

Can Money Buy Happiness?

PSY6422 Project



Background

The World Happiness Report has reviewed the state of happiness across the world since 2011. The report makes use of life evaluations from Gallup World Poll data which provide the basis of the happiness rankings. Life evaluation questions are assessed using the Cantril ladder which asks respondents to think of a ladder, where 10 is the best possible life and 0 is the worst possible life. Six variables are used to explain the variation of happiness levels across the countries. These include, GDP per capita, social support, life expectancy, freedom, generosity, and corruption.

What Makes Us Happy?

The common expression 'money can't buy happiness' has been around for centuries and is a widely accepted notion, but is this true? What if you are living paycheck to paycheck? In this case, winning the lottery would relieve stress and inevitably increase happiness. So, does this imply that this statement is wrong?

This project aims to visualise global happiness ratings, as well as, average national income per capita to assess if there is a relationship between the two variables.

Research Questions

Aims of this data visualisation:

1. Which countries are the happiest and the least happy?
2. How has happiness changed over the last 10 years?
3. Which countries are the richest and the poorest based on average national income per capita?
4. Is there a relationship between average income and overall happiness?

Data Origins

Happiness data sourced from [World Happiness Report](#) (Accessed on: 01-03-2023)

Average national income sourced from [The United Nations Development Programme](#) (Accessed on: 01-03-2023)

Average income data was sourced from the human development index. Gross National Income (GNI) per capita is one measurement of the human development index, a summary measurement of three key dimensions of human development including healthy life, education and standard of living.

Data Preparation

Loading Packages and Fonts

```
#-----LOADING PACKAGES-----  
#install.packages(readxl)  
#install.packages("countrycode")  
#install.packages("scales")  
#install.packages("ggiraph")  
#install.packages("Hmisc")  
#install.packages("kableExtra")  
#install.packages("extrafont")  
library(readxl) #Read excel file  
library(tidyverse) #Transform and better present data  
library(dplyr) #Makes data manipulation easier  
library(ggplot2) #Create plots from a data frame  
library(extrafont) #Fonts used for ggplot  
library(here) #Finds projects file based on current working directory  
library(maps) #Source of geospatial data  
library(stringr) #Used for wrapping legend titles  
library(gganimate) #Used to create animated GIF  
library(gifski) #Used to create animated GIF  
library(countrycode) #Converts country names into continent  
library(scales) #Used to add dollar sign to labels  
library(ggiraph) #Used to create interactive scatterplot with hover text  
library(Hmisc) #Used to add labels to variables  
library(tibble) #Extract labels from data frame and add into new column  
library(kableExtra) #Formatting table for PDF output  
  
#Loading fonts  
font_import()  
loadfonts(device = "win", quiet = TRUE)
```

Loading Happiness Data

```
#-----LOADING THE DATA-----  
#Loading happiness data  
Happiness <- read_xls(here("Data", "WorldHappinessReport.xls"))  
  
#Show first few rows of raw data  
head(Happiness)  
  
## # A tibble: 6 x 12  
##   Countr~1 year Life ~2 Log G~3 Socia~4 Healt~5 Freed~6 Gener~7 Perce~8 Posit~9  
##   <chr>      <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 Afghani~ 2008 3.72 7.30 0.451 50.5 0.718 0.173 0.882 0.414  
## 2 Afghani~ 2009 4.40 7.47 0.552 50.8 0.679 0.195 0.850 0.481  
## 3 Afghani~ 2010 4.76 7.58 0.539 51.1 0.600 0.126 0.707 0.517  
## 4 Afghani~ 2011 3.83 7.55 0.521 51.4 0.496 0.168 0.731 0.480  
## 5 Afghani~ 2012 3.78 7.64 0.521 51.7 0.531 0.241 0.776 0.614  
## 6 Afghani~ 2013 3.57 7.66 0.484 52 0.578 0.0663 0.823 0.547  
## # ... with 2 more variables: 'Negative affect' <dbl>,  
## # 'Confidence in national government' <dbl>, and abbreviated variable names  
## # 1: 'Country name', 2: 'Life Ladder', 3: 'Log GDP per capita',  
## # 4: 'Social support', 5: 'Healthy life expectancy at birth',  
## # 6: 'Freedom to make life choices', 7: 'Generosity',  
## # 8: 'Perceptions of corruption', 9: 'Positive affect'
```

Data Wrangling

The data set includes several variables which contribute to the overall measurement of well-being, but for this visualisation the main focus will be the overall life ladder score and the relationship between average national income per capita provided by another data set. Therefore, the variables selected are country, year and life ladder.

