Corruption and its effects on society

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Introduction

Corruption is something that no society wants to be associated with. It is defined as the abuse of entrusted power for private gain. Bribery, extortion, embezzlement, and blackmail all act as arms of corruption. It can cost people's lives, freedoms, health, and money. It can exist in the private or public sector. It can operate at a small scale or large scale. It can transform a government from a progressing leader into a decaying cesspool. It operates solely on the greed of people and but be combatted by good morals.

Robert Klitgaard stipulated that corruption will occur by the unmoral if the corrupt gain is greater than the penalty multiplied by the likelihood of getting caught. He later defined the degree of corruption which was further amended by Constantin Stephen. The equation is as follows:

$$Degree\ of\ Corruption = Monopoly + Discretion - Transparency - Morality$$

Even with such a definition of corruption, it is difficult to quantify corruption numbers. Transparency International takes it upon themselves to shed light on the issue of corruption and release macro scale corruption data for each country. This data is determined through public sentiment and focuses on the public sector of corruption. With a large pool of data existing for corruption, it needs to be known how it actually affects society. This paper attempts to find a relationship between a country's corruption index value and their societal standing. After putting this relationship to test, conclusions will be drawn on whether corruption affects society as much as its image appears to imply.

Methods

To determine how corruption affects society, an indicator representative of a country's society was developed. The corruption index value was then compared directly to this newly developed indicator. A relationship will try to be established between the two using regression analysis.

The composite index is composed of multiple individual indicators. The individual indicators that were chosen to make this composite index, called the Social Standing Index, were selected to compose various elements of society. Seven indicators, whose data comes from the United Nations, were picked to fall into the following categories environment (2), political (2), and quality of life (3).

Environment

Percent forest cover measures the percent of landmass that is covered in forest. Forested land is important for a society as it is provides an environmental role by preserving the ecosystems and a social role by providing recreation such as hiking or biking. Due to the environmental and social role forested land provides, a country with higher percent was ranked to lower (better). The data for forested land was provided from 2010. Another sustainability metric is carbon dioxide (CO_2) emissions, measured in metric tons per capita from 2010. CO_2 emissions are a factor of how industrialized a country is and how regulated their stationary and mobile sources are. Since CO_2 is a harmful greenhouse gas, higher emissions were seen as being worse and would result in a higher ranking.

Politics

Political indicators include educational and military expenditure as a percentage of total government spending. Military spending was observed to be between 9 and 20% of total spending. While military spending is necessary, a country with higher military spending was seen as negative since this spending could be allocated to other portions of the government

such as infrastructure, healthcare or education. Higher educational spending was seen as better, since more spending on education would be more beneficial to future generations. Educational spending data is from 2002 while military spending data is taken from 1995-2012.
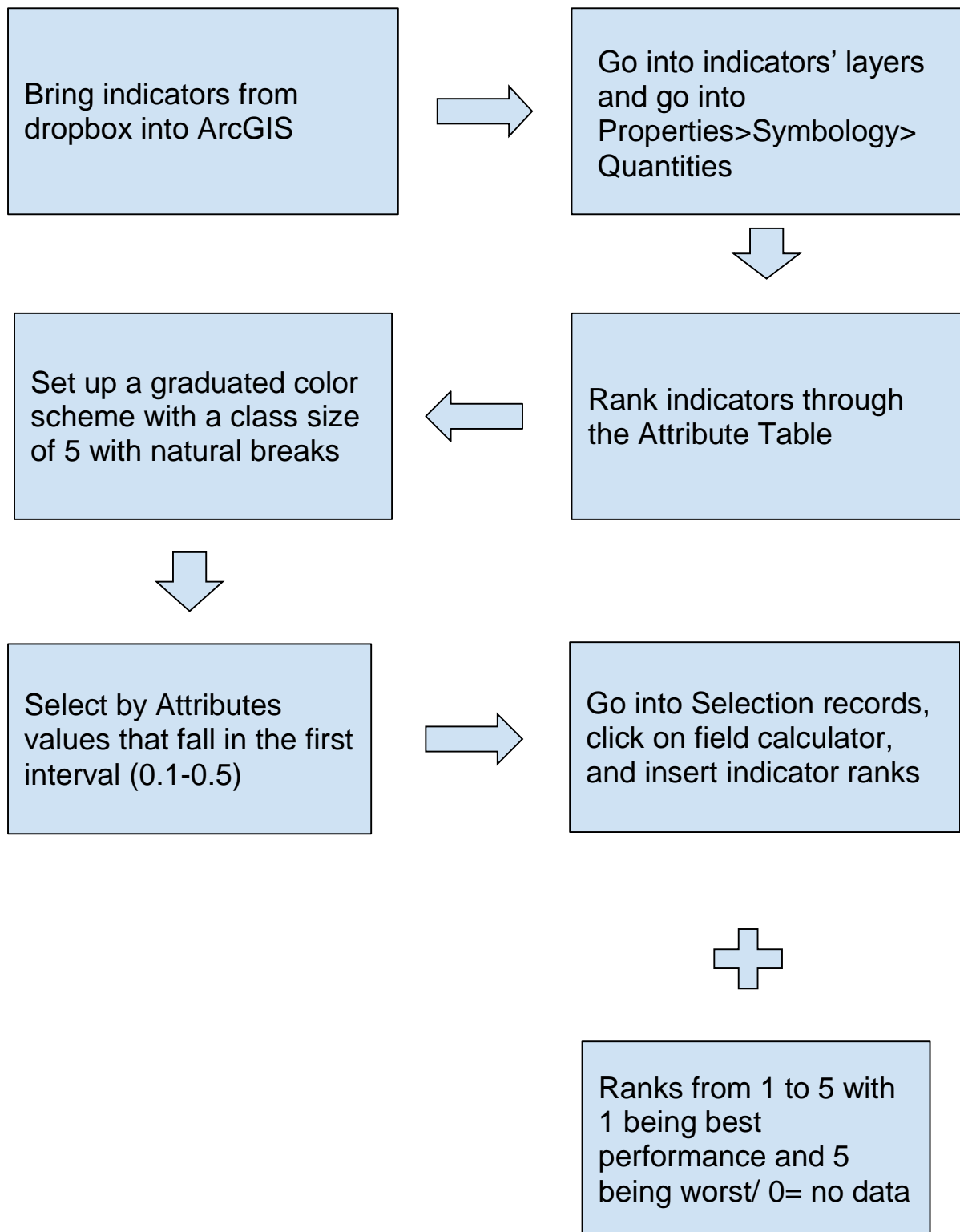
Quality of Life

