An investigation into factors contributing to Happiness

Final Project

CSCI 2000U

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Introduction

The purpose of this investigation is to ascertain and explain key factors contributing to happiness. This will be accomplished through the examination and comparison of two datasets: the World Happiness report (2017) and the CIA World Factbook.

The World Happiness report is drawn by the United Nations which contains the "happiness score" of each surveyed nations as well as the observance of six variables believed to best explain happiness score [1]. These variables are GDP per capita, social support, healthy life expectancy, freedom to make life choices, generosity, and perceptions of corruption. The lowest national averages for each of these fields are create a hypothetical "Dystopia" state, to which all others are compared to estimate the contribution each of the six variables have to the nation's overall happiness score. Happiness score is the dependent variable in this study.

The CIA World Factbook references objective statistical information regarding each nation updated frequently by the U.S. Central Intelligence Agency [2]. It contains fields such as GDP per capita, birthrate, infant mortality, etc. These fields will constitute this study's set of independent variables.

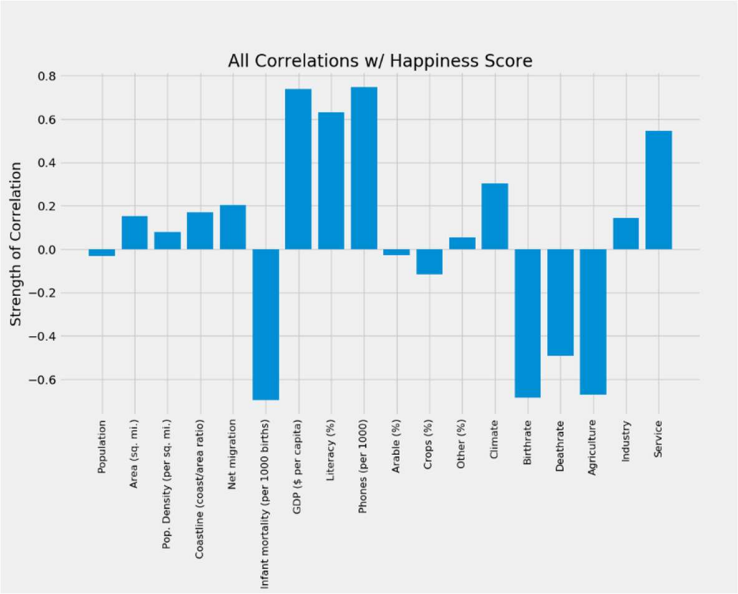

Figure 1: World Factbook Variables and their correlation with Happiness Score

The correlations between happiness score and all independent variables are shown in figure 1. This study will focus on the factors which correlate strongly with happiness score, whether positively or negatively. The variables which yield the strongest correlations are infant mortality, GDP, literacy, phones, birthrate, and deathrate. The GDP composition variables, consisting of agriculture, industry, and service will be examined ensemble with reference to GDP, as they are all related to the economic status of a given nation.

Phones (per 1000)

The largest correlation found was between happiness score and phones per 1000 people. At first glance this may seem surprising, but there are several reasons for this correlation to be as strong as it is. Firstly, the widespread possession of phones in a nation indicates that the population can afford such devices. As such, we can infer that there is a strong positive correlation between GDP per capita, which by itself already correlates strongly with happiness score, and Phones (per 1000). And there is indeed a very strong correlation between the two (see figure 3). Another explanation for this correlation's strength is that the prevalence of phones indicates a more general technological availability in the respective nation, which not only has implications regarding the nation's GDP per capita, but also technologies relating to health, education, and so on. Mobile phones also serve to connect people to jobs, business opportunities, and other services which would contribute to a better livelihood [3]. Overall, this level of correlation between happiness score and possession of phones among the population is expected.

