2024 World Happiness Analysis

By Sam Rector

2024-10-14

Context

(From 2021 Demo) The World Happiness Report is a landmark survey of the state of global happiness. The report continues to gain global recognition as governments, organizations and civil society increasingly use happiness indicators to inform their policy-making decisions. Leading experts across fields – economics, psychology, survey analysis, national statistics, health, public policy and more – describe how measurements of well-being can be used effectively to assess the progress of nations. The reports review the state of happiness in the world today and show how the new science of happiness explains personal and national variations in happiness.

Content

(From 2021 Demo) The happiness scores and rankings use data from the Gallup World Poll. The columns following the happiness score estimate the extent to which each of six factors – economic production, social support, life expectancy, freedom, absence of corruption, and generosity – contribute to making life evaluations. They have no impact on the total score reported for each country, but they do explain why some countries rank higher than others.

Goal/Areas of Focus

For this analysis, I will have three different areas of focus, with three questions dedicated to each. First, I want to dive into how wealth is distributed amongst countries (by looking at highs/lows, overall distribution). Second, I want to discuss potential relationships of interest based on my hypotheses of them. Finally, I will analyze how countries change in some of these metrics over time.

Research Questions

Here are my specific topics of inquiry:

I. What are the top 5 richest countries by GDP?

II. What are the top 5 poorest countries by GDP?

III. How is wealth distributed among countries?

IV. What factors (GDP, Generosity, etc.) have the most correlation to Life Ladder?

V. Is there a linear relationship between Generosity and Freedom to make life choices?

VI. Is there a linear relationship between Log GDP per Capita and Perception of Corruption?

VII. How does happiness change over time?

VIII. Do countries become wealthier over time?

IX. Have perceptions of corruption decreased in recent years?

Exploratory Data Analysis

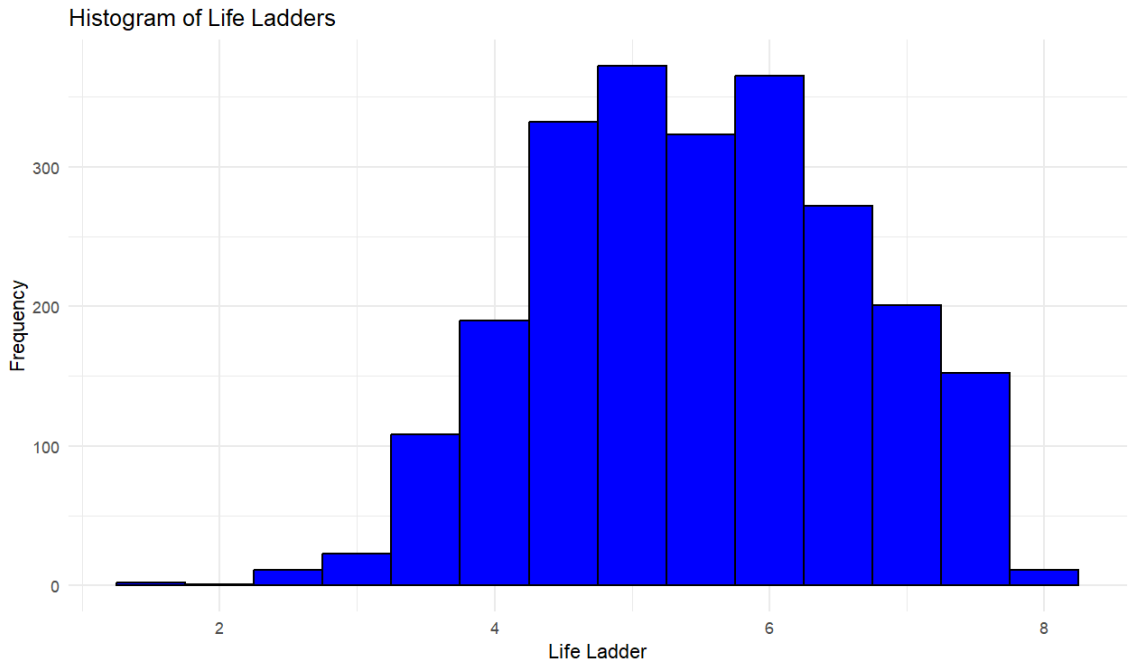
Summary Statistics

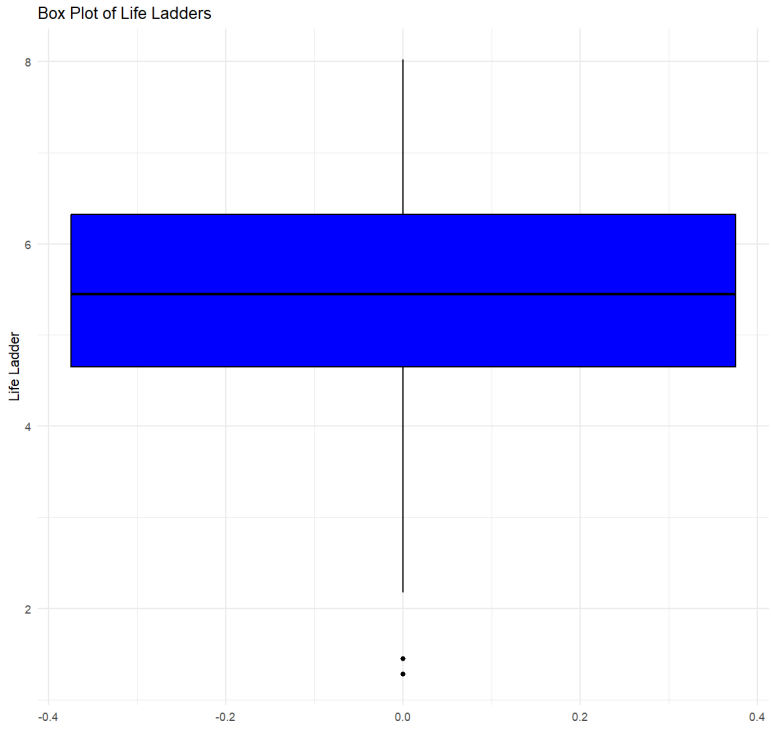
```
> summary(World_happiness_report_updated_2024)
 country_name            year       life_ladder    log_gdp_per_capita
 Length:2363        Min.   :2005   Min.   :1.281   Min.   : 5.527
 Class :character   1st Qu.:2011   1st Qu.:4.647   1st Qu.: 8.507
 Mode  :character   Median :2015   Median :5.449   Median : 9.503
                    Mean   :2015   Mean   :5.484   Mean   : 9.400
                    3rd Qu.:2019   3rd Qu.:6.324   3rd Qu.:10.393
                    Max.   :2023   Max.   :8.019   Max.   :11.676
                                                   NA's   :28
 social_support   healthy_life_expectancy_at_birth freedom_to_make_life_choices
 Min.   :0.2280   Min.   : 6.72                   Min.   :0.2280
 1st Qu.:0.7440   1st Qu.:59.20                   1st Qu.:0.6610
 Median :0.8345   Median :65.10                   Median :0.7710
 Mean   :0.8094   Mean   :63.40                   Mean   :0.7503
 3rd Qu.:0.9040   3rd Qu.:68.55                   3rd Qu.:0.8620
 Max.   :0.9870   Max.   :74.60                   Max.   :0.9850
 NA's   :13       NA's   :63                      NA's   :36
   generosity       perceptions_of_corruption positive_affect  negative_affect
 Min.   :-0.34000   Min.   :0.0350            Min.   :0.1790   Min.   :0.0830
 1st Qu.:-0.11200   1st Qu.:0.6870            1st Qu.:0.5720   1st Qu.:0.2090
 Median :-0.02200   Median :0.7985            Median :0.6630   Median :0.2620
 Mean   : 0.00010   Mean   :0.7440            Mean   :0.6519   Mean   :0.2732
 3rd Qu.: 0.09375   3rd Qu.:0.8678            3rd Qu.:0.7370   3rd Qu.:0.3260
 Max.   : 0.70000   Max.   :0.9830            Max.   :0.8840   Max.   :0.7050
 NA's   :81         NA's   :125               NA's   :24       NA's   :16
```

Standard Deviations

lifeladdersd	loggdpsd	socialsupportsd	lifeexpectancysd	freedomsd	generositysd
<db l>	*<db l>*	*<db l>*	*<db l>*	*<db l>*	*<db l>*
1.13	1.15	0.121	6.84	0.139	0.161