The Human Development Index (HDI), data from 2013, is a quality of life indicator that is a composite statistic ranging from 0 -1. It is created from life expectancy, education, and income per capita indicators. A country with a higher HDI is viewed as having a higher quality of life. Poverty ratio is also a quality of life indicator and is the proportion of the population that lives under the poverty line. The poverty line is however determined by each country, so there can be some discrepancy in value between countries. A country with a higher ratio of population living under the poverty line is seen as having a lower quality of life and is given a higher rank. The last indicator used is incarceration rate, measured as number of incarcerated persons per 100,000 people in 2014. A higher value in this indicator was seen as a negative indication of quality of life.

Equal weights were given to the indicators since the group saw them all to have equal importance in determining a country's social standing.

The Social Standing Indicator (SSI) was developed using ArcGIS 10.2. A process

flow chart of the methods of making this indicator is seen below:

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┌─────────────────────┐         ┌─────────────────────┐
│ Bring indicators    │         │ Go into indicators' │
│ from dropbox into   │  ──▷    │ layers and go into  │
│ ArcGIS              │         │ Properties>Symbology>│
│                     │         │ Quantities          │
└─────────────────────┘         └─────────────────────┘
                                           │
                                           ▽
┌─────────────────────┐         ┌─────────────────────┐
│ Set up a graduated  │         │                     │
│ color scheme with a │  ◁──    │ Rank indicators     │
│ class size of 5 with│         │ through the         │
│ natural breaks      │         │ Attribute Table     │
└─────────────────────┘         └─────────────────────┘
           │
           ▽
┌─────────────────────┐         ┌─────────────────────┐
│ Select by Attributes│         │ Go into Selection   │
│ values that fall in │  ──▷    │ records, click on   │
│ the first interval  │         │ field calculator,   │
│ (0.1-0.5)           │         │ and insert indicator│
│                     │         │ ranks               │
└─────────────────────┘         └─────────────────────┘
                                           ┼
                                ┌─────────────────────┐
                                │ Ranks from 1 to 5   │
                                │ with 1 being best   │
                                │ performance and 5   │
                                │ being worst/ 0= no  │
                                │ data                │
                                └─────────────────────┘
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After the social standing index was created for each country, it was compared to the country's corruption index. To make this comparison easier, a sample of ten countries was selected out of all that had data to represent the world. China, Indonesia, Malaysia, Mexico, Brazil, Uruguay, Sweden, Italy, Kenya, and South Africa were the countries picked. These countries were chosen because of their wide range of corruption scores. The corruption values of the countries chosen range from 2.1 (Kenya) to 9.2 (Sweden) and have a standard deviation that is 16% higher (2.12) than the deviation of all the countries (1.83). A data set with a wide range allows for examination at multiple levels of corruption which creates a better picture in the results. The countries were also selected to equally represent regions of the world. Regions in focus included the Americas, Europe, Africa, southern Asia, and the West Indies. Selected countries were picked to have populations above 3 million (Uruguay being the lowest at 3.4 million).

| Countries	CPI
China	3.5
Indonesia	2.8
Malaysia	4.4
Mexico	3.1
Brazil	3.7
Uruguay	6.9
Sweden	9.2
Italy	3.9
Kenya	2.1
South Africa	4.5

A table of the selected countries and their associated corruption scores from 2010 as determined by Transparency International.

Results and Discussion
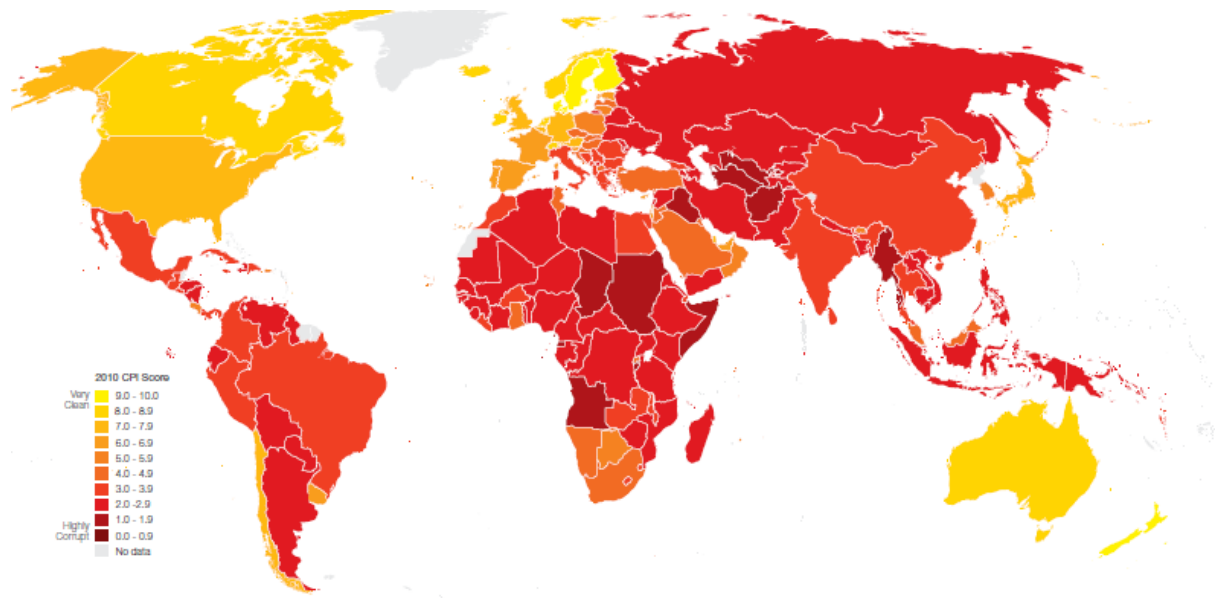
Corruption Perception Index map of all countries from 2010.

