Alcohol Consumption And Happiness Around The World

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Abstract

The study investigates the association between alcohol consumption and happiness score across different countries. Data on alcohol consumption and happiness score was collected for a sample of countries, and regression analysis was used to examine the relationship between the two variables. The results showed that there was a positive relationship between alcohol consumption and happiness score, such that countries with higher alcohol consumption tended to have higher happiness scores. However, this relationship was found to be moderated by cultural and economic factors, and the strength of the relationship varied across different countries. The findings have important implications for public health policy and suggest that interventions to reduce alcohol consumption should consider the potential impact on happiness and well-being.

Introduction

"Alcohol consumption is a widely debated topic, with both potential benefits and drawbacks for health and well-being. One aspect of well-being that has received relatively little attention in the literature is happiness. The aim of this study is to examine the relationship between alcohol consumption and happiness score across different countries. Happiness has been widely studied in the fields of psychology, economics, and sociology, and is widely recognized as an important indicator of well-being. However, the relationship between alcohol consumption and happiness is complex and not fully understood. Some studies have suggested that moderate alcohol consumption may be associated with increased happiness, while others have found no relationship or even a negative association between the two variables. Given the conflicting

evidence, it is important to examine the relationship between alcohol consumption and happiness score in a more systematic and comprehensive manner. This study aims to address this gap in the literature by collecting data on alcohol consumption and happiness score for a sample of countries, and using regression analysis to examine the relationship between the two variables. The study also aims to explore the potential moderating role of cultural and economic factors on the relationship between alcohol consumption and happiness score."

"Alcohol consumption is a widespread phenomenon that has both economic and social consequences. One key aspect of the economic consequences of alcohol consumption is its impact on Gross Domestic Product (GDP), which is a measure of the economic output of a country. The relationship between alcohol consumption and GDP is of interest to economists, policymakers, and researchers, as it sheds light on the economic impact of alcohol consumption on a country's economy.

Previous studies have explored the relationship between alcohol consumption and GDP using different methodologies and data sources. Some studies have found a positive relationship between alcohol consumption and GDP, while others have found no relationship or a negative relationship. The evidence is mixed, and it is not clear what factors might explain the observed variability in the relationship between alcohol consumption and GDP.

In this study, we aim to examine the relationship between alcohol consumption and GDP using a large and comprehensive dataset of countries. Our study will use regression analysis to control for other factors that might influence the relationship between alcohol consumption and GDP, and will examine the role of cultural and economic factors in mediating the relationship. Our findings will contribute to a better understanding of the relationship between alcohol consumption and GDP, and will have important implications for policymakers and researchers."

Source of Data

I have taken this data from Kaggle. But The data is originally from World Health Organisation, Global Information System on Alcohol and Health (GISAH).Also We have taken most of our research about alcohol consumption and happiness from "OUR WORLD IN DATA". Theere were many good facts about the Alcohol.

Analysis Goal

The current research aims to ascertain "what is the realtionship between the alcohol consumption and Happiness at a global level?. How does alcohol consumption differ among countries with high levels of happiness versus countries with low levels of happiness?,Does the type of

alcohol consumed (e.g. wine, beer, spirits) have an impact on happiness?.Are there any cultural or demographic factors that influence the relationship between alcohol consumption and happiness?. like these , there are so many question that we will like to answer with the help of our dataset After analyzing the data we are going to extract the happiness of the people as per the alcohol uses in the countries, what are the significant impact on the GROSS DOMESTIC PRODUCT (GDP per capita), and in its relation with Human development Index.

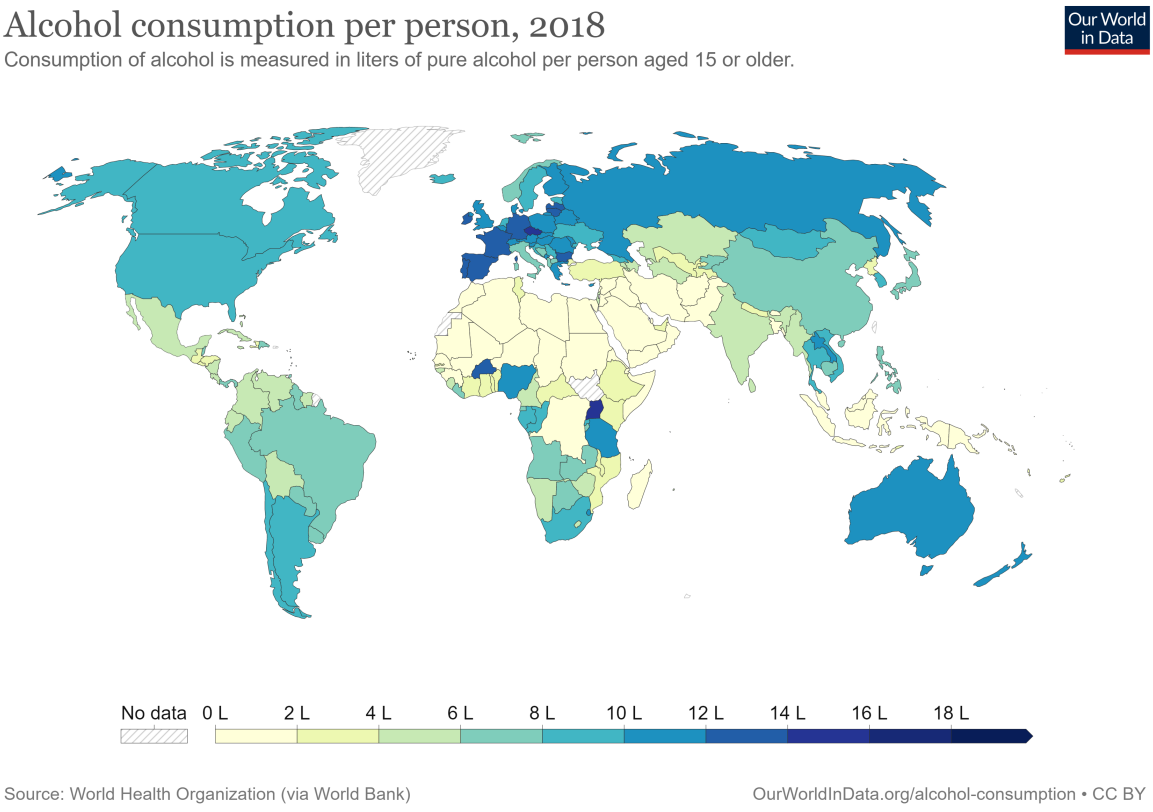
Alcohol Consumption Across the world Today

This interactive map is a visual representation of the average annual alcohol consumption for individuals aged 15 years or older. The data is presented in a user-friendly format to allow for easy interpretation and comparison. To accurately measure the amount of alcohol consumed, the data is reported in liters of pure alcohol per year. This is to account for the varying alcohol content of different alcoholic beverages, such as beer, wine, and spirits. This information is valuable for understanding patterns and trends in alcohol consumption, and can be used to inform policies and interventions aimed at reducing alcohol-related harm.The Global alcohol consumption was 6.18 per litre per person in the latest year available.

To make the average alcohol consumption more easily comprehended,the data is expressed in the terms of equivalent bottles of wine . wine contains approximately 12% pure alcohol per volume, meaning that one liter of wine contains 0.12 liters of pure alcohol.Therefore, the global average of 6.2 liters of pure alcohol per person year equates to 53 bottles of wine per person aged 15 or older, or approximately one litre of wine per week.

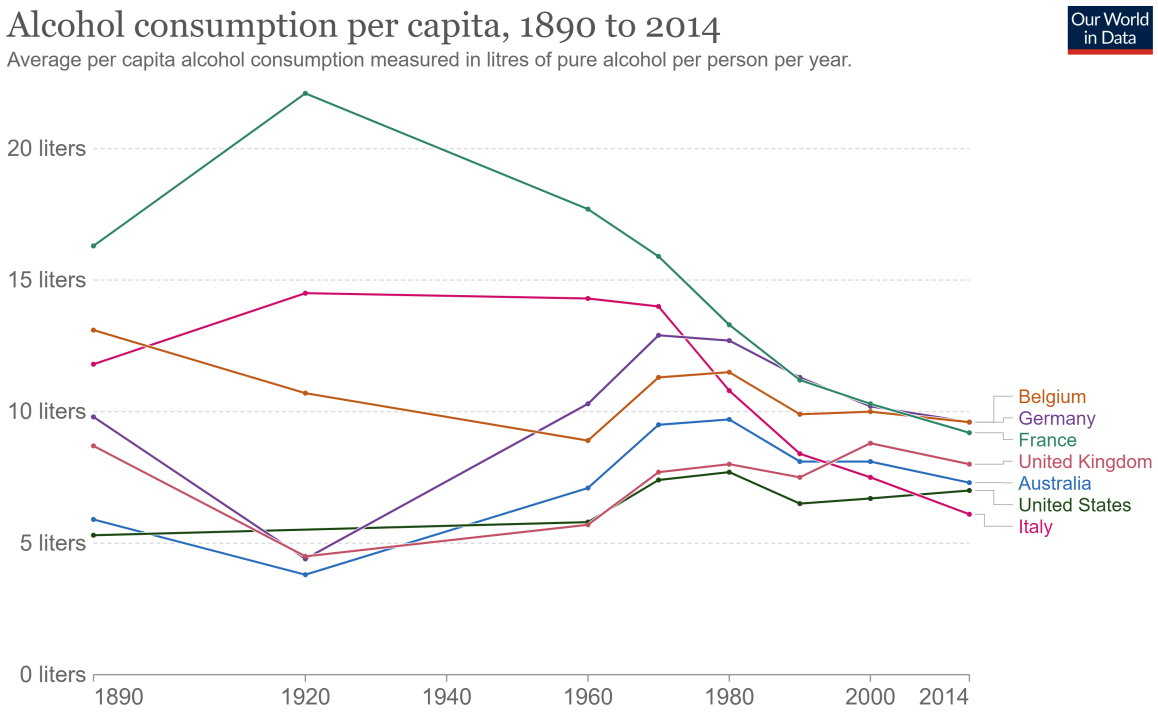
This map also reveal geographical disparities in alcohol consumption. As in the map you can see that North Africa and The middle East exhibits little or no alcohol consumption, with many countries having close to zero intake. Conversely, alcohol intake is highest in Europe, particularly in Czechia, where it averages around 15 liters per person per year, or two bottles of wine per week.

