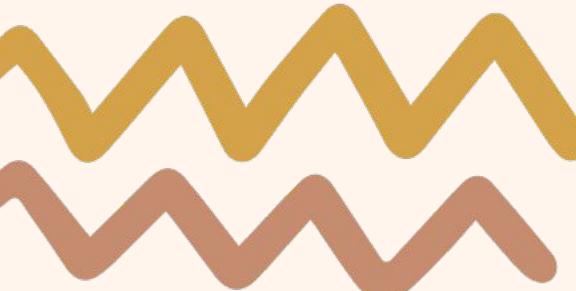


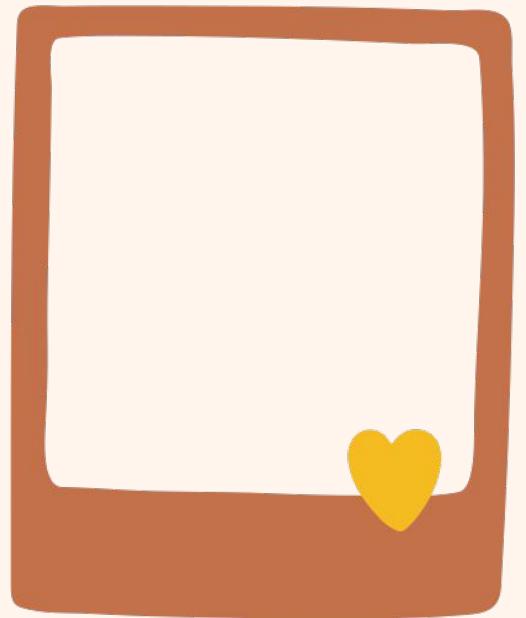
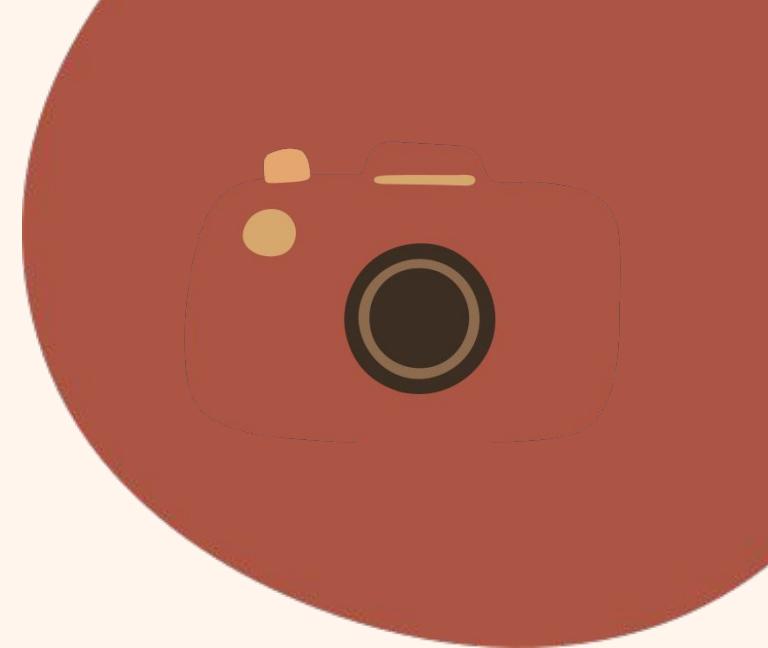
Exploring Factors Influencing Global Happiness

By Zainab Makhsum, Virginia Ferreras, &
Nischal Bhandari

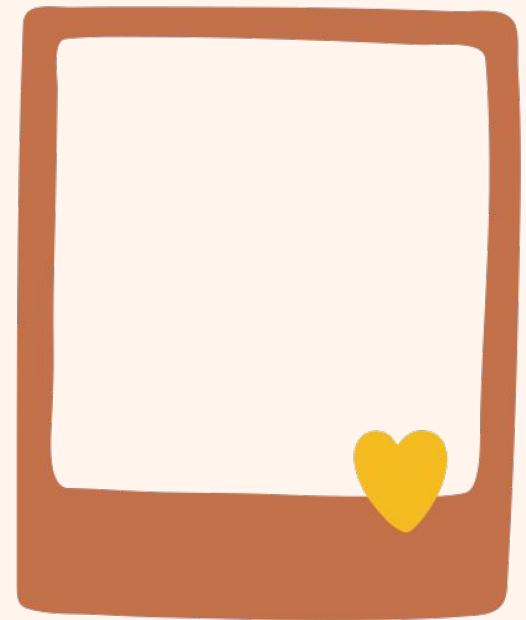
START



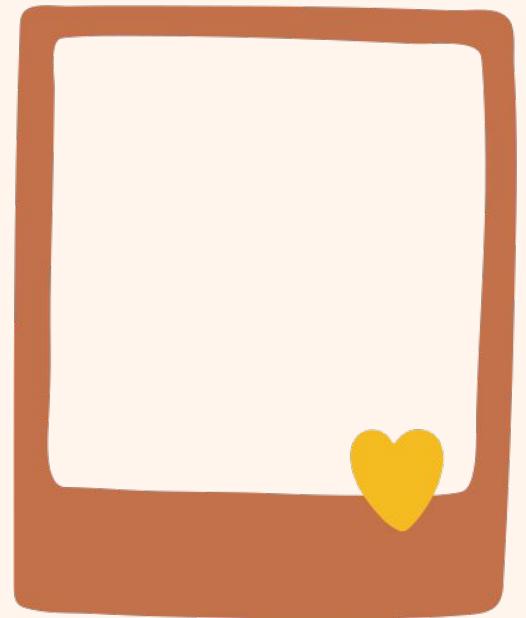
Our Team



Zainab Makhdum



Virginia Ferreras



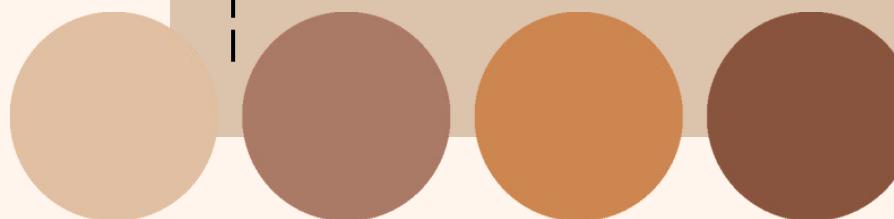
Nischal Bhandari



Introduction

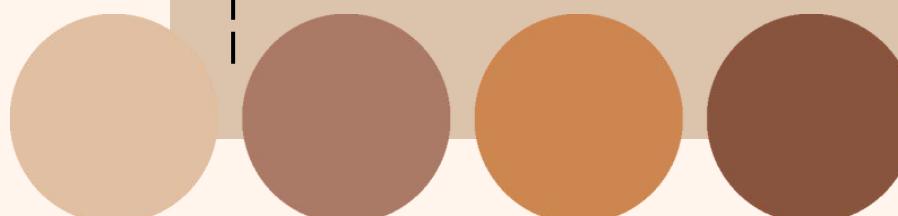
Certain regions and countries of the world are known to have more positive and happy people residing there compared to other countries, which often influences people to either move into or leave a country. Many countries look to improve their land in order to make it a more suitable and comfortable place for their people and new people to live in.

We will be analyzing the 2022 World Happiness Report to answer the following questions: What are the political, economic, and social factors that impact the happiness of countries and how do these factors change over the years? We will be utilizing the factors in the dataset in order to fully investigate and answer our research questions. The outcome of this project will give us better insights on what factors may improve or impair a country's happiness score. Ultimately, we will be able to determine what steps a country can take to improve their overall happiness and well-being.



Data Description

- **Primary Dataset:** *World Happiness Report 2005-Present*
 - contains one csv file (whr.csv)
 - sourced from contributor Usama Buttar on the website *Kaggle* and is a publication of the *United Nations (UN) Sustainable Development Solutions Network*.
 - whr.csv is a collection of 2,199 rows/ observations and 13 columns
- **Secondary Dataset:** parsed from 'Countries-Continents.csv'
 - This dataset was sourced from user 'dbouqin' on Github
 - This publicly available CSV file contains 194 rows/ observations and 2 columns – country and continent
 - During the data manipulation process, we will be merging this file with the original one i.e., whr.csv to obtain the continent for each country.



Data Exploration

Description of the dataframe

```
RangeIndex: 2199 entries, 0 to 2198
Data columns (total 13 columns):
 #   Column           Non-Null Count  Dtype  
 --- 
  0   country          2199 non-null    object  
  1   region            2087 non-null    object  
  2   year              2199 non-null    int64  
  3   happinessScore    2199 non-null    float64 
  4   logGdpPerCapita   2179 non-null    float64 
  5   socialSupport     2186 non-null    float64 
  6   LifeExpAtBirth    2145 non-null    float64 
  7   lifeChoicesFreedom 2166 non-null    float64 
  8   generosity         2126 non-null    float64 
  9   corruptionPerception 2083 non-null    float64 
  10  positiveAffect    2175 non-null    float64 
  11  negativeAffect    2183 non-null    float64 
  12  confInNatGov      1838 non-null    float64 
dtypes: float64(10), int64(1), object(2)
memory usage: 223.5+ KB
```

Summary Statistics

	year	happinessScore	logGdpPerCapita	socialSupport	LifeExpAtBirth	lifeChoicesFreedom	generosity	corruptionPerception	positiveAffect	negativeAffect	confInNatGov
count	2199.000000	2199.000000	2179.000000	2186.000000	2145.000000	2166.000000	2126.000000	2083.000000	2175.000000	2183.000000	1838.000000
mean	2014.161437	5.479226	9.389766	0.810679	63.294583	0.747858	0.000096	0.745195	0.652143	0.271501	0.483999
std	4.718736	1.125529	1.153387	0.120952	6.901104	0.140150	0.161083	0.185837	0.105922	0.086875	0.193071
min	2005.000000	1.281271	5.526723	0.228217	6.720000	0.257534	-0.337527	0.035198	0.178886	0.082737	0.068769
25%	2010.000000	4.646750	8.499764	0.746609	59.119999	0.656528	-0.112116	0.688139	0.571684	0.207660	0.332549
50%	2014.000000	5.432437	9.498955	0.835535	65.050003	0.769821	-0.022671	0.799654	0.663063	0.260671	0.467140
75%	2018.000000	6.309460	10.373216	0.904792	68.500000	0.859382	0.092070	0.868827	0.737936	0.322894	0.618846
max	2022.000000	8.018934	11.663788	0.987343	74.474998	0.985178	0.702708	0.983276	0.883586	0.704590	0.993604

Data Cleaning and Transformation

Merging the secondary dataset

- on 'country' column.

	country	continent
0	Algeria	Africa
1	Angola	Africa
2	Benin	Africa
3	Botswana	Africa
4	Burkina	Africa

Missing values in the dataframe

country	0
region	112
year	0
happinessScore	0
logGdpPerCapita	20
socialSupport	13
LifeExpAtBirth	54
lifeChoicesFreedom	33
generosity	73
corruptionPerception	116
positiveAffect	24
negativeAffect	16
confInNatGov	361
	dtype: int64

	country	continent	region	year	happinessScore	logGdpPerCapita	socialSupport	LifeExpAtBirth	lifeChoicesFreedom	generosity	corruptionPerception	positiveAffect	negativeAffect	confInNatGov
0	Afghanistan	Asia	South Asia	2008	3.723590	7.350416	0.450662	50.500000	0.718114	0.167652	0.881686	0.414297	0.258195	0.612072
1	Afghanistan	Asia	South Asia	2009	4.401778	7.508646	0.552308	50.799999	0.678896	0.190809	0.850035	0.481421	0.237092	0.611545
2	Afghanistan	Asia	South Asia	2010	4.758381	7.613900	0.539075	51.099998	0.600127	0.121316	0.706766	0.516907	0.275324	0.299357
3	Afghanistan	Asia	South Asia	2011	3.831719	7.581259	0.521104	51.400002	0.495901	0.163571	0.731109	0.479835	0.267175	0.307386
4	Afghanistan	Asia	South Asia	2012	3.782938	7.660506	0.520637	51.700001	0.530935	0.237588	0.775620	0.613513	0.267919	0.435440

Data Cleaning and Data Exploration

Data Exploration: Missing values in
'ConflnNatGov' Column

```
continent
Africa      80
Asia       196
Europe      62
North America 11
Oceania      2
South America 10
dtype: int64
```

Data Exploration: Missing values in
'CorruptionPerception' column

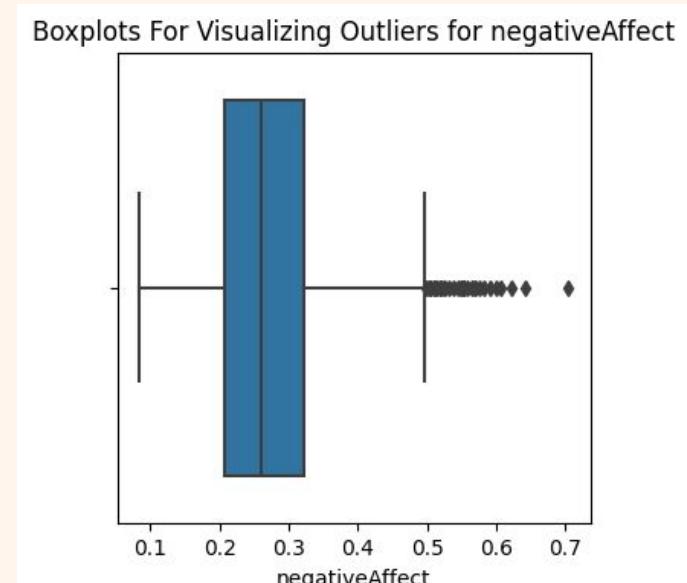
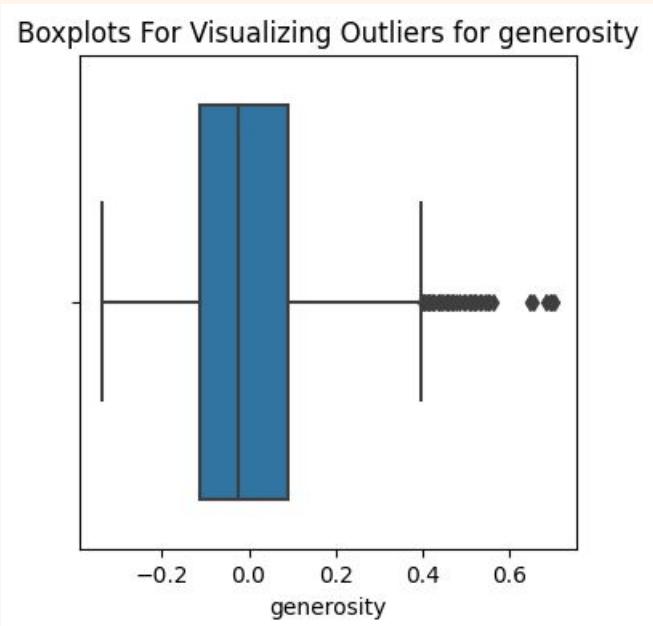
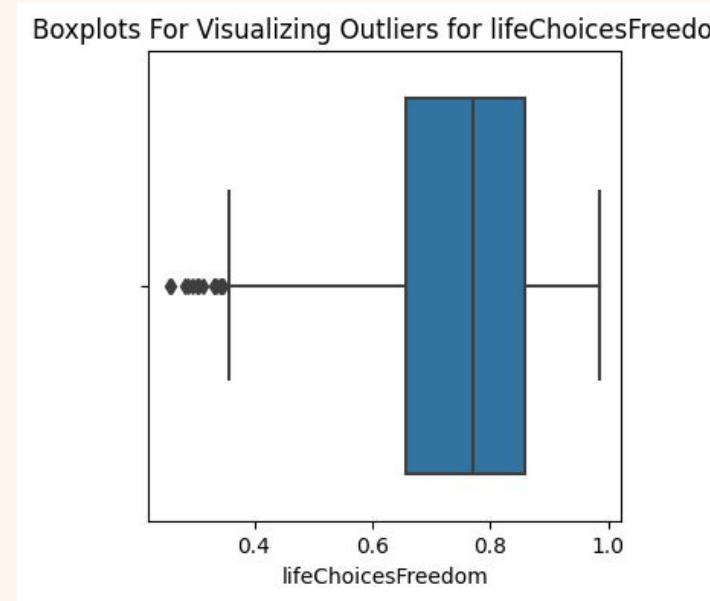
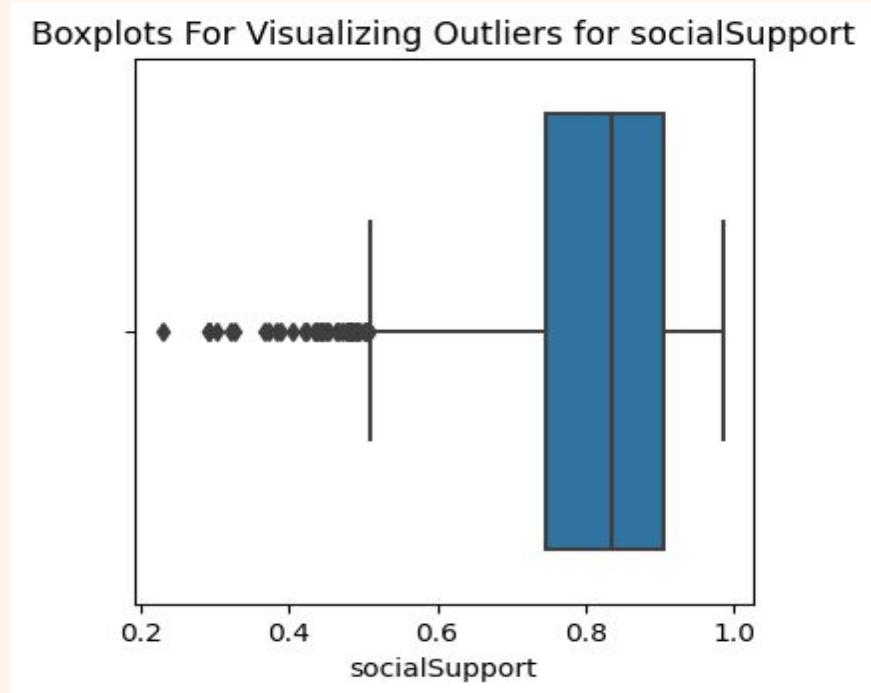
```
continent
Africa      15
Asia       94
Europe      6
North America 1
dtype: int64
```