Using the ranking system of 1 to 5 with 1 being the best and 5 the worst, maps were

created for each indicator and combined into a map containing the country's composite score.

The individual indicator maps and country rankings are shown below.
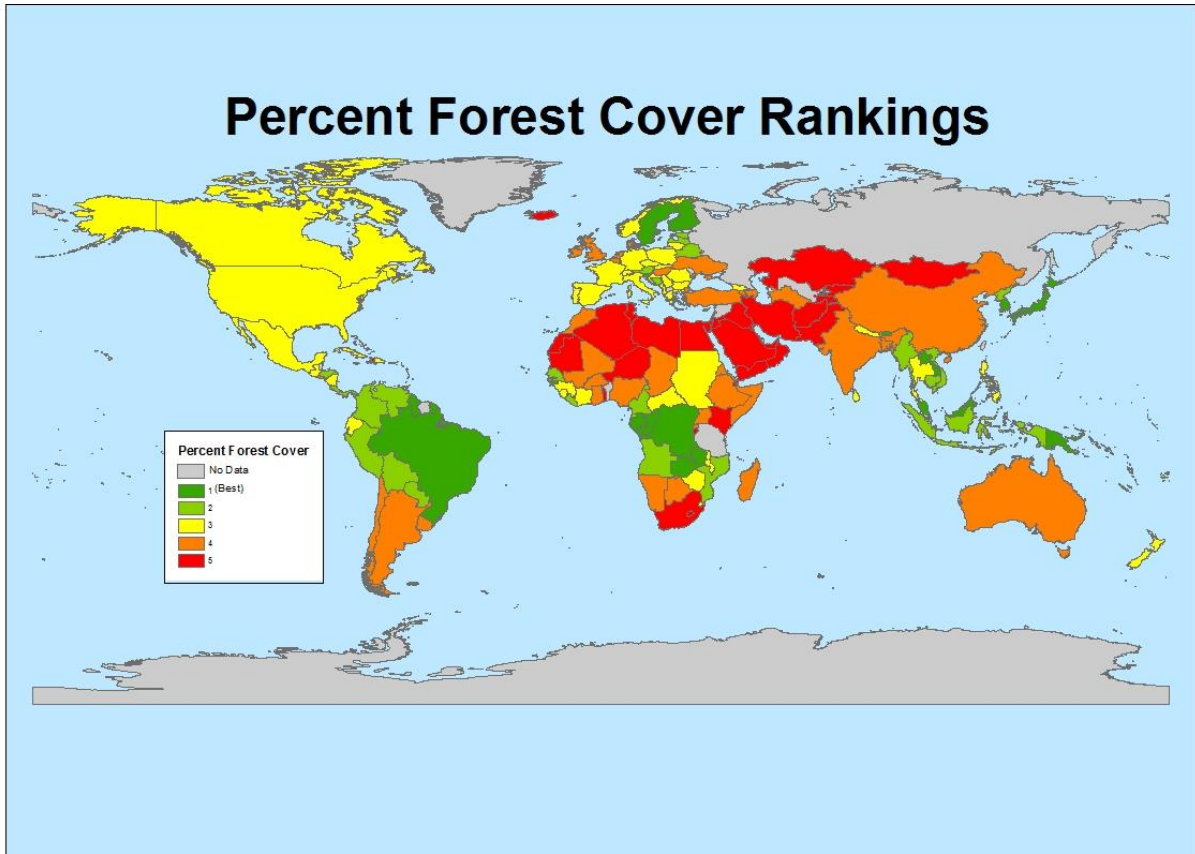
(Figure 1: This map shows the amount of forest cover that a country contains with dark green representing the most forest cover to red representing the lowest amount of forest cover)

Percent Forest Cover	
Country	Ranking
China	4
Indonesia	2
Malaysia	1
Mexico	3
Brazil	1
Uruguay	4
Sweden	1
Italy	3
Kenya	5
South Africa	5