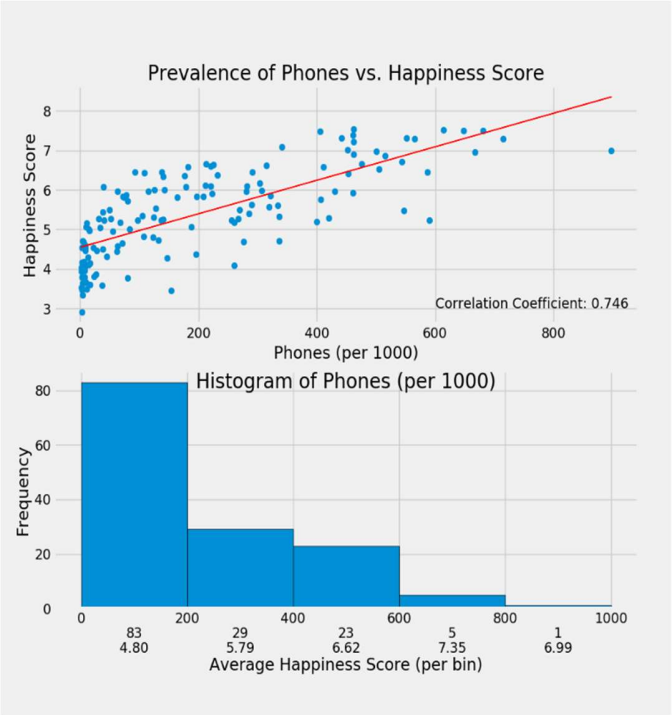

Figure 2: Prevalence of Phones vs. Happiness Score

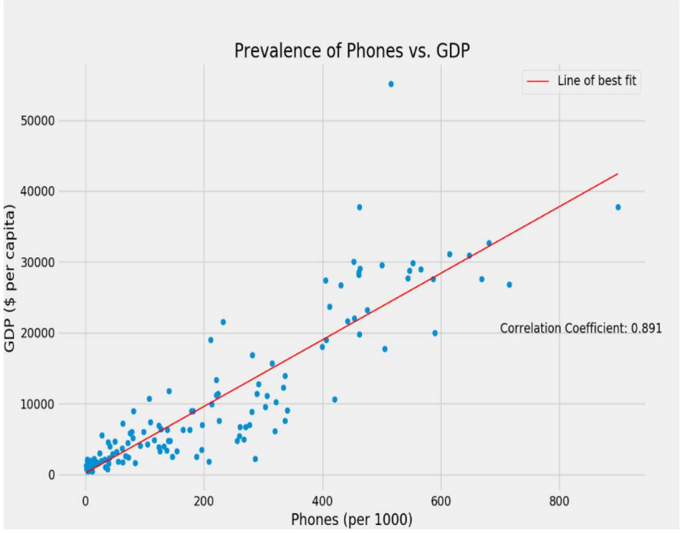

Figure 3: Prevalence of Phones vs. GDP ($ per capita)

Literacy

A moderate correlation exists between literacy rate and happiness score. The most surprising takeaway from the graph is the sheer amount of variance in happiness score between nations whose literacy rates are greater than 90%. While high literacy rates are generally an indication of the prevalence of educational institutions in a region, hence why there is at least a moderate correlation, literacy rates are clearly not a sufficient condition for happiness in a nation. Literacy rates have also been increasing in developing nations worldwide in the last few decades, which is perhaps another reason the correlation isn't as strong as one would expect [4]. The overall trend in the data reveals that, while lower literacy rates clearly correlate with lower happiness scores, already high literacy rates approaching 100 does not necessarily improve happiness scores.

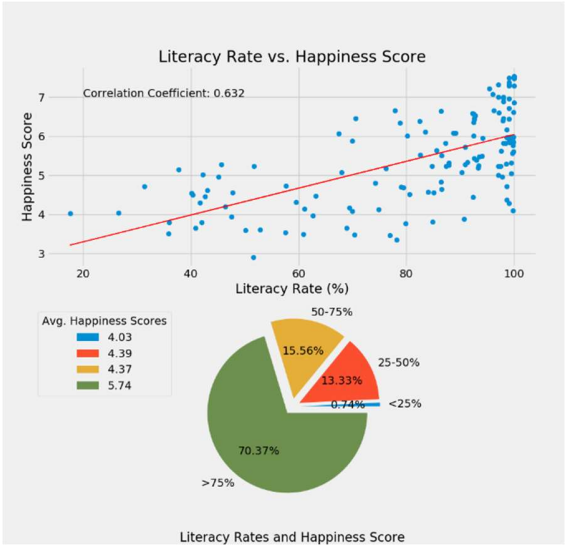

Figure 4: Literacy Rate vs. Happiness Score

GDP ($ per capita)

GDP per capita is defined as a nation's total GDP divided by its population; it is often used to describe the standard of living in a nation. As could be expected, GDP correlates strongly with happiness scores among nations. Wealthier nations tend to have the capability to support better infrastructure for their population, such as roads, hospitals, and other services. We can also see from this figure that that many nations' average GDP per capita is near or below the extreme poverty line, which is defined as earning less than $1.90 (USD) per day [5]. These countries unilaterally have low happiness scores. GDP per capita is also one of the variables that the World Happiness survey uses to explain happiness score and is frequently a large contributor to each nation's score [1].