Manual Imputation of missing values:

- some countries in two datasets did not match, for example, one dataset had US, and other had United States of America
- Such missing values were manually imputed by using key, value pair of country and continent.

Data Cleaning and Transformation

Dealing with missing values



- contains lots of outliers
- so imputed with median of the country related to the missing value
- if no values for country were present, imputed with median of the continent.

country	False
continent	False
region	False
year	False
happinessScore	False
logGdpPerCapita	False
socialSupport	False
LifeExpAtBirth	False
lifeChoicesFreedom	False
generosity	False
corruptionPerception	False
positiveAffect	False
negativeAffect	False
confInNatGov	False
dtype: bool	



Primary Research Question

**What are the factors impacting happiness
of a country/ continent?**

Secondary Research Question

1



What political and economic factors influence the happiness score of countries and continents?

Secondary Research

Question #1

Factors:

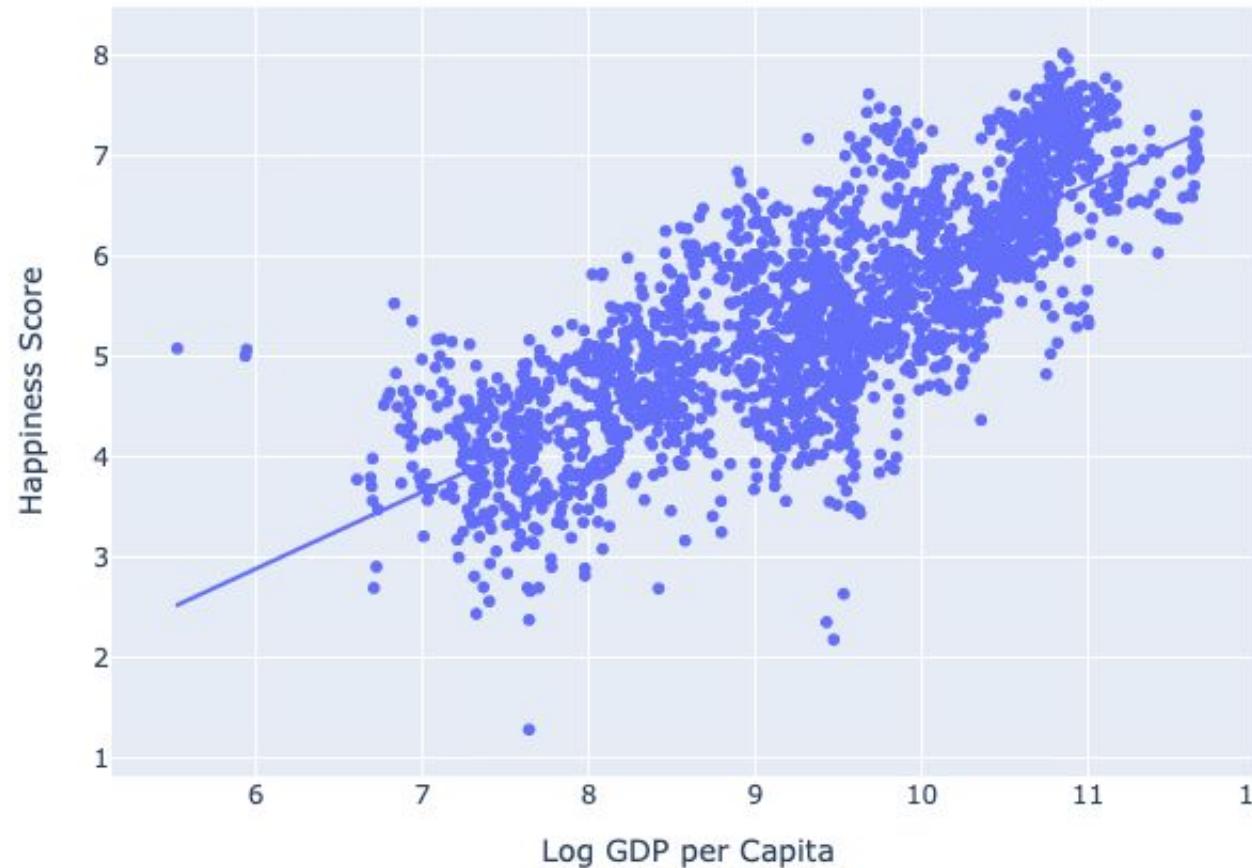
- log GDP per capita: measure of country's economic output (logarithmic scale) based on size of economy and population.
- Freedom to make life choices: binary response to Gallop World Poll (GWP)
- yes (0) meaning complete dissatisfaction and no (1) meaning complete satisfaction for freedom to choose what you do with your life.
- Perception of Corruption: GWP poll questions: Is corruption widespread in the government/businesses or not? 0 - high corruption and 1 - low corruption.
- Confidence in National Government: binary response 1 - extremely confident and 0 - no confidence.



Relationship Between GDP per capita and Happiness Score

Visualization

Log GDP per Capita vs Happiness Score



What Does it Tell Us

- Correlation Coefficient: 0.785
- Strong positive correlation
- As GDP per capita of a country increases, so does the happiness score

Relationship Between Freedom to Make Life Choices and Happiness Score

Visualization

Freedom to Make Life Choices vs Happiness Score



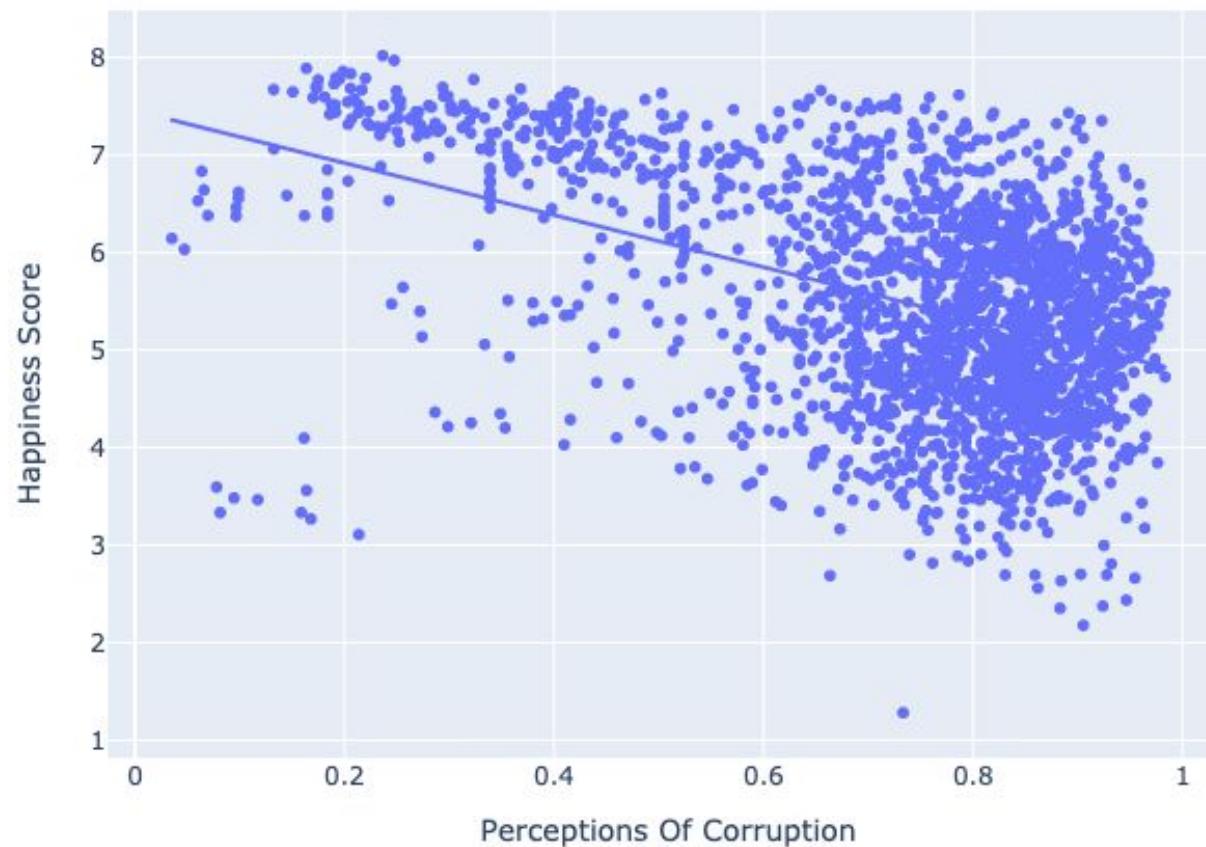
What Does it Tell Us

- Correlation Coefficient: 0.529
- Relatively strong positive correlation
- The more the freedom to make life choices, the higher the happiness score

Relationship Between Perceptions of Corruption and Happiness Score

Visualization

Perceptions Of Corruption vs Happiness Score



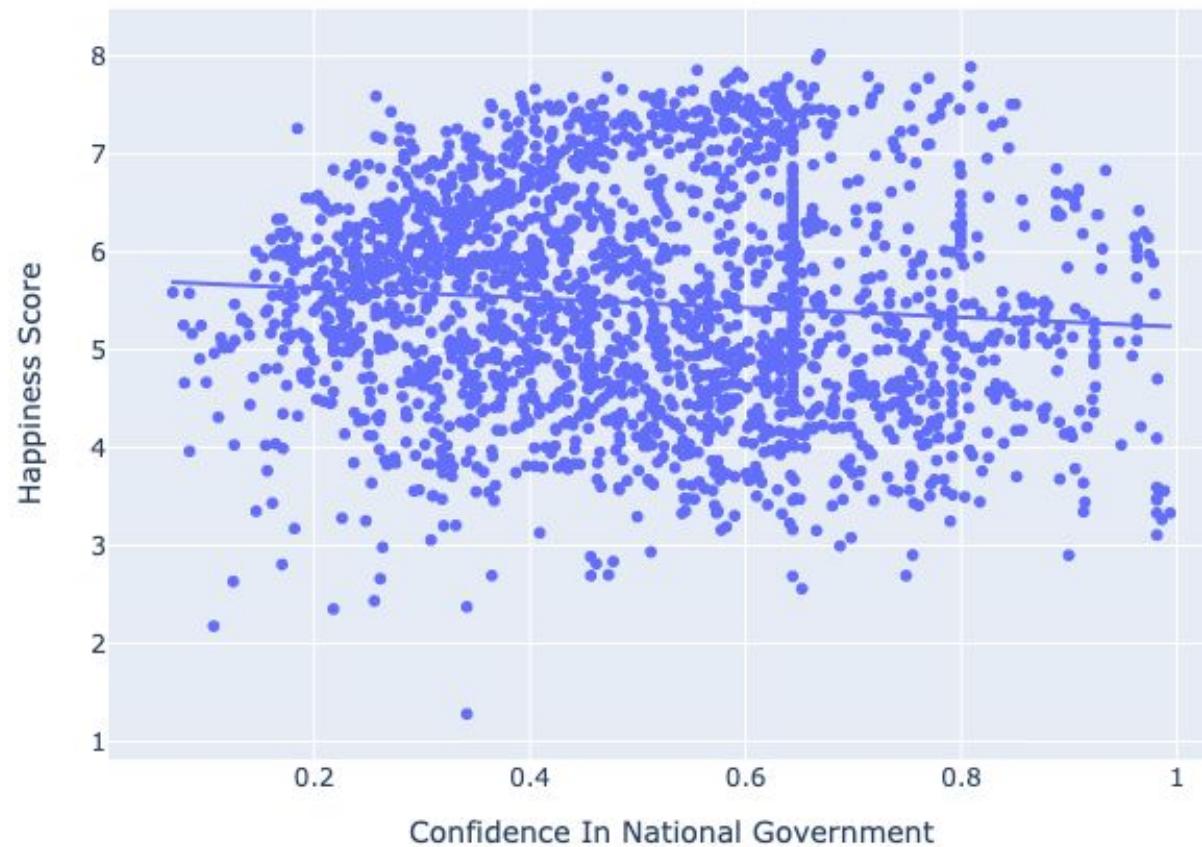
What Does it Tell Us

- Correlation Coefficient: -0.446
- Negative correlation
- As perception of corruption increases for a country, the happiness decreases

Relationship Between Confidence in National Government and Happiness Score

Visualization

Confidence In National Government vs Happiness Score



What Does it Tell Us

- Correlation Coefficient: -0.085
- Extremely weak negative correlation
- As confidence in national government increases, happiness score decreases (only very slightly) - some citizens may feel that their government is too powerful or too controlling so they may get unhappy with the government overtime

Hypothesis Testing and Confidence Intervals

From The Scatterplots and Correlation Coefficients:

The strongest correlation is between log GDP per capita and happiness score i.e., approximately 0.785.

Therefore, we now want to determine the following: Is there significant difference in the happiness score between countries with higher log GDP per capita as compared to countries with lower log GDP per capita.

Process:

- ❖ Used the median as a cutoff point to divide the data into two groups: countries with high GDP per capita and countries with low GDP per capita.

Constructing a 95% confidence interval for the difference in happiness score between countries with high GDP per capita and countries with low GDP per capita:

- ❖ t-critical value: 1.961
- ❖ Confidence Interval: (1.3979, 1.5372)

Result:

We are 95% confident that the true population mean difference in happiness score between high GDP per capita and low GDP per capita countries lies between 1.3979 and 1.5372.