South Africa and Kenya have the lowest amounts of % forest cover, while Sweden, Malaysia and Brazil have the highest. This data is skewed depending on the biome that the country is in, with high forest cover for countries that have large tropical forests in them. This is why the equatorial countries in South America, Africa and South Asia all have low rankings.
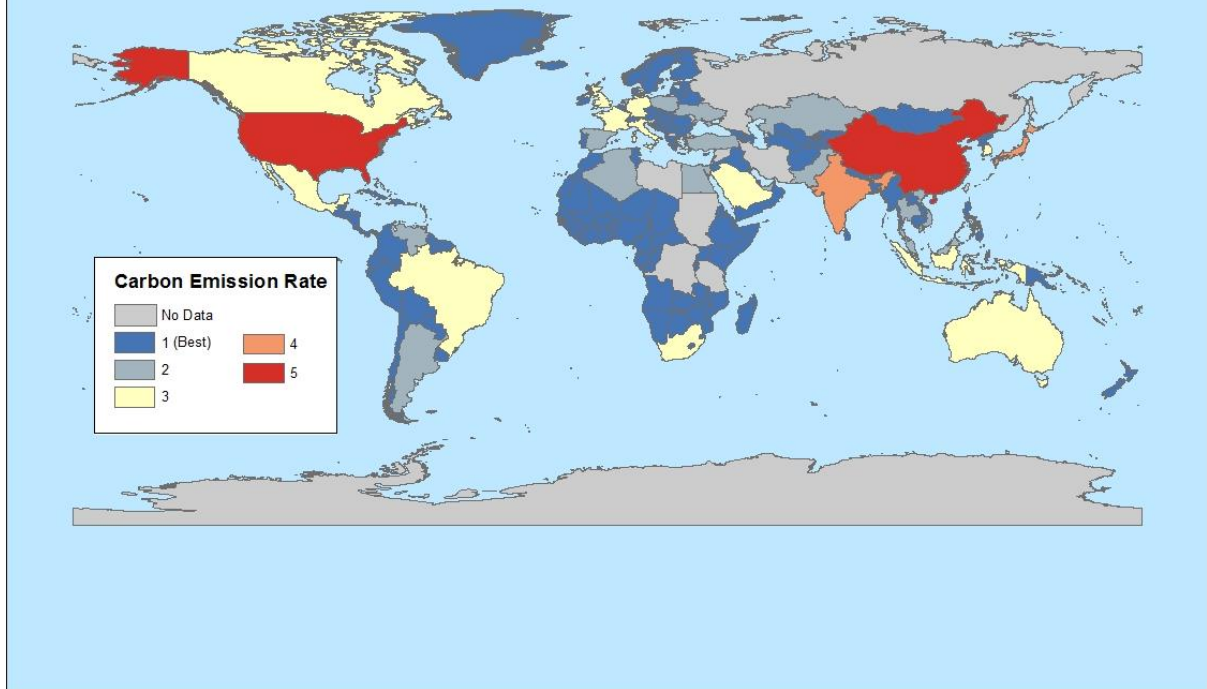
(Figure 2: Map displaying the rate of carbon dioxide emission for a given country with dark

blue being the lowest emission to dark red being the highest level of CO_2 emission)

CO_2 emissions	
Country	Ranking
China	5
Indonesia	3
Malaysia	2
Mexico	3
Brazil	3
Uruguay	1
Sweden	1
Italy	3
Kenya	1
South Africa	3

China has very high amounts of CO_2 emissions per capita due to its lack of regulations and

highly industrialized economy. Uruguay, Sweden and Kenya are all categorized into the

lowest ranking of emissions.

Countries Ranked by Education Expenditure
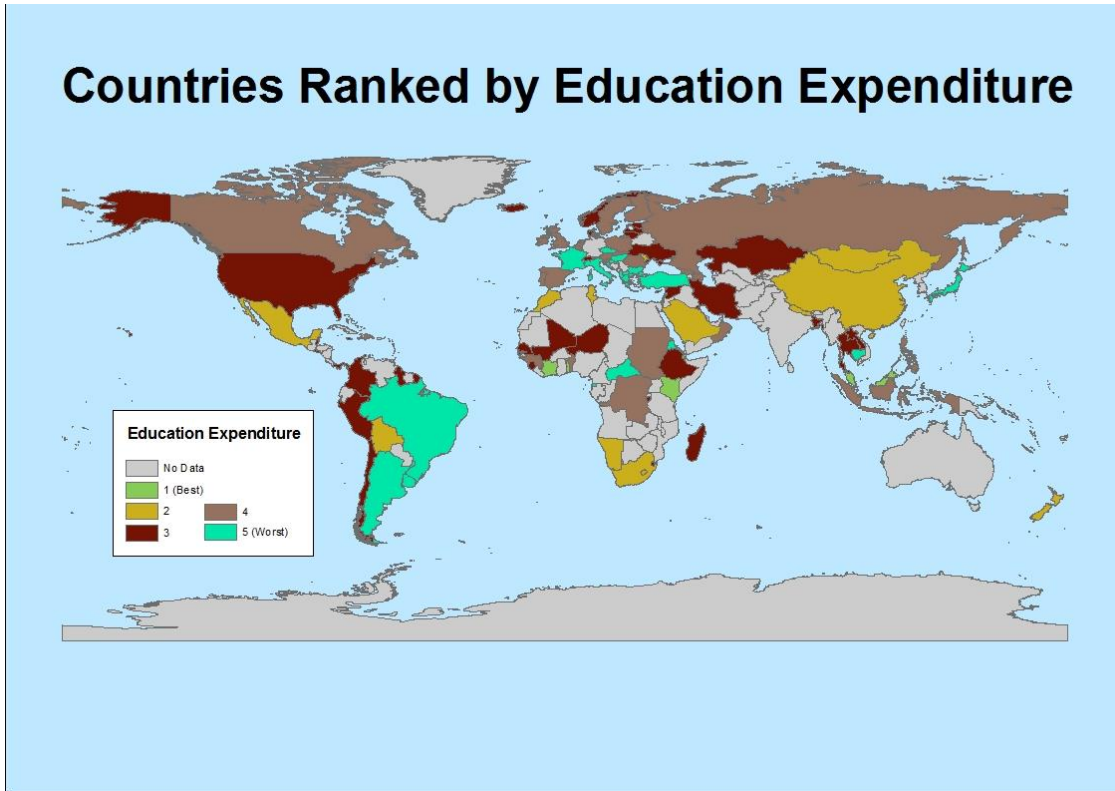
(Figure 3: This map visually displays the amount a country spends on education per capita as of 2010 with green being the highest amount spent to blue being the lowest education expenditure)

| Education Expenditure %	
Country	Ranking
China	2
Indonesia	4
Malaysia	1
Mexico	2
Brazil	5
Uruguay	5
Sweden	4
Italy	5
Kenya	1
South Africa	2