But In the western European Countries alcohol consumptions are more like France,Germany, France, Portugal, Ireland, and Belgium, are close behind Eastern Europe with alcohol intake averaging between 12 and 14 liters per person per year. These differences in alcohol consumption across the world highlight the need for further research and analysis to understand the underlying factors and inform policies and interventions aimed at reducing alcohol-related harm.



Historical perspective on alcohol consumption

As per this chart shows the alcohol consumption since 1890 in a number of countries. Across all the high income countries the annual average today lies between 5.6 liters in Japan and 10.4 liters in Austria. A century ago, alcohol consumption was much higher in some countries compared to today. For example, in France during the 1920s, the average was 22.1 liters of pure alcohol per person per year, or the equivalent of 184 one liter wine bottles per person per year. It's important to note that this data includes children, meaning the actual average alcohol consumption per adult was even higher.



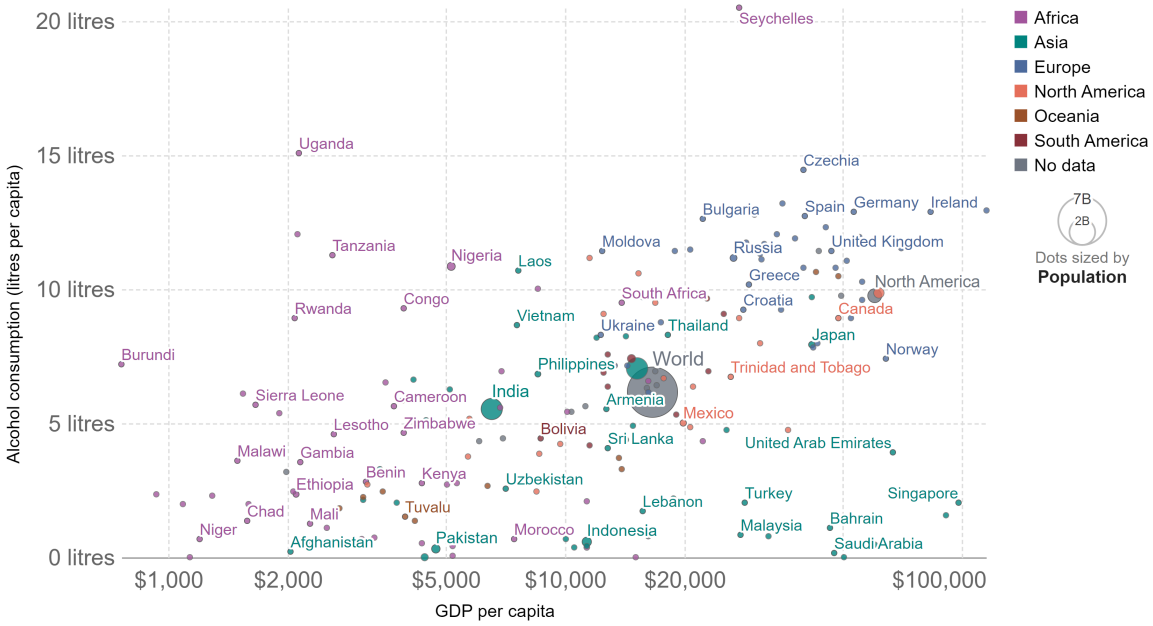
Source: Holmes, A. J., & Anderson, K. (2017). Convergence in national alcohol consumption patterns: New global indicators.
Note: Note figures are presented as the per capita average of the total population (not restricted to adults).
OurWorldInData.org/alcohol-consumption • CC BY

Relationship between Alcohol consumption vs. income

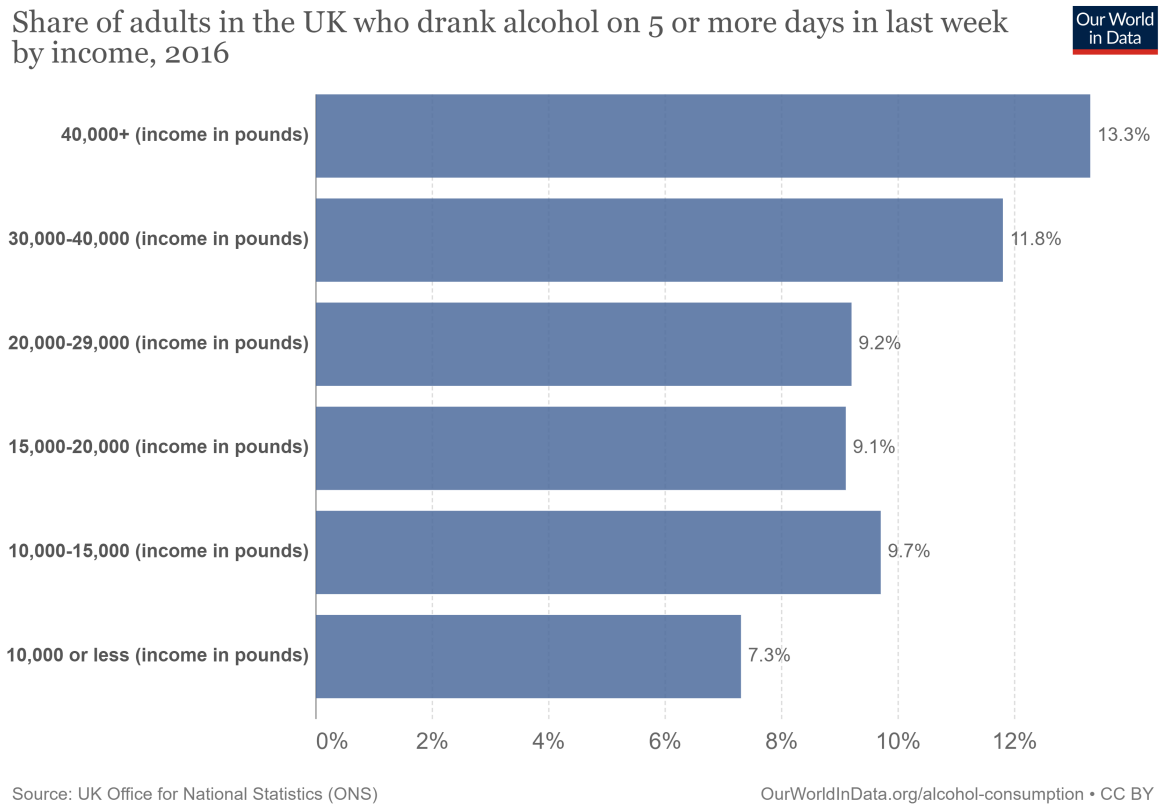
With the help of this chart we can see Does alcohol consumption increase as countries get richer?. this is also one of our research question that, we are trying to find answer for. The relationship between alcohol consumption and GDP per capita across countries is not clear cut. There are strong cultural factors that can impact the standard relationship we may expect. However, when we look at data within individual countries, we can see a correlation between income and alcohol consumption. For example, in the UK in 2016, those in higher income brackets tended to drink more frequently. Education level and profession also play a role in drinking patterns, with those in higher education or managerial positions tending to drink more frequently but those in lower income or education groups drinking less overall but in a higher-intensity pattern. These correlations demonstrate the importance of considering multiple factors when analyzing the relationship between alcohol consumption and income.

Alcohol consumption vs. GDP per capita, 2018

Average annual alcohol consumption measured in liters of pure alcohol per person aged 15 years or older.



Source: World Health Organization (via World Bank), Data compiled from multiple sources by World Bank
Note: Gross domestic product (GDP) per capita is adjusted for differences in price levels between countries (measured in international-$).
OurWorldInData.org/alcohol-consumption • CC BY




```
getwd()
```

```
[1] "C:/Users/Khushboo singh/OneDrive/Desktop"
```

Our Finding about the countries that consumed most Alcohol (Umesh Kumar Pareek)

There are many nations that consume a significant amount of alcohol, including some from Europe, North America, and Asia. This high level of consumption leads to numerous issues, including high rates of alcoholism and related health problems. Alcohol is even a leading cause of death in some of these countries where it is culturally accepted to drink in large quantities. This drinking culture can result in alcohol abuse and addiction, as well as other health problems. The average alcohol consumption worldwide was 6.18 liters per person in 2018, which equates to 53 bottles of wine per person over 15 years of age per year, according to Our World in Data.. Along with each country, we have mentioned the liters of pure alcohol consumed per person.

An Analysis Of The Alcoholic Beverages Industry

The Alcoholic Beverages industry is a multi-billion dollar enterprise involved in the manufacture and distribution of alcoholic drinks. It operates through three main players: producers, distributors, and retailers. Producers can range from large corporations to small, family-owned businesses. Distributors distribute the liquor products to retailers, who then sell them to consumers. The liquor industry is highly regulated, with laws governing its production, distribution, and sale differing from country to country. In the U.S., for instance, each state has the authority to regulate the production, distribution, and sale of alcoholic beverages. The liquor industry is a significant contributor to the economy and a major source of government funding through the tax revenue generated by alcohol sales. Moreover, it provides employment for millions of people globally.

According to a report from Grand View Research, the global liquor industry was valued at $1.4 trillion in 2021. The industry is projected to grow and reach a value of $2.8 trillion by 2028, with a projected compound annual growth rate of 10.3% from 2022 to 2028. North America is the dominant player in the global liquor industry, holding a market share of 33%. Analysts from Grand View Research predict that the Asia Pacific region will be the fastest-growing market, with a CAGR of 11.1% over the forecast period, followed by Europe with a CAGR of 10.4% from 2022 to 2028.

Leading brands in the alcoholic beverage industry include those owned by Brown-Forman Corporation (NYSE:BF), Diageo plc (NYSE:DEO), and Constellation Brands, Inc. (NYSE:STZ).

Methodology

To identify the 15 nations with the highest alcohol consumption, we analyzed data from Our World in Data, which contained information on alcohol consumption in liters per person for various countries. We selected the top 15 countries with the highest alcohol consumption and arranged them in ascending order.

15 Countries That Consume The Most Alcohol

All 15 countries are ranked from top to bottom. Also For each country, we have listed the amount of pure alcohol consumed per person.

1. **seychelles 20.50 L per person**

Seychelles, an eastern African nation known for its stunning beaches, rich coral reefs, and diverse wildlife, is another country with a disturbingly high alcohol consumption rate. As of 2018, Seychelles recorded an alcohol consumption of 20.50 liters per person, ranking it high among the nations with the highest alcohol consumption. The number of premature deaths

caused by alcohol in Seychelles has risen from 41.79 per 100,000 people in 1990 to 49.79 per 100,000 people in 2019. Some of the most popular alcoholic beverages in Seychelles include SeyBrew Beer, French Wine, Buka, and Palm Wine.