Hypothesis Testing and Confidence Intervals

Conducting a two-tailed hypothesis test because we are comparing the differences between the following two groups: countries with a higher log GDP per capita and countries with a lower log GDP per capita.

Step 1. Let μ_1 represent countries with high GDP per capita and μ_2 represent countries with low GDP per capita respectively.

$$\begin{aligned} H_o: \mu_1 &= \mu_2 \\ H_a: \mu_1 &\neq \mu_2 \end{aligned}$$

Step 2. The level of significance is $\alpha = 0.05$.

Step 3. Obtaining the p-value of the two-tailed test:

Results.

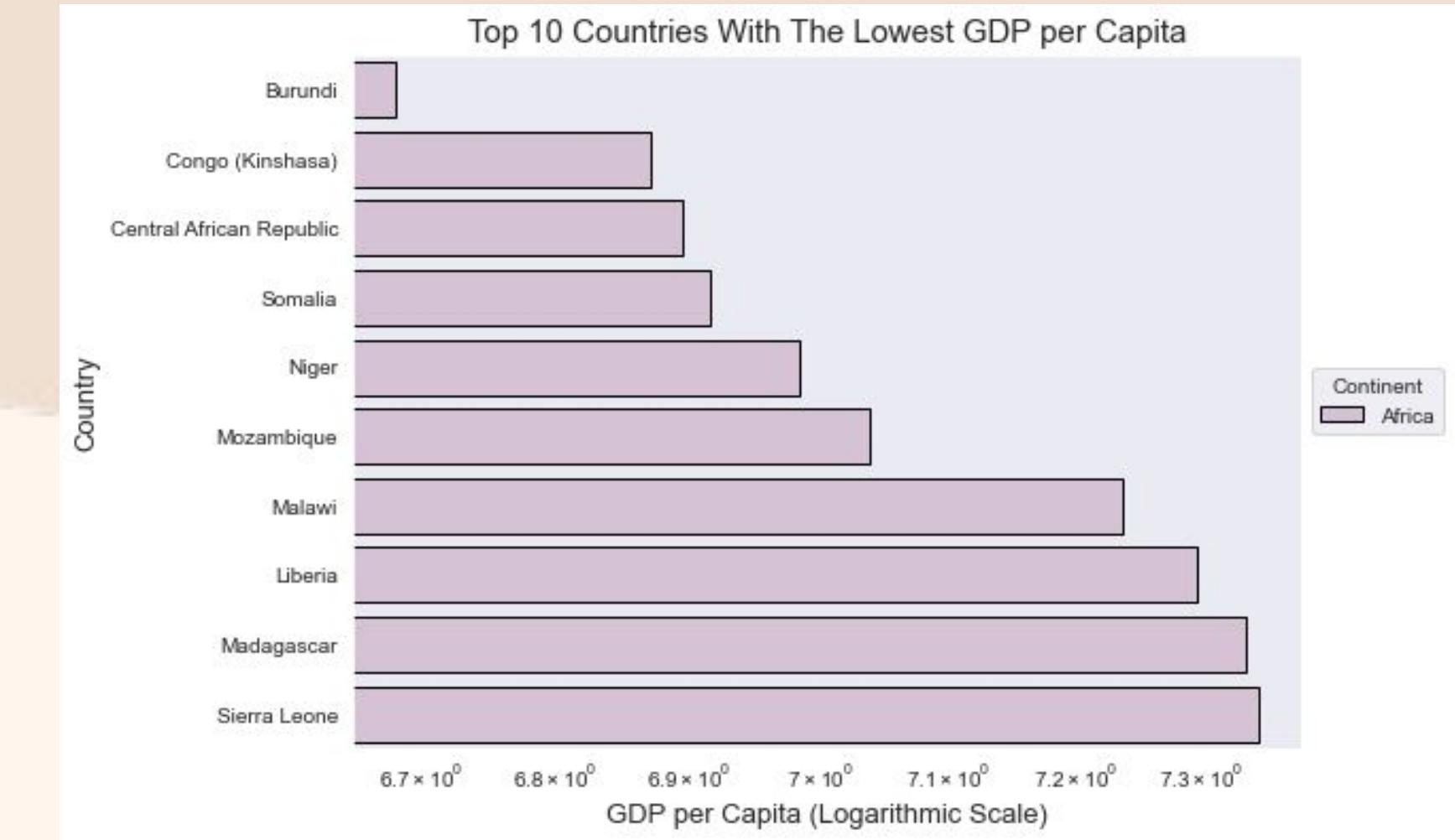
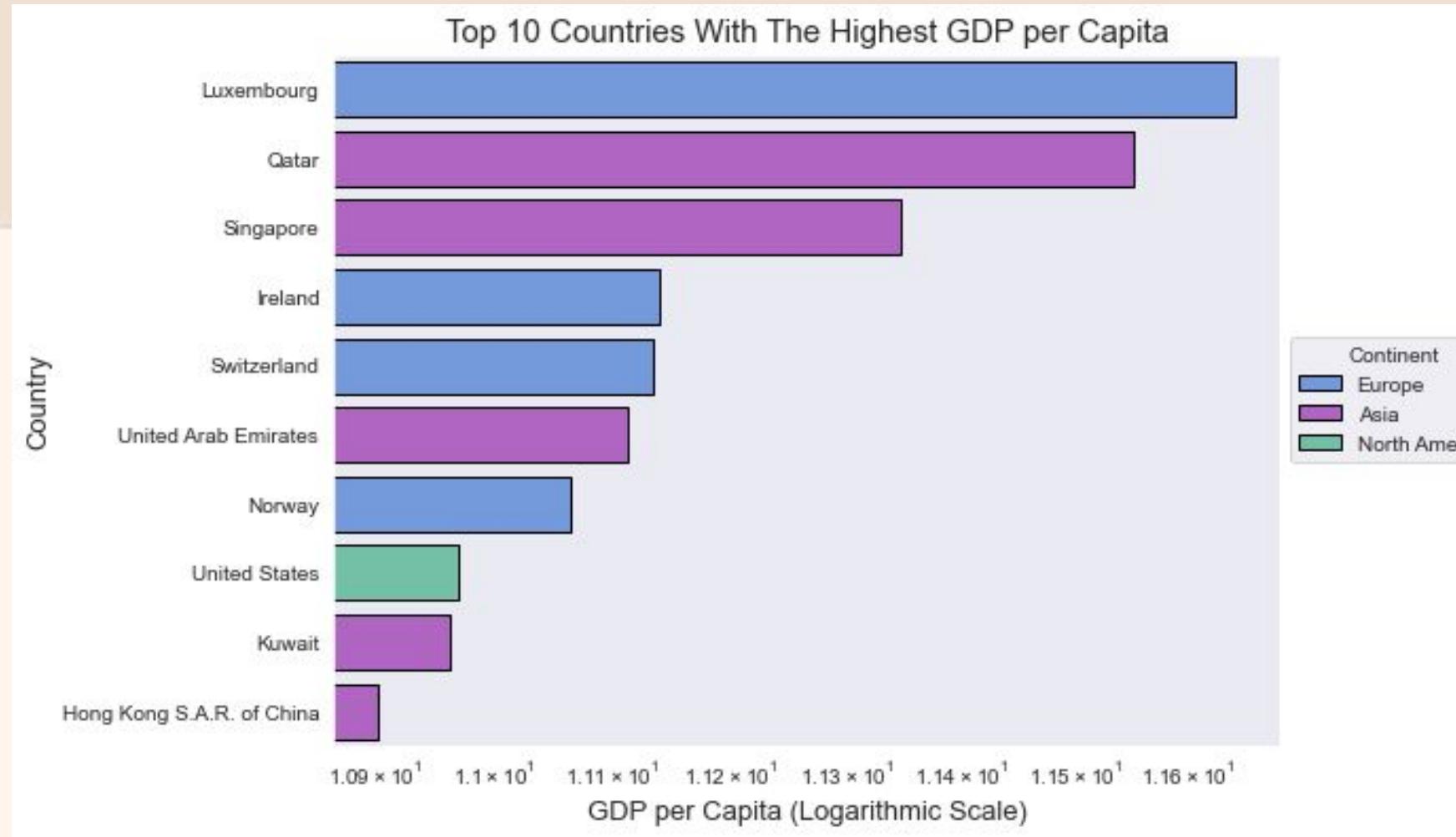
Test statistic = 41.259

p-value = 3.691e-275

Therefore, p-value < α as $3.691e-275 < 0.05$.

Hence, we **reject the null hypothesis (H_o)**. Thus, there is significant evidence that there is a significant difference between the happiness scores of countries with higher GDP per capita and countries with lower GDP per capita.

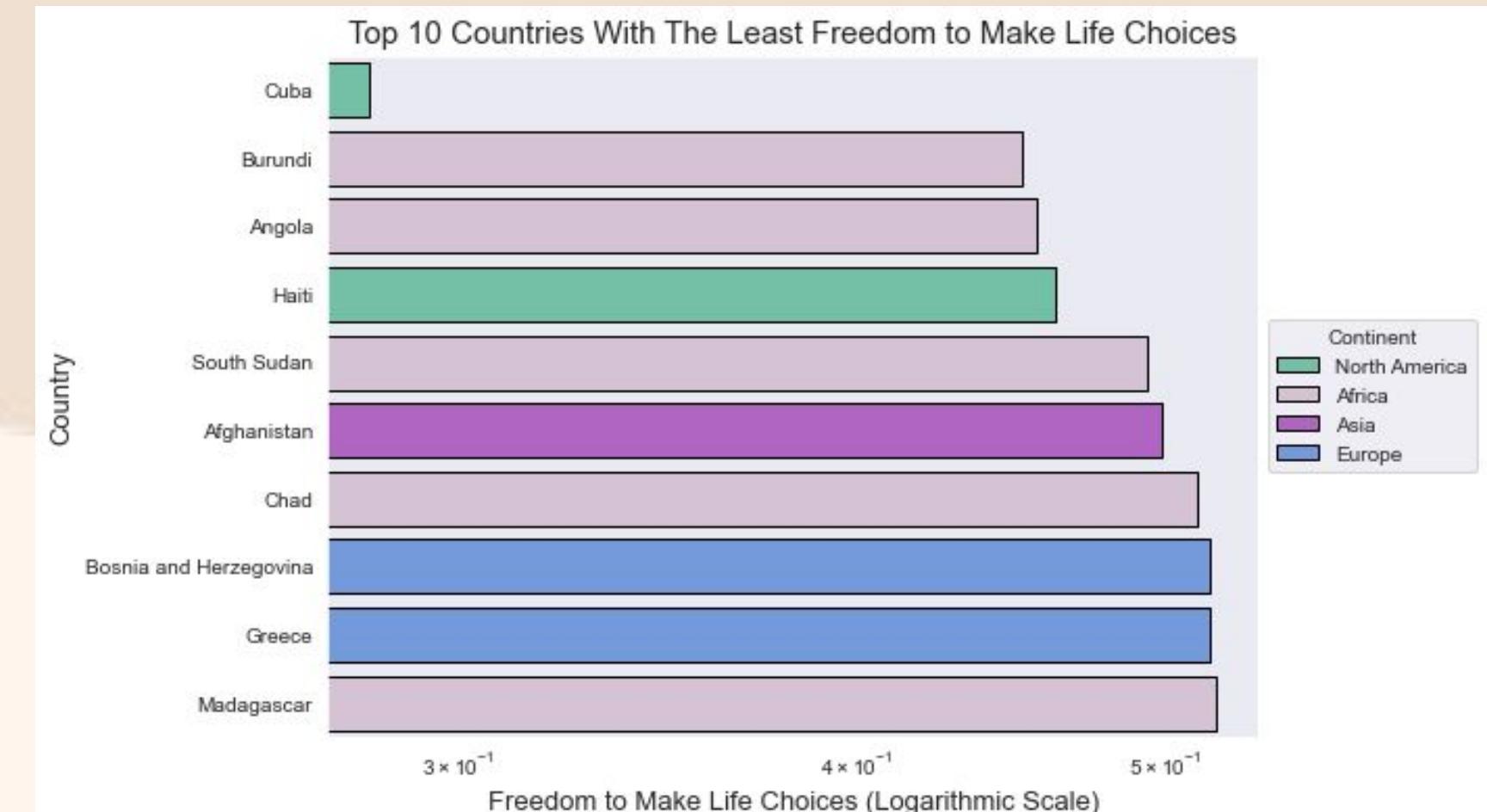
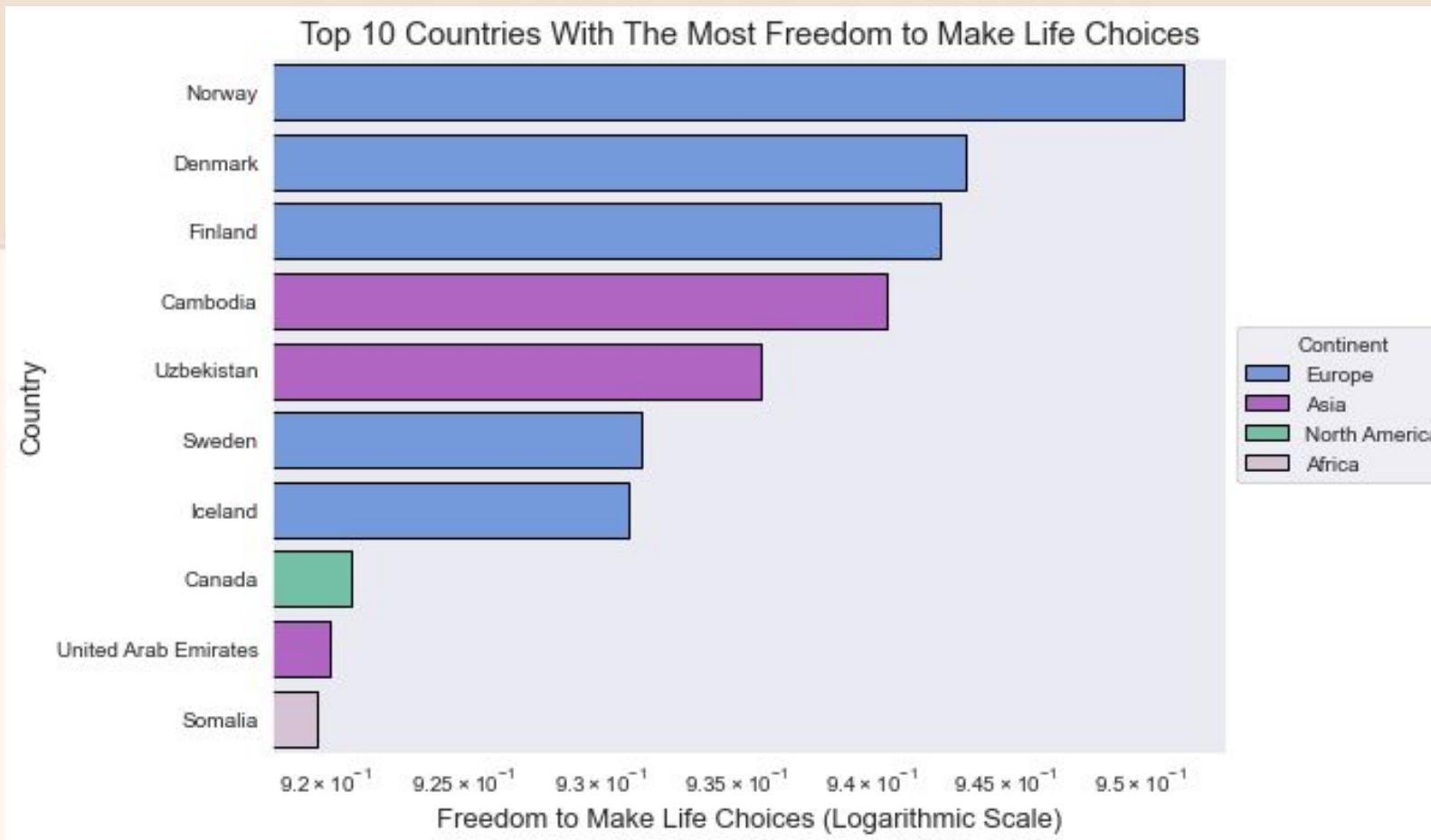
Ranking Countries Based on Political and Economic Factors



