**The influence of temperature**

**Questions and hypotheses**

Questions

Is there a correlation between average temperature and:

1. The suicide rate (number of suicides per 100k people)?
2. The Gross Domestic Product (GDP) per capita (in $)?
3. The Human Development Index (HDI)?
4. The military expenses (as % of GDP)?

Hypotheses

1. The suicide rate in warm countries differs from the suicide rate in cold countries.
2. The GDP per capita in warm countries differs from the GDP per capita in cold countries.
3. The HDI in warm countries differs from the HDI in cold countries.
4. The military expenses in warm countries differs from the military expenses in cold countries.

**Workflow**

1. List of interesting topics
2. Research of valuable and reliable data to use for each topic
3. Selecting a definitive topic, create Questions and Hypotheses
4. Download and clean datasets and necessary related information
5. Understand relations between different data values along the years and find correlations between different data
6. Creating plots to visualize and make understanding easier
7. Testing hypotheses and answering questions
8. Producing a presentation for the results

**Data retrieval and dataset relationship**

Data was retrieved from two different sources from Kaggle(<https://www.kaggle.com/datasets>) and from Worldbank Data (<https://data.worldbank.org/>). The data was merged into one data frame, which contained information about all of the topics during the period of 1997 – 2013. Some countries were not considered in the study due to the lack of data. The complete data frame was structured in the following manner:

* Country
* Year
* AvgTemperature
* Suicides/100k
* HDI
* gdp\_per\_capita
* military\_exp
* warm/cold

**Results**

**Question 1**

*Is there a correlation between average temperature and t*he suicide rate (number of suicides per 100k people)?

In plot 1 of the appendix, you can see a scatterplot of the relation between average temperature and the suicide rate. The relation was checked on Spearman Correlation and had a result of

R = -0.61, which means that there is a moderate negative correlation.

**Question 2**

*Is there a correlation between average temperature and* the Gross Domestic Product (GDP) per capita (in $)?

In plot 2 of the appendix, you can see a scatterplot of the relation between average temperature and the GDP per capita. The relation was checked on Spearman Correlation and had a result of R = -0.29, which means that there no significant correlation between the two variables.

**Question 3**

*Is there a correlation between average temperature and* the Human Development Index (HDI)?

In plot 3 of the appendix, you can see a scatterplot you can see a scatterplot of the relation between average temperature and the HDI. The relation was checked on Spearman Correlation and had a result of R = -0.45, which means that there no significant correlation between the two variables.

**Question 4**

*Is there a correlation between average temperature and* the military expenses (as % of GDP)?

In plot 4 of the appendix, you can see a scatterplot you can see a scatterplot of the relation between average temperature and the military expenses. The relation was checked on Spearman Correlation and had a result of R = -0.07, which means that there no significant correlation between the two variables.

**Hypotheses 1**

H0 : Suicide rate in both samples are the same

H1 : Suicide rate in samples is not the same

alpha = 0.05

Mannwhitneyu(statistic=14899.0, pvalue=9.684142476284347e-51)

This result means that we can reject H0, there is a significant difference between the suicide rate in ‘warm’ and ‘cold’ countries. The two groups are plotted in boxplot 1 in the appendix.

**Hypotheses 2**

H0 : GDP per capita in both samples are the same

H1 : GDP per capita in samples is not the same

alpha = 0.05

Mannwhitneyu(statistic=37129.5, pvalue=1.7136363105261424e-10)

This result means that we can reject H0, there is a significant difference between the GDP per capita in ‘warm’ and ‘cold’ countries. The two groups are plotted in boxplot 2 in the appendix.

**Hypotheses 3**

H0 : Military expenses in both samples are the same

H1 : Military expenses in samples is not the same

alpha = 0.05

Mannwhitneyu(statistic=55317.0, pvalue=0.5168924101168829)

This result means that we cannot reject H0, there is not a significant difference between the military expenses in ‘warm’ and ‘cold’ countries. The two groups are plotted in boxplot 3 in the appendix.

**Hypotheses 4**

H0 : HDI in both samples are the same

H1 : HDI in samples is not the same

alpha = 0.05

Mannwhitneyu(statistic=54901.0, pvalue=0.6260846538760811)

This result means that we cannot reject H0, there is a no significant difference between the HDI in ‘warm’ and ‘cold’ countries. The two groups are plotted in boxplot 4 in the appendix.

**Appendix**

**Chart, scatter chart

Description automatically generated**

Plot 1: Scatterplot of the average temperature per year per country and the number of suicides

Chart, scatter chart

Description automatically generated

Plot 2: Scatterplot of the average temperature per year per country and the GDP per capita

Chart, scatter chart

Description automatically generated

Plot 3: Scatterplot of the average temperature per year per country and the military expenses

Chart, scatter chart

Description automatically generated

Plot 4: Scatterplot of the average temperature per year per country and the HDI

**Chart, box and whisker chart

Description automatically generated**

Boxplot 1: Boxplot of the average suicide rate in cold and warm countries

**Chart, box and whisker chart

Description automatically generated**

Boxplot 2: Boxplot of the GDP per capita in cold and warm countries

Chart, box and whisker chart

Description automatically generated

Boxplot 3: Boxplot of the military expenses in cold and warm countries

Chart, box and whisker chart

Description automatically generated

Boxplot 4: Boxplot of the HDI in cold and warm countries