The data was filtered to 2011-2021 to focus on 10 years of happiness ratings. This filtered out many missing data points as more countries joined the World Happiness Report in subsequent years.

```
#-----DATA WRANGLING-----  
#Selecting and renaming the variables  
HappinessReport <- Happiness %>%  
  select('Country name', year, 'Life Ladder') %>%  
  rename(Country = 'Country name', Year = year,  
         Happiness_Score = 'Life Ladder')  
  
#Creating data frame  
HappinessReport = as.data.frame(HappinessReport)  
  
#Filtering years to 2011-2021  
HappinessReport <- HappinessReport[HappinessReport$Year >= "2011" &  
                                     HappinessReport$Year <= "2021",]  
  
#Show first few rows of processed data  
head(HappinessReport)
```

```
##      Country Year Happiness_Score
## 4 Afghanistan 2011      3.831719
## 5 Afghanistan 2012      3.782938
## 6 Afghanistan 2013      3.572100
## 7 Afghanistan 2014      3.130896
## 8 Afghanistan 2015      3.982855
## 9 Afghanistan 2016      4.220169
```

Codebook

Variable_ID	Type	Description
Country	character	Country of the happiness rating
Year	numeric	Year that the happiness score was recorded
Happiness_Score	numeric	Happiness score based on the Cantril ladder scale, measuring well being as a continuum where 10 is the best possible life, and 0 is the worst possible life

Visualisation 1: Happiest and Least Happy Countries on Average Between 2011-2021

For the first visualisation, the average happiness score was calculated for each country to identify which countries are the happiest and the least happy between 2011-2021.

```
#-----SUMMARY STATISTICS-----
#Finding average happiness score of each country
Average <- HappinessReport %>%
  group_by(Country) %>%
    #Specify happiness score as column for summary statistics
    summarise_at(vars(Happiness_Score),
    #Specify summary statistics as computing mean
    list(Happiness_Score = mean))
```

Creating a Bar Chart of The Top 10 Happiest Countries on Average

```
#Select top 10 happiest countries on average
Top10 <- Average %>%
  #Arrange happiness score in descending order
  arrange(desc(Happiness_Score)) %>%
  #Select the first 10 data points
  slice(1:10) %>%
  #Rearranging happiness score so highest score is plotted first
  arrange(Happiness_Score) %>%
  #Mutate country column to display correct order
  mutate(Country = factor(Country, levels = Country))

#Plot top 10 happiest countries
#Add mappings to ggplot
p_top10 <- ggplot(Top10, aes(Country, Happiness_Score, fill = Happiness_Score))

p_top10 <- p_top10 +      #Add geom layer to ggplot
```

```

geom_col() +          #Plot x and y as a bar chart
coord_flip() +        #Making the bars horizontal
#Fill bars based on happiness score
scale_fill_gradient2(low = "#FFF9C4", high = "#FFEB3B", mid = "#FFF176",
midpoint = median(Top10$Happiness_Score)) +
geom_text(aes(label = round(Happiness_Score, 3)), #Add score on bar
          nudge_y = -.55, color = "black") +
#Add labels
labs(title = "Top 10 Happiest Countries on Average Between 2011-2021",
      subtitle = "0 = Worst Possible Life, 10 = Best Possible Life",
      y = "Average Happiness Score",
      caption = "Source: World Happiness Report, Gallup World Poll") +
theme_bw() + #Setting plot theme
theme(text = element_text(family = "Arial"), #change font
      plot.title = element_text(face = "bold"), #bold title
      plot.title.position = "plot", #move title
      panel.border = element_blank(), #remove background
      legend.position="none") #remove legend

#Saving the plot
ggsave(here("Figures", "Top 10 Happiest Countries.png"), plot = p_top10)