Life Ladder

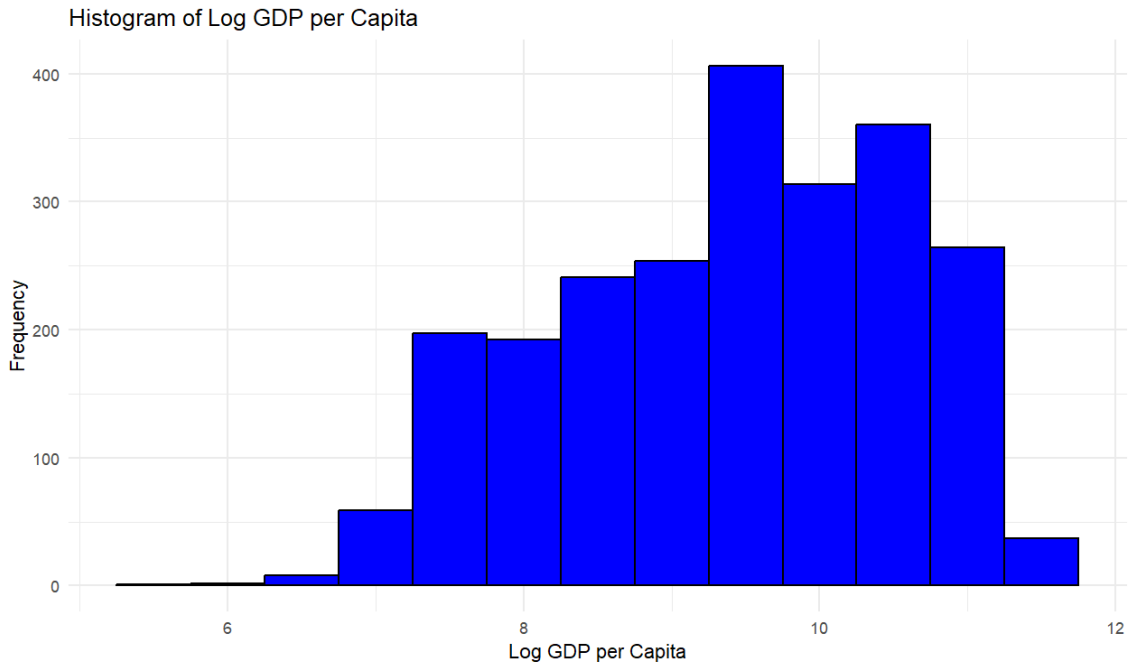


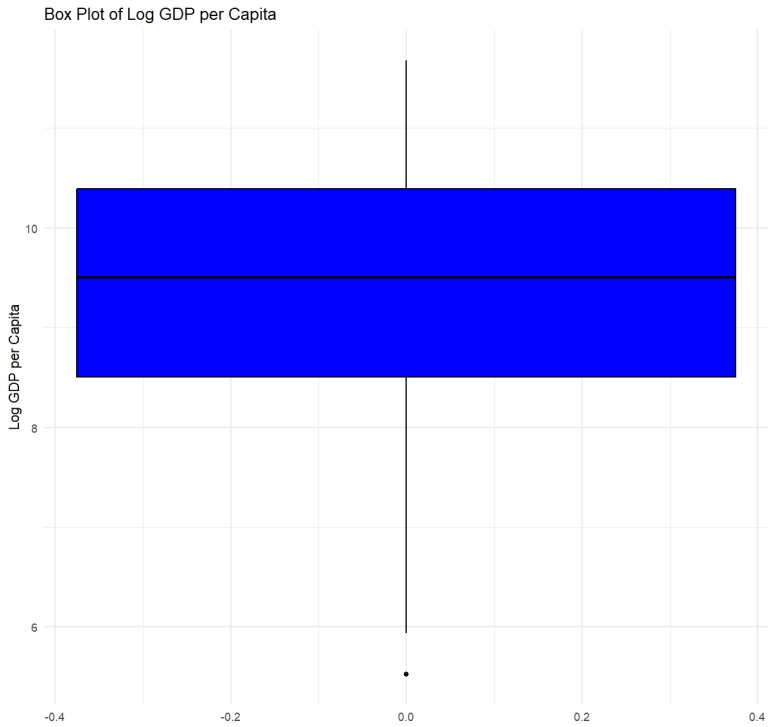


Shape: Bimodal

Outliers: 2

Log GDP per Capita





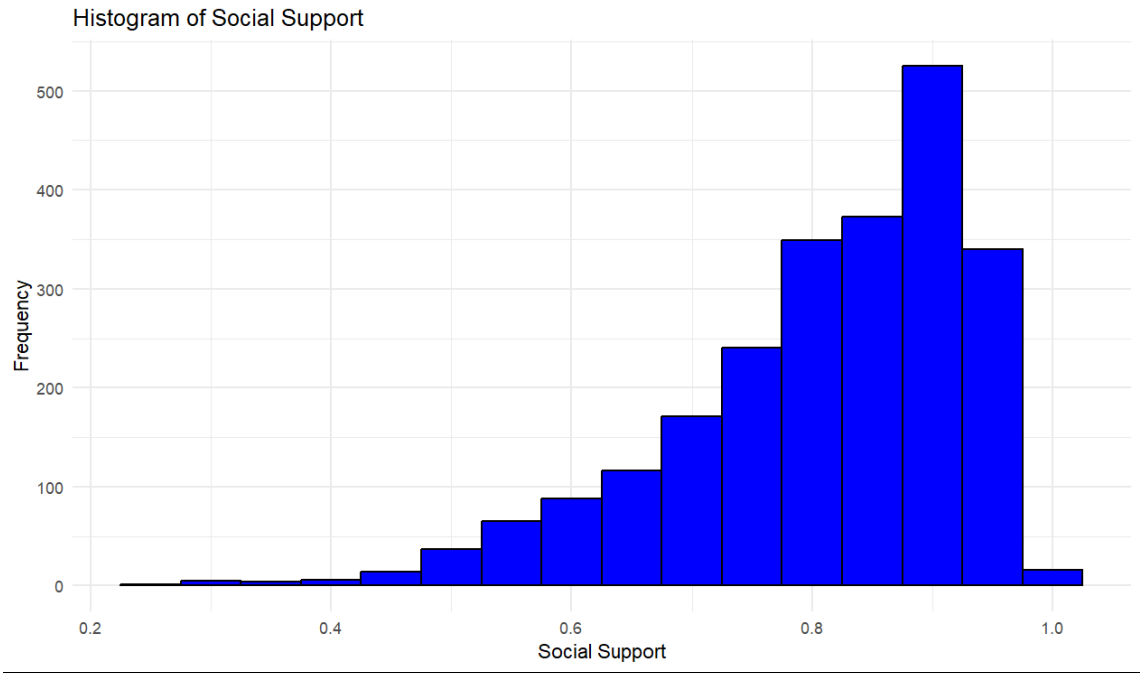
Shape: Left-Skewed

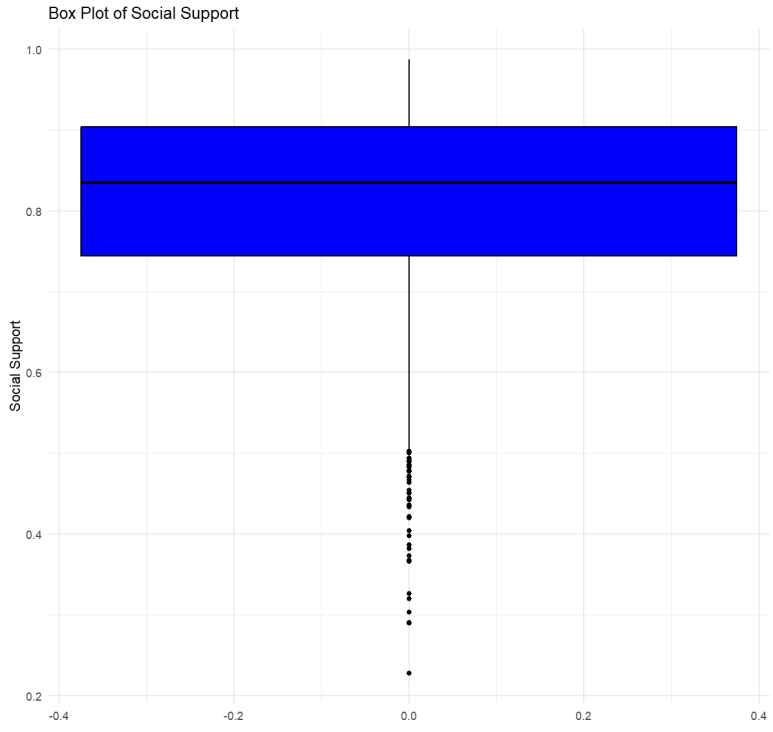
- Could also be described as

Bimodal

Outliers: 1

Social Support

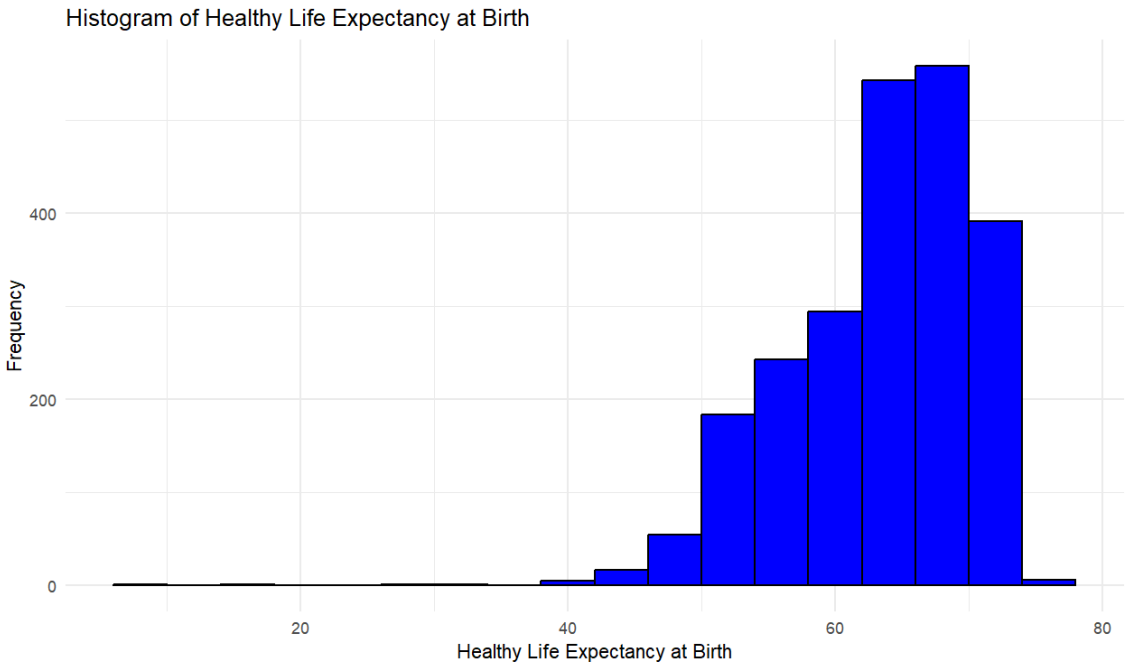