- ★ Top 10 countries with the highest GDP per capita are primarily from Europe and Asia, with the exception of the United States in North America
- ★ Indicates that citizens of these countries/regions have a high standard of living and are economically well off
- ★ The country with the highest GDP per capita between 2005 - 2022 is Luxembourg

- ★ All of the top 10 countries with the lowest GDP per capita are from the African continent – with Burundi taking the top spot
- ★ Data suggests that the region is suffering economically and the log GDP would consequently impact the standard of living of the citizens

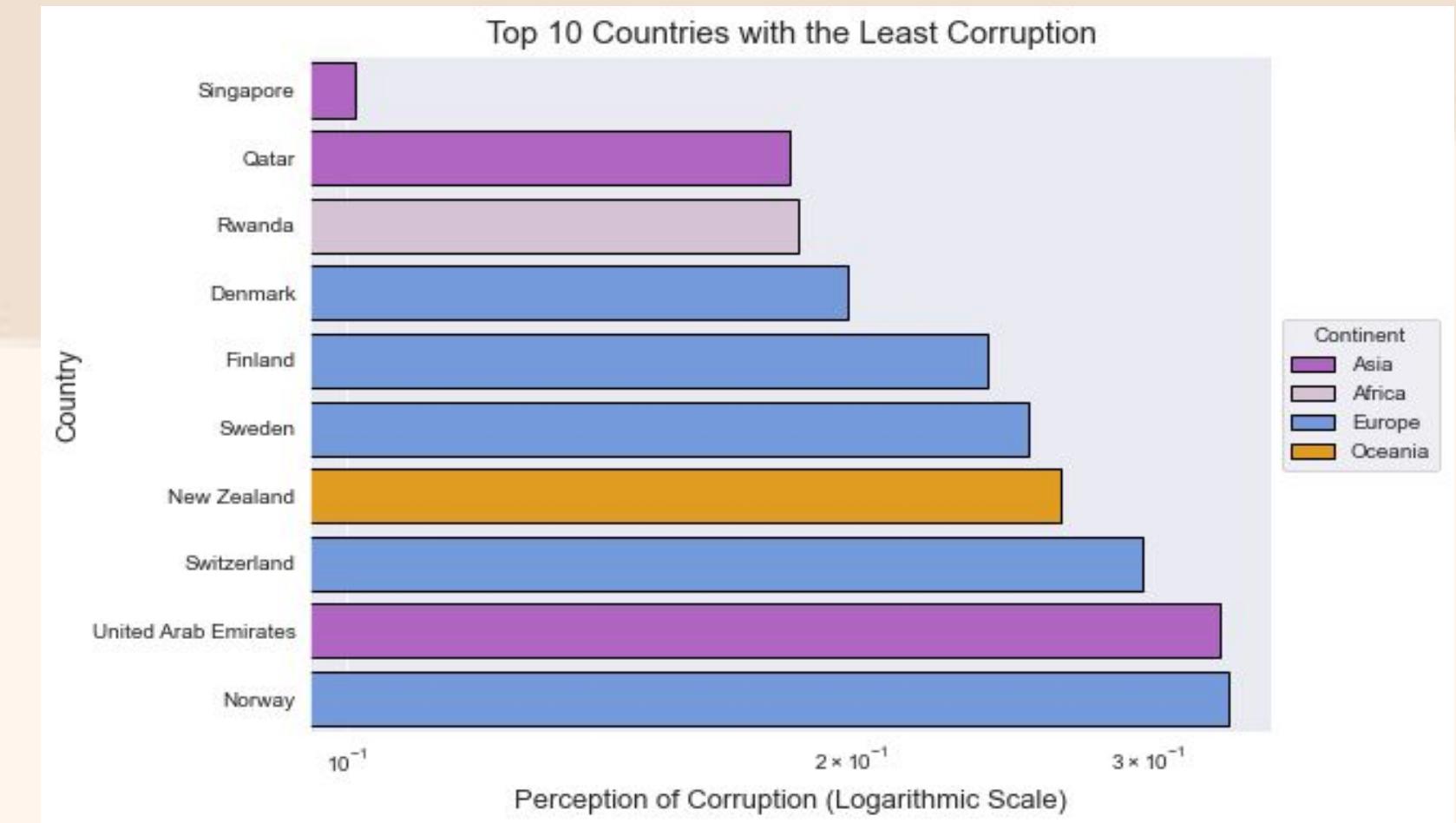
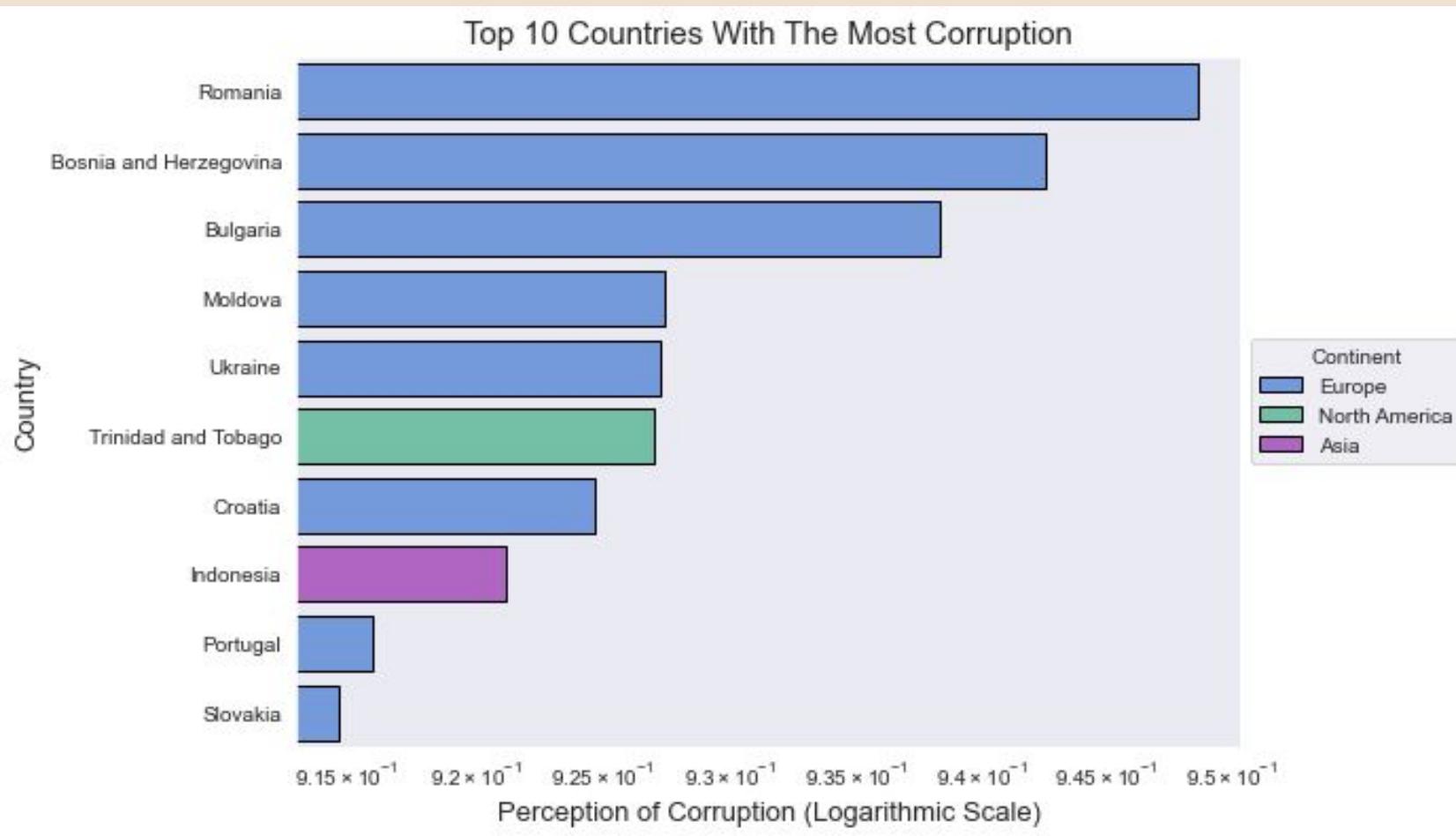
Ranking Countries Based on Political and Economic Factors



- ★ European and Asian countries tend to have higher levels of freedom as the top 10 countries with the most freedom to make life choices are primarily located in these two continents.
- ★ The country with the most freedom to make life choices is Norway, followed by Denmark and Finland.
- ★ Upon a closer look, the European countries with the most freedom to make life choices belong in the northern and western region of Europe.

- ★ The top 10 countries with the least freedom to make life choices are mostly located in Africa .
- ★ Even though African countries dominate this category, the country with the least freedom to make life choices is Cuba.
- ★ European countries with the least freedom to make life choices belong in the Balkan regions and Eastern/ Southern Europe.

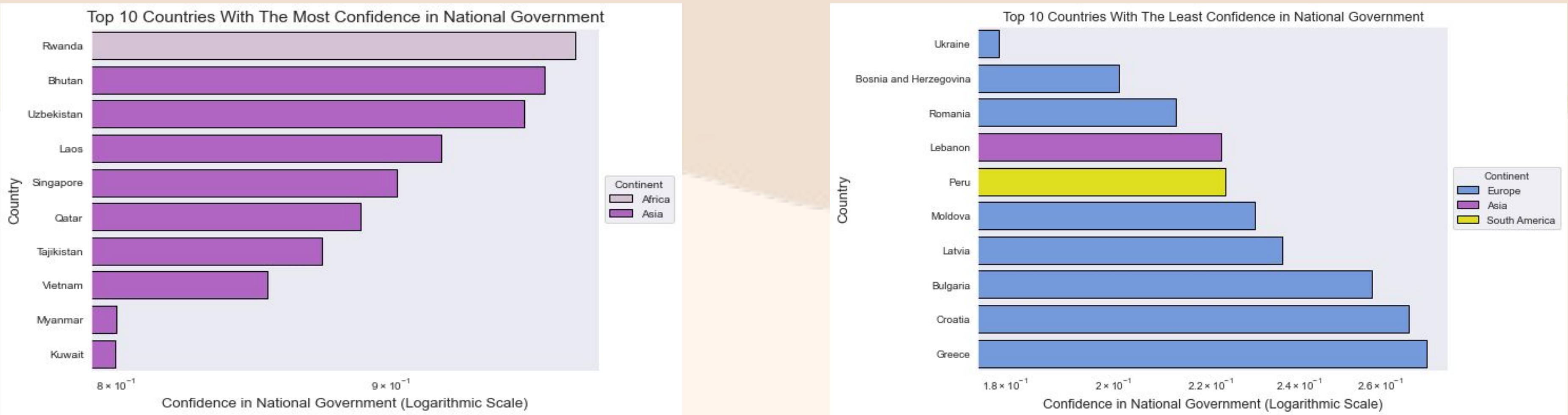
Ranking Countries Based on Political and Economic Factors



- ★ The majority of the countries with the highest perception of corruption are from Europe.
- ★ Many of these countries such as Romania, Ukraine, Moldova etc., have struggled with political and economic stability over the years which may explain the high levels of corruption.

- ★ The countries with the least perception of corruption are from a diverse range of continents.
- ★ Singapore and Qatar are ranked as the top two countries with the least perception of corruption.
- ★ These countries are known for their high levels of economic prosperity as well as political stability between 2005 – 2022.

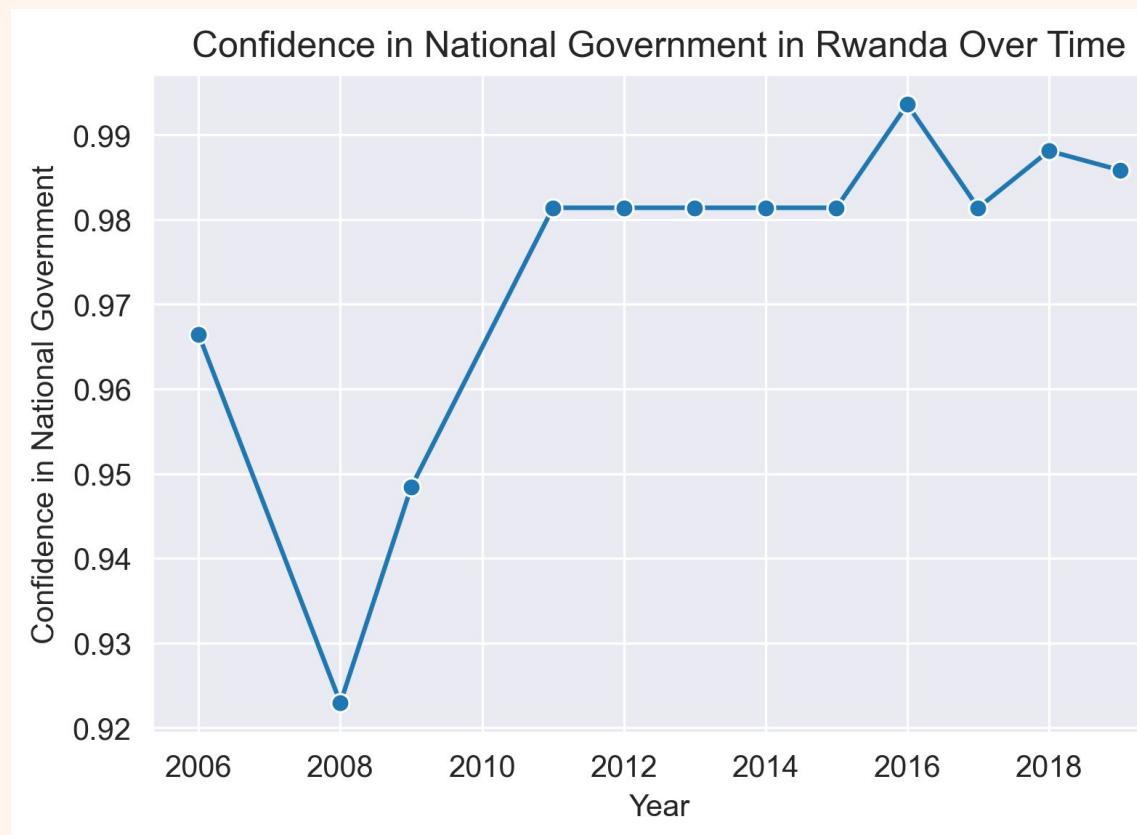
Ranking Countries Based on Political and Economic Factors



- ★ All countries with the most confidence in national government are located in Asia - except Rwanda.
- ★ Based on their political/ economic states, Rwanda is an anomaly here.
- ★ High trust in national government, may be due to a stable political state, or strict law and order and a respect for authority.
- ★ Ukraine takes the top spot as the #1 country with the least confidence in national government.
- ★ 8/10 countries in this plot are located in Europe - all of which belong in the Balkan regions or Eastern/ Southern Europe.
- ★ These countries have very low trust in their national government which may be due to corruption, political and social unrest, or economic troubles.

Taking a closer look at Rwanda

How did Rwanda end up being the country with the most confidence in national government?



Rwanda (circa 2008):

- ❖ trials conducted for individuals involved in the Rwandan Genocide of 1994 (800,000 people of an ethnic group were killed)
- ❖ war criminals being sentenced to prison may have contributed in the increased confidence in national government

Rwanda is also ranked as the third highest country with the least corruption.

But, Rwanda does not make it to the list for the top 10 countries with the highest happiness score. This suggests that other factors need to be taken into account to determine the overall happiness.