Kenya and Malaysia are ranked as the best in terms of education expenditure. This data was seen to be all over the place with very little noticeable patterns.
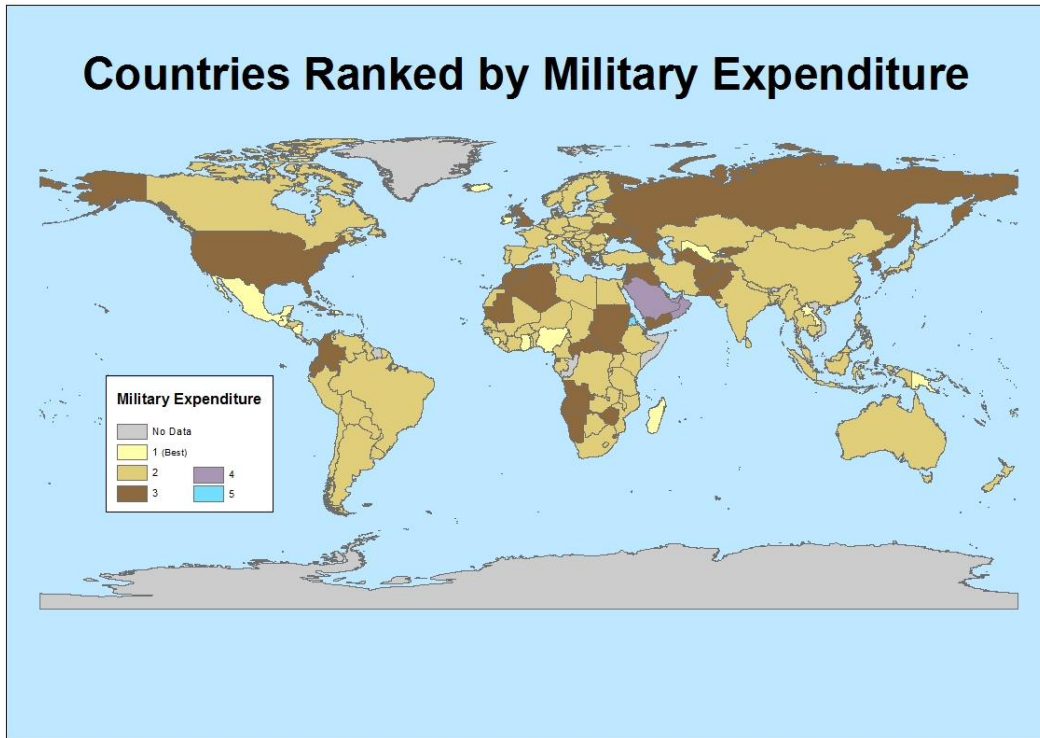
(Figure 4: Map showing countries ranked by military expenditure with cream being the highest amounts spent on the military and blue the lowest)

| Military Expenditure	
Countries	Ranking
China	2
Indonesia	2
Malaysia	2
Mexico	1
Brazil	2
Uruguay	2
Sweden	2
Italy	2
Kenya	2
South Africa	2

Mexico was the only selected county that was ranked at a 1, very little globally. Large western powers, such as the United States, United Kingdom, and Russia were seen to have higher expenditure percentages. North Korea was also observed to have a higher military expenditure, indicative of its military dictatorship.
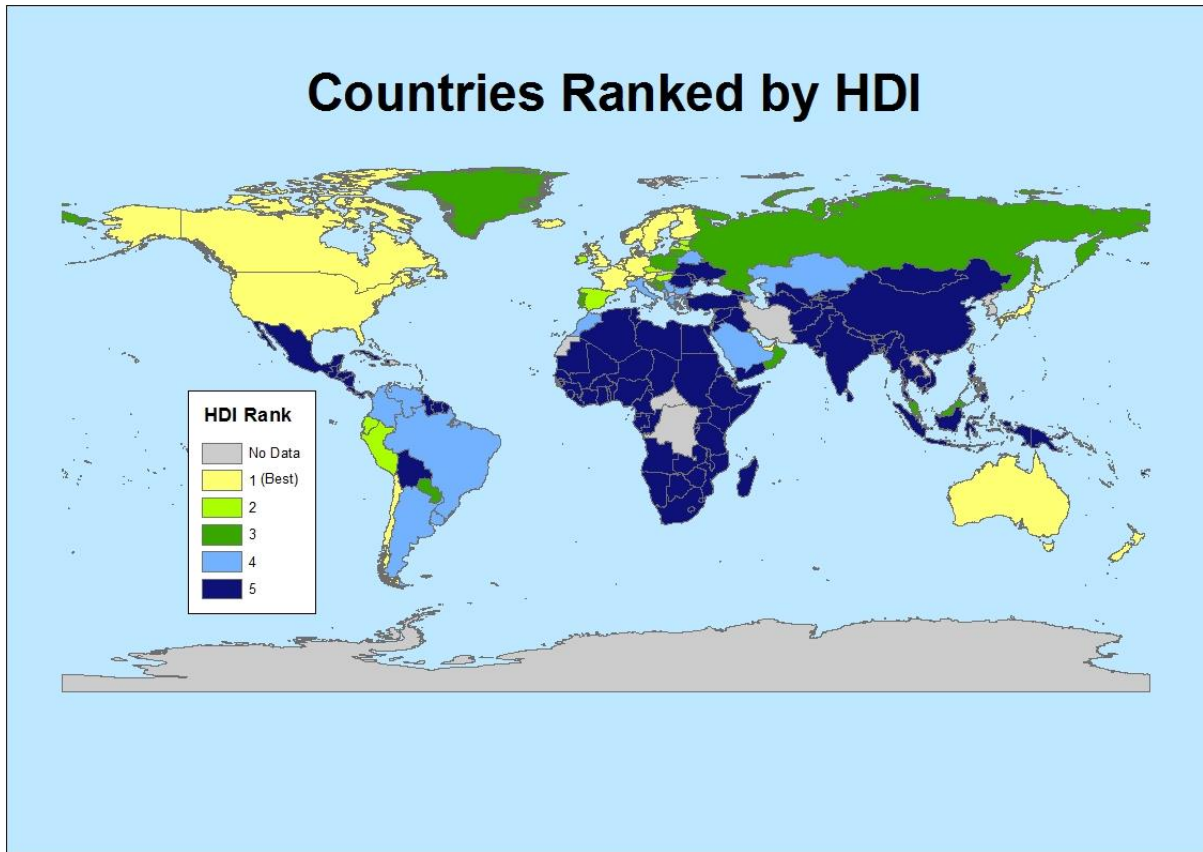
(Figure 5: Map showing the Human Development Index across the globe. HDI is a composite statistic that combines income per capita, education, and life expectancy. Cream represents countries with the highest human development while dark blue represents countries with the lowest HDI.)

