631
Kurtosis:           3.604   Cond. No.              27.2
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Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

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4.3

Statistical Values	r-squared	p-value
GDP per Capita Average	0.65	0.0000
Social Support	0.60	0.0000
Healthy Life Expectancy	0.64	0.0000
Generosity	0.01	0.1778
Freedom to make Life Choices	0.32	0.0000
Perceptions of Corruption	0.12	0.0000

4.4