```

Creating a Bar Chart of The Top 10 Least Happy Countries on Average

```

#Finding top 10 least happy countries
Least10 <- Average %>%
  #Arrange happiness score in ascending order
  arrange(Happiness_Score) %>%
  #Select the first 10 data points
  slice(1:10) %>%
  #Rearranging scores so they are plotted from lowest to highest
  arrange(desc(Happiness_Score)) %>%
  #Mutate country column to display correct order
  mutate(Country = factor(Country, levels = Country))

#Plotting top 10 least happy countries
#Add mappings to ggplot
p_least10 <- ggplot(Least10, aes(Country, Happiness_Score, fill = Happiness_Score))

p_least10 <- p_least10 + #Add geom layer to ggplot
  geom_col() + #Plot x and y as bar chart
  coord_flip() + #Making the bars horizontal
  ylim(0, 8) + #Set y axis scale to match top 10 happiest countries
  #Fill bars based on happiness score
  scale_fill_gradient2(low = "#0D47A1", high = "#BBDEFB", mid = "#2196F3",
midpoint = median(Least10$Happiness_Score)) +
  geom_text(aes(label = round(Happiness_Score, 3)),
            nudge_y = -.55, color = "black") + #Add score on bar
  #Add labels
  labs(title = "Top 10 Least Happy Countries on Average Between 2011-2021",
      subtitle = "0 = Worst Possible Life, 10 = Best Possible Life",
      y = "Average Happiness Score",

```

```
caption = "Source: World Happiness Report, Gallup World Poll") +
theme_bw() + #Set plot theme
theme(text = element_text(family = "Arial"), #change font
plot.title = element_text(face = "bold"), #bold title
plot.title.position = "plot", #move title
panel.border = element_blank(), #remove background
legend.position="none") #remove legend
```

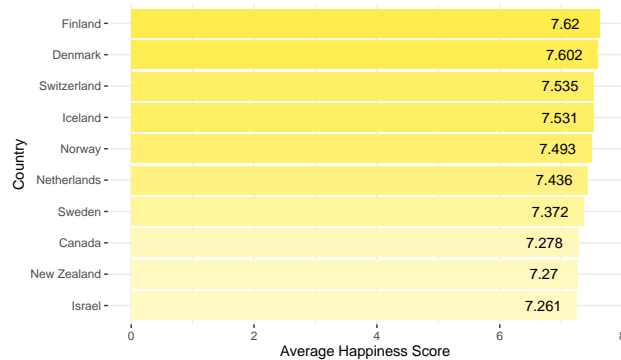
#Saving the plot

```
ggsave(here("Figures", "Top 10 Least Happy Countries.png"), plot = p_least10)
```

#The following was included in the rMarkdown code block to plot each graph side by side
#{r, echo=FALSE, fig.show="hold", out.width="50%"}

Top 10 Happiest Countries on Average Between 2011–2021

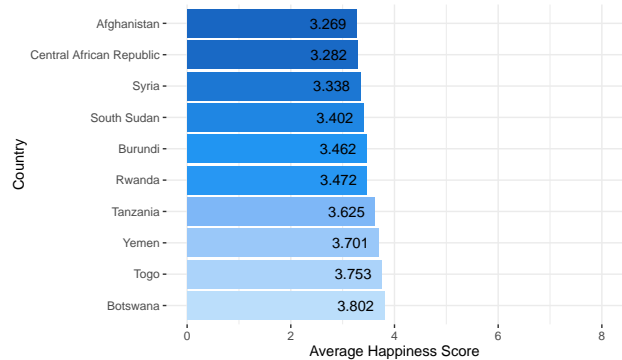
0 = Worst Possible Life, 10 = Best Possible Life



Source: World Happiness Report, Gallup World Poll

Top 10 Least Happy Countries on Average Between 2011–2021

0 = Worst Possible Life, 10 = Best Possible Life



Source: World Happiness Report, Gallup World Poll

Aim 1 = Which countries are the happiest and the least happy?

This visualisation shows that 7 out of the top 10 happiest countries are located in Europe whereas, 7 out of the top 10 least happy countries are located in Africa, with roughly half the happiness scores of those located in Europe. This already sheds light over the causes of the difference in happiness scores. With Africa being the poorest continent in the world, this could imply a relationship between money and happiness, reinforcing the motivation for this data visualisation.

Visualisation 2: Choropleth Map of World Happiness 2011-2021

The second visualisation focuses on how happiness ratings have changed over time during the 10 year period.

There were several missing data points for various countries, but the decision was made not to create averages for these missing points. It was likely that the data was unable to be collected either due to war or natural disaster etc. and therefore, creating an average of surrounding data points for the missing point would not be a true reflection of the happiness score for that year. Consequently, these points have been left blank and show up as grey on the map.