2. **Uganda 15.09 L**

Uganda, famous for its lush landscapes, friendly people, and diverse wildlife, has a legal drunk driving limit of 0.08% BAC, which is higher than in Europe. Despite this, Uganda has reported fewer road fatalities resulting from drunk driving, with a rate of 0.8% in 2017. However, the country still faces a high rate of premature deaths due to alcohol consumption, at 95.63 per 100,000 people in 2019, although this is lower than the 123.24 per 100,000 recorded in 1990. The healthcare infrastructure in Uganda is poor, contributing to the high rate of premature deaths. Uganda has an alcohol consumption of 15.09 liters per person and is listed among the countries with the highest alcohol consumption.

3. **Czechia 14.45 L**

The Czech Republic, a country in Central Europe known for its castles, old town squares, glassmaking, and puppetry, has a population that is among the heaviest drinkers. It is ranked among the countries with the highest alcohol consumption, with 14.45 liters per person reported in 2018. Despite its high alcohol consumption, the rate of premature deaths due to alcohol has decreased from 57.39 per 100,000 people in 1990 to 36.90 per 100,000 people in 2019. Additionally, the percentage of road fatalities from drunk driving in the country was reported at 9.5% in 2017, lower than in other European countries with high alcohol consumption.

4. **Lithuania 13.22 L**

Lithuania, located in the Baltic region of Europe, has a long-standing relationship with alcohol that dates back to its pagan origins. Alcohol is a deeply ingrained part of Lithuanian culture and is widely accessible and affordable in the country. Beer and vodka are the most consumed alcoholic beverages. Drinking is considered a social activity and is often associated with relaxation and enjoyment. Unfortunately, binge drinking is widespread and alcohol-related issues, such as alcoholism, pose a significant problem in Lithuania. The number of premature deaths caused by alcohol use has risen from 42.10 per 100,000 people in 1990 to 56.95 per 100,000 people in 2019.

5. **Luxembourg 12.94 L**

Luxembourg is a country located in Western Europe and surrounded by Belgium, Germany, and France. Despite its small size, it is ranked among the top countries with high alcohol consumption with an average of 12.94 liters per person. The preferred drink in Luxembourg is beer, including both local and international brands, as well as wine, spirits, and liqueurs. Beer brewing has a long history in the country, dating back to the Middle Ages, and it is home to many small, local breweries producing various beer styles.

6. **Germany 12.91 L**

Germany is famous for its automobiles, engineering, and its food and drinks, including beer, wine, and spirits. The country has a rich history of brewing beer and producing popular brews. In addition to beer, Germany is known for its wine and spirit production, including schnapps and Jägermeister. Germany is also home to unique alcoholic beverages such as Kölsch beer from Cologne and Obstler, a fruit brandy. Alcohol is an integral part of German culture, enjoyed by people of all ages, with a per capita alcohol consumption of 12.91 liters in 2018, which is more than double the global average of 6.18 liters. As a result, Germany is ranked among the countries with the highest alcohol consumption.

7. **Ireland 12.88 L**

Ireland is renowned for its top-notch beer and its extensive brewing heritage, and is highly placed on our list of nations with the highest alcohol consumption. In 2018, the country recorded a per capita alcohol consumption of 12.88 liters. Despite having the standard drink-drive limit of 0.05 BAC, the number of fatalities caused by driving under the influence is much higher compared to other areas. In 2019, drunken driving was responsible for 38.5% of road deaths in Ireland.

8. **Latvia 12.77 L**

Latvia is a country located in Northern Europe's Baltic region and is famous for its forests, lakes, and meadows. Latvia has a high concentration of alcohol consumption, with a per capita consumption of 12.77 liters in 2018. The rate of early deaths caused by alcohol in Latvia has risen from 35.31 per 100,000 people in 1990 to 59.15 in 2019. In 2017, 10.8% of road fatalities in Latvia were attributed to alcohol. Latvia's driving laws are in line with most other European countries, and the legal blood alcohol limit is 0.05%.Some of the major players in the European alcoholic beverage market include Brown-Forman Corporation (NYSE: BF), Diageo plc (NYSE: DEO), and Constellation Brands, Inc. (NYSE: STZ).

9. **Spain 12.72 L**

Spain is renowned for its cuisine, wine, flamenco dancing, bullfighting, and laid-back way of life. With a long history of winemaking, Spanish wines are well-known for their quality and diversity, ranging from light and crisp whites to bold and full-bodied reds, often made using native grape varieties such as Tempranillo and Garnacha and possessing a distinct regional character. Whether you're seeking a wine to complement a meal or simply to enjoy by itself, Spanish wine is a great option.

Despite being a major producer of high-quality wine, Spain has a high level of alcohol consumption and is among the countries with the highest alcohol consumption. In 2018, the country recorded a per capita alcohol consumption of 12.72 liters of pure alcohol. In 2017, 17% of road fatalities in Spain were due to drunken driving. The rate of premature deaths from alcohol

consumption in Spain has declined from 47.41 per 100,000 people in 1990 to 21.36 per 100,000 people in 2019.

10. **Bulgaria 12.65 L**

Bulgaria is one of the oldest nations in Europe and is renowned for its holiday destinations, historic landmarks, mineral baths, and wine. Despite having a high level of alcohol consumption, the laws regarding driving under the influence in Bulgaria are stringent. The blood alcohol limit in Bulgaria is only 0.05%, and drivers caught with a blood alcohol level exceeding this limit face a fine and a suspension of their license. In 2017, only 0.9% of deaths in Bulgaria were caused by drunken driving.

11. **France 1.33L**

France is the birthplace of French wine, which is one of the most popular types of wine globally and for good reason. The country has a rich tradition of vineyard cultivation, and the climate provides ideal growing conditions for a diverse range of grapes. French wines are recognized for their sophistication and refinement, and there is a variety to suit all tastes. From the light and crisp whites of Burgundy to the full-bodied reds of Bordeaux, French wine is a sure delight. Some of the most well-known French wines include Champagne, Bordeaux, and Burgundy. France is among the European nations with the highest alcohol consumption, with a recorded per capita alcohol consumption of 12.33 liters in 2018.

12. **Burkina Faso 12.03L**

Burkina Faso is a landlocked nation located in West Africa and surrounded by Niger in the east, Benin in the south, Ghana in the west, and Mali in the north. The capital city of Burkina Faso is Ouagadougou. The country is known for its farming, gold extraction, and textile industries. Despite over half of its population adhering to Islam, which prohibits alcohol, Burkina Faso has one of the world's highest levels of alcohol consumption. In 2018, the per capita alcohol consumption in Burkina Faso was 12.03 liters.

13. **Portugal 11.96L**

Portugal, with a population of over 10 million, is one of the oldest nations in Europe. It is famous for its beautiful coastal towns, rich history and culture, and hospitable people. With a per capita alcohol consumption of 12.03 liters, Portugal is ranked among the countries with the highest levels of alcohol consumption. In 2017, approximately 29% of road deaths were attributed to alcohol consumption in Portugal.

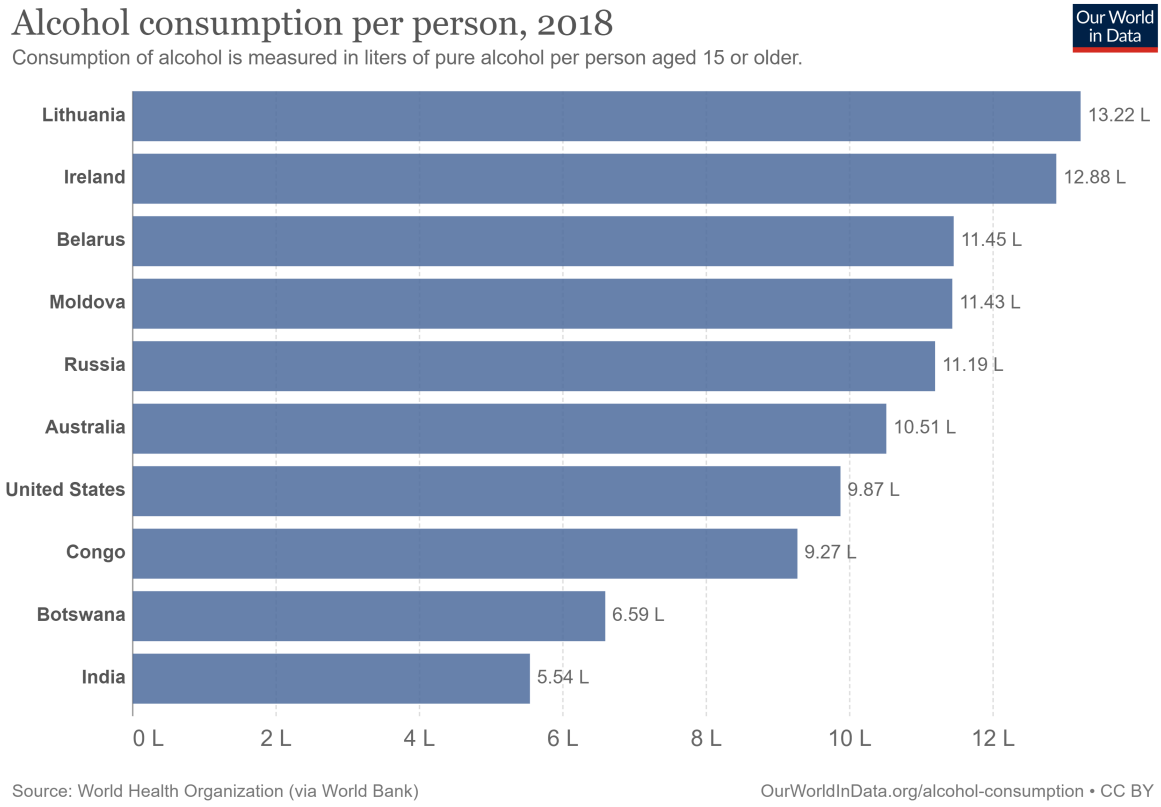
14. **Austria 11.96L**

Austria is a country located in Central Europe and is famous for its music, art, and delicious food. Despite a decrease in the number of premature deaths caused by alcohol, which fell from 50.23 per 100,000 people in 1990 to 30.54 per 100,000 in 2019, the country still has a high level

of alcohol consumption with 11.96 liters per person. It is ranked among the countries with the highest alcohol consumption.