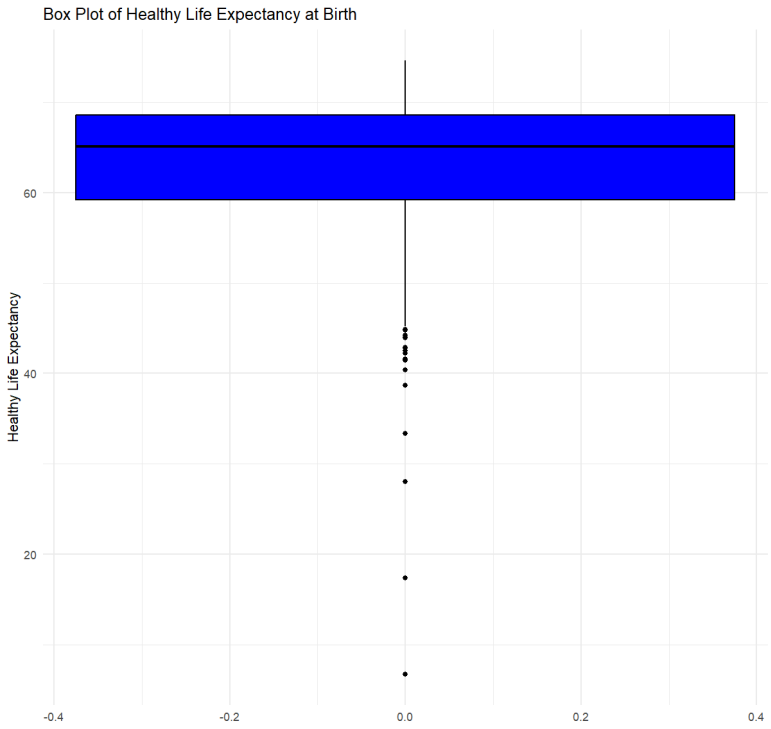


Shape: Left-Skewed

Outliers: 25+

Healthy Life Expectancy at Birth

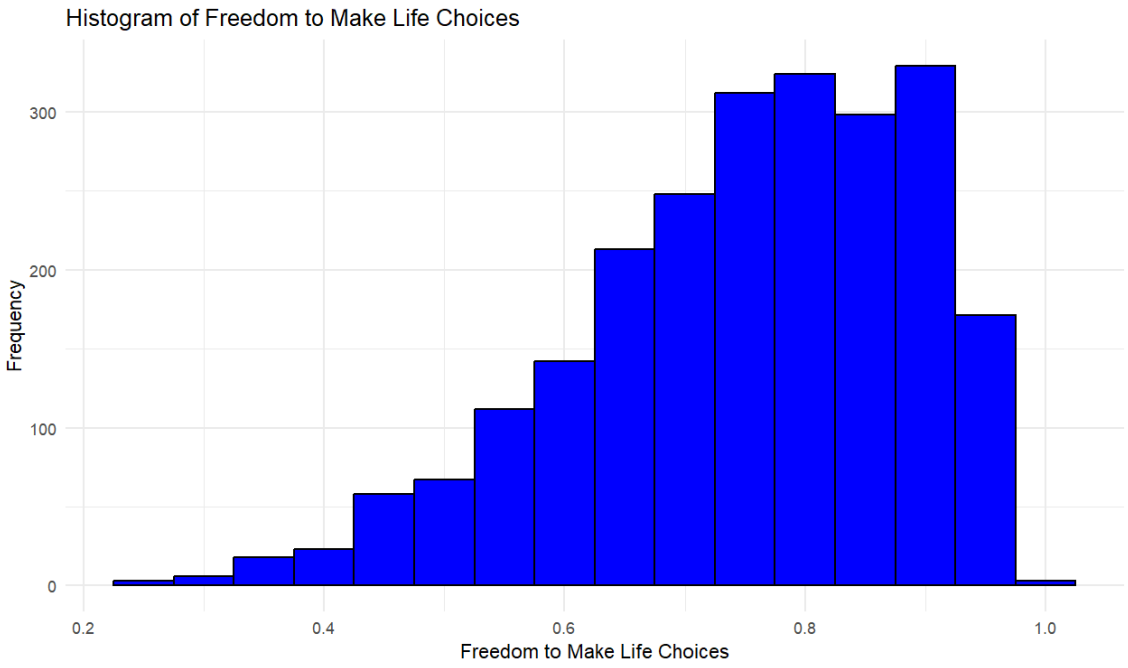


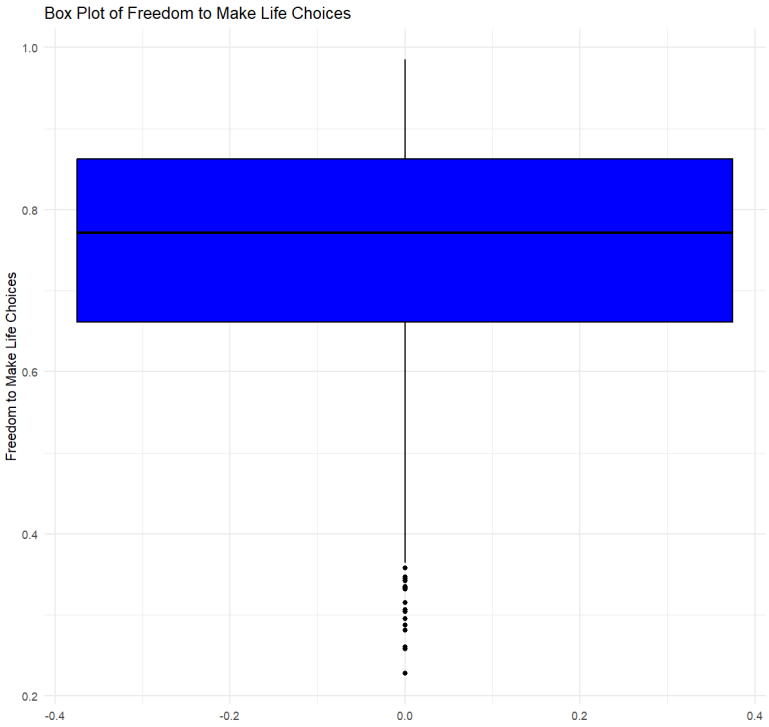


Shape: Left-Skewed

Outliers: ~13

Freedom to Make Life Choices

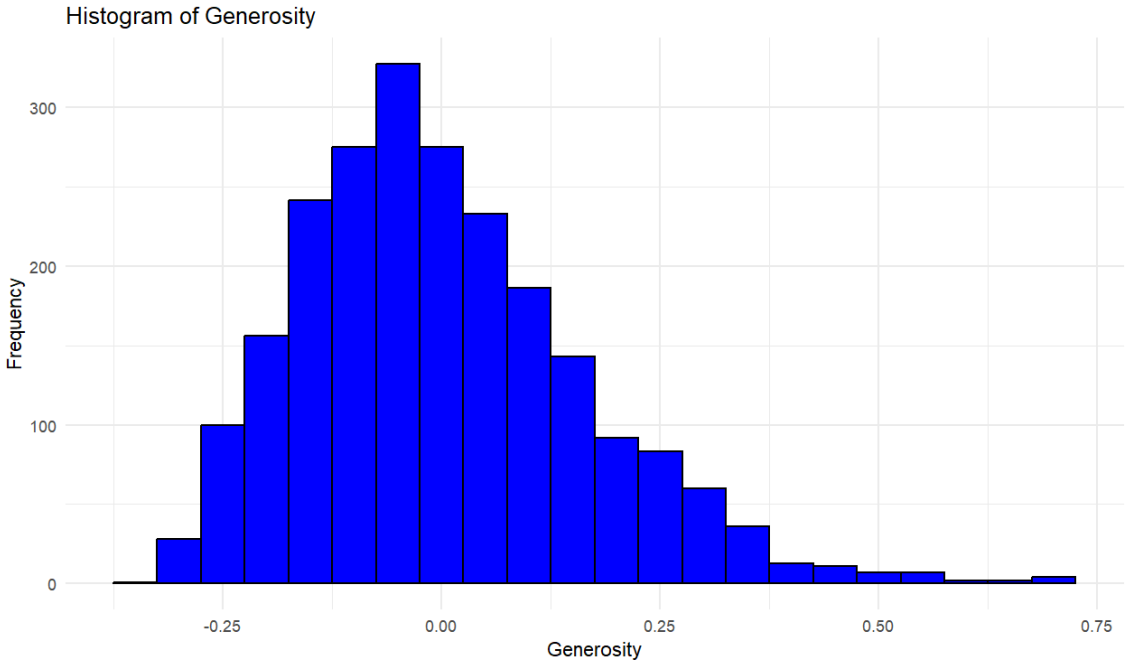


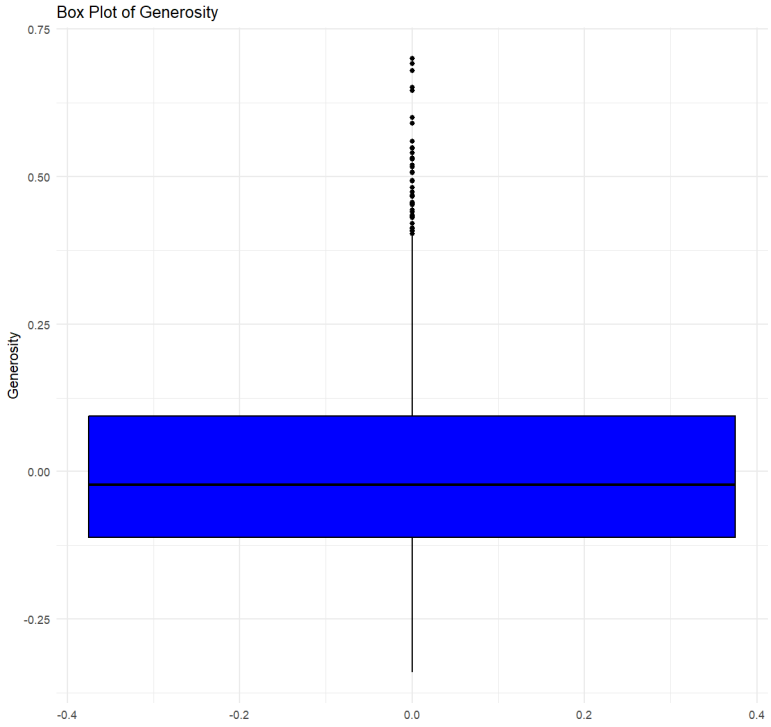


Shape: Left-Skewed

Outliers: ~15

Generosity