Loading The World Map

```
#-----PLOTING WORLD MAP-----
#Loading world map
world_map <- map_data("world")
```

```

#Remove Antarctica
world_map <- subset(world_map, region != "Antarctica")

#Recoding country names to match data
HappinessReport$Country <- recode(HappinessReport$Country,
                                   'United States' = 'USA',
                                   'United Kingdom' = 'UK')

```

Plotting the Choropleth Map

```

#-----PLOTING CHOROPLETH MAP-----
#Wrapping legend title for plotted map
name <- c("Average Happiness Score")
name <- str_wrap(name, width = 5)

#List containing each year to be used in the title of each map
Year <- list("2011", "2012", "2013", "2014", "2015", "2016",
             "2017", "2018", "2019", "2020", "2021")

#For loop to create choropleth map for each year
my_plots = list()
for(i in 1:11) {

  #Year index starting from 2011 and increasing to 2021
  Year1 = 2010 + i

  #Selecting specific data using the index
  HappinessYear <- filter(HappinessReport, Year == Year1)

  #Joining country in happiness data to region in world map data
  World_Map_Joined <- left_join(world_map, HappinessYear, by = c('region' = 'Country'))

  #Creating the choropleth plot
  p <- ggplot(World_Map_Joined, aes(long, lat)) + #Adding mappings to ggplot
    geom_map(dat = world_map, map = world_map, #Plotting countries on map
    #Filling in the countries
    aes(map_id = region), fill = "white", color = 'grey', linewidth = 0.25) +
    labs(title = sprintf("World Happiness Report: %s", Year[i]), #Adding labels
    subtitle = "Life Evaluation based on Cantril Ladder where 0 = Worst Possible Life,
    10 = Best Possible Life",
    caption = "Source: World Happiness Report, Gallup World Poll") +
    theme(text = element_text(family = "Arial"),
          plot.title = element_text(face = "bold"),
          axis.title = element_blank(), #Removing x and y labels
          axis.text.x = element_blank(),
          axis.text.y = element_blank())

  #Plotting happiness scores onto the map
  p_out <- p + geom_map(map = World_Map_Joined, aes(map_id = region,
    fill = Happiness_Score), linewidth = 0.25) +
    #Filling countries based on happiness score

```



```

    scale_fill_gradient2(low = "#0D47A1", high = "#FFEB3B", mid = "#BBDEFB",
                        midpoint = 5, name = name, limits = c(2, 8)) +
    coord_fixed(1.5) #Fixing aspect ratio

print(p_out)

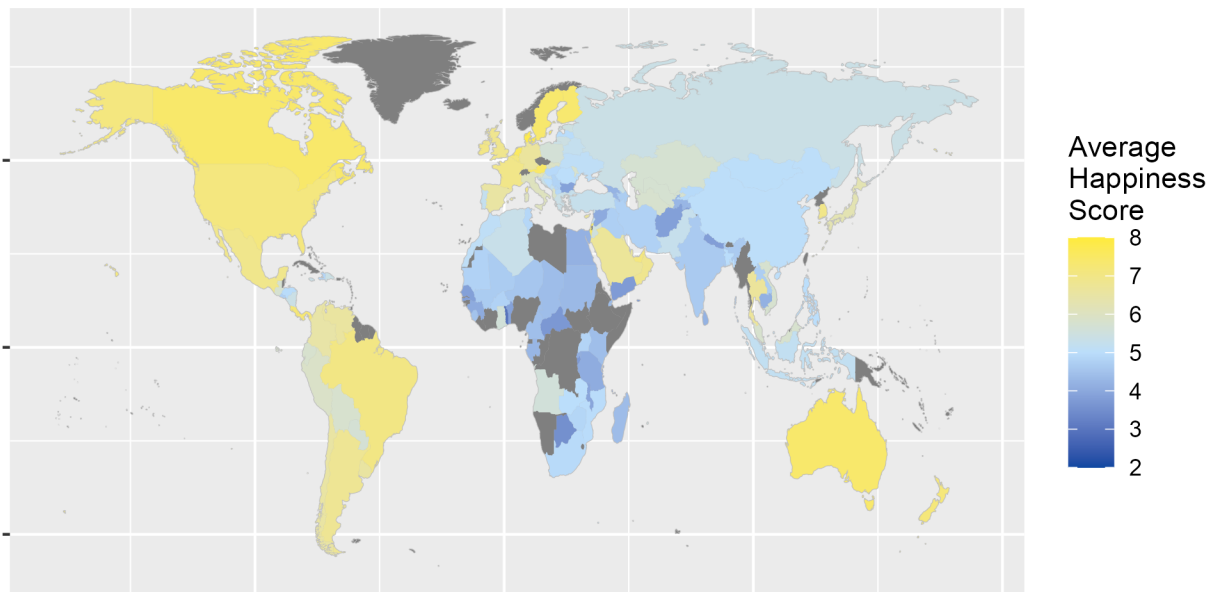
#Saving each plot
ggsave(here("Figures", file=paste0("plot_", 2010 + i, ".png")))
}

```

One of the plots generated by the for loop has been included in this document however, the visualisation has been animated into a GIF which can be seen on my GitHub pages.