15. **Slovenia 11.90L**

Slovenia is a Central European nation renowned for its picturesque landscapes and delectable cuisine. Despite having a high alcohol consumption rate of 11.90 liters per person, which is nearly double the global average of 6.18 liters, Slovenia is still considered one of the countries with the highest alcohol intake. Slovenia boasts several well-known alcoholic drinks, such as its highly regarded Slovenian wine. The country's wine region is one of the oldest in the world and produces top-notch wines. Other popular alcoholic beverages from Slovenia include the classic Slovenian brandy, made from distilled grapes.



AGGREGATE–LEVEL STUDIES AND PER CAPITA CONSUMPTION (Khushboo singh)

Some cross–national comparisons of alcohol consumption use aggregate–level data. The most widely analyzed variable in such studies is per capita alcohol consumption—the amount of

ethanol in liters per year that every adult consumes. To calculate annual adult per capita consumption, one sums up production and imports of alcoholic beverages, subtracts exports of alcoholic beverages, and then divides by the number of adults (often all people age 15 and older) in the population. Ideally, the calculation would also consider informal alcohol production, consumption by residents outside the country, duty–free consumption, consumption by foreign tourists in the country, imported alcohol re–exported to other countries, and any additional stocks5 (WHO 2000); however, these data are difficult to obtain. (5These additional stocks refer to alcoholic beverages stored because they require aging [e.g., whiskey and cognac]. Thus, these beverages may have been produced in earlier years but are released for sale or export only after reaching maturation. However, the effect of stockpiling on estimates of total alcohol consumption in most countries is likely to be small.)

What is HDI?

The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living.

The HDI can be used to question national policy choices, asking how two countries with the same level of GNI per capita can end up with different human development outcomes. These contrasts can stimulate debate about government policy priorities.

The HDI simplifies and captures only part of what human development entails. It does not reflect on inequalities, poverty, human security, empowerment, etc. The HDRO provides other composite indices as broader proxy on some of the key issues of human development, inequality, gender disparity and poverty.

The global effects of alcohol consumption on Gross Domestic Product in high- and low-income countries

Gross domestic product (GDP) is a measure of a country's economic health, it is the sum of final consumption, investment, and net exports. It stands as a good indicator for the economic size and overall performance of a country (8). To better understand prices on healthcare spending across developing and developed countries as well as how the reduction of alcoholism can alleviate pressures on healthcare expenditure in HICs and LICs, the relationship between alcohol-attributable diseases/injury and the GDP-Purchasing Parity (GDP PPP) could be a possible outlet. Baumberg and colleagues estimated that the global economic burden of alcohol consumption stands at approximately 0.6-2.0% of global GDP. This includes $40-105 billion dollars spent towards alcohol-related health issues, $30-85 billion for crime and violence, and around $0-80 billion towards unemployment (7). The surge in alcohol affordability over the past years poses immense pressures on public health systems and economies.

Alcohol is responsible for 2.8 million premature deaths each year (Khushboo singh)

Why it is so important to understand the how a alcohol consumption affects the Gross domestic product of any country in the world. As alcohol is one of the world's largest risk factors for premature death in many countries. As per "The Institute for Health Metrics and Evaluation (IHME)" in there Global Burden of Disease study provide the number of risk factors that are associated with consumption of alcohol. Risk Factors are as follows

- High Blood Pressure
- Most People who drinks, they also likes to smoke
- high blood sugar
- obesity
- Air Pollution and many more

LIMITATION OF THE DATA ANALYSIS (Umesh Kumar Pareek)

Assessing the reliability and validity of responses is an important component of any type of DATA analysis and alcohol consumption mostly meauserd by surveys research, so there can be inconsistent response.Alcohol is known to have negative effects on overall well-being, as it is a major contributor to premature death and disability worldwide, and is associated with various social and economic issues. However, despite being a source of enjoyment, there is limited research on the relationship between alcohol and well-being, and little discussion on its policy implications. This lack of evidence makes it difficult to develop effective alcohol policies. The current approach used to evaluate the impact of alcohol on well-being is the "consumer surplus" method, but it has some flaws that lead to overestimating the positive effects of drinking and understating the negative effects. For instance, the UK Treasury used this method in evaluating the effects of minimum unit pricing on well-being and found that the costs outweighed the benefits, leading to a temporary halt in the policy until outside experts intervened. there are also other factors that we have included here as follows:-

- **level of economic development**

As level of economic development matters. For some countries who cannot afford one time meal properly, It is difficult to say whether they can afford alcohol.When there are not much data available on GDP,alcohol consumption and happiness for developing countries.

- **culture and social norms**

It is important to recognize that the link between cultural values and alcohol consumption is complex and involves many factors. While some societies that prioritize individual autonomy and harmonious relationships may exhibit higher levels of alcohol consumption, this relationship is not always present. This may be due to alcohol being perceived as a means to foster

social connections and relaxation in these societies. However, cultural, historical, and economic factors can also play a significant role in determining alcohol consumption levels.It is also noteworthy that even cultures with traditional values can have high alcohol consumption, and there are many societies with strong collective values that still have low alcohol consumption. The connection between cultural values and alcohol consumption cannot be easily defined and varies from place to place. The relationship is influenced by a multitude of factors, and it may differ between countries and regions.

- **religion**

As In some religion for instance Islam, alcohol is considered haram, or forbidden, and its consumption is strictly regulated. In some sects of Buddhism, alcohol is discouraged because it is believed to lead to loss of control and negative behavior. In some religion alcohol is seen as an important part of rituals and ceremonies. for Instance ,In Christianity, wine is used in the celebration of the Eucharist or Communion. In Hinduism, alcohol is used in certain rituals as an offering to the gods.

- **geography**

Geography also plays a important role when it comes to alcohol consumption.We can say that countries whose whether is cold drinks more alcohol as compare to countries where whether is warm.

- **political instability**

In some countries government bans alcohol due to excess consumption of alcohol, because it affects the GDP of the country or state. for instance In India North east state of Gujarat, where government has banned alcohol, also well in Bihar. Due to Excess usage of Alcohol, people started to have a drinking problem.

- **Variation in Drink Sizes and Strengths (grams and litre)**
- **based on age, gender and ethnicity**

Data Preparation & Overview

Setup and Data Import

When opening R Studio first the libraries ,lubricate ,hms,ggplot2 and tidyverse and its sub-libraries, which contain important functions for processing, analyzing and visualizing data, must be loaded.

Install and load libraries of R

In the very first step, We need to install the packages that will be needed for my project. So,We used the function install.packages() to install packages like tidyverse, ggplot, and likert,and then we used the library() function to load them. Tidyverse provides a consistent, easy to-learn, and integrated approach to data analysis and manipulation. The packages in the tidyverse include ggplot2 for data visualization, dplyr for data manipulation, tidyr for data cleaning, and readr for data import, among others. The goal of the tidyverse is to provide a set of tools that work together seamlessly and make data analysis more efficient and enjoyable.

```
library(tidyverse)
```

```
-- Attaching packages --------------------------------------- tidyverse 1.3.2 --
v ggplot2 3.4.0     v purrr   1.0.1
v tibble  3.1.8     v dplyr   1.1.0
v tidyr   1.3.0     v stringr 1.5.0
v readr   2.1.3     v forcats 1.0.0
-- Conflicts ------------------------------------------ tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag()    masks stats::lag()
```

This output is generated when the tidyverse package is loaded into R. It shows the version of each package within the tidyverse and confirms that they have been loaded successfully.The package versions listed indicate that you are using tidyverse version 1.3.2 and each of its sub-packages (e.g. dplyr version 1.0.10, tidyr version 1.2.1, etc.). The warning messages indicate that some of the packages in the tidyverse were built under a different version of R and may cause conflicts with other functions in R that have the same name. The Conflicts section shows any potential conflicts between the tidyverse packages and other packages in your environment.

```
library(ggplot2)
library(hms)
library(lubridate)
```

```
Attaching package: 'lubridate'
```

```
The following object is masked from 'package:hms':

    hms
```

```
The following objects are masked from 'package:base':

    date, intersect, setdiff, union
```

```
library(dplyr)
```

Data Importing

We use the R programming language to analyze my data. We use confidential data that is not available from public sources. Before we can manipulate and analyze data with R, we need to import data. R supports a variety of file formats, including.docx,.xls,.txt, and comma separated files like.csv.We imported data with the function read.csv() and named the dataframe DF and DF1. We have used two different datasets one data set was about the alcohol consumption and other Data set is alcohol and happiness around the world.So, Along with read.csv() function, We have also used Head(), to see the head of our both datasets. Also We have Used Merge() function. merge is a generic function whose principal method is for data frames: the default method coerces its arguments to data frames and calls the "data.frame" method.

Next, We will import our, the CSV file will be imported as a data frame from the destop.

```
setwd("C:/Users/Khushboo singh/OneDrive/Desktop")
getwd()
```

```
[1] "C:/Users/Khushboo singh/OneDrive/Desktop"
```

```
df = read.csv("drinks for datascience.csv")

df
```

```
                      country beer_servings spirit_servings wine_servings
1                 Afghanistan             0               0             0
2                     Albania            89             132            54
3                     Algeria            25               0            14
4                     Andorra           245             138           312
5                      Angola           217              57            45
6          Antigua & Barbuda           102             128            45
7                   Argentina           193              25           221
8                     Armenia            21             179            11
```

9	Australia	261	72	212
10	Austria	279	75	191
11	Azerbaijan	21	46	5
12	Bahamas	122	176	51
13	Bahrain	42	63	7
14	Bangladesh	0	0	0
15	Barbados	143	173	36
16	Belarus	142	373	42
17	Belgium	295	84	212
18	Belize	263	114	8
19	Benin	34	4	13
20	Bhutan	23	0	0
21	Bolivia	167	41	8
22	Bosnia-Herzegovina	76	173	8
23	Botswana	173	35	35
24	Brazil	245	145	16
25	Brunei	31	2	1
26	Bulgaria	231	252	94
27	Burkina Faso	25	7	7
28	Burundi	88	0	0
29	Cote d'Ivoire	37	1	7
30	Cabo Verde	144	56	16
31	Cambodia	57	65	1
32	Cameroon	147	1	4
33	Canada	240	122	100
34	Central African Republic	17	2	1
35	Chad	15	1	1
36	Chile	130	124	172
37	China	79	192	8
38	Colombia	159	76	3
39	Comoros	1	3	1
40	Congo	76	1	9
41	Cook Islands	0	254	74
42	Costa Rica	149	87	11
43	Croatia	230	87	254
44	Cuba	93	137	5
45	Cyprus	192	154	113
46	Czech Republic	361	170	134
47	North Korea	0	0	0
48	DR Congo	32	3	1
49	Denmark	224	81	278
50	Djibouti	15	44	3
51	Dominica	52	286	26