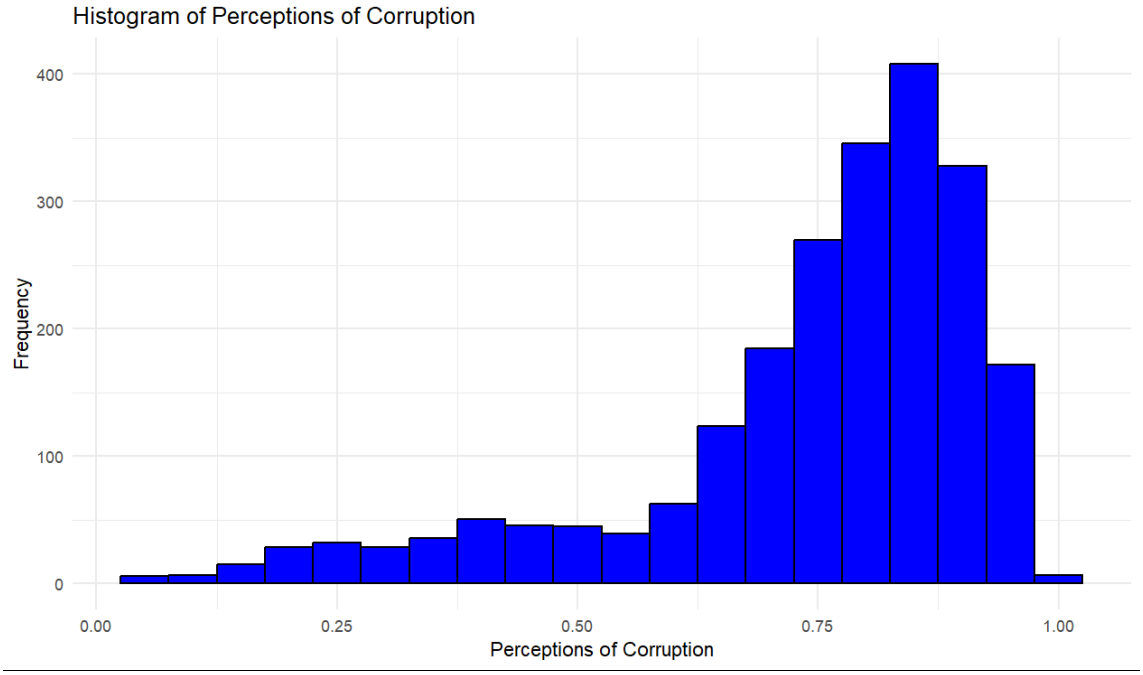


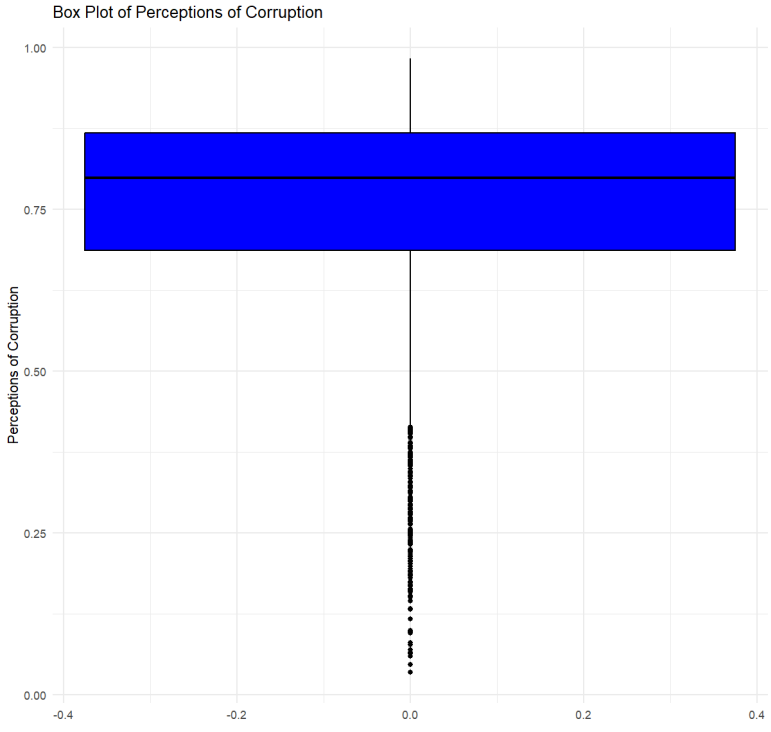


Shape: Right-Skewed

Outliers: 25+

Perceptions of Corruption

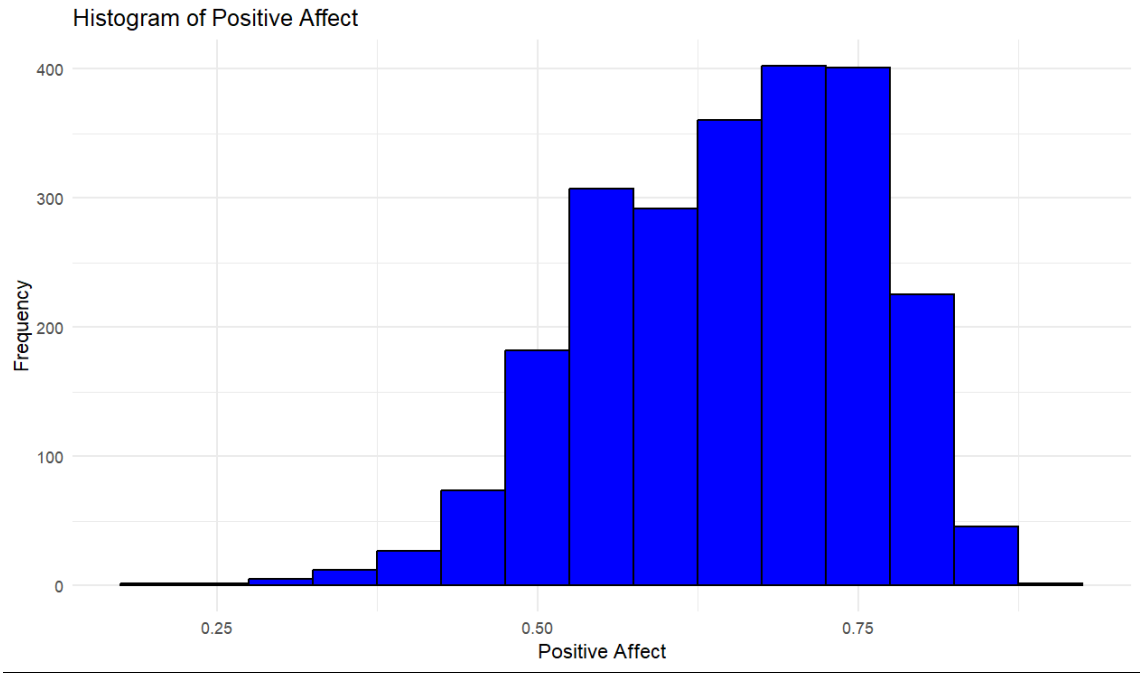


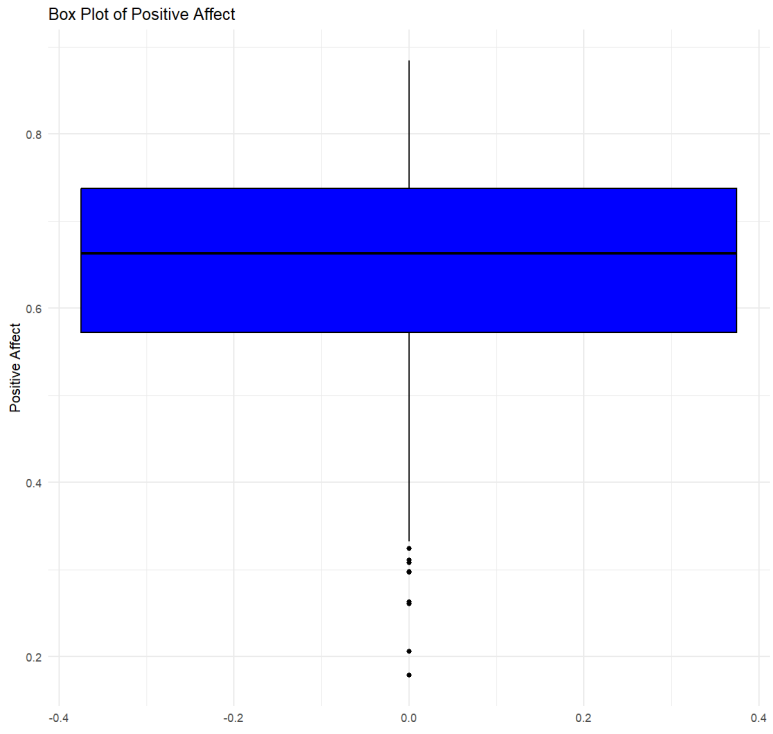


Shape: Left-Skewed

Outliers: 50+

Positive Affect

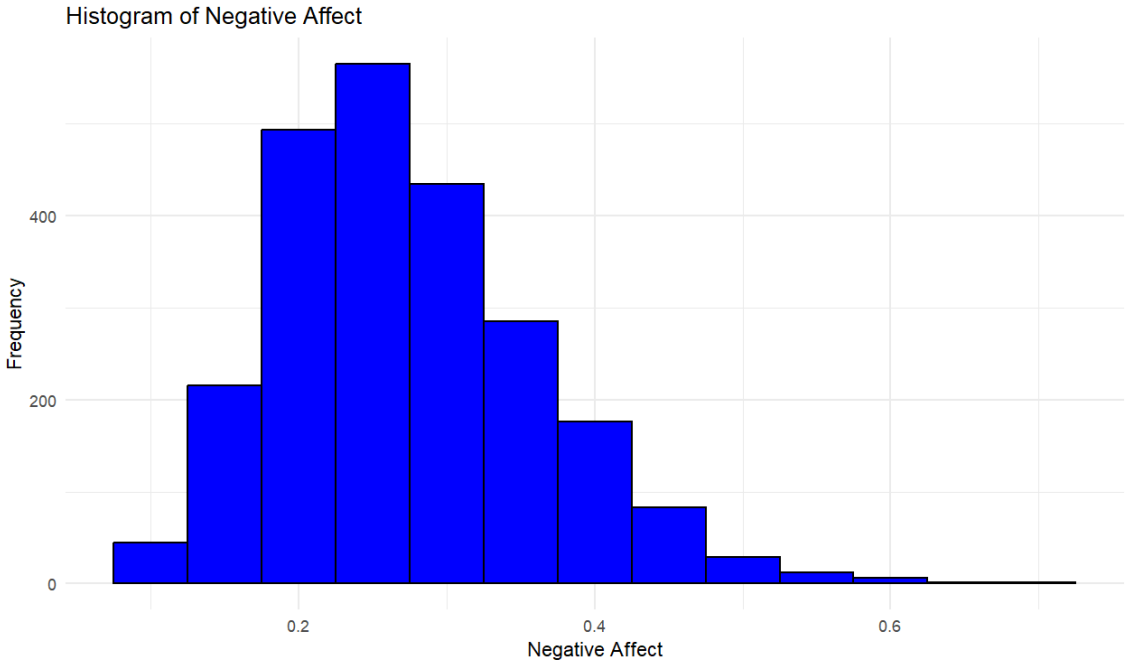


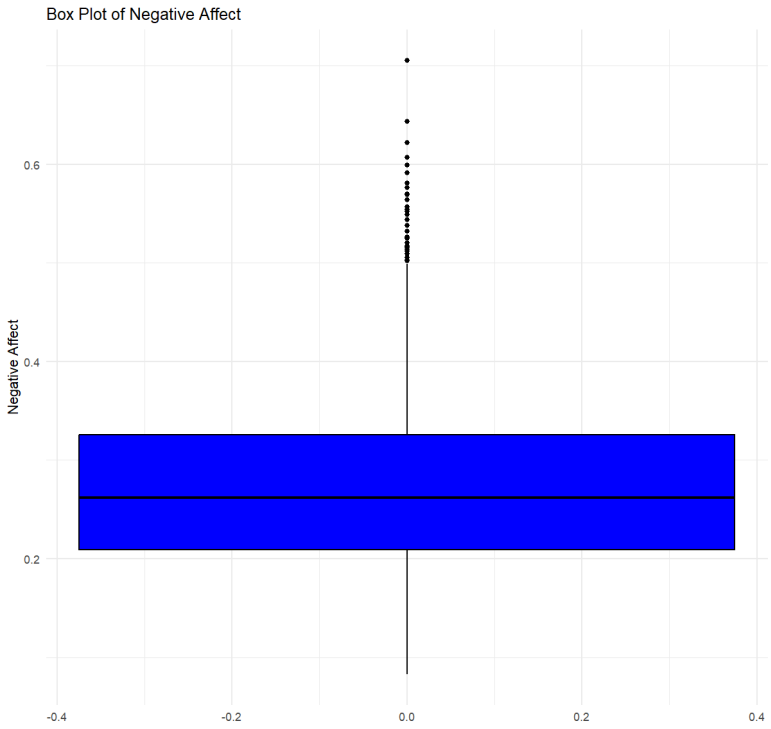


Shape: Left-Skewed

