# Final Project (Group 2)

Group 2

2024-05-07

- Research Question/Hypothesis: What variable in the world happiness report (family, health, trust, generosity, and economics) has the greatest effect on a nation's happiness score?
- Hypothesis: Economics plays the largest role in a nation's happiness score.

```
library(readxl)
library(dplyr)
library(ggplot2)
library(tidyr)

data <- read_excel("WHR_2015.xlsx")

colnames(data)
```

```
##  [1] "Country"                    "Region"
##  [3] "Happiness Rank"             "Happiness Score"
##  [5] "Standard Error"             "Economy (GDP per Capita)"
##  [7] "Family"                     "Health (Life Expectancy)"
##  [9] "Freedom"                    "Trust (Government Corruption)"
## [11] "Generosity"                 "Dystopia Residual"
```

```
colnames(data) <- c("Country", "Region", "Happiness Score",
                    "Happiness Rank","Economy",
                    "Health", "Freedom",
                    "Trust", "Family", "Generosity",
                    "Dystopia Residual", "Standard Error")
```

[ Module 4: Eugene Kim - Explanatory Data Analysis ]

```
str(data)
```

```
## tibble [158 x 12] (S3: tbl_df/tbl/data.frame)
##  $ Country          : chr [1:158] "Switzerland" "Iceland" "Denmark" "Norway" ...
##  $ Region           : chr [1:158] "Western Europe" "Western Europe" "Western Europe" "Weste
##  $ Happiness Score  : num [1:158] 1 2 3 4 5 6 7 8 9 10 ...
```

```
##  $ Happiness Rank   : num [1:158] 7.59 7.56 7.53 7.52 7.43 ...
##  $ Economy          : num [1:158] 0.0341 0.0488 0.0333 0.0388 0.0355 ...
##  $ Health           : num [1:158] 1.4 1.3 1.33 1.46 1.33 ...
##  $ Freedom          : num [1:158] 1.35 1.4 1.36 1.33 1.32 ...
##  $ Trust            : num [1:158] 0.941 0.948 0.875 0.885 0.906 ...
##  $ Family           : num [1:158] 0.666 0.629 0.649 0.67 0.633 ...
##  $ Generosity       : num [1:158] 0.42 0.141 0.484 0.365 0.33 ...
##  $ Dystopia Residual: num [1:158] 0.297 0.436 0.341 0.347 0.458 ...
##  $ Standard Error   : num [1:158] 2.52 2.7 2.49 2.47 2.45 ...
```

```
head(data)
```

| Country | Region | Happiness Score | Happiness Rank | Economy | Health | Freedom | Trust | Family | Generosity | Dystopia Residual | Standard Error |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Switzerland | Western Europe | 1 | 7.587 | 0.03411 | 1.39651 | 1.34951 | 0.94143 | 0.66557 | 0.41978 | 0.29678 | 2.51738 |
| Iceland | Western Europe | 2 | 7.561 | 0.04884 | 1.30232 | 1.40223 | 0.94784 | 0.62877 | 0.14145 | 0.43630 | 2.70201 |
| Denmark | Western Europe | 3 | 7.527 | 0.03328 | 1.32548 | 1.36058 | 0.87464 | 0.64938 | 0.48357 | 0.34139 | 2.49204 |
| Norway | Western Europe | 4 | 7.522 | 0.03880 | 1.45900 | 1.33095 | 0.88521 | 0.66973 | 0.36503 | 0.34699 | 2.46531 |
| Canada | North America | 5 | 7.427 | 0.03553 | 1.32629 | 1.32261 | 0.90563 | 0.63297 | 0.32957 | 0.45811 | 2.45176 |
| Finland | Western Europe | 6 | 7.406 | 0.03140 | 1.29025 | 1.31826 | 0.88911 | 0.64169 | 0.41372 | 0.23351 | 2.61955 |

```
tail(data)
```

| Country | Region | Happiness Score | Happiness Rank | Economy | Health | Freedom | Trust | Family | Generosity | Dystopia Residual | Standard Error |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Afghanistan | Southern Asia | 153 | 3.575 | 0.03084 | 0.31982 | 0.30285 | 0.30335 | 0.23414 | 0.09719 | 0.36510 | 1.95210 |
| Rwanda | Sub-Saharan Africa | 154 | 3.465 | 0.03464 | 0.22208 | 0.77370 | 0.42864 | 0.59201 | 0.55191 | 0.22628 | 0.67042 |
| Benin | Sub-Saharan Africa | 155 | 3.340 | 0.03656 | 0.28665 | 0.35386 | 0.31910 | 0.48450 | 0.08010 | 0.18260 | 1.63328 |
| Syria | Middle East and Northern Africa | 156 | 3.006 | 0.05015 | 0.66320 | 0.47489 | 0.72193 | 0.15684 | 0.18906 | 0.47179 | 0.32858 |
| Burundi | Sub-Saharan Africa | 157 | 2.905 | 0.08658 | 0.01530 | 0.41587 | 0.22396 | 0.11850 | 0.10062 | 0.19727 | 1.83302 |
| Togo | Sub-Saharan Africa | 158 | 2.839 | 0.06727 | 0.20868 | 0.13995 | 0.28443 | 0.36453 | 0.10731 | 0.16681 | 1.56726 |

```r
if (!require(readxl)) {
  install.packages("readxl")
}
library(readxl)

data <- read_excel("WHR_2015.xlsx")

print(colnames(data))
```

```
##  [1] "Country"                       "Region"
##  [3] "Happiness Rank"                "Happiness Score"
##  [5] "Standard Error"                "Economy (GDP per Capita)"
##  [7] "Family"                        "Health (Life Expectancy)"
##  [9] "Freedom"                       "Trust (Government Corruption)"
## [11] "Generosity"                    "Dystopia Residual"
```

