**Question and introduction**

What makes the world happy?

More specifically, what factors affect the perceived happiness of countries throughout the world?

We will use a measure of happiness developed by (). Information was obtained by administering a survey over years 2015-2018. We will focus on the happiness score from 2016.

Other questions:

How is happiness distributed around the world?

Does happiness differ by geography?

Is the happiness of one country affected by the happiness level of surrounding countries?

What factors affect happiness?

Here we will investigate whether happiness score has any correlation with GDP, PPP, Population Total, Population Density, Median Age, alcohol consumption rates, access to education, perceived risk of disasters, internet access, and amount of sleep.

Has happiness changed over time?

**Data Sources**

Data sources: All data sources include only data from the year 2016, with the exception of the sleep rate data with a limited number of countries in study.

Happiness data: Discuss this a bit more

Geographic coordinate data:

Demographic data: What is PPP, etc

Alcohol consumption: how is it defined

Education index:

Disaster rate: the risk that countries naturally get for its location in the world.

Internet access: the rate shows the probability that the people in a country could access to the internet using means of technologies.

Sleep rate: show how many hours in a day a person spent in average in that country.

**Data Cleaning**

Cleaning techniques: Variables were all obtained separately, for each merge, it was noted which countries were missing. Countries that were named differently in two data sources, the names were reconciled.

Show an example of two names for the same country.

**Analysis**

Geographic distribution of happiness score: show map of happiness scores, point out blues and reds

Happiness scores by continent. Violin plots

Are continents different? table of t-tests

Are countries different within continents (regions within continents)? A couple of violin plots in one slide

Are you more like those geographically close to you?: distance vs difference in happiness by continent

Size of country varies the comparison. A continent where countries tend to be more uniformly distributed is a more accurate test. Look at Europe.

What factors affect happiness?

(Factors that didn’t make the cut): table of R sq

Scatter and regression plots of a few strong variables.

Show GPD before and after ln transformation.

**Conclusions**

Conclusions.: The perceived happiness of a country is affected by x, y, and z

The happiest country is Denmark

Happiness scores are significantly different from each other from continent to continent, with the exception of North America, South America, and Europe, whose countries’ happiness scores are not different from each other. However, the happiness scores of the countries within these continents is significantly different from that of other continents.

Happiness and unhappiness do appear to be clustered in a few places. African and North American countries have a slight tendency to be like their neighboring countries. European countries that are close to each other have a strong influence one other’s happiness.

Factors that influence happiness include: Median Age, ….

Over time, the happiness score …

Followups:

Further study in other factors that affect happiness. With more time points in the future, a time series analysis could yield a forecasting model to predict future happiness.

It would be beneficial to compare happiness in major cities as opposed to entire countries. Large countries like the united states and China have multiple climates, and various cultural differences within the countries themselves.