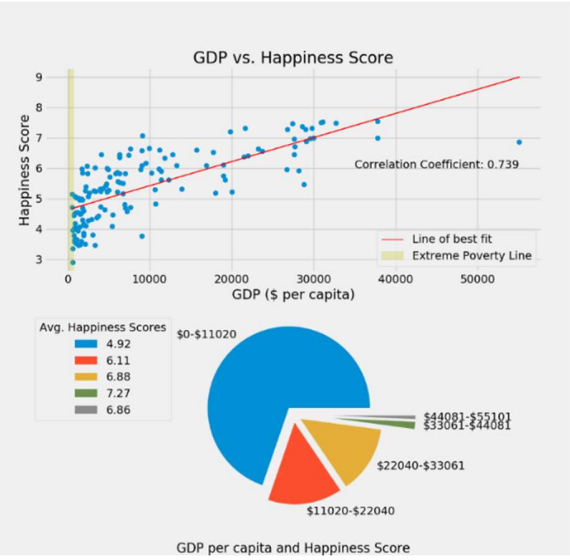

Figure 5: GDP vs. Happiness Score

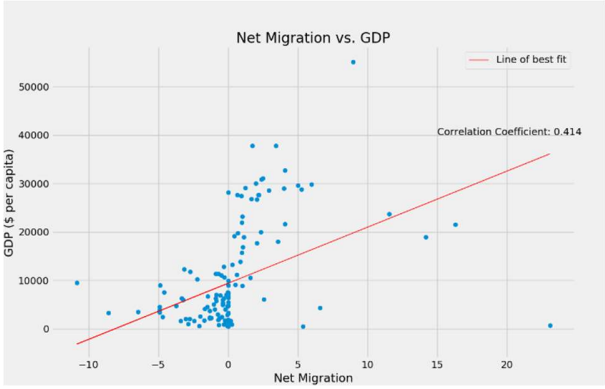

Figure 6: Net Migration vs. GDP

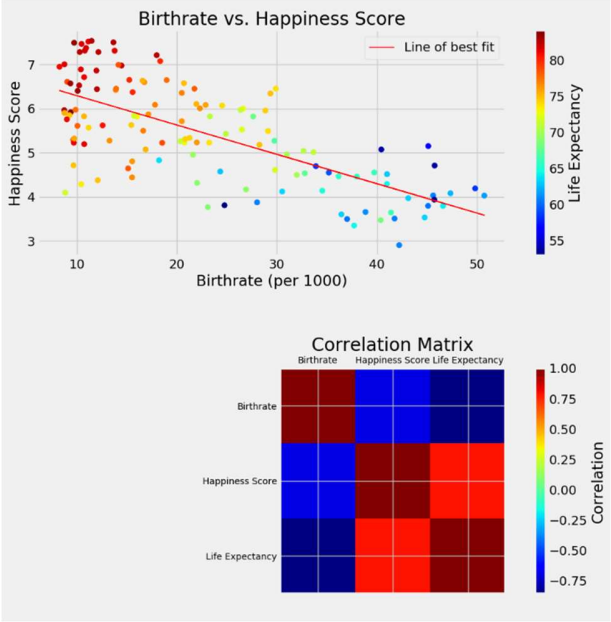

Figure 7: Birthrate vs. Happiness Score W/ Life Expectancy

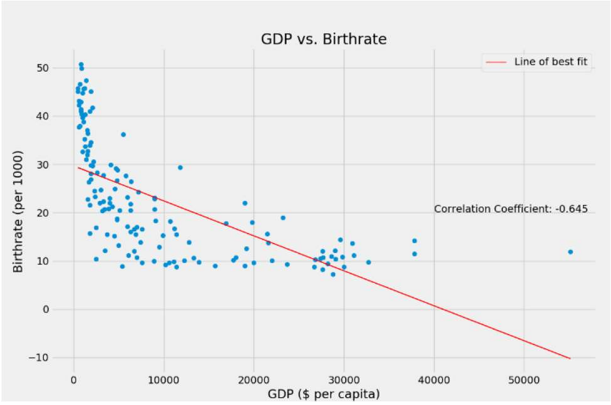

Figure 8: GDP per capita vs. Birthrate

Wealthier countries are also more likely to be a target for immigration (see figure 6). Immigrants further contribute to the overall economy of the nation by increasing labour supply, paying taxes, and increasing consumer demand for goods and services [6].

Birthrate and Life Expectancy

Birthrate has a seemingly counter-intuitive relationship with both life expectancy and happiness score. As seen in figure 7, the birthrate is higher in countries with lower happiness scores and lower life expectancy. This relationship has frequently been noted in developing countries and is primarily presented as GDP vs Birthrate [7]. Even within developed nations, high-income families tend to have fewer children than low-income ones [8]. Lower fertility rates have been associated with increased life expectancy, reduced infant mortality, greater freedoms and opportunities for women, and increased GDP per capita [9]. Figure 7 seems to support this hypothesis.