Rankings For The Top Five Most Happiest Countries Based on Each Factor

- The tables below shows whether any of these countries lay in the top 10 of any of the socio-economic factors. If so, then their rank (from 1 - 10) is shown.

Ranking	Country	Mean Happiness Score
1	Denmark	7.673428
2	Finland	7.619146
3	Norway	7.48182
4	Switzerland	7.474483
5	Iceland	7.458607

Table 3.1.5. Top Five countries with the highest mean happiness Score throughout the years

country	Rankings							
	GDP per Capita	Freedom of Life Choices	Low Perception of Corruption	Confidence in National Government	Social Support	Life Expectancy	Generosity	
Switzerland	5		8		10	3		
Norway	7	1	10		7			
Denmark		2	4		3			
Finland		3	5		5			
Iceland		7			1	5		

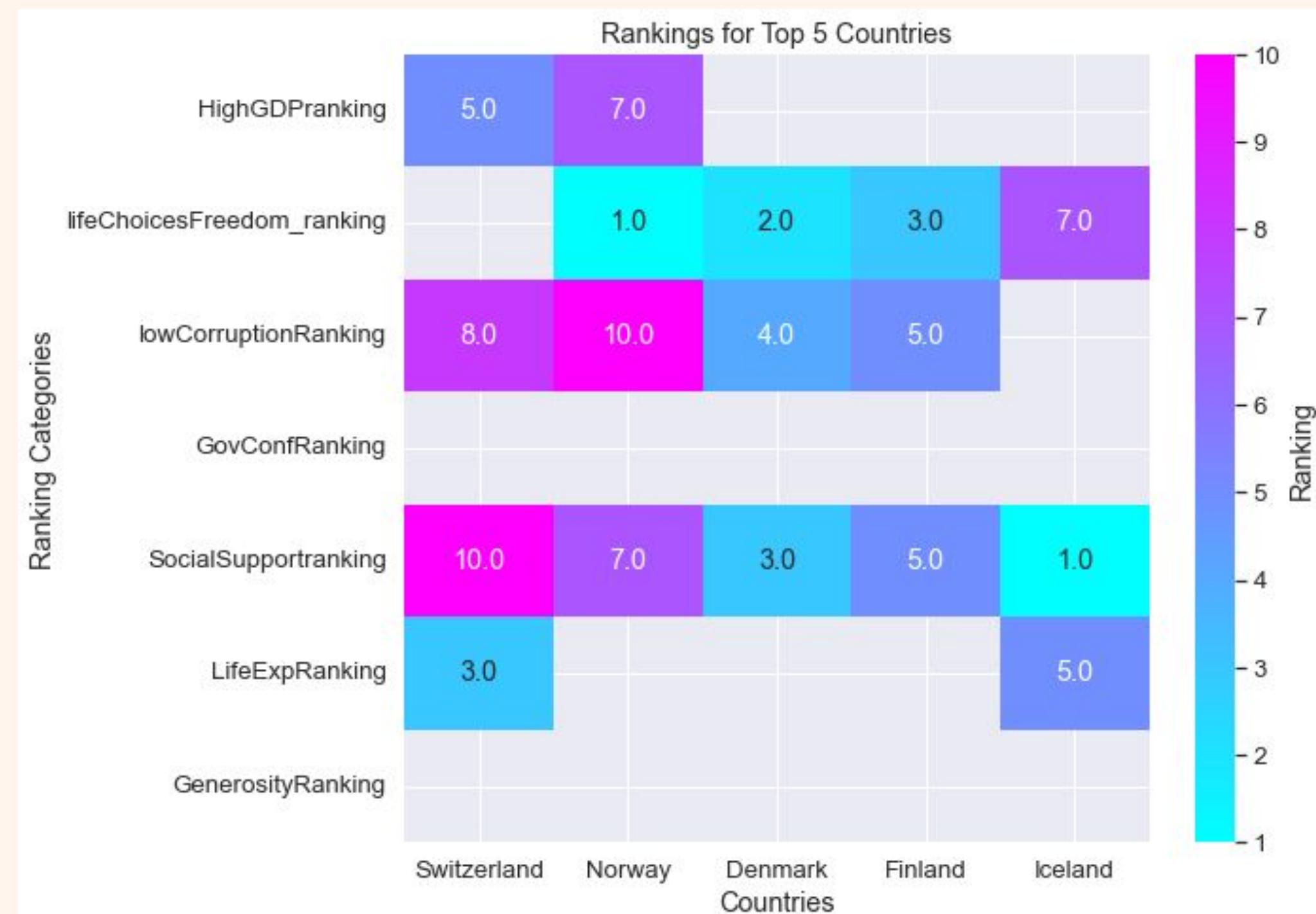
Table 3.1.6. Information on whether any of the five most happiest countries rank in the top 10 of socio-economic and political factors



Rankings For The Top Five Most Happy Countries Based on Each Factor

What Does it Tell Us

- ❖ The heatmap depicts the information from the table (3.1.6.).
- ❖ The more the color leans towards bright blue, the better the ranking of a country for a specific factor.
- ❖ Each of these five countries rank in the top 10 of at least 3 political/ socio-economic factors.
- ❖ Confidence in national government and generosity are the only factors that do not contain any of the top 5 happiest countries.
- ❖ This indicates that happiness of a country depends on multiple areas rather than just one.



Secondary Research Question

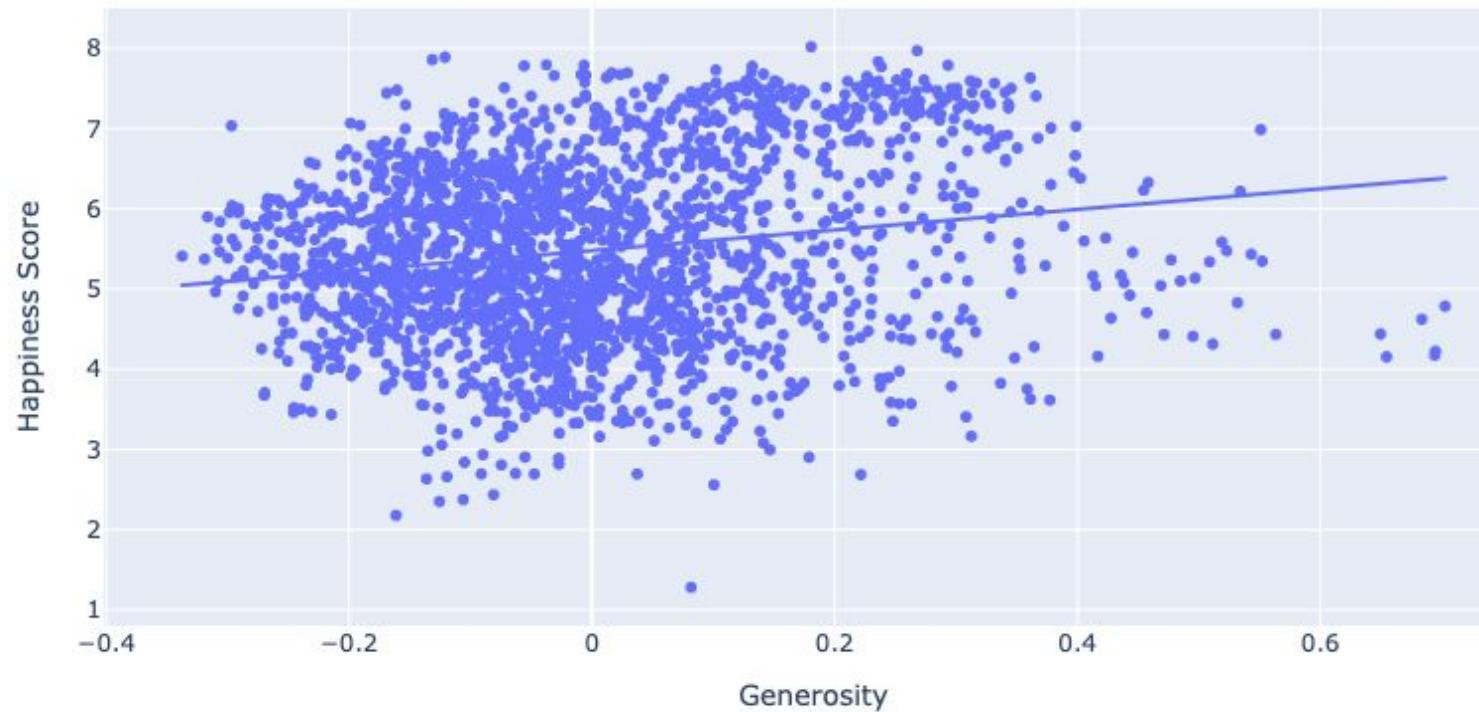
2

How are socio-psychological factors influencing the happiness score of a country?

What is the Relationship Between Happiness Score and Generosity?

Visualization

Happiness Score Vs Generosity



What Does it Tell Us

- "Have you donated money to a charity in the past month?"
- correlation coefficient between Generosity and happiness score is **0.1823922512533233**
- very low, positive correlation

What is the Relationship Between Happiness Score Life Expectancy At Birth?

Visualization

Happiness Score Vs Life Expectancy at Birth



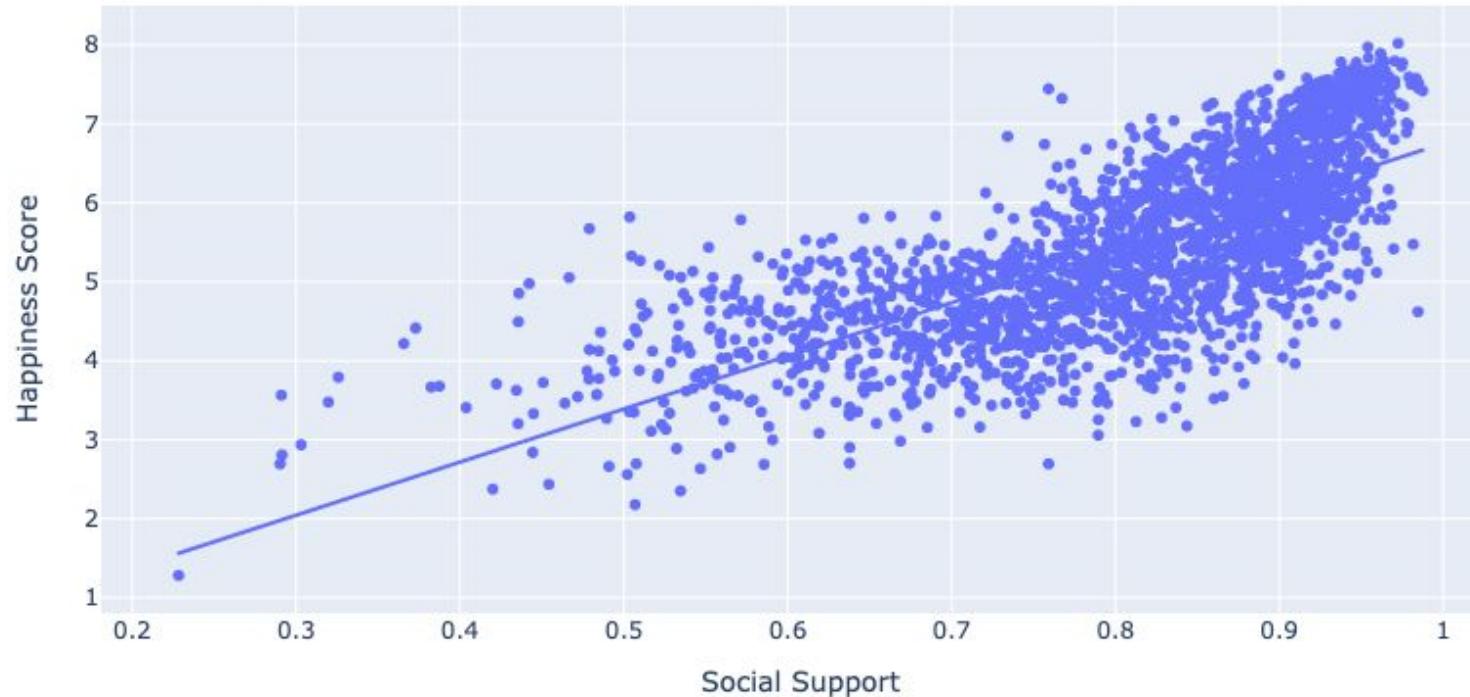
What Does it Tell Us

- The correlation coefficient between Life Expectancy at Birth and happiness score was obtained to be **0.7131248631518963**.
- This is a **strong positive correlation**: where countries with higher life expectancy at birth tend to have higher happiness scores.
- Haiti : lower data points

What is the relationship between Happiness Score and Social Support

Visualization

Happiness Score Vs Social Support



What Does it Tell Us

Social support is the average of the binary responses (0=no, 1=yes) to the Gallup World Poll (GWP) question "**If you were in trouble, do you have relatives or friends you can count on to help you whenever you need them, or not?**"

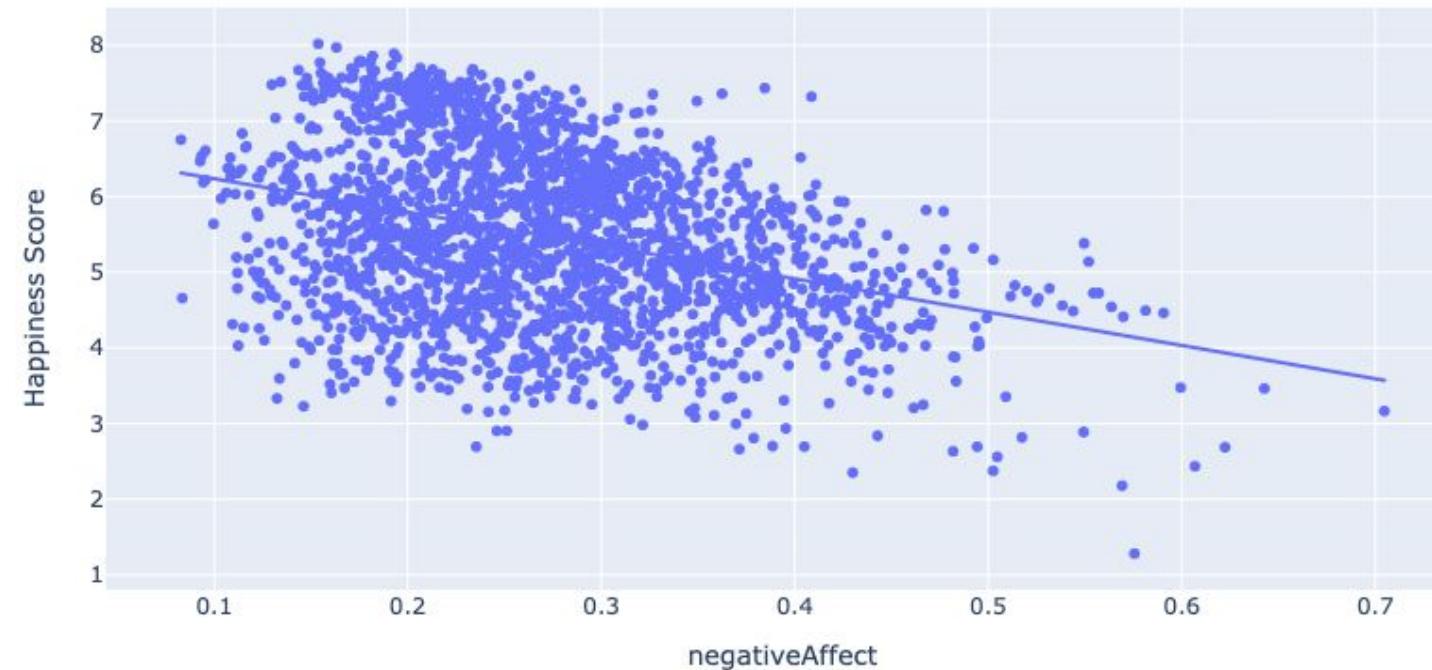
The correlation coefficient between social support and Happiness Score of a nation was obtained to be **0.7217745770416992**.