Outliers: ~8

Negative Affect

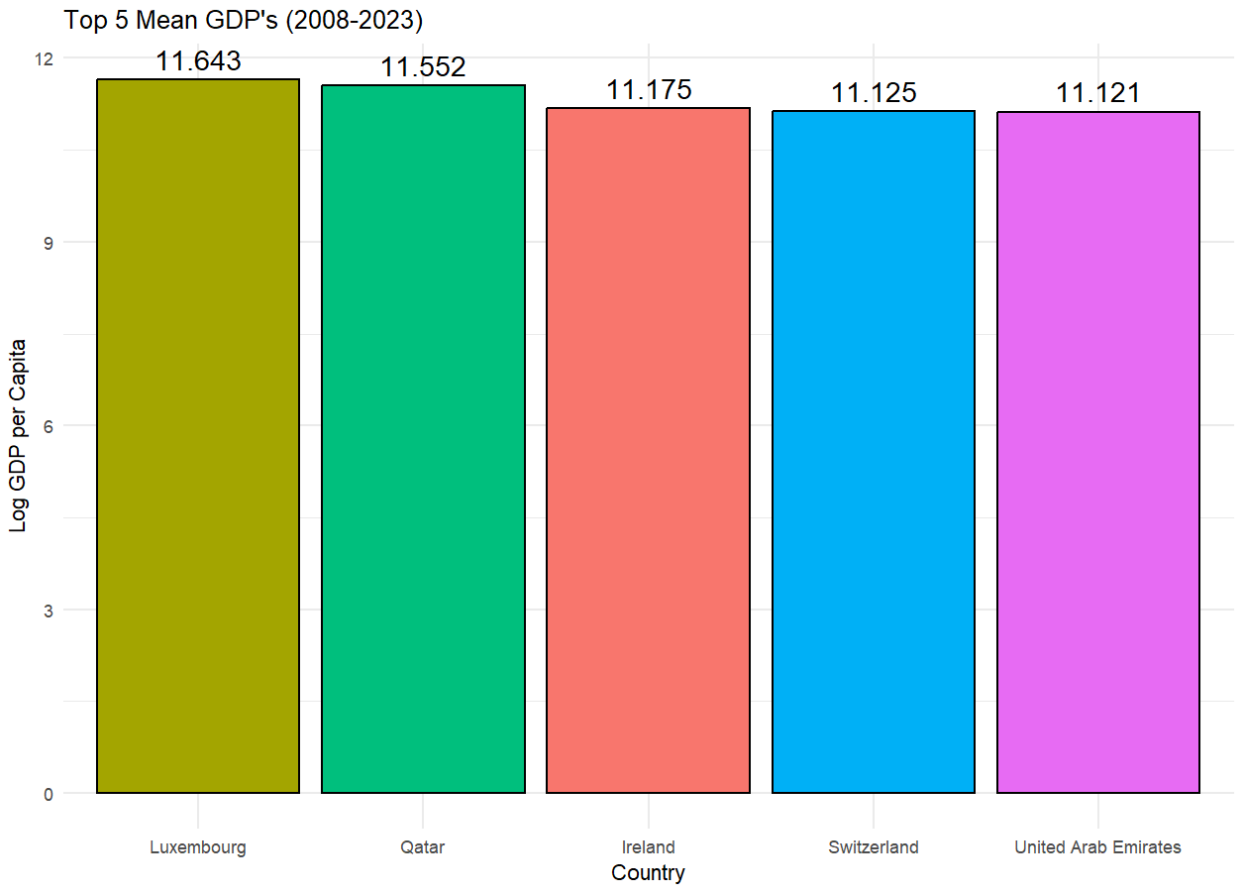




Shape: Right-Skewed

Outliers: ~25

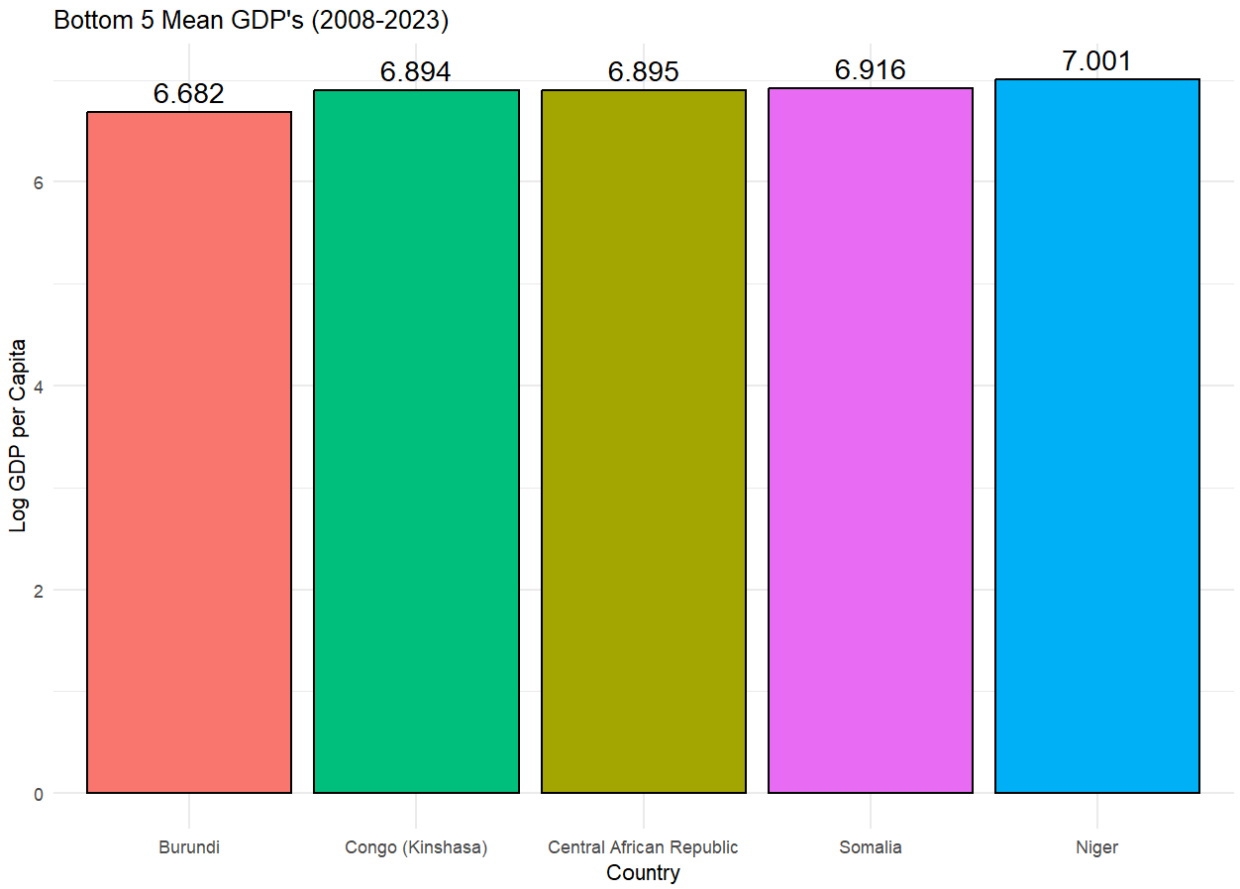
I. What are the top 5 richest countries by Log GDP per Capita?



Luxembourg has the highest average Log GDP per Capita over the years included in this data. This country is followed by Qatar, Ireland, Switzerland, and the United Arab Emirates. Now, what characteristics do these countries share? At a glance, they are all very small countries. None have a population above 10,000,000. Does this mean that the top 5 poorest countries will feature more populous domains?

	country_name	meangdp
	<chr>	<dbl>
1	Luxembourg	11.6
2	Qatar	11.6
3	Ireland	11.2
4	Switzerland	11.1
5	United Arab Emirates	11.1