| HDI	
Countries	Ranking
China	5
Indonesia	5
Malaysia	3
Mexico	5
Brazil	4
Uruguay	4
Sweden	1
Italy	4
Kenya	5
South Africa	5

Global trends are easily spotted for HDI, with Most of Africa and Southeastern Asia having poor values. Western Europe and Scandinavia was regionally seen to have good HDI, as well as the US, Canada, Australia, New Zealand, and Japan.

Countries Rankings by Percentage Poverty

Percent Poverty

No Data	
1	4
2	5 (Worst)
3	
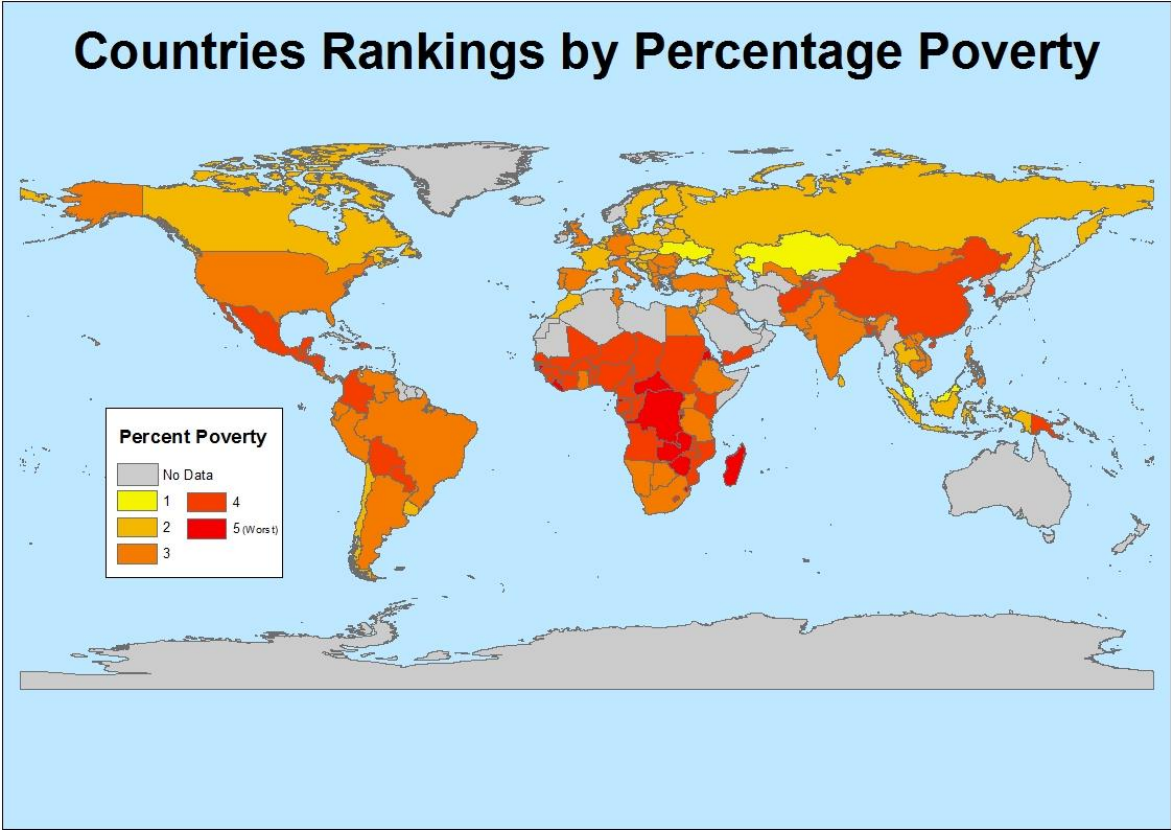
(Figure 6: map displaying the percent poverty per capita globally. Yellow shows the countries with the lowest poverty levels while red shows those with the highest poverty percentages.)

Poverty Rate	
Countries	Ranking
China	4
Indonesia	2
Malaysia	1
Mexico	4
Brazil	3
Uruguay	2
Sweden	2
Italy	3
Kenya	4
South Africa	3