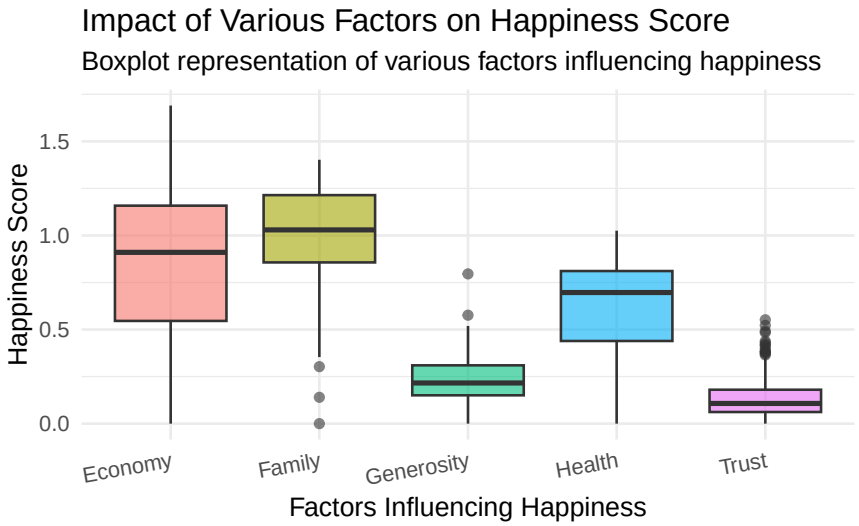
```r
data <- data %>%
  rename(
    Economy = `Economy (GDP per Capita)`,
    Family = 'Family',
    Health = `Health (Life Expectancy)`,
    Trust = `Trust (Government Corruption)`,
    Generosity = 'Generosity',
    Happiness_Score = `Happiness Score`
  )
print(colnames(data))
```

```
##  [1] "Country"           "Region"            "Happiness Rank"
##  [4] "Happiness_Score"   "Standard Error"    "Economy"
##  [7] "Family"            "Health"            "Freedom"
## [10] "Trust"             "Generosity"        "Dystopia Residual"
```

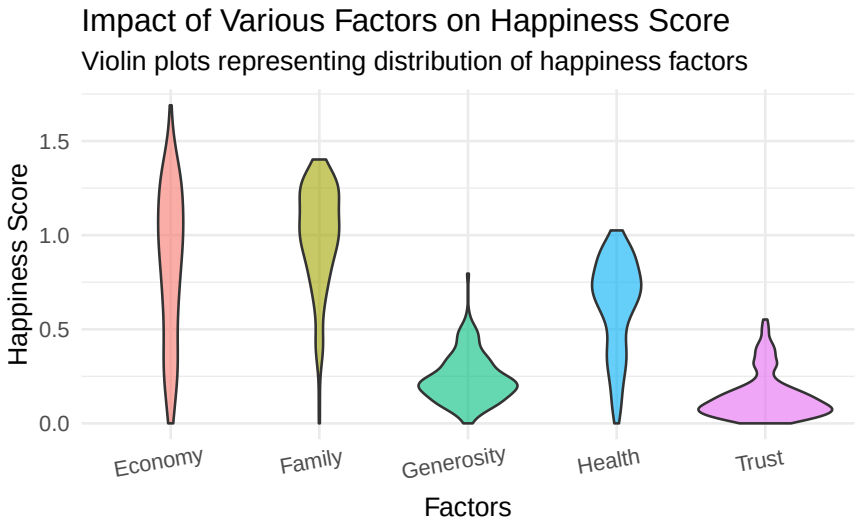
```r
library(tidyr)
library(dplyr)

happiness_long <- data %>%
  pivot_longer(
    cols = c(`Economy`, `Family`, `Health`, `Trust`, `Generosity`),
    names_to = "Variable",
    values_to = "Value"
  )
```

```r
library(ggplot2)

ggplot(happiness_long, aes(x = Variable, y = Value, fill = Variable)) +
```

```
  geom_boxplot(alpha = 0.6) +
  labs(title = "Impact of Various Factors on Happiness Score",
       subtitle = "Boxplot representation of various factors influencing happiness",
       x = "Factors Influencing Happiness",
       y = "Happiness Score") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 10, hjust = 1),
        legend.position = "none")
```




```
library(ggplot2)

ggplot(happiness_long, aes(x = Variable, y = Value, fill = Variable)) +
  geom_violin(trim = TRUE, alpha = 0.6) +
  labs(title = "Impact of Various Factors on Happiness Score",
       subtitle = "Violin plots representing distribution of happiness factors",
       x = "Factors",
       y = "Happiness Score") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 10, hjust = 0.65, vjust = 1),
        legend.position = "none")
```


Impact of Various Factors on Happiness Score
Violin plots representing distribution of happiness factors
Happiness Score
1.5
1.0
0.5
0.0
Economy
Family
Generosity
Health
Trust
Factors