- Afghanistan - the lowest social support datapoint (Central African Republic, Togo)

What is the relationship between Happiness Score and Negative Affect

Visualization

Happiness Score Vs negativeAffect



What Does it Tell Us

Negative affect, the average of previous-day measures for worry, sadness, and anger.

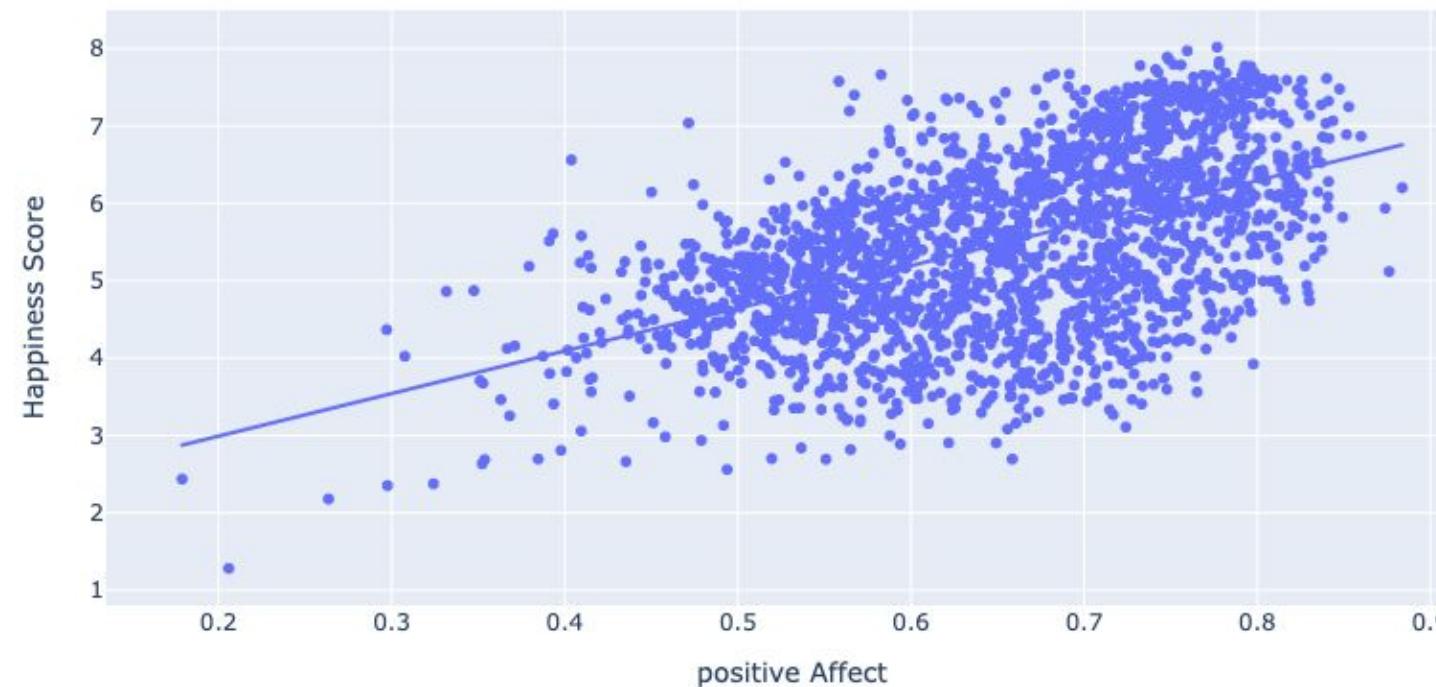
The correlation coefficient between social support and Happiness Score of a nation was obtained to be **-0.3393712550847594**

- highest negative affect: Syria (2012, 2013, 2015), Lebanon (2021), Afghanistan(2022)

What is the relationship between Happiness Score and Positive Affect?

Visualization

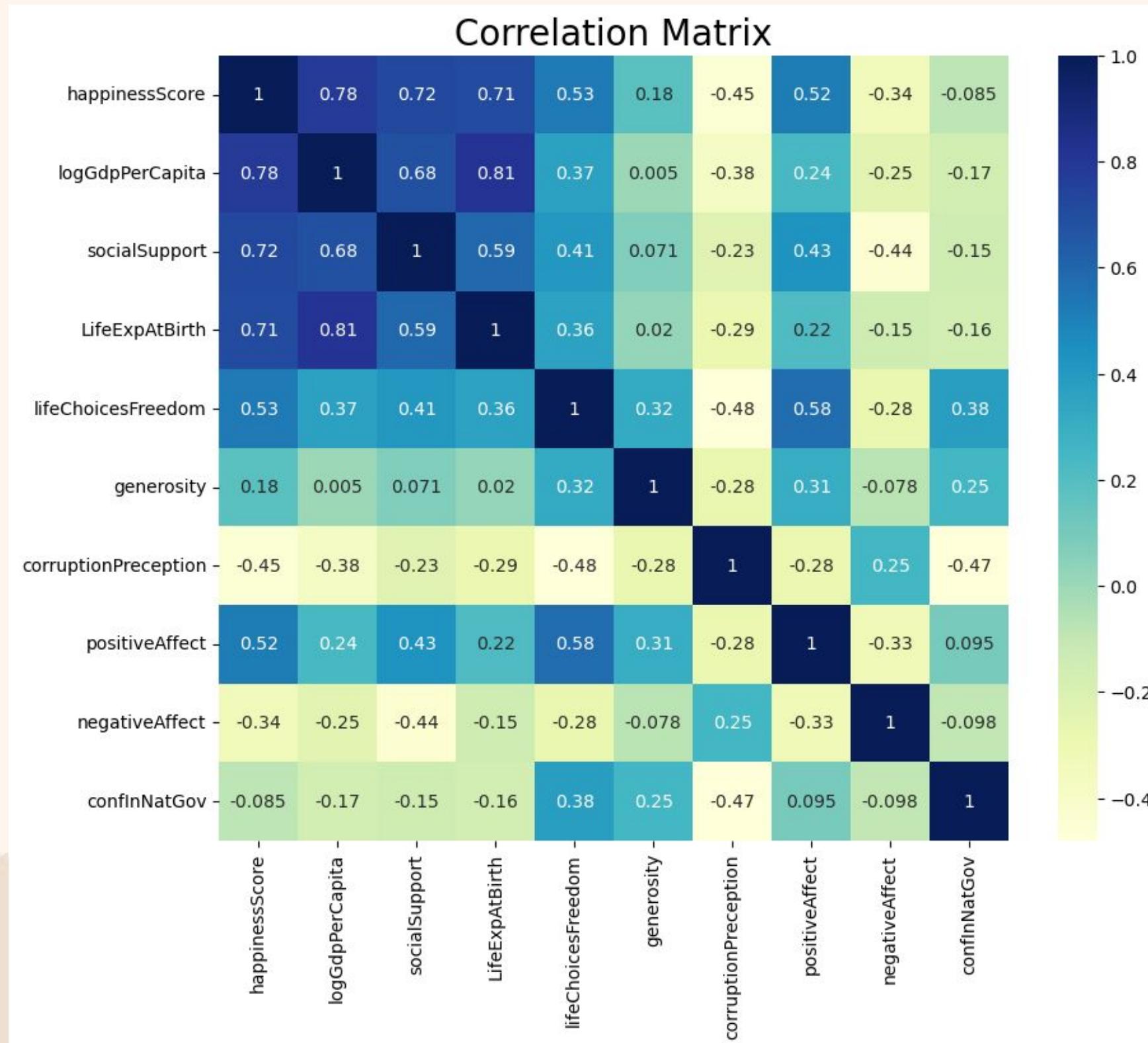
Happiness Score Vs Positive Affect



What Does it Tell Us

Positive effect is defined as the **average of previous-day effects** measures for **laughter, enjoyment, and interest**. A strong positive correlation between positive affect people feel and their happiness score was found with correlation coefficient of **0.5173038219551038**.

The Overall Correlation Matrix Showing the Interaction of Numerical Variables in World Happiness Dataset in Relation to the Happiness Score



What Does it Tell Us

- positive affect is positively correlated with freedom of choices
- Corruption perception is negatively correlated with social support and freedom of choices.
- Social support was positively correlated with GDP per capita.
- GDP per capita is positively correlated with life expectancy at birth

Hypothesis Testing 2: Is there any significant difference in happiness score before and after COVID?

Hypothesis Testing

Step 1: Hypotheses:

Let μ_1 represent happiness score before COVID (2019) and μ_2 represent happiness score after COVID (2021) respectively.

$$H_0: \mu_1 = \mu_2$$

$$H_a: \mu_1 > \mu_2$$

This is a **one-tailed test** as we are hypothesizing that the happiness score after covid will be less than the happiness score before COVID.

Step 2

The level of significance is $\alpha = 0.05$.

Step 3 Obtain the P-value.

This is a **one-tailed test**.

What Does it Tell Us

Ttest_indResult(statistic=-0.4686776813813489,
pvalue=0.6801496110636177)

The p value $0.680 > 0.05 = \alpha$, so we fail to reject the null hypothesis.

So there is **no significant difference in the happiness score before and after COVID**.

Hypothesis Testing 2.1: Is there any significant difference in happiness score among people in Africa and N. America?

Hypothesis Testing

Step 1

Let μ_1 represent happiness score of African people and μ_2 represent happiness score of people in North America respectively.

$$H_0 : \mu_1 = \mu_2$$

$$H_a : \mu_1 < \mu_2$$

This is a one-tailed test as we are hypothesizing that the happiness score of N. American people to be higher than that of African people.

Step 2

The level of significance is $\alpha = 0.05$.

Step 3

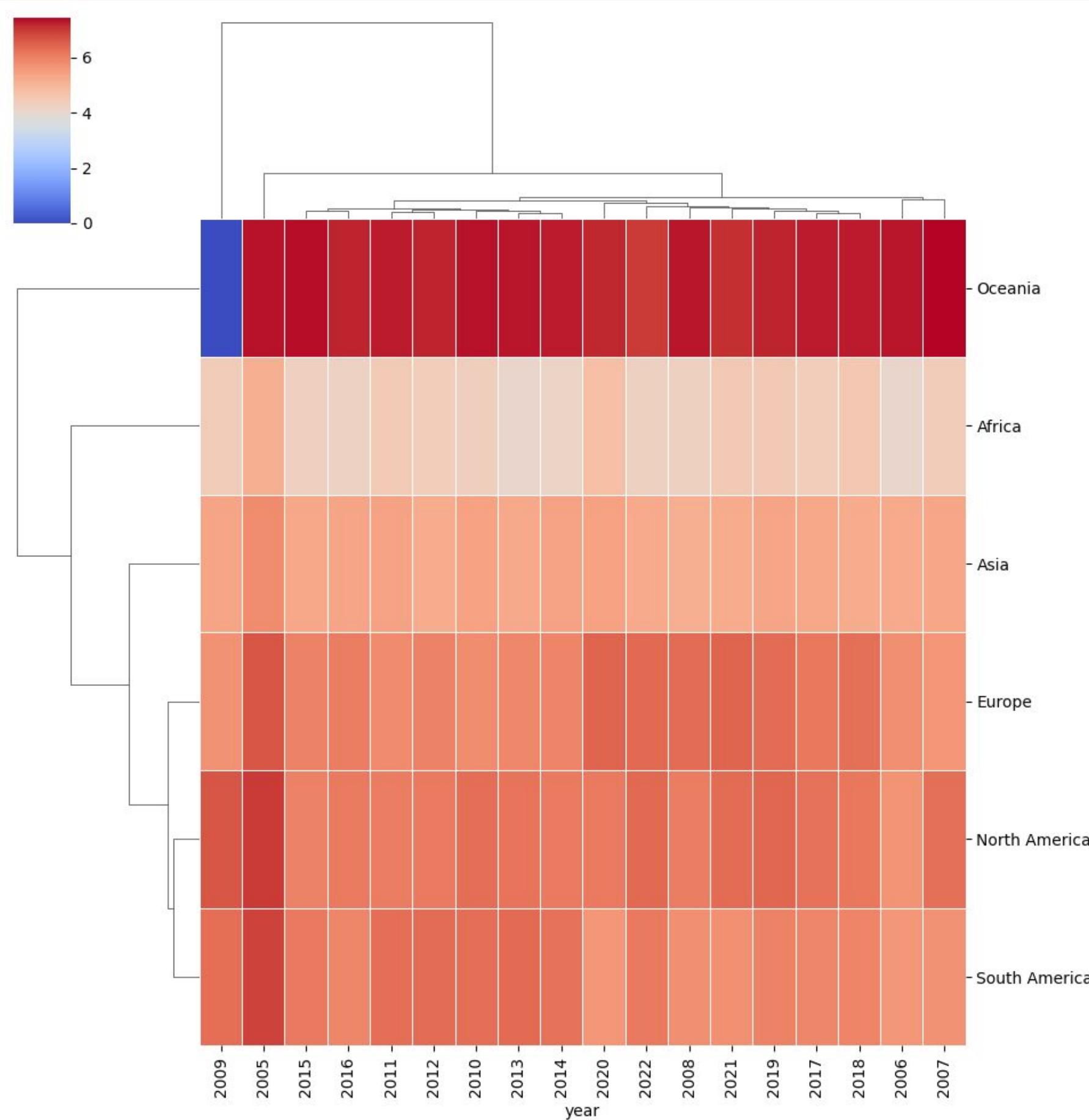
We use `scipy.stats.ttest_ind` to help us compute the P-value.

What Does it Tell Us

```
Ttest_indResult(statistic=-24.7718135716637,  
pvalue=3.1504041350994046e-71)
```

The p value $3.1504041350994046e-71 < 0.05 = \alpha$, so **we reject the null hypothesis**. So happiness score of African people is significantly lower than that of North Americans.

How each continent and year are related to each other based on happiness score?



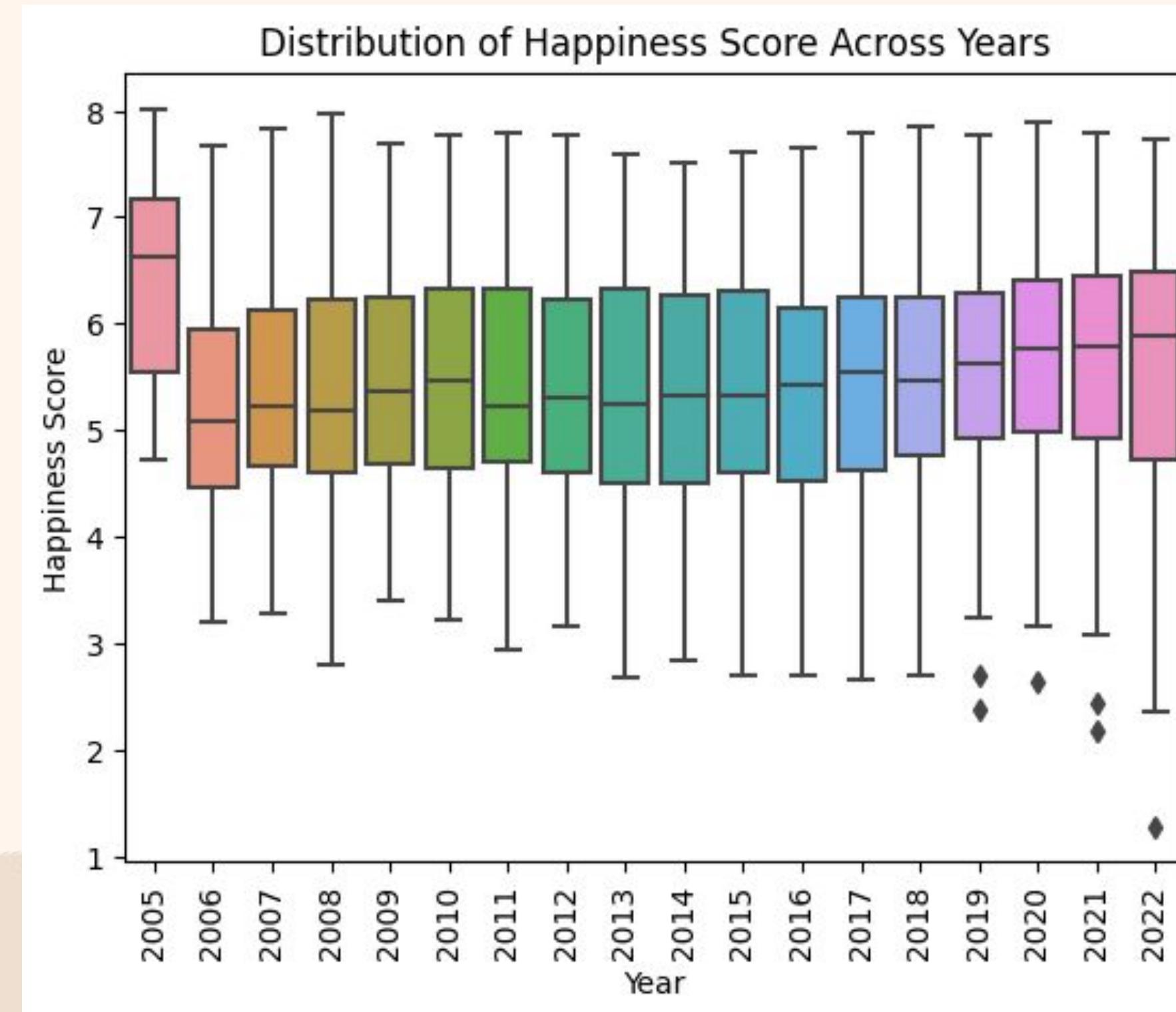
What Does it Tell Us

- S. America and N. America are closely related based on their happiness score
- Oceania is uniquely positioned
- year 2020 and 2022 & 2008 and 2021 are closely related in terms of happiness score.