Malaysia was found to have surprisingly portion of the population living under the poverty line. High ranking countries from the selection include China, Mexico and Kenya. This could be rationalized due to their wide spread subsistence agriculture (seen in Western China).
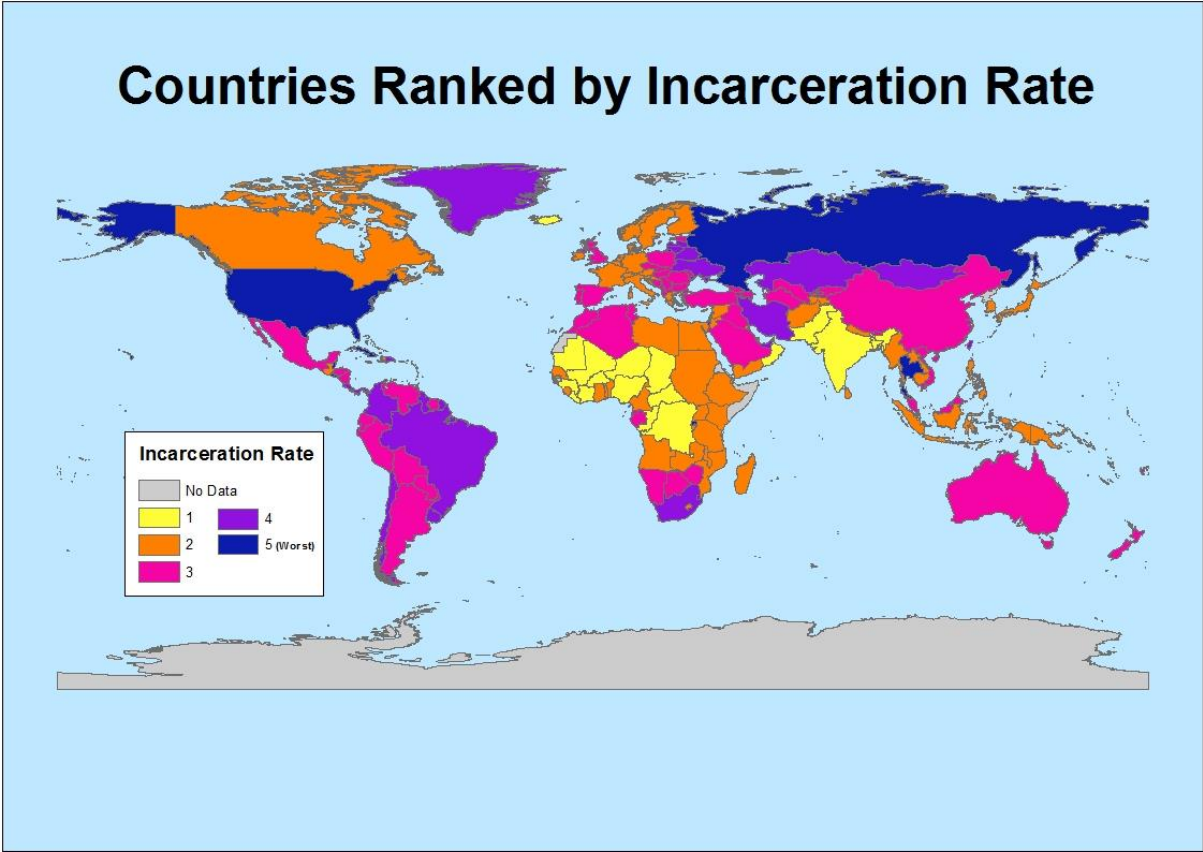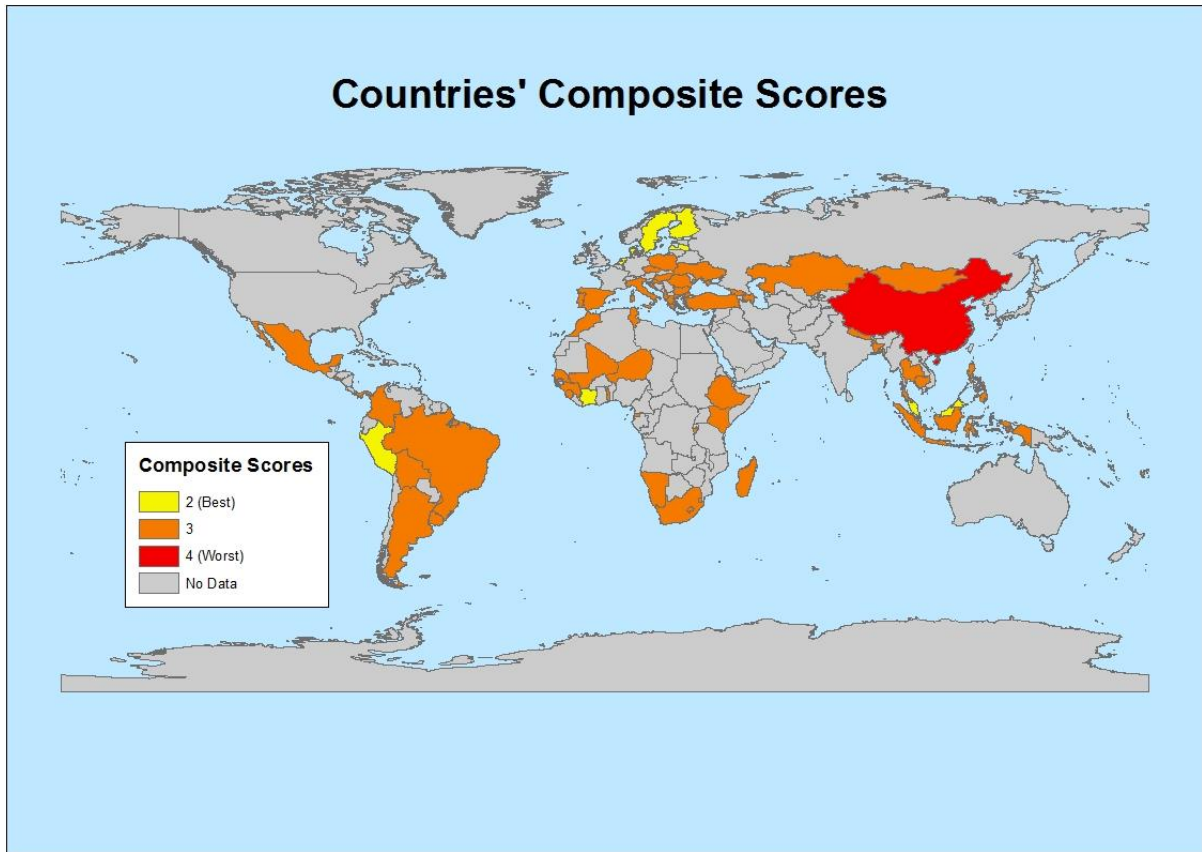
(Figure 7: this map shows the incarceration rate across a global scale with yellow being the

lowest incarceration rate and dark blue the highest.)