World Happiness Report: 2011

Life Evaluation based on Cantril Ladder where 0 = Worst Possible Life,
10 = Best Possible Life



Source: World Happiness Report, Gallup World Poll

Aim 2 = How has happiness changed over the last 10 years?

The use of the gradient colour scale ranging from blue (representing sadness) to yellow (representing happiness), shows the substantial variation in happiness ratings across the world. The choropleth map shows that North America, Oceania and Europe have had consistently high happiness ratings over the last 10 years. However, the brightness of the yellow decreases throughout the years suggesting happiness has decreased over the 10 years. In contrast, there is a lot of inconsistency in scores for countries located in Africa and Asia, made visible by the blue colours as well as the frequent changes in colour.

Visualisation 3: Top 10 Richest and Poorest Countries on Average in 2021

Next, the average national income per capita data is loaded to visualise the relationship with happiness ratings.

Loading Average Income Data

```
#-----LOADING AVERAGE INCOME DATA-----
#Loading the data
Average_Income <- read.csv(here("Data", "HumanDevelopmentReport.csv"))

#Showing first few rows of raw data
head(Average_Income)
```

```
##      Back Table.1..Human.Development.Index.and.its.components
## 1
## 2
## 3
## 4
## 5 HDI rank                      Country
## 6
##      X X.1                      X.2 X.3
## 1                      NA
## 2                      NA      SDG3
## 3                      NA
## 4 Human Development Index (HDI)  NA Life expectancy at birth
## 5                      Value NA      (years)
## 6                      2021 NA      2021
##      X.4 X.5                      X.6 X.7
## 1
## 2                      SDG4.3                      SDG4.4
## 3
## 4 Expected years of schooling      Mean years of schooling
## 5                      (years)                      (years)
## 6                      2021 a                      2021 a
##      X.8 X.9                      X.10
## 1
## 2                      SDG8.5
## 3
## 4 Gross national income (GNI) per capita      GNI per capita rank minus HDI rank
## 5                      (2017 PPP $)
## 6                      2021
## X.11      X.12 X.13 X.14 X.15 X.16 X.17 X.18 X.19 X.20 X.21 X.22 X.23 X.24
## 1                      NA NA NA NA NA NA NA NA NA NA NA NA NA NA
## 2                      NA NA NA NA NA NA NA NA NA NA NA NA NA NA
## 3                      NA NA NA NA NA NA NA NA NA NA NA NA NA NA
## 4      HDI rank      NA NA NA NA NA NA NA NA NA NA NA NA NA NA
## 5                      NA NA NA NA NA NA NA NA NA NA NA NA NA NA
## 6      b      2020      NA NA NA NA NA NA NA NA NA NA NA NA NA NA
```

Data Wrangling

```
#-----DATA WRANGLING-----
#Removing unwanted data
Average_Income <- Average_Income %>%
  filter(!row_number() %in% c(1:7, 202:276)) %>% #Remove unwanted data
```

```

select(Table.1..Human.Development.Index.and.its.components, X.8) %>%
rename(Country = Table.1..Human.Development.Index.and.its.components,
Average.Income = X.8) %>% #Renaming long variable
mutate_all(na_if, "") %>% #Entering NA for missing data
na.omit() #Removing rows containing NA

#Remove comma in average income to make class numeric
Average_Income$Average.Income <- as.numeric(gsub(",", "", Average_Income$Average.Income))

#Selecting data from 2021 in happiness report
Happiness2021 <- HappinessReport %>%
  filter(Year == "2021") %>%
  na.omit()

#Joining the happiness data in 2021 to average income data so only countries that also
#have a happiness rating are plotted
Joined_Data <- left_join(Happiness2021, Average_Income, by = "Country") %>%
  select(Country, Happiness_Score, Average.Income) %>%
  na.omit()

#Show first few rows of processed data
head(Joined_Data)

```

```

##      Country Happiness_Score Average.Income
## 1 Afghanistan      2.436034         1824
## 2   Albania      5.255482         14131
## 3   Algeria      5.217018         10800
## 4  Argentina      5.908279         20925
## 5   Armenia      5.300569         13158
## 6  Australia      7.111599         49238