Limitations:

- clusters can change based on the underlying Clustering algorithms

Were there drastic changes in the distribution of happiness score over time?



Research Question # 3



How does each factor change for each country over the years compared to the happiness score?

We want to gain insight on how a country improved or injured their happiness score by looking into which countries had the largest change in their scores overtime.

Process

How did we find the overall change in score for each country?

- ❖ Found the “Score Difference” for each country
 - The score difference was found by taking the most recent happiness score from each country and subtracting it by the first happiness score they received in the dataset.

Positive differences represent positive change

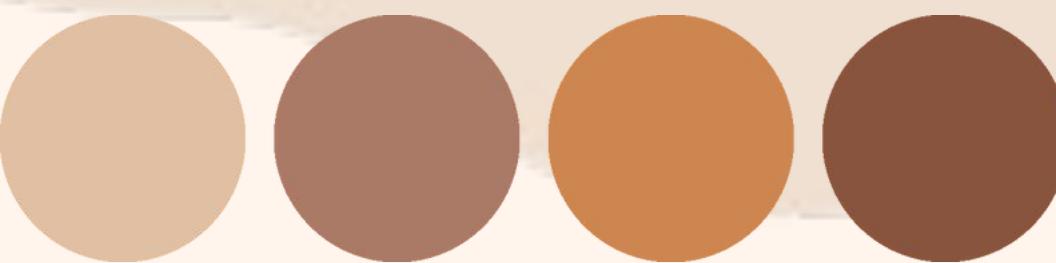
Negative differences mean negative changes

Removed countries that had less than 5 recorded happiness scores.

- ❖ Since we are dealing with **165** countries, we decided to **focus on the top six countries with the largest positive and negative score differences**
- ❖ These countries were found to be: Nicaragua, Georgia, Congo (Brazzaville), Jordan, Afghanistan, Lebanon.

	Country	ScoreDifference	YearsAmount
153	Lebanon	-3.138818	17
152	Afghanistan	-2.442319	14
151	Jordan	-1.939054	17
2	Georgia	1.617647	16
1	Nicaragua	1.932099	16
0	Congo (Brazzaville)	1.985126	14

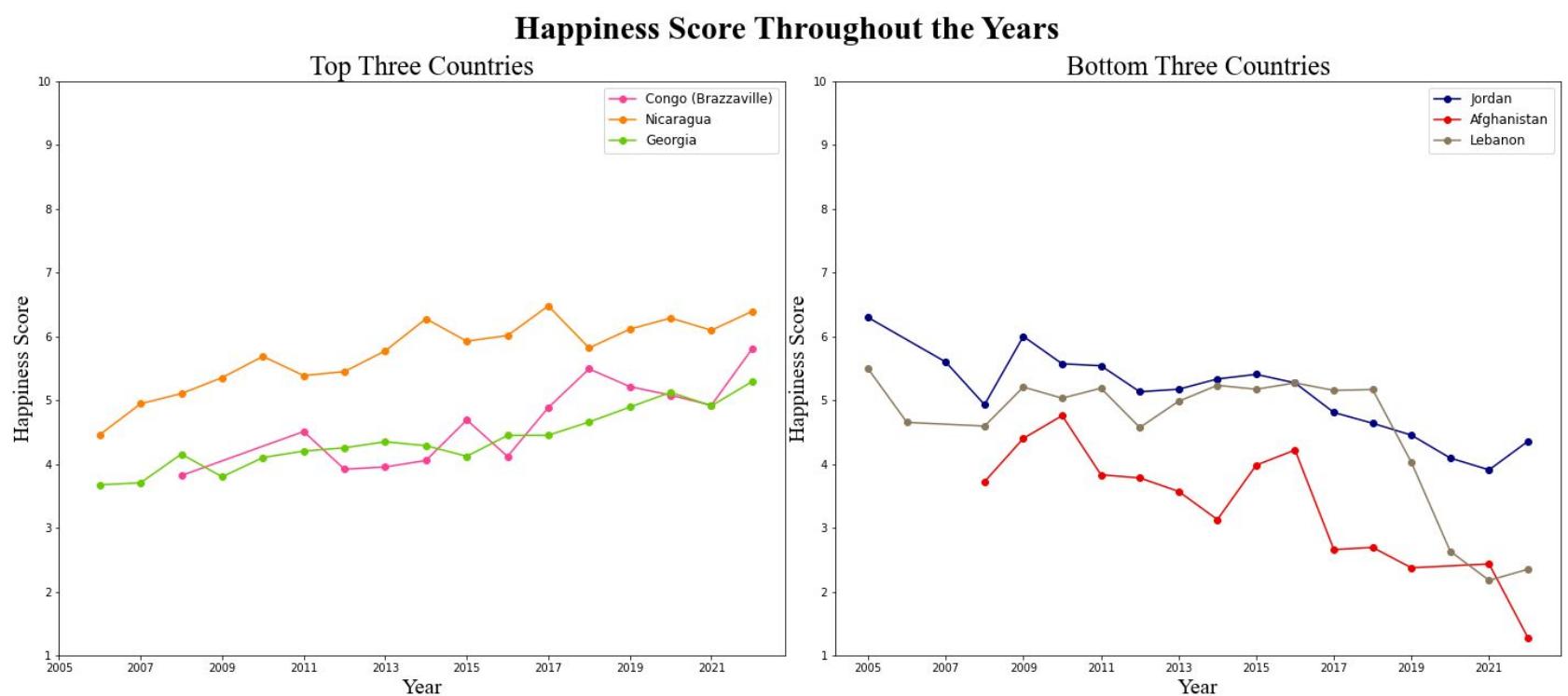
Time-series line graphs were used to visualize the change of each country's happiness score along with each factor throughout the years.



In the next few slides, we will be looking into the line graphs that had the most relevance to the change in each country's happiness score.

Results

Visualization



*** What is the happiness score based on?

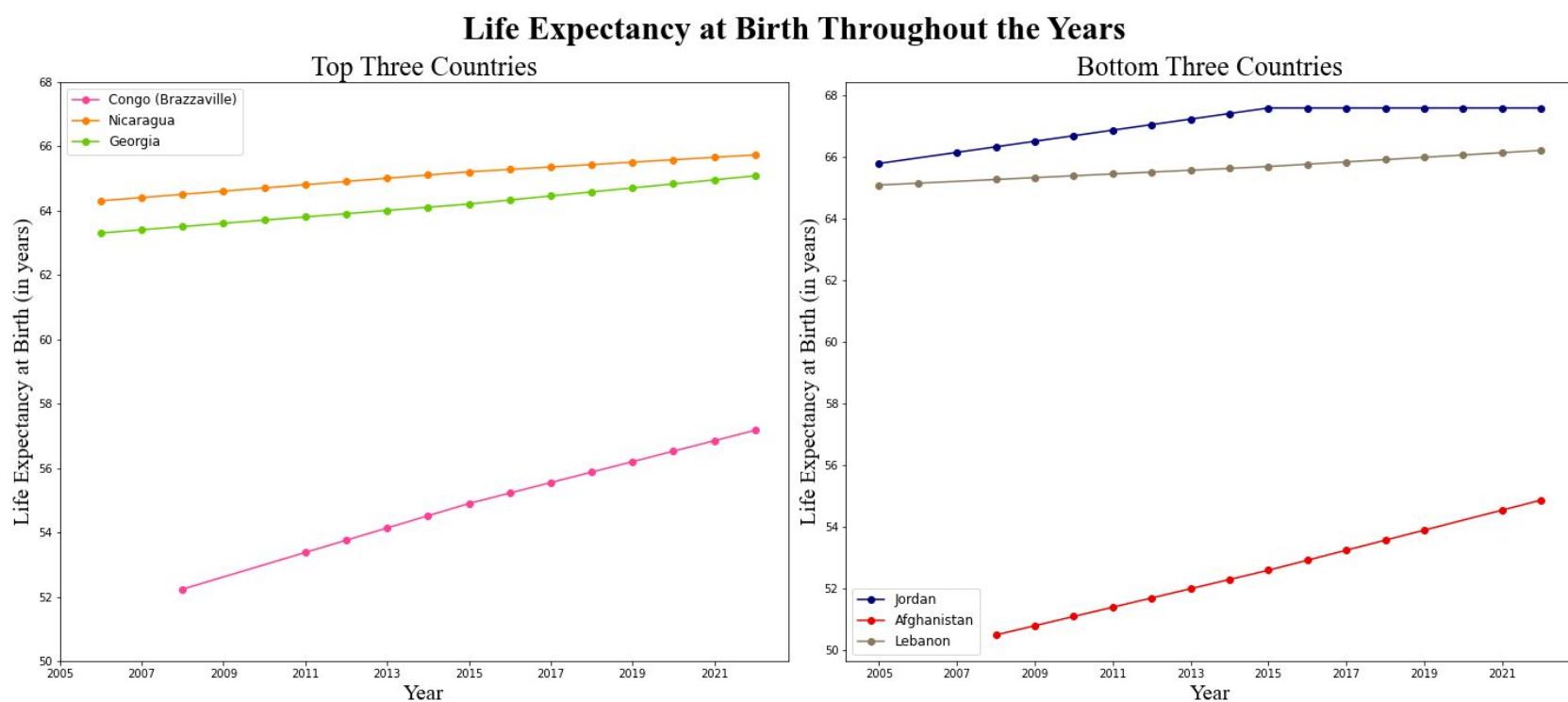
Life evaluations from the Gallup World Poll provide the basis for the annual happiness rankings. They are based on answers to the main life evaluation question. The Cantril ladder asks respondents to think of a ladder, with the best possible life for them being a 10 and the worst possible life being a 0. They are then asked to rate their own current lives on a 0 to 10 scale. The rankings are from nationally representative samples over three years.

What Does it Tell Us

- There seems to be significant fluctuations in their scores from year to year between the first and last scores.
- The fluctuations may be due to real-world examples such as: new policies, strengthened policies, protests, or a struggling economy

Results

Visualization

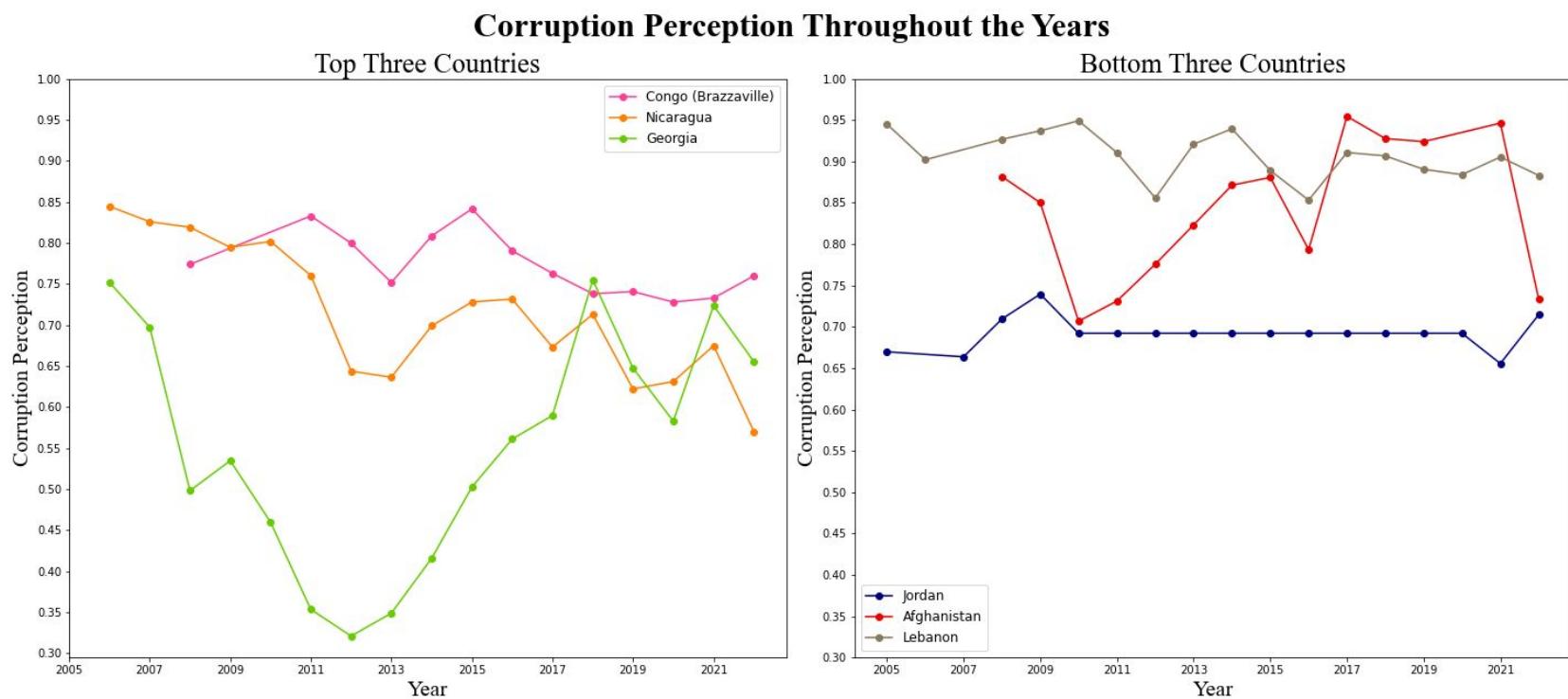


What Does it Tell Us

- Throughout all six countries being investigated, the life expectancy has increased overall throughout the years.
- A decreasing happiness score may not mean that a country's health is declining.
- Healthcare policies and laws may be beneficial towards the overall health and lifespan of a human.