52	Dominican Republic	193	147	9
53	Ecuador	162	74	3
54	Egypt	6	4	1
55	El Salvador	52	69	2
56	Equatorial Guinea	92	0	233
57	Eritrea	18	0	0
58	Estonia	224	194	59
59	Ethiopia	20	3	0
60	Fiji	77	35	1
61	Finland	263	133	97
62	France	127	151	370
63	Gabon	347	98	59
64	Gambia	8	0	1
65	Georgia	52	100	149
66	Germany	346	117	175
67	Ghana	31	3	10
68	Greece	133	112	218
69	Grenada	199	438	28
70	Guatemala	53	69	2
71	Guinea	9	0	2
72	Guinea-Bissau	28	31	21
73	Guyana	93	302	1
74	Haiti	1	326	1
75	Honduras	69	98	2
76	Hungary	234	215	185
77	Iceland	233	61	78
78	India	9	114	0
79	Indonesia	5	1	0
80	Iran	0	0	0
81	Iraq	9	3	0
82	Ireland	313	118	165
83	Israel	63	69	9
84	Italy	85	42	237
85	Jamaica	82	97	9
86	Japan	77	202	16
87	Jordan	6	21	1
88	Kazakhstan	124	246	12
89	Kenya	58	22	2
90	Kiribati	21	34	1
91	Kuwait	0	0	0
92	Kyrgyzstan	31	97	6
93	Laos	62	0	123
94	Latvia	281	216	62

95	Lebanon	20	55	31
96	Lesotho	82	29	0
97	Liberia	19	152	2
98	Libya	0	0	0
99	Lithuania	343	244	56
100	Luxembourg	236	133	271
101	Madagascar	26	15	4
102	Malawi	8	11	1
103	Malaysia	13	4	0
104	Maldives	0	0	0
105	Mali	5	1	1
106	Malta	149	100	120
107	Marshall Islands	0	0	0
108	Mauritania	0	0	0
109	Mauritius	98	31	18
110	Mexico	238	68	5
111	Micronesia	62	50	18
112	Monaco	0	0	0
113	Mongolia	77	189	8
114	Montenegro	31	114	128
115	Morocco	12	6	10
116	Mozambique	47	18	5
117	Myanmar	5	1	0
118	Namibia	376	3	1
119	Nauru	49	0	8
120	Nepal	5	6	0
121	Netherlands	251	88	190
122	New Zealand	203	79	175
123	Nicaragua	78	118	1
124	Niger	3	2	1
125	Nigeria	42	5	2
126	Niue	188	200	7
127	Norway	169	71	129
128	Oman	22	16	1
129	Pakistan	0	0	0
130	Palau	306	63	23
131	Panama	285	104	18
132	Papua New Guinea	44	39	1
133	Paraguay	213	117	74
134	Peru	163	160	21
135	Philippines	71	186	1
136	Poland	343	215	56
137	Portugal	194	67	339

138	Qatar	1	42	7
139	South Korea	140	16	9
140	Moldova	109	226	18
141	Romania	297	122	167
142	Russian Federation	247	326	73
143	Rwanda	43	2	0
144	St. Kitts & Nevis	194	205	32
145	St. Lucia	171	315	71
146	St. Vincent & the Grenadines	120	221	11
147	Samoa	105	18	24
148	San Marino	0	0	0
149	Sao Tome & Principe	56	38	140
150	Saudi Arabia	0	5	0
151	Senegal	9	1	7
152	Serbia	283	131	127
153	Seychelles	157	25	51
154	Sierra Leone	25	3	2
155	Singapore	60	12	11
156	Slovakia	196	293	116
157	Slovenia	270	51	276
158	Solomon Islands	56	11	1
159	Somalia	0	0	0
160	South Africa	225	76	81
161	Spain	284	157	112
162	Sri Lanka	16	104	0
163	Sudan	8	13	0
164	Suriname	128	178	7
165	Swaziland	90	2	2
166	Sweden	152	60	186
167	Switzerland	185	100	280
168	Syria	5	35	16
169	Tajikistan	2	15	0
170	Thailand	99	258	1
171	Macedonia	106	27	86
172	Timor-Leste	1	1	4
173	Togo	36	2	19
174	Tonga	36	21	5
175	Trinidad & Tobago	197	156	7
176	Tunisia	51	3	20
177	Turkey	51	22	7
178	Turkmenistan	19	71	32
179	Tuvalu	6	41	9
180	Uganda	45	9	0

181	Ukraine	206	237	45
182	United Arab Emirates	16	135	5
183	United Kingdom	219	126	195
184	Tanzania	36	6	1
185	USA	249	158	84
186	Uruguay	115	35	220
187	Uzbekistan	25	101	8
188	Vanuatu	21	18	11
189	Venezuela	333	100	3
190	Vietnam	111	2	1
191	Yemen	6	0	0
192	Zambia	32	19	4
193	Zimbabwe	64	18	4

	total_litres_of_pure_alcohol
1	0.0
2	4.9
3	0.7
4	12.4
5	5.9
6	4.9
7	8.3
8	3.8
9	10.4
10	9.7
11	1.3
12	6.3
13	2.0
14	0.0
15	6.3
16	14.4
17	10.5
18	6.8
19	1.1
20	0.4
21	3.8
22	4.6
23	5.4
24	7.2
25	0.6
26	10.3
27	4.3
28	6.3
29	4.0

30	4.0
31	2.2
32	5.8
33	8.2
34	1.8
35	0.4
36	7.6
37	5.0
38	4.2
39	0.1
40	1.7
41	5.9
42	4.4
43	10.2
44	4.2
45	8.2
46	11.8
47	0.0
48	2.3
49	10.4
50	1.1
51	6.6
52	6.2
53	4.2
54	0.2
55	2.2
56	5.8
57	0.5
58	9.5
59	0.7
60	2.0
61	10.0
62	11.8
63	8.9
64	2.4
65	5.4
66	11.3
67	1.8
68	8.3
69	11.9
70	2.2
71	0.2
72	2.5

73	7.1
74	5.9
75	3.0
76	11.3
77	6.6
78	2.2
79	0.1
80	0.0
81	0.2
82	11.4
83	2.5
84	6.5
85	3.4
86	7.0
87	0.5
88	6.8
89	1.8
90	1.0
91	0.0
92	2.4
93	6.2
94	10.5
95	1.9
96	2.8
97	3.1
98	0.0
99	12.9
100	11.4
101	0.8
102	1.5
103	0.3
104	0.0
105	0.6
106	6.6
107	0.0
108	0.0
109	2.6
110	5.5
111	2.3
112	0.0
113	4.9
114	4.9
115	0.5

116	1.3
117	0.1
118	6.8
119	1.0
120	0.2
121	9.4
122	9.3
123	3.5
124	0.1
125	9.1
126	7.0
127	6.7
128	0.7
129	0.0
130	6.9
131	7.2
132	1.5
133	7.3
134	6.1
135	4.6
136	10.9
137	11.0
138	0.9
139	9.8
140	6.3
141	10.4
142	11.5
143	6.8
144	7.7
145	10.1
146	6.3
147	2.6
148	0.0
149	4.2
150	0.1
151	0.3
152	9.6
153	4.1
154	6.7
155	1.5
156	11.4
157	10.6
158	1.2

```
159                          0.0
160                          8.2
161                         10.0
162                          2.2
163                          1.7
164                          5.6
165                          4.7
166                          7.2
167                         10.2
168                          1.0
169                          0.3
170                          6.4
171                          3.9
172                          0.1
173                          1.3
174                          1.1
175                          6.4
176                          1.3
177                          1.4
178                          2.2
179                          1.0
180                          8.3
181                          8.9
182                          2.8
183                         10.4
184                          5.7
185                          8.7
186                          6.6
187                          2.4
188                          0.9
189                          7.7
190                          2.0
191                          0.1
192                          2.5
193                          4.7
```

```
setwd("C:/Users/Khushboo singh/OneDrive/Desktop")
getwd()
```

```
[1] "C:/Users/Khushboo singh/OneDrive/Desktop"
```

```r
df1 = read.csv("HappinessAlcoholConsumption.csv")

head(df)
```

```
           country beer_servings spirit_servings wine_servings
1      Afghanistan             0               0             0
2          Albania            89             132            54
3          Algeria            25               0            14
4          Andorra           245             138           312
5           Angola           217              57            45
6 Antigua & Barbuda           102             128            45
  total_litres_of_pure_alcohol
1                          0.0
2                          4.9
3                          0.7
4                         12.4
5                          5.9
6                          4.9
```

```r
head(df1)
```

```
      Country         Region Hemisphere HappinessScore HDI GDP_PerCapita
1     Denmark Western Europe      north          7.526 928        53.579
2 Switzerland Western Europe      north          7.509 943        79.866
3     Iceland Western Europe      north          7.501 933        60.530
4      Norway Western Europe      north          7.498 951        70.890
5     Finland Western Europe      north          7.413 918        43.433
6      Canada  North America      north          7.404 922        42.349
  Beer_PerCapita Spirit_PerCapita Wine_PerCapita
1            224               81            278
2            185              100            280
3            233               61             78
4            169               71            129
5            263              133             97
6            240              122            100
```

```r
## As We are using Two different dataset, so we will be using Merger()function to Merge tu

jointdataset <- merge(df, df1, by.x = "country", by.y = "Country", all.x = TRUE, all.y = T
```

With the help of merge() function, we have merged the two different datasets.

Dataset Overview

Now by the str() function can learn more about the data structure of our table. Each sample in the data sets contains details on the country, beer_serving,wine_ serving and spirit_serving, also total_litres_of_pure_alcohol. There are 193 observations and 5 varibales in our dataset df and there are 122 observation and 9 varibales in our dataset df1

Also "Head()" function which helps in Returns the first or last parts of a vector, matrix, table, data frame or function. Since head() and tail() are generic functions, they may also have been extended to other classes.

Also summary() The summary() function in R can be used to quickly summarize the values in a vector, data frame, regression model.