```

Codebook

Variable_ID	Type	Description
Country	character	Country of the average income
Average.Income	numeric	Gross National Income (GNI) per capita, measured in American dollars (\$). Each income has been corrected using purchasing power parity to adjust for the differences in cost of living between countries

Plotting Top 10 Richest Countries on Average in 2021

```

#-----PLOTING RICHEST COUNTRIES-----
#Selecting countries with highest incomes
MostRich <- Joined_Data %>%
  #Arrange data in descending order
  arrange(desc(Average.Income)) %>%
  #Select first 10 data points
  slice(1:10) %>%
  #Mutate country column to display correct order
  mutate(Country = factor(Country, levels = Country))

```

```

#Plotting top 10 richest countries
#Addings mappings to ggplot
p_rich <- ggplot(MostRich, aes(x = reorder(Country, Average.Income) , y = Average.Income))

p_rich <- p_rich + #Adding geom layer to ggplot
  geom_col(aes(fill=Average.Income)) + #Plotting x and y as bar chart
  coord_flip() + #Making bars horizontal
  #Filling bars based on average income
  scale_fill_gradient2(low = "#FFF9C4", high = "#FFEB3B", mid = "#FFF176",
    midpoint = median(MostRich$Average.Income)) +
  geom_text(aes(label = dollar(Average.Income)), hjust = 1, nudge_y = -0.35,
    color = "black") + #Adding income on top of bar
  labs(title = "Top 10 Richest Countries based on average income per capita ($)"
    in 2021", #Adding labels
    x= "Country", y = "Average Income Per Capita ($)",
    caption = "Source: United Nations Development Programme") +
  theme_bw() + #Setting plot theme
  theme(text = element_text(family = "Arial"),
    plot.title = element_text(face = "bold"),
    plot.title.position = "plot",
    panel.border = element_blank(),
    legend.position="none")

#Saving the plot
ggsave(here("Figures", "Top 10 Richest Countries.png"), plot = p_rich)

```

Plotting Top 10 Poorest Countries on Average in 2021

```

#-----PLOTING POOREST COUNTRIES-----
#Arranging data in ascending order and selecting first 10
MostPoor <- Joined_Data %>%
  arrange(Average.Income) %>%
  slice(1:10) %>%
  arrange(desc(Average.Income)) %>%
  #Mutate country column to display correct order
  mutate(Country = factor(Country, levels = Country))

#Plotting top 10 poorest countries
#Adding mappings to ggplot
p_poor <- ggplot(MostPoor, aes(x = Country, y = Average.Income))

p_poor <- p_poor +
  geom_col(aes(fill=Average.Income)) +
  coord_flip() +
  scale_fill_gradient2(low = "#0D47A1", high = "#BBDEFB", mid = "#2196F3",
    midpoint = median(MostPoor$Average.Income)) +
  #Adding income next to bar
  geom_text(aes(label = dollar(Average.Income)), hjust = -0.5, color = "black") +
  ylim(0, 90000) + #Setting scale to match top 10 rich countries bar chart
  labs(title = "Top 10 Poorest Countries based on average income per capita ($)"
    in 2021",
    x= "Country", y = "Average Income Per Capita ($)",
    caption = "Source: United Nations Development Programme") +

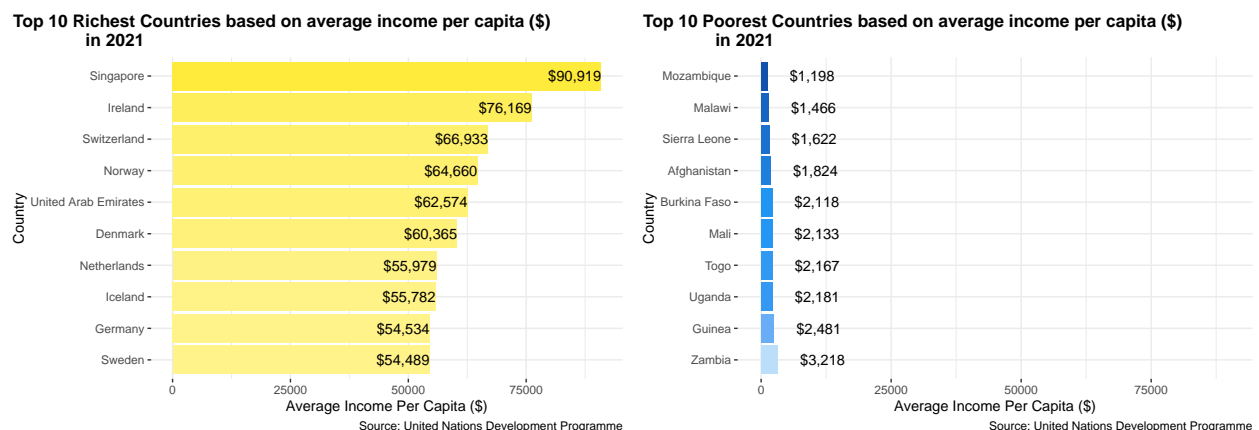
```

```
theme_bw() +
theme(text = element_text(family = "Arial"),
      plot.title = element_text(face = "bold"),
      plot.title.position = "plot",
      panel.border = element_blank(),
      legend.position="none")
```