Incarceration rate	
Country	Ranking
China	3
Indonesia	2
Malaysia	3
Mexico	3
Brazil	4
Uruguay	4
Sweden	2
Italy	2
Kenya	2
South Africa	4

Regionally, sub Saharan Africa sees the lowest incarceration rates. This could be due to their

lack of money to sustain a working police force, or prison system. In addition to Kenya,

Sweden and Italy had relatively low rankings. The United States and Russia boast the highest

rates of incarceration.

Countries' Composite Scores

Composite Scores
- 2 (Best) — yellow
- 3 — orange
- 4 (Worst) — red
- No Data — grey

(Figure 8: the final map containing the composite scores that average all indicators previously mentioned into one ranking. Only countries with data for all 7 categories are displayed in colour. Yellow shows the greatest overall score while red shows the worst composite score.)

The composite index sums for each of the ten countries is seen in the table below:

Countries	SUM	Composite
China	25	4
Indonesia	20	3
Malaysia	13	2
Mexico	21	3
Brazil	22	3
Uruguay	22	3
Sweden	13	2
Italy	22	3
Kenya	20	3
South Africa	24	3

The composite sums were divided by the maximum sum value, 35, to create the social

standing index ranging from 0 - 1, with the lower value indicating better social standing. Per

our ranking system, Sweden and Uruguay were determined to have the best social standing at

0.37, and China the worst at 0.71. The tables below has all ten country values.

Countries	SSI
China	0.71
Indonesia	0.57
Malaysia	0.37
Mexico	0.60
Brazil	0.63
Uruguay	0.63
Sweden	0.37
Italy	0.63
Kenya	0.57
South Africa	0.69

The developed SSI values were charted against corruption index data to compare the

two. Regression analysis between the two variables determined their relationship. Linear

regression resulted in a coefficient of determination, R-squared value, of 0.2166. This value

is used as an indicator of the goodness of fit, to determine how well the regression line fits

the data. A value of 0.22 is concluded to be a poor fit of the data meaning there is a weak

correlation. While there is a present negative correlation between the variables, it was

concluded to be not significant, meaning that there is not a relationship between a country's
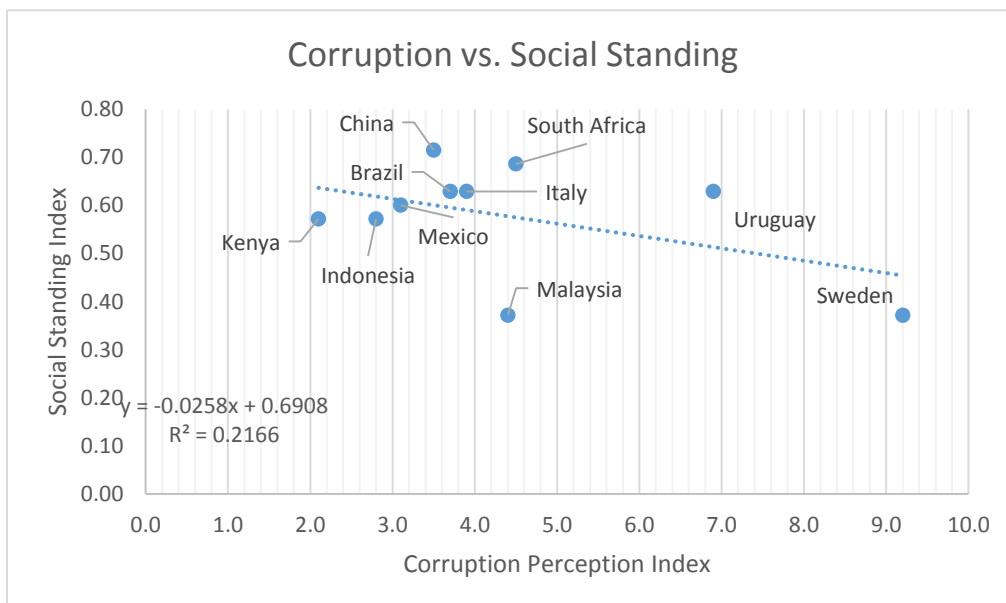
social standing and corruption.

Conclusion

The lack of a relationship between social standing and corruption that we found does not necessarily mean that there isn't a relationship between the two. The indicators that were used to develop what we thought of social standing could not be a good indicator of such. We could have left out or included indicators that could be very instrumental to determining where a country stands socially. Additionally, we could have used the indicators wrongly when determining rankings. For example, Mexico might have a very low military expenditure because of corruption. In this scenario, cartels could be paying off government officials to encourage less military spending since a stronger military could be bad business for them down the road. Furthermore, Mexico could be instead of using money on military be putting it into the police force to combat the cartels or healthcare and infrastructure. Another example, Brazil could be very corrupt in terms of deforestation. Logging companies could possibly be paying officials to look the other way while they ravage the country of its forests, but since it has so much, it still has the best ranking for percent forest cover. A lack of knowledge about the source of the data could result in our group not using the indicators properly and thus having improperly developed social standings. Other limitations include the lack of data for certain indicators or the difference in years that the data was published, as this data can potentially change a lot over time.

While the composite scores factor in environmental, education, social, and political factors, it does not encompass all aspects that one may perceive to make a country corrupt. It is common to form the association that corruption is bad for society. After comparisons between a created social standing index and the corruption perception index, it was determined that this relationship does not exist on the macro scale. The research question however needs further examination to accurately make this conclusion.