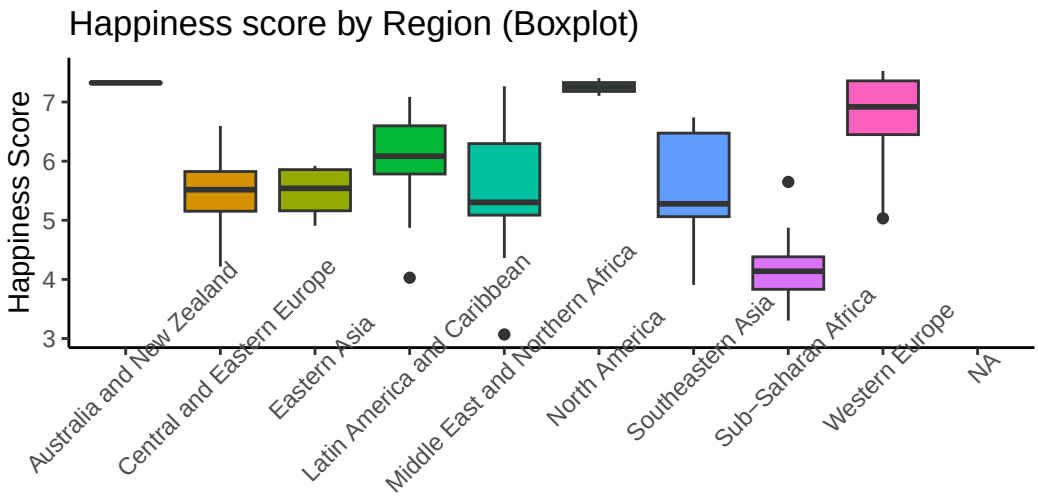
```
str(df)
```

```
'data.frame':   193 obs. of  5 variables:
 $ country                     : chr  "Afghanistan" "Albania" "Algeria" "Andorra" ...
 $ beer_servings               : int  0 89 25 245 217 102 193 21 261 279 ...
 $ spirit_servings             : int  0 132 0 138 57 128 25 179 72 75 ...
 $ wine_servings               : int  0 54 14 312 45 45 221 11 212 191 ...
 $ total_litres_of_pure_alcohol: num  0 4.9 0.7 12.4 5.9 4.9 8.3 3.8 10.4 9.7 ...
```

Boxplot of Happiness score against Region

```
## Boxplot of Happiness score against Region

ggplot(jointdataset, aes(x = Region, y = HappinessScore, fill = Region)) +
  geom_boxplot() +
  theme_classic() +
  labs(y = "Happiness Score", title = "Happiness score by Region (Boxplot)") +
  theme(
  legend.position = "none",
  axis.text.x = element_text(angle = 45)
  )
```

```
Warning: Removed 76 rows containing non-finite values (`stat_boxplot()`).
```

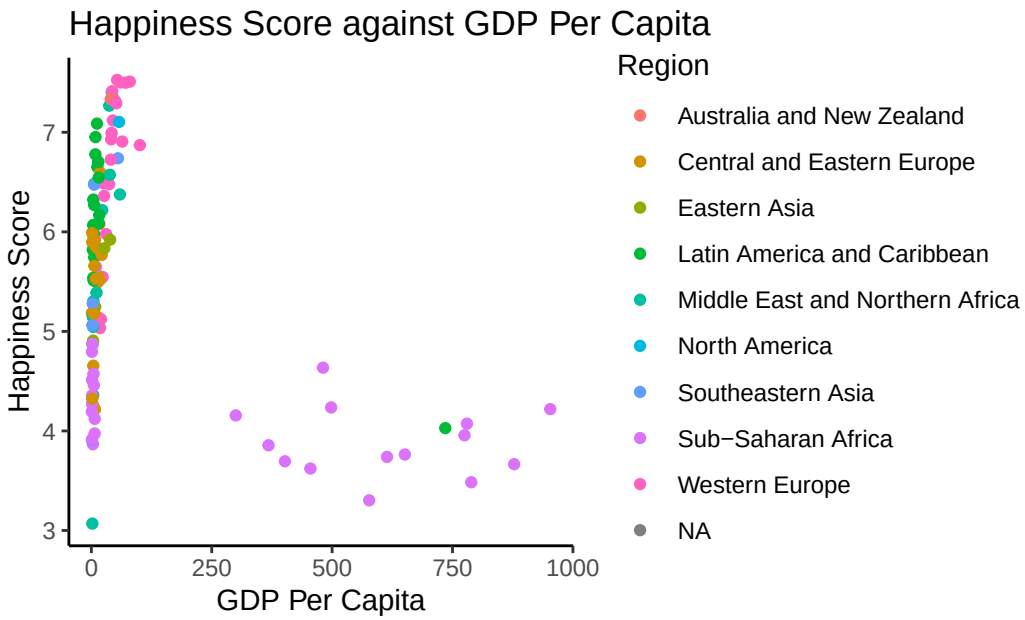


It is possible for countries and regions to have different cultures regarding alcohol consumption, as some cultures tend to drink more alcohol and others tend to drink less or completely abstain from drinking alcohol. Aside from the cultural difference between regions, a large impact of the overall will be the wealth, prosperity, health, and the living conditions of the region variables that are covered or correlated with the GDP per capita of the region/country as well as the Human Development Index (HDI).

Exploring GDP per Capita

```
#GDP per capita against Happiness Score
## Exploring GDP against Happiness score due to counter-intuitive results
ggplot(jointdataset, aes(GDP_PerCapita, HappinessScore, color = Region))+
  geom_point() +
  theme_classic() +
  labs(x = "GDP Per Capita", y = "Happiness Score", title = "Happiness Score against GDP P
```

```
Warning: Removed 76 rows containing missing values (`geom_point()`).
```

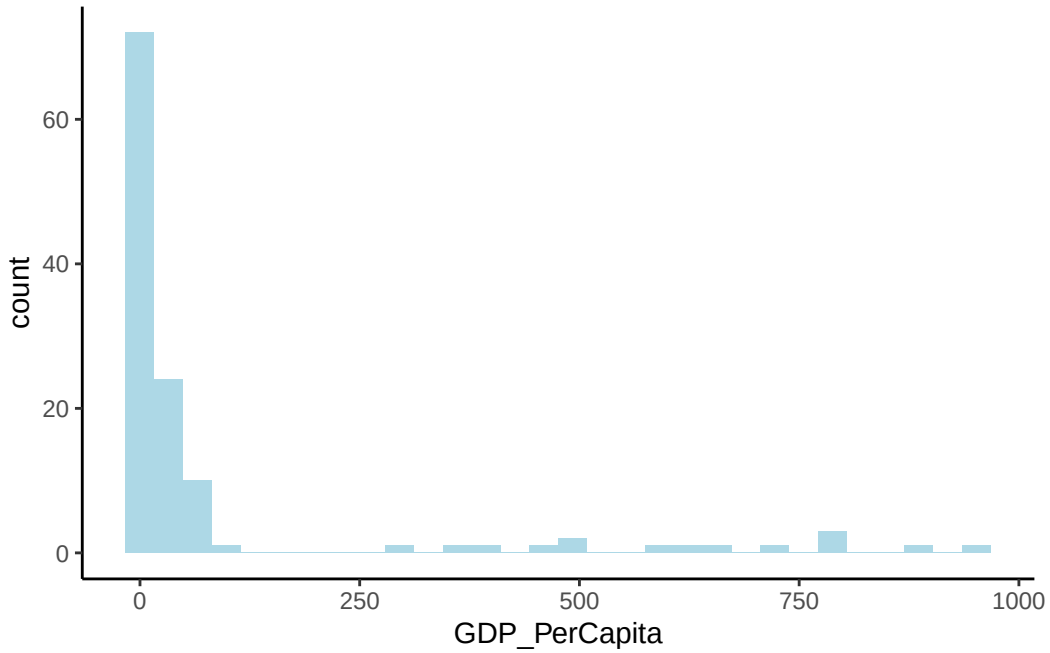


1k (USD) GDP Per Capita are standardized differently

```
ggplot(jointdataset, aes(GDP_PerCapita))+
  geom_histogram(fill = "lightblue") +
  theme_classic()
```

```
`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
Warning: Removed 76 rows containing non-finite values (`stat_bin()`).
```




```
  labs(x = "GDP Per Capita (Log Transformation)", y = "Count", title = "Histogram of GDP Per
```

```
$x
[1] "GDP Per Capita (Log Transformation)"

$y
[1] "Count"

$title
[1] "Histogram of GDP Per Capita"

attr(,"class")
[1] "labels"
```

Based on the above graphs, an error in addition to a linear transformation needs to take place to deal with the variable. There is an interesting thing occurring where a large portion of countries with a GDP per capita of greater than 250 have some of the lowest happiness scores. But they do not exceed a GDP of 1000: moreover, the current country with the lowest GDP per Capita is Zimbabwe at 1.029, thus, I am lead to the conclusion that there has been an error in the transformation of this variable and countries with a were not properly transformed to GDP per Capita in thousands.