II. What are the top 5 poorest countries by Log GDP per Capita?

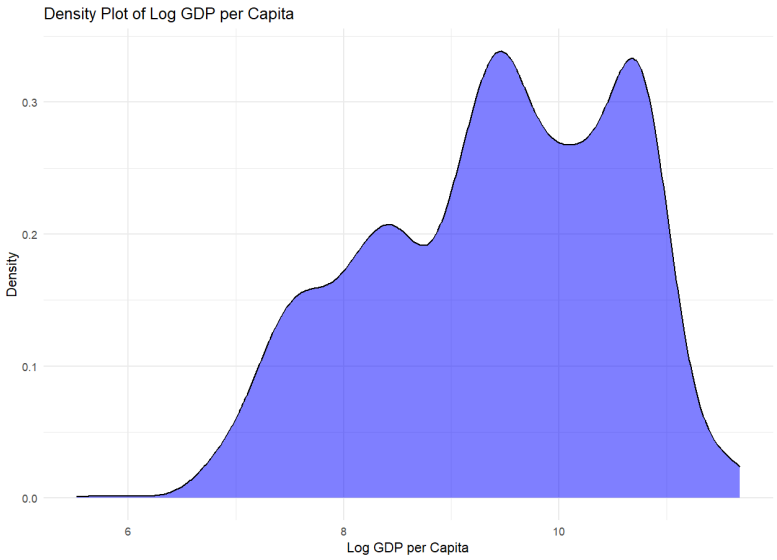


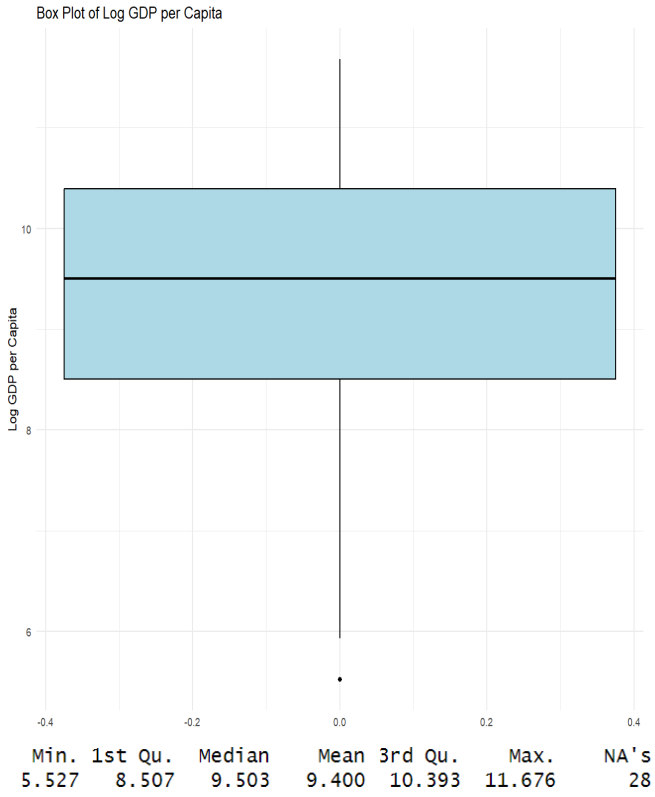
Burundi has the lowest average Log GDP per Capita over the years included in this data. They are followed by Congo, the Central African Republic, Somalia, and Niger. While these countries do have higher populations than the richest countries, they are not nearly the most populous countries in the world. For future research, I'd love to assess the correlation between wealth and population.

	country_name	meangdp
	<chr>	<dbl>
1	Burundi	6.68
2	Congo (Kinshasa)	6.89
3	Central African Republic	6.89
4	Somalia	6.92
5	Niger	7.00

III. How is wealth distributed among countries?

This density plot shows that the shape is left-skewed, but there also seems to be two modes, around 9 and 11.






```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
  5.527   8.507   9.503   9.400  10.393  11.676      28
```

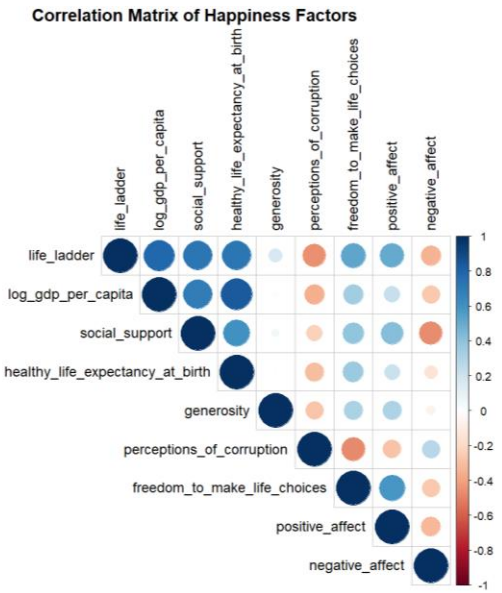
The length of the lower tail concurs with this assessment of the shape. Otherwise, the data is fairly concentrated within the IQR. The median of 9.503 is probably the best measure of center due to the skewer. This distribution's standard deviation of 1.15 also seems relatively low, so the data is not overly spread out. There is only one outlier.

So, more countries seem to be wealthy than poor, and the distribution is not spread very wide. The central log GDP per capita is around 9.5.

IV. What factors (GDP, Generosity, etc.) have the most correlation to Life Ladder?

Hypothesis: Log GDP per Capita and Life Expectancy have the highest positive relationship on the Life Ladder score.

```
                                life_ladder log_gdp_per_capita social_support
life_ladder                       1.0000000          0.7871919      0.7249636
log_gdp_per_capita                0.7871192          1.0000000      0.6989985
social_support                    0.7249264          0.6989985      1.0000000
healthy_life_expectancy_at_birth  0.7252396          0.8321419      0.6021197
generosity                        0.1625579         -0.0249539      0.0558200
perceptions_of_corruption        -0.4515752         -0.3524645     -0.2233415
freedom_to_make_life_choices      0.5281304          0.3499735      0.3938349
positive_affect                   0.5021954          0.2229828      0.4261180
negative_affect                  -0.3455397         -0.2695264     -0.4617810
                                healthy_life_expectancy_at_birth  generosity
life_ladder                                           0.72523962  0.16255789
log_gdp_per_capita                                    0.83214199 -0.02495393
social_support                                        0.60211977  0.05582004
healthy_life_expectancy_at_birth                      1.00000000  0.01164712
generosity                                            0.01164712  1.00000000
perceptions_of_corruption                            -0.30766870 -0.27270434
freedom_to_make_life_choices                          0.36645489  0.31295798
positive_affect                                       0.21207360  0.30989854
negative_affect                                      -0.14516448 -0.06939231
                                perceptions_of_corruption
life_ladder                                    -0.4515752
log_gdp_per_capita                             -0.3524641
social_support                                 -0.2233415
healthy_life_expectancy_at_birth               -0.3076687
generosity                                     -0.2727043
perceptions_of_corruption                       1.0000000
freedom_to_make_life_choices                   -0.4741101
positive_affect                                -0.2876335
negative_affect                                 0.2740036
                                freedom_to_make_life_choices positive_affect
life_ladder                                        0.5281304       0.5021954
log_gdp_per_capita                                 0.3499735       0.2229828
social_support                                     0.3938349       0.4261180
healthy_life_expectancy_at_birth                   0.3664549       0.2120736
generosity                                         0.3129580       0.3098985
perceptions_of_corruption                         -0.4741101      -0.2876335
freedom_to_make_life_choices                       1.0000000       0.5808449
positive_affect                                    0.5808449       1.0000000
negative_affect                                   -0.2664939      -0.3279926
                                negative_affect
life_ladder                      -0.34553967
log_gdp_per_capita               -0.26952643
social_support                   -0.46178104
healthy_life_expectancy_at_birth -0.14516448
generosity                       -0.06939231
perceptions_of_corruption         0.27400358
freedom_to_make_life_choices     -0.26649389
positive_affect                  -0.32799261
negative_affect                   1.00000000
```



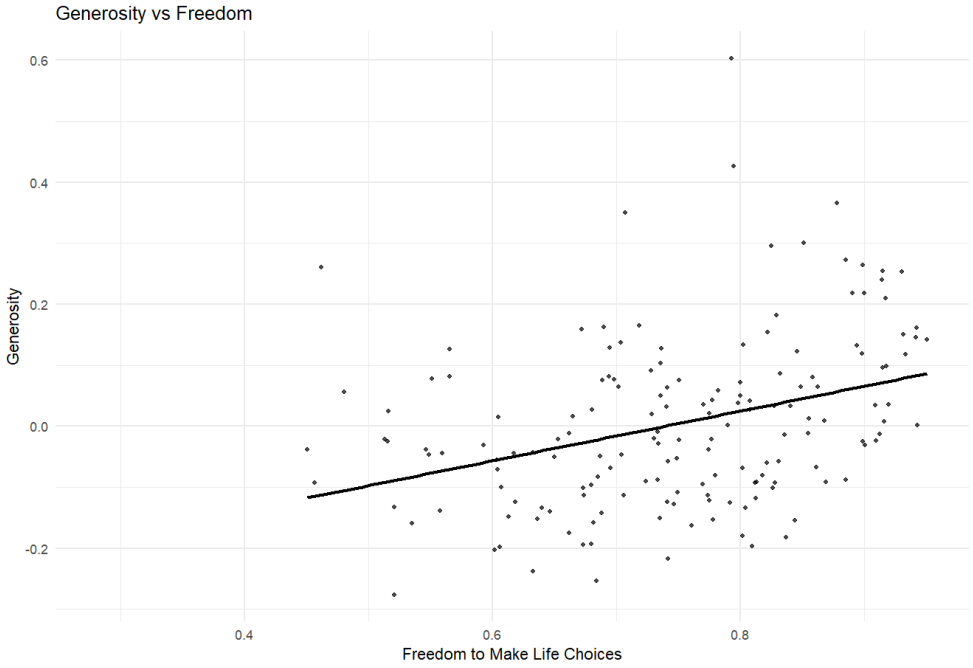
Takeaway: My hypothesis was correct.