#Saving the plot

```
ggsave(here("Figures", "Top 10 Poorest Countries.png"), plot = p_poor)
```

#The following was included in the rMarkdown code block to plot each graph side by side
#{r, echo=FALSE, figures-side, fig.show="hold", out.width="50%"}



Aim 3 = Which countries are the richest and the poorest based on average national income per capita?

The decision was made to make the scale the same for both graphs to show the dramatic difference in average income between the top 10 richest countries and the top 10 poorest countries. This graph again shows that 8 out of the top 10 richest countries are located in Europe, whilst 9 out of the top 10 poorest countries are located in Africa. This is very similar to the happiness rating graphs and therefore, further indicates a potential relationship between the two variables. By matching the axis scales on both graphs, this visualisation shows the striking difference in average income between the richest and poorest countries.

Visualisation 4: The Relationship Between Average Income and Happiness Score

The previous visualisations point towards a potential relationship between average income and happiness score. Therefore, the last visualisation includes a scatterplot of the two variables to help identify if there is a relationship between them.

Creating Scatterplot of Average Income Against Happiness Score

```
#Adding column with continent to display colour coded points on the scatterplot
Joined_Data$continent <- countrycode(sourcevar = Joined_Data$Country,
                                     origin = "country.name",
                                     destination = "continent")
```

```
#Creating tooltip column for hover text
```

```

Joined_Data <- Joined_Data %>%
  mutate(tooltip_text = paste0(Country, "\n",
                                "Happiness Score: ", round(Happiness_Score, 3), "\n",
                                "Average Income: ", dollar(Average.Income)))

#Creating scatterplot - ggiraph package is used to make scatterplot interactive -
#when mouse hovers over points on the plot, country name, happiness score and
#average income will be visible
p_both <- ggplot(Joined_Data, aes(Average.Income, Happiness_Score)) +
  scale_colour_manual(values=c("#FFCC00", "red", "#339000", "black", "#3999FF")) +
  geom_point_interactive(aes(col = continent, #Make scatterplot with hover text
                             tooltip = tooltip_text)) +
  geom_smooth(method="lm", formula= y ~ log(x), se = FALSE, color = "black",
              size = 0.5) + #Add logarithmic regression line

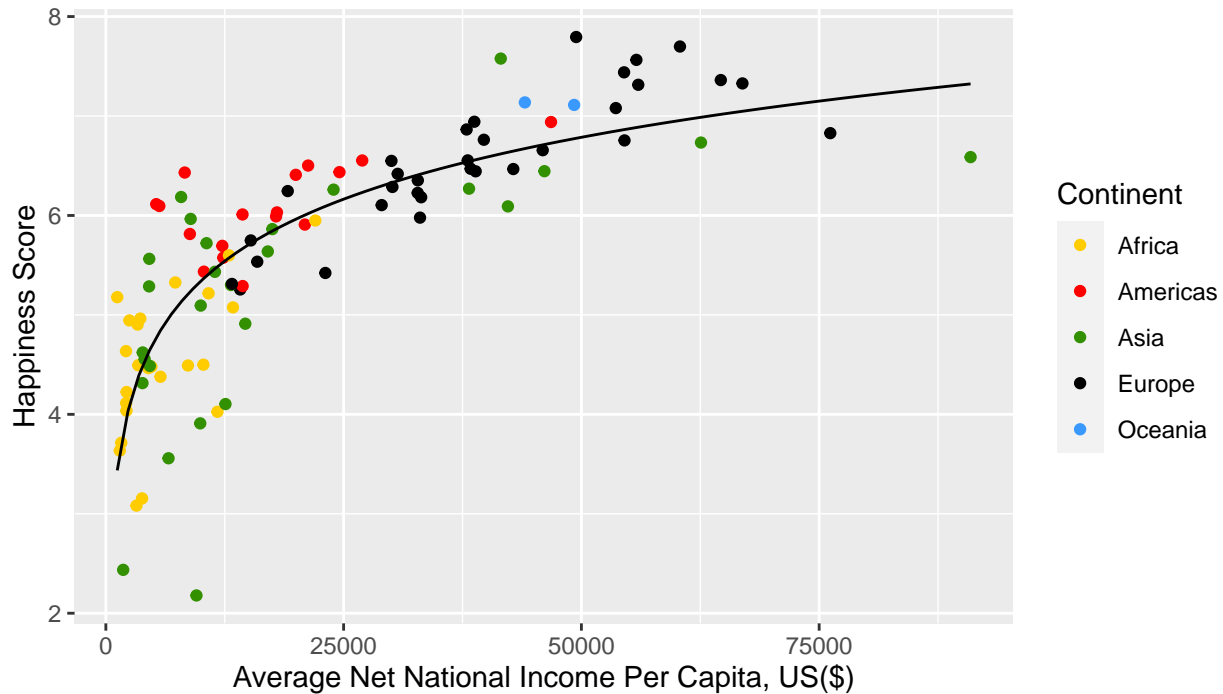
#Add labels
labs(title = "The Relationship Between Average Income and Happiness Score",
      subtitle = "Data from 104 countries in 2021",
      x = "Average Net National Income Per Capita, US($)",
      y = "Happiness Score",
      caption = "Source: World Happiness Report,
                United Nations Development Programme",
      color = "Continent") +
  theme(text = element_text(family = "Arial"),
        plot.title = element_text(face = "bold"), #Make title bold
        plot.title.position = "plot") #Move title position

#Saving the plot
ggsave(here("Figures", "Average Income and Happiness Score.png"), plot = p_both)