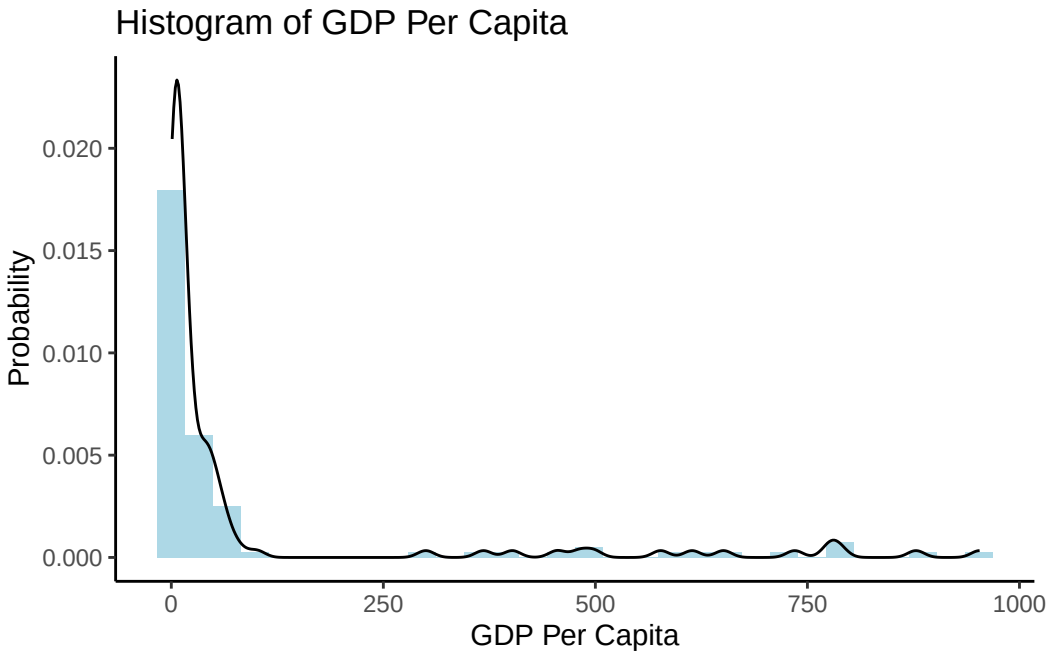
```r
ggplot(jointdataset, aes(GDP_PerCapita))+
  geom_histogram(aes(y = ..density..), fill = "lightblue") +
  theme_classic() +
  geom_density() +
  labs(x = "GDP Per Capita", y = "Probability", title = "Histogram of GDP Per Capita")
```

```
Warning: The dot-dot notation (`..density..`) was deprecated in ggplot2 3.4.0.
i Please use `after_stat(density)` instead.
```

```
`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
Warning: Removed 76 rows containing non-finite values (`stat_bin()`).
```

```
Warning: Removed 76 rows containing non-finite values (`stat_density()`).
```



Dataset Overview

Now by the str() function can learn more about the data structure of our table. Each sample in the data sets contains details on the country, beer_serving,wine_ serving and spirit_serving,

also total_litres_of_pure_alcohol. There are 193 observations and 5 varibales in our dataset df and there are 122 observation and 9 varibales in our dataset df1

Also "Head()" function which helps in Returns the first or last parts of a vector, matrix, table, data frame or function. Since head() and tail() are generic functions, they may also have been extended to other classes.

Also summary() The summary() function in R can be used to quickly summarize the values in a vector, data frame, regression model

```
str(df)
```

```
'data.frame':   193 obs. of  5 variables:
 $ country                     : chr  "Afghanistan" "Albania" "Algeria" "Andorra" ...
 $ beer_servings               : int  0 89 25 245 217 102 193 21 261 279 ...
 $ spirit_servings             : int  0 132 0 138 57 128 25 179 72 75 ...
 $ wine_servings               : int  0 54 14 312 45 45 221 11 212 191 ...
 $ total_litres_of_pure_alcohol: num  0 4.9 0.7 12.4 5.9 4.9 8.3 3.8 10.4 9.7 ...
```

```
summary(df)
```

```
  country          beer_servings   spirit_servings  wine_servings
 Length:193         Min.   :  0.0   Min.   :  0.00   Min.   :  0.00
 Class :character   1st Qu.: 20.0   1st Qu.:  4.00   1st Qu.:  1.00
 Mode  :character   Median : 76.0   Median : 56.00   Median :  8.00
                    Mean   :106.2   Mean   : 80.99   Mean   : 49.45
                    3rd Qu.:188.0   3rd Qu.:128.00   3rd Qu.: 59.00
                    Max.   :376.0   Max.   :438.00   Max.   :370.00
 total_litres_of_pure_alcohol
 Min.   : 0.000
 1st Qu.: 1.300
 Median : 4.200
 Mean   : 4.717
 3rd Qu.: 7.200
 Max.   :14.400
```

```
summary(df1)
```

```
  Country             Region           Hemisphere        HappinessScore
 Length:122         Length:122         Length:122         Min.   :3.069
```

```
Class :character   Class :character   Class :character   1st Qu.:4.528
Mode  :character   Mode  :character   Mode  :character   Median :5.542
                                                         Mean   :5.525
                                                         3rd Qu.:6.477
                                                         Max.   :7.526
     HDI        GDP_PerCapita     Beer_PerCapita   Spirit_PerCapita
Min.   :351.0   Min.   :  1.029   Min.   :  1.00   Min.   :  1.0
1st Qu.:663.8   1st Qu.:  4.134   1st Qu.: 38.25   1st Qu.: 25.5
Median :757.5   Median : 12.016   Median :125.50   Median : 82.5
Mean   :740.9   Mean   : 91.483   Mean   :137.57   Mean   : 96.6
3rd Qu.:861.5   3rd Qu.: 41.990   3rd Qu.:224.75   3rd Qu.:142.5
Max.   :951.0   Max.   :953.000   Max.   :376.00   Max.   :373.0
Wine_PerCapita
Min.   :  1.0
1st Qu.:  5.0
Median : 16.0
Mean   : 66.6
3rd Qu.:112.8
Max.   :370.0
```

```
summary(jointdataset)
```

```
  country          beer_servings   spirit_servings  wine_servings
Length:198         Min.   :  0.0   Min.   :  0.00   Min.   :  0.00
Class :character   1st Qu.: 20.0   1st Qu.:  4.00   1st Qu.:  1.00
Mode  :character   Median : 76.0   Median : 56.00   Median :  8.00
                   Mean   :106.2   Mean   : 80.99   Mean   : 49.45
                   3rd Qu.:188.0   3rd Qu.:128.00   3rd Qu.: 59.00
                   Max.   :376.0   Max.   :438.00   Max.   :370.00
                   NA's   :5       NA's   :5        NA's   :5
total_litres_of_pure_alcohol    Region           Hemisphere
Min.   : 0.000               Length:198         Length:198
1st Qu.: 1.300               Class :character   Class :character
Median : 4.200               Mode  :character   Mode  :character
Mean   : 4.717
3rd Qu.: 7.200
Max.   :14.400
NA's   :5
HappinessScore       HDI        GDP_PerCapita     Beer_PerCapita
Min.   :3.069   Min.   :351.0   Min.   :  1.029   Min.   :  1.00
1st Qu.:4.528   1st Qu.:663.8   1st Qu.:  4.134   1st Qu.: 38.25
```

```
 Median :5.542   Median :757.5   Median : 12.016   Median :125.50
 Mean   :5.525   Mean   :740.9   Mean   : 91.483   Mean   :137.57
 3rd Qu.:6.477   3rd Qu.:861.5   3rd Qu.: 41.990   3rd Qu.:224.75
 Max.   :7.526   Max.   :951.0   Max.   :953.000   Max.   :376.00
 NA's   :76      NA's   :76      NA's   :76        NA's   :76
 Spirit_PerCapita Wine_PerCapita
 Min.   :  1.0    Min.   :  1.0
 1st Qu.: 25.5    1st Qu.:  5.0
 Median : 82.5    Median : 16.0
 Mean   : 96.6    Mean   : 66.6
 3rd Qu.:142.5    3rd Qu.:112.8
 Max.   :373.0    Max.   :370.0
 NA's   :76       NA's   :76
```

```
str(df1)
```

```
'data.frame':   122 obs. of  9 variables:
 $ Country         : chr  "Denmark" "Switzerland" "Iceland" "Norway" ...
 $ Region          : chr  "Western Europe" "Western Europe" "Western Europe" "Western Europe"
 $ Hemisphere      : chr  "north" "north" "north" "north" ...
 $ HappinessScore  : num  7.53 7.51 7.5 7.5 7.41 ...
 $ HDI             : int  928 943 933 951 918 922 928 915 938 932 ...
 $ GDP_PerCapita   : num  53.6 79.9 60.5 70.9 43.4 ...
 $ Beer_PerCapita  : int  224 185 233 169 263 240 251 203 261 152 ...
 $ Spirit_PerCapita: int  81 100 61 71 133 122 88 79 72 60 ...
 $ Wine_PerCapita  : int  278 280 78 129 97 100 190 175 212 186 ...
```

```
str(jointdataset)
```

```
'data.frame':   198 obs. of  13 variables:
 $ country                     : chr  "Afghanistan" "Albania" "Algeria" "Andorra" ...
 $ beer_servings               : int  0 89 25 245 217 102 193 21 261 279 ...
 $ spirit_servings             : int  0 132 0 138 57 128 25 179 72 75 ...
 $ wine_servings               : int  0 54 14 312 45 45 221 11 212 191 ...
 $ total_litres_of_pure_alcohol: num  0 4.9 0.7 12.4 5.9 4.9 8.3 3.8 10.4 9.7 ...
 $ Region                      : chr  NA "Central and Eastern Europe" NA NA ...
 $ Hemisphere                  : chr  NA "north" NA NA ...
 $ HappinessScore              : num  NA 4.66 NA NA 3.87 ...
 $ HDI                         : int  NA 782 NA NA 577 NA 822 749 938 906 ...
 $ GDP_PerCapita               : num  NA 4.13 NA NA 3.31 ...
```

```
 $ Beer_PerCapita              : int  NA 89 NA NA 217 NA 193 21 261 279 ...
 $ Spirit_PerCapita            : int  NA 132 NA NA 57 NA 25 179 72 75 ...
 $ Wine_PerCapita              : int  NA 54 NA NA 45 NA 221 11 212 191 ...
```

```
## using Str function for my jointdataset

str(jointdataset)
```

```
'data.frame':   198 obs. of  13 variables:
 $ country                     : chr  "Afghanistan" "Albania" "Algeria" "Andorra" ...
 $ beer_servings               : int  0 89 25 245 217 102 193 21 261 279 ...
 $ spirit_servings             : int  0 132 0 138 57 128 25 179 72 75 ...
 $ wine_servings               : int  0 54 14 312 45 45 221 11 212 191 ...
 $ total_litres_of_pure_alcohol: num  0 4.9 0.7 12.4 5.9 4.9 8.3 3.8 10.4 9.7 ...
 $ Region                      : chr  NA "Central and Eastern Europe" NA NA ...
 $ Hemisphere                  : chr  NA "north" NA NA ...
 $ HappinessScore              : num  NA 4.66 NA NA 3.87 ...
 $ HDI                         : int  NA 782 NA NA 577 NA 822 749 938 906 ...
 $ GDP_PerCapita               : num  NA 4.13 NA NA 3.31 ...
 $ Beer_PerCapita              : int  NA 89 NA NA 217 NA 193 21 261 279 ...
 $ Spirit_PerCapita            : int  NA 132 NA NA 57 NA 25 179 72 75 ...
 $ Wine_PerCapita              : int  NA 54 NA NA 45 NA 221 11 212 191 ...
```

```
## using Head Function for My Jointdataset

head(jointdataset)
```

```
           country beer_servings spirit_servings wine_servings
1      Afghanistan             0               0             0
2          Albania            89             132            54
3          Algeria            25               0            14
4          Andorra           245             138           312
5           Angola           217              57            45
6 Antigua & Barbuda           102             128            45
  total_litres_of_pure_alcohol                     Region Hemisphere
1                          0.0                       <NA>       <NA>
2                          4.9 Central and Eastern Europe      north
3                          0.7                       <NA>       <NA>
4                         12.4                       <NA>       <NA>
5                          5.9        Sub-Saharan Africa      south
```

```
6                          4.9                         <NA>       <NA>
  HappinessScore HDI GDP_PerCapita Beer_PerCapita Spirit_PerCapita
1             NA  NA            NA              NA                NA
2          4.655 782         4.132              89               132
3             NA  NA            NA              NA                NA
4             NA  NA            NA              NA                NA
5          3.866 577         3.309             217                57
6             NA  NA            NA              NA                NA
  Wine_PerCapita
1             NA
2             54
3             NA
4             NA
5             45
6             NA
```

```r
## side of the data

dim(df1)
```

```
[1] 122   9
```

```r
## R classification of data

class(df1$HappinessScore)
```

```
[1] "numeric"
```