Results

Visualization



What Does it Tell Us

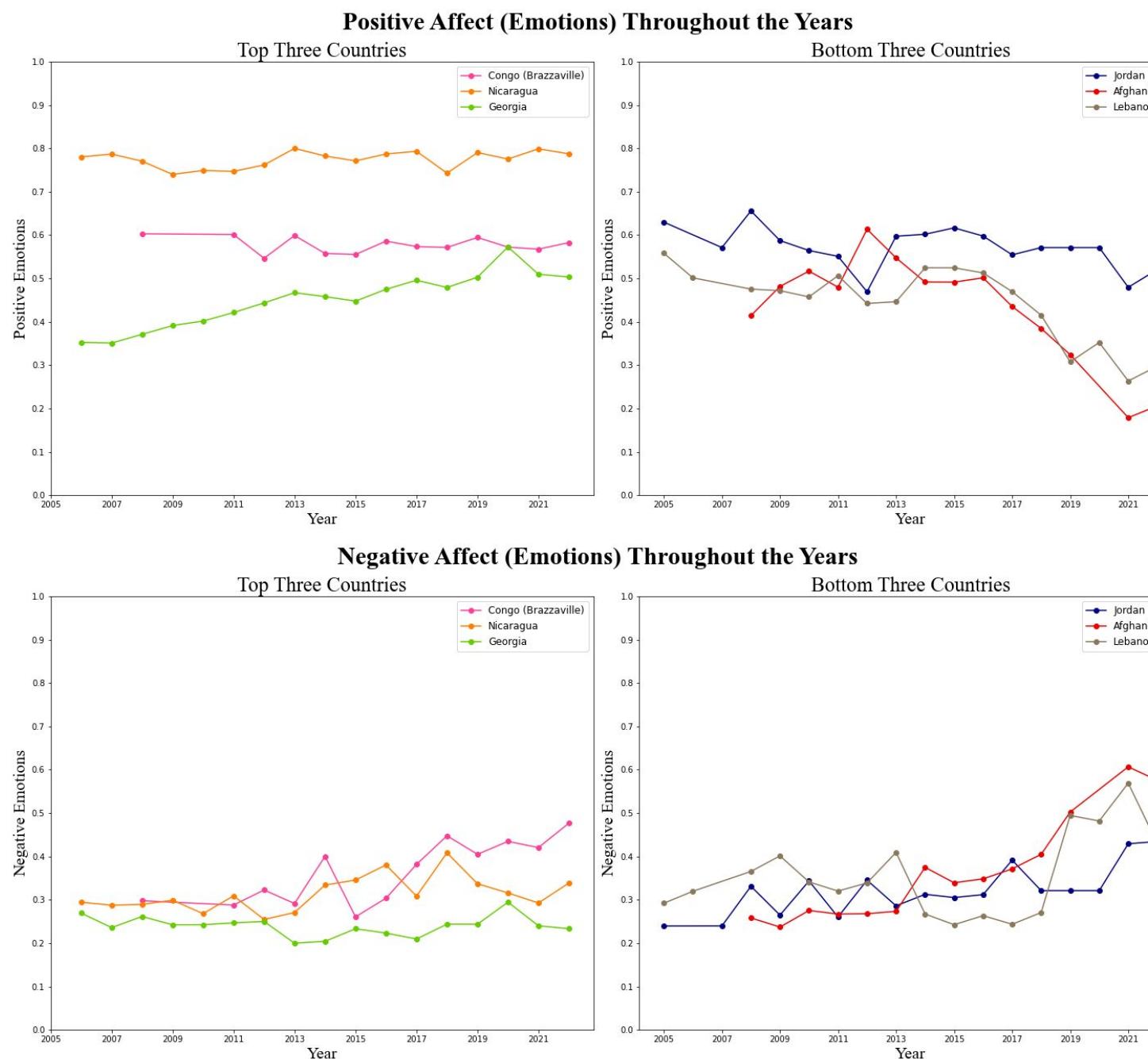
- Countries who are seeing overall improvement in their happiness score, may still be facing large issues with corruption within their government and businesses
- Perception of the government from all six countries (positive and negative changes) have either remained relatively the same or have had a slight decrease or increase.

** What is Corruption Perception based on?

"Is corruption widespread throughout the government or not?" and "Is corruption widespread within businesses or not?" Where data for government corruption are missing, the perception of business corruption is used as the overall corruption perception measure."

Results

Visualization

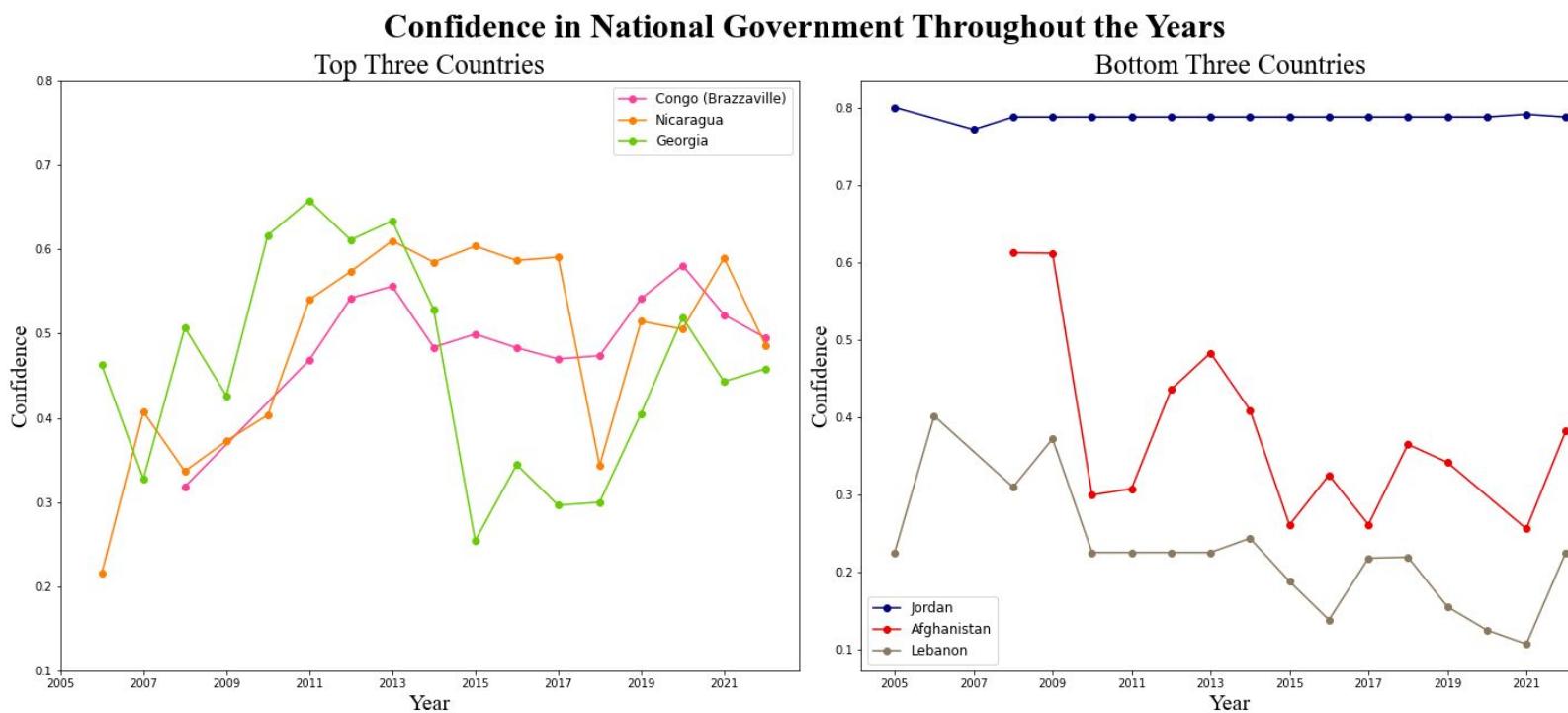


What Does it Tell Us

- An improvement in a country's happiness score may not mean their positive affect factor improves too.
- Even though the top three countries positive emotion factor generally remained the same overtime, their negative emotions score seemed to rise throughout the years (except for Georgia, whose score slightly decreased)
- Various factors, such as poverty, corruption, and political instability, may also lead to an increase in negative emotions in a country.

Results

Visualization



What Does it Tell Us

- Aside from Georgia, the other two countries with largest positive happiness score differences have on average increased their confidence in their National Government
- The increases suggests that their country's governments are working to implement laws and policies that may help their people and economy.
- Countries with the largest negative differences either see a decrease or barely any change in their confidence in their government.

Overall, has the Happiness Scores Throughout Each Country Decreased Overtime?

To answer this question, we conducted a hypothesis test to determine if there is significant evidence that proves if the the happiness scores throughout each country has decreased overtime.

Hypothesis Test

Let μ_1 represent the happiness score change of a country.

$$\begin{aligned} H_o: \mu_1 &= 0 \\ H_a: \mu_1 &< 0 \end{aligned}$$

*Note, this will be a left-tailed hypothesis test**

The level of significance is $\alpha = 0.05$.

The test statistic and p-value found were:

Test Statistic
3.2166962784567703

p-value
0.99920459351876

Since the p-value found is greater than our alpha value (0.05), we fail to reject the null hypothesis. This means that on average, the happiness scores have NOT decreased overtime.

So About How Much Does a Country's Score Change Overtime?

We created a 95% confidence interval to estimate how much a countries score changes overtime.

The calculated t-critical value and confidence interval were found to be:

t-critical value

1.976013177679155

Confidence interval

(0.07295896312119941, 0.3053597630788006)

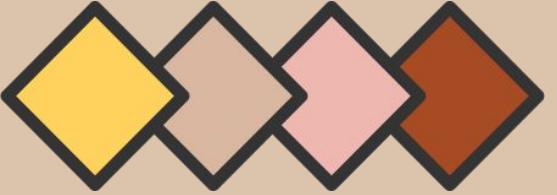
We are 95% confident that the average happiness score change throughout the countries is between 0.07295896312119941 and 0.3053597630788006.

Conclusion

Based on our research, we have deduced the following:

- The top four factors that contribute most significantly to the overall happiness of a country are 1) GDP per capita, 2) social support, 3) life expectancy at birth, and 4) freedom to make life choices.
- The top five countries with the highest average happiness score are: Denmark, Finland, Norway, Switzerland, and Iceland. At least one out of these five countries rank highly (in the top 10) for each of the socio-economic as well as political factors - with the exception of generosity and confidence in national government.
 - All in all: **a single factor does not necessarily contribute to the overall happiness of a country's citizen, but rather, a combination of them does.**
- European countries primarily dominate the high ranks of most socio-economic factors, but these countries are located in Western/Northern Europe as compared to countries that rank poorly overall, which are located in eastern Europe.
- Overall, African countries have ranked poorly for the economic/political indicators. This is attributed to a phenomenon economists describe as “The Resource Curse” - a nation with valuable resources can have less economic development and more corruption as compared to a nation with less valuable resources.
- Overall, the happiness score throughout each country has increased overtime.
- An increase in happiness score overtime does not always mean a country will see an increase in its other factors overtime.
- A country’s score change overtime may be a reflection on real-world events that occur in the country.

Limitations & Future Work

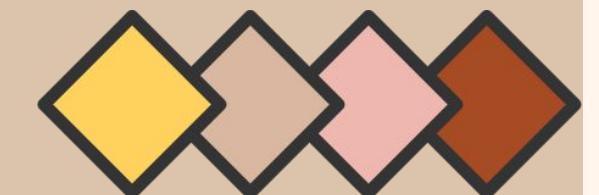


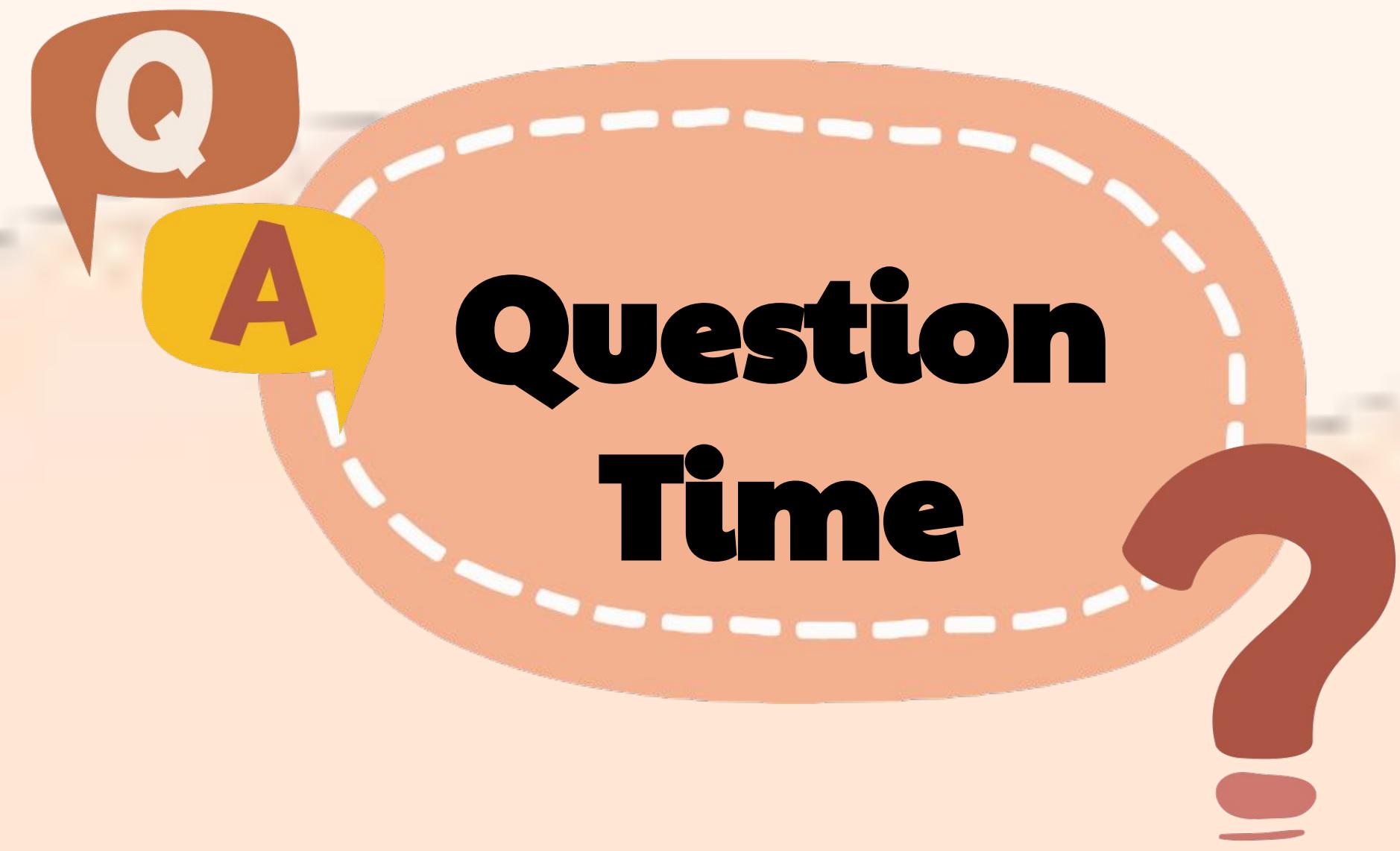
Limitations

- The first two hypothesis tests may face type I errors (rejecting a null hypothesis that is actually true), while the third hypothesis test may face type II errors (not rejecting a null hypothesis that is actually false).
- Some countries were missing from the dataset, meaning they did not receive any scores throughout the years.
- There may be even more factors that affect the happiness score of the country, we only looked at 9 factors.
- The data used in the analysis is based on self-reported measures of happiness, which may be subject to biases, cultural differences, social desirability effects, government corruption, etc..

Future Work

- Looking into these factors may help give experts and government officials insight into how they can help improve the happiness and well-being of their country.
- Moving forward, countries that are looking to improve their overall happiness score should pay attention to how these factors interact and look to instill policies and laws based on the factors that will benefit their people and environment.
- Countries can use this information to develop and implement policies that align with the factors that contribute to happiness, with the ultimate goal of improving the quality of life for their citizens.





THANK YOU
SO MUCH!