```

The Relationship Between Average Income and Happiness Score

Data from 104 countries in 2021



Source: World Happiness Report,
United Nations Development Programme

The scatterplot above has been included without the interactive element to support the pdf format. The `girafe()` function has been used in the html link to create an interactive plot which provides information of each point when the mouse is hovered over it. This version of the scatterplot can be seen on my GitHub pages.

Aim 4 = Is there a relationship between average income and overall happiness?

Using the Olympic colours to represent each continent, the scatterplot confirms what was found in the previous visualisations, African countries have the lowest incomes and relatively low happiness scores. In comparison, European countries mainly have higher incomes and higher happiness scores. However, the relationship between the two variables does not appear to be linear and therefore, a logarithmic regression line was used to show the relationship.

Summary

It would seem that money *can* buy happiness but only up to a certain point. The regression line shows a rapid initial increase before beginning to plateau, suggesting that money can make you happy up until a certain point but after that, increasing your income will have no further effect on happiness. This finding is in support of [Kahneman and Deaton \(2010\)](#) who found that well-being levels increased with income up until \$75,000 before plateauing. [Killingsworth \(2021\)](#) state that for the most part, larger incomes are associated with greater happiness. However, there is an exception for rich people who are unhappy or depressed, where more money simply does not help.

Limitations and Future Directions

It is important to consider other factors which may also be contributing to the happiness scores as happiness isn't entirely dependent on money. The countries with the lowest happiness ratings are mainly third world

countries whilst the highest rated countries are mostly first world countries and consequently, there are likely to be many other factors contributing to the happiness scores. Other contributing factors may include war, quality of life, health etc.

The happiness data set included several variables which contributed to the overall happiness score but due to the time constraints of this module, only the overall happiness score was visualised. Future visualisations using this data could explore the contributors to the happiness score to see which variables had the biggest impact on well-being.

References

Freeland, Z. (2019). *Can money buy happiness? It sure can.* [Image]. Vox. <https://www.vox.com/the-highlight/2019/11/13/20951937/money-experiences-buy-happiness-happy-how-to-spend>

Kahneman, D., & Deaton, A. (2010). High income improves evaluation of life but not emotional well-being. *Proceedings of the national academy of sciences*, 107(38), 16489-16493. <https://doi.org/10.1073/pnas.1011492107>

Suliman, A. (2023, March 8). *Can money buy happiness? Scientists say it can.* The Washington Post. <https://www.washingtonpost.com/business/2023/03/08/money-wealth-happiness-study/>

The rMarkdown file along with all the files needed to reproduce this analysis can be found on [GitHub](#)