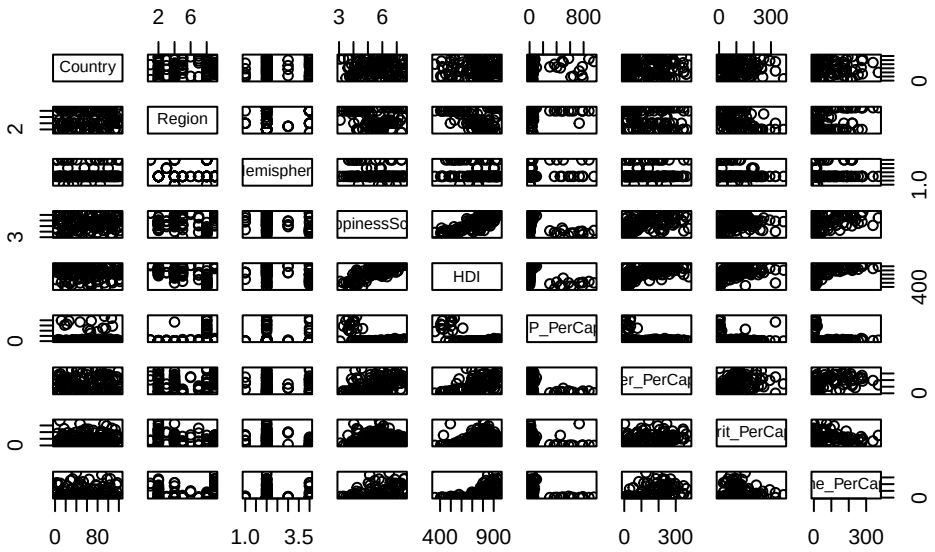
```r
## This varibale is Numberic

class(df1$GDP_PerCapita)
```

```
[1] "numeric"
```

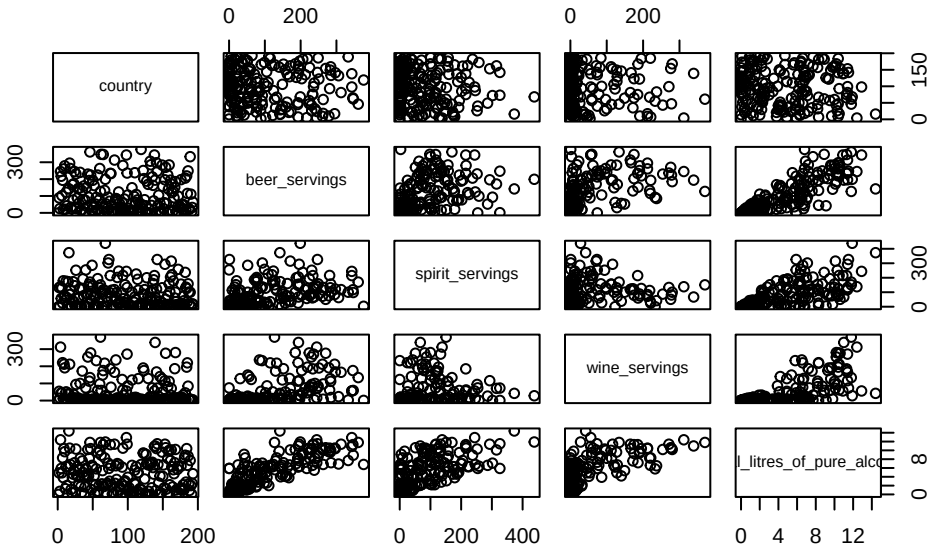
```r
## This Data is Integer

class(df1$Beer_PerCapita)
```

```
[1] "integer"
```

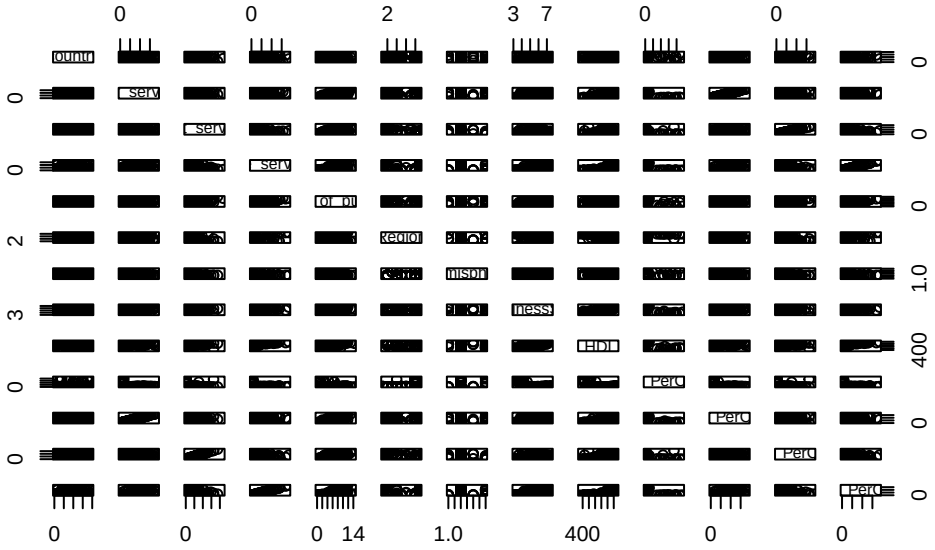
```
## Look for any notable trends between all pairs of variables

plot(df1)
```




```
plot(df)
```




```
plot(jointdataset)
```



Learning and Growth Through the Project Process (Khushboo and Umesh)

In this section, we will describe the obstacles that we were able to overcome and those that we were unable to overcome, which will be discussed in the next chapter. At the beginning of this project, we had little to no knowledge of machine learning or R programming. Being from a non-scientific background, it was challenging for us to progress in this project. However, with the help of our professor, Mr. Huber, we were able to make significant progress.

Also As we have done project in a group, this report is the effort of both of us, which also helped us to be a good team member, where we both have tried to overcome some obstacles together, which i have mention below.

One of our first obstacles was choosing the right dataset, which was a difficult task as our first choice did not have enough variables. We had to search for a similar dataset that was more relevant to our project. Another challenge we faced was adding Google images to our R Markdown. The code we used initially did not work, so we had to search for a different code on Github, which eventually worked for us.

A significant obstacle we encountered was trying to knit our RMD file to PDF, which we were unable to do. We reached out to Mr. Huber for help and spent about three hours trying different solutions such as uninstalling and reinstalling Rstudio and Tinytex, updating our computer, but to no avail. However, Mr. Huber provided us with an alternative solution, which was to use "Quarto Document" for our PDF file.

Another issue we faced was the basic word count code not working, but Mr. Huber gave us a new code that worked for our Windows 11. The night before submitting our project, we encountered another problem with knitting our file to PDF in Quarto. As Mr. Huber was on a business trip, we contacted him for help and he suggested that we copy and paste our work one by one to find the problem, which we eventually did and solved.

Overall, this experience was like a roller coaster ride, but we are happy and grateful for the progress we made with the help of Mr. Huber.

Remaining Challenges, Problems, and Weaknesses

- Limited data size, Our dataset is relatively small, which can limit the accuracy of our analysis and predictions.
- Complexity of the model,Our current model is complex and can be difficult to interpret, which may limit its practical applications.
- Liner Regression,We tried to do coding for liner Regression, but we were getting error, and We didn't have much time, we didnt do liner Regression.

- word Count, our word count coding was not working for quarto, but its working for RMD file, so we couldnot do the word count coding for PDF.
- As We are still new to R programming, we couldnot do much of the coding in our project, but we did tried doing the coding, but for lot of them, it was coming error.
- Incomplete documentation, The documentation for our project is still incomplete, making it difficult for others to understand our methodology and results.
- As we used different datasets and merged them, when we merged it, some of the value were lost and it was coming as NA.
- We also wrote the Reference normally, We couldn't use the application jabfef.
- Also In this Quarto, The date which is appearing is wrong, in our coding we wrote 13/02/2023, but it is showing as 1/2/2024.

These challenges have the potential to impact the accuracy of our analysis and predictions, limit the practical applications of our model, and make it difficult for others to understand and use our work.

To address the limited data issue, we plan to gather additional data in the future to improve the robustness of our analysis and predictions. To address the complexity of the model, we plan to simplify the model and make it more interpretable. To address the incomplete documentation, we plan to complete the documentation for our project and make it more user-friendly.

We believe that addressing these challenges will be crucial for the success of our project and will improve the overall quality of our work later. Also if we would have more time then, we could have done everything, in a more better way.

How we Would Suggest Proceeding with Our Work If We Had More Time and Resources

If we have more time and resources we would have tried to do coding more acurtally, and would also have done liner regression,would have found solution for word count coding for Our Quarto File. Additionally, we would have performed more in-depth exploratory data analysis, as well as visualizing the data in a way that would be most meaningful. This would have helped us gain deeper insights into the data and understand the relationships between the different variables. Moreover, we could have expanded our work to include more data sources or consider alternative methods of processing the data to extract more relevant information. Finally, we would have also focused on improving the efficiency and scalability of our solution, as well as the user experience and the overall presentation of the results. This could have involved using more complex coding to handle large amounts of data, as well as creating more intuitive and interactive visualizations.

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