Economic Sectors

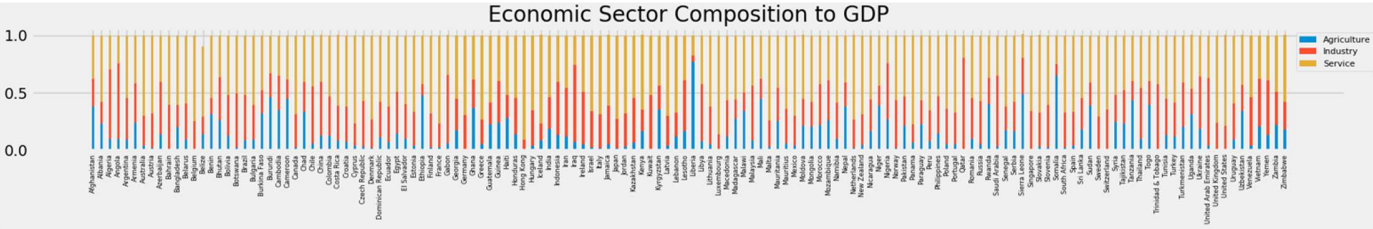

Figure 9: Economic Sector Composition to GDP

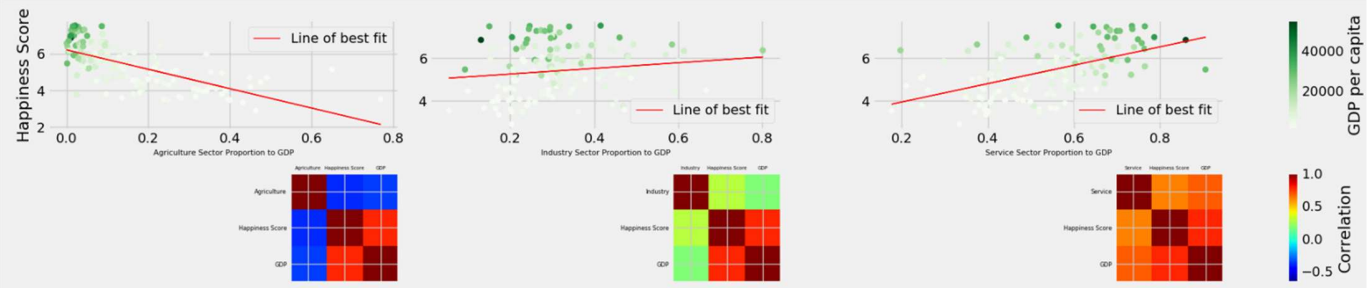

Figure 10: Economic Sectors vs. Happiness Scores w/ GDP

The economic sector composition is the proportionate contribution to the GDP of each of the three sectors: agriculture, industry, and service. Figure 9 displays the economic sector composition for each respective nation. Figure 9 shows the relationship between each economic sector, happiness score, and GDP per capita.

Agriculture has a strong negative correlation with both happiness score and GDP per capita. This implies that countries with a larger portion of their GDP coming from agriculture are more likely to have both a lower happiness score and lower GDP per capita. Impoverished countries tend to have a greater dependence on agriculture due to lack of development to support more technologically dependent occupations. Industry has no significant correlation to happiness score or GDP per capita. This is likely due to the fact that most nations have a significant industrial sector, thus not making it a notable point of dissimilarity. Figure 11 indicates that Industry has the least amount of variance among the three sectors. Service has a strong positive correlation with both happiness score and GDP per capita. There is a notable relationship between services growth and overall economic growth with the past two decades. In high-income countries, service accounted for 74% GDP, which is an overall increase 60% in 1997 [10]. In low and middle income countries, it jumped from 48% in 1997 to 57% in 2015. Both Industry and agriculture have been declining in the face of Service's growth. Given the strong correlation

between GDP and happiness score, this is a sensible trend.

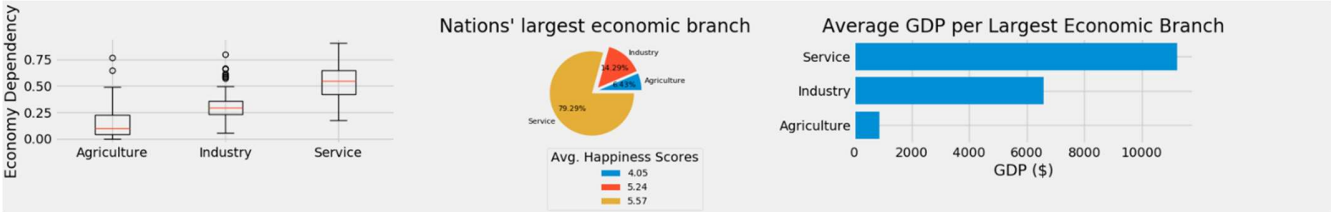

Figure 11: GDP Composition Statistics

Citations

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