- Log GDP per Capita (~0.79) – High, positive correlation between happiness and wealth.
- Healthy Life Expectancy at Birth (~0.73) – High, positive correlation between happiness and life expectancy.
- Social Support (~0.72) – High, positive correlation between happiness and social support.
- Positive Affect (~0.5) and Freedom to Make Life Choices (~0.53) – Moderate, positive correlation between happiness and positive affect/freedom.
- Perceptions of Corruption (~-0.45) and Negative Affect (~-.34) – Moderate, negative correlations between happiness and corruption/negative affect.

So, it could be argued that countries should focus on economic, physical, and social health when trying to maximize happiness, while eradicating corruption and minimizing negative affect.

V. Is there a linear relationship between Generosity and Freedom to Make Life Choices?

Hypothesis: Yes, I believe there will be a positive relationship between these variables. In other words, more freedom leads to more generosity.




```
> cor(mean_factors$meanfreedom, mean_factors$meangenerosity, use = 'complete.obs')
[1] 0.3456538
```

Note: rows grouped by country to make graphic simpler (less points)

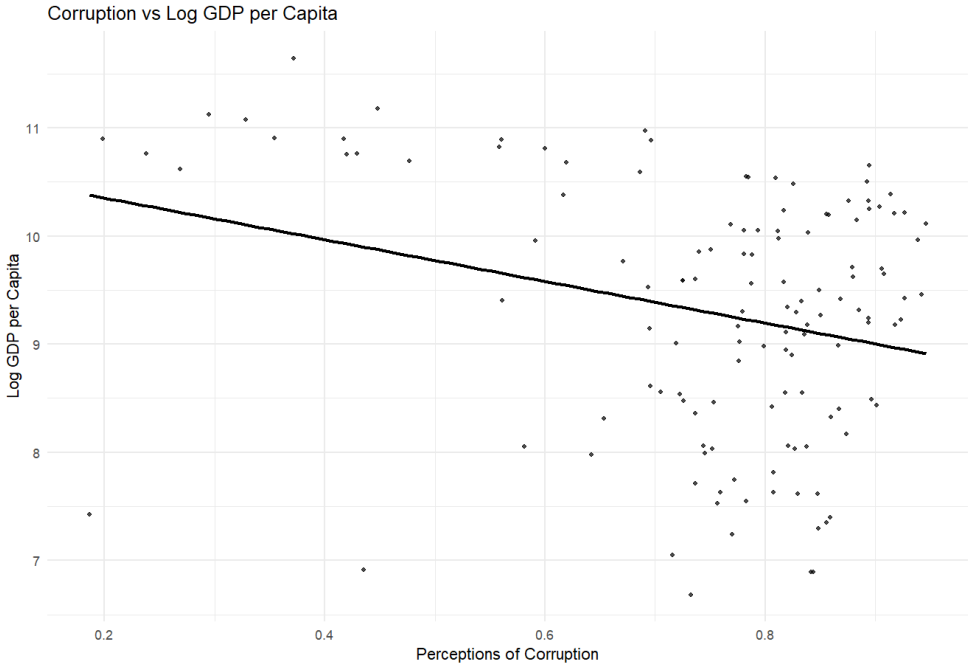
Correlation: There is a moderate, positive correlation between these two variables.

Outliers: There is only one clear outlier at ~(0.8, 0.6).

Implications: So, an increase in freedom theoretically only creates a moderate increase in generosity. My hypothesis was correct, but there is not as strong of a relationship as I would have guessed.

VI. Is there a linear relationship between Perception of Corruption and GDP per Capita?

Hypothesis: I believe there will not be any strong relationship between corruption and GDP per capita. In other words, I do not believe economic health calms perceptions of corruption. For instance, the U.S. has a high GDP, and yet the populous has suspicions of corruption every election.




```
> cor(mean_factors2$meancorruption, mean_factors2$meangdp, use = 'complete.obs')
[1] -0.2759299
```

Note: rows grouped by country to make graphic simpler (less points)

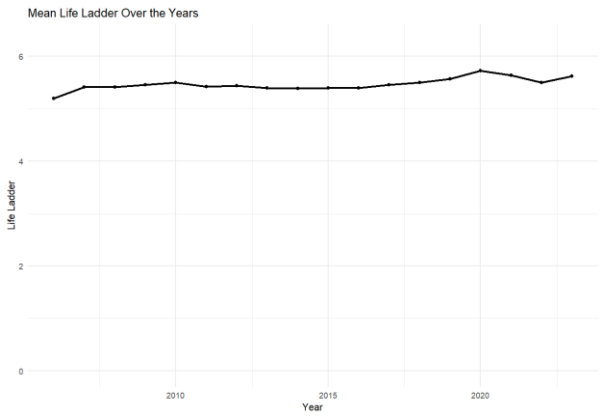
Correlation: There is a moderate, negative correlation between these two variables.

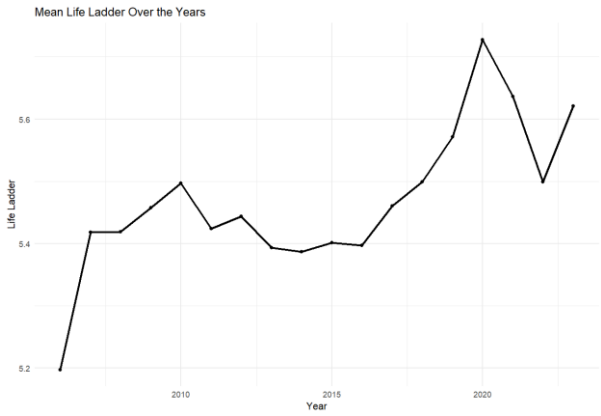
Outliers: There are a few potential outliers.

Implications: So, richer countries tend to have more of a perception of corruption, although the relationship is not particularly strong. Is money the root of all evil?

VII. How does happiness change over time?

To answer this question, I will group by years and find the average Life Ladder for each year.





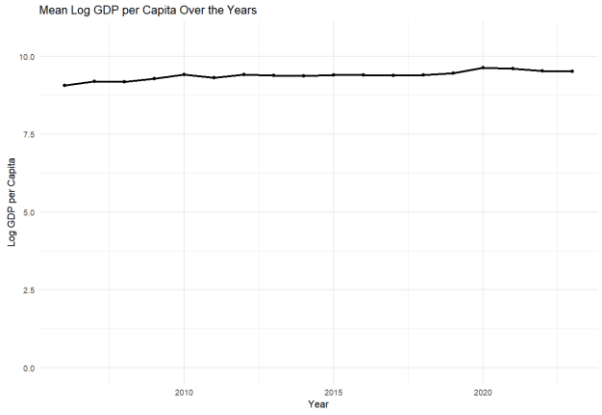
	year	meanhappiness	count
	<dbl>	<dbl>	<int>
1	2006	5.20	89
2	2007	5.42	102
3	2008	5.42	110
4	2009	5.46	114
5	2010	5.50	124
6	2011	5.42	146
7	2012	5.44	141
8	2013	5.39	136
9	2014	5.39	144
10	2015	5.40	142
11	2016	5.40	141
12	2017	5.46	147
13	2018	5.50	141
14	2019	5.57	143
15	2020	5.73	116
16	2021	5.64	122
17	2022	5.50	140
18	2023	5.62	138

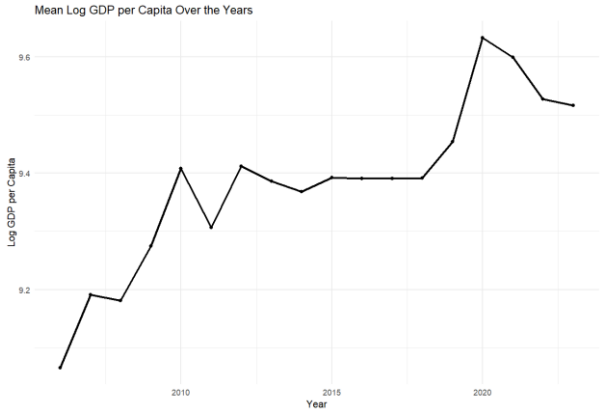
These two line graphs offer different perspectives of the fluctuations. In reality, the changes of happiness rating are minimal year-over-year, as shown by the left graph. However, the general trend is still positive, as shown by the right graph.

So, this data lends itself to the conclusion that countries are generally able to increase happiness little-by-little. From 2007-2017, the ratings were stagnant. Then, the most fluctuations were seen from 2018-2023. Surprisingly, 2020 received the highest Life Ladder. I would never have expected that given the global pandemic. Overall, this shows that improving happiness is a process that can take time.

VIII. Do countries become wealthier over time?

To answer this question, I will group by years and find the average Log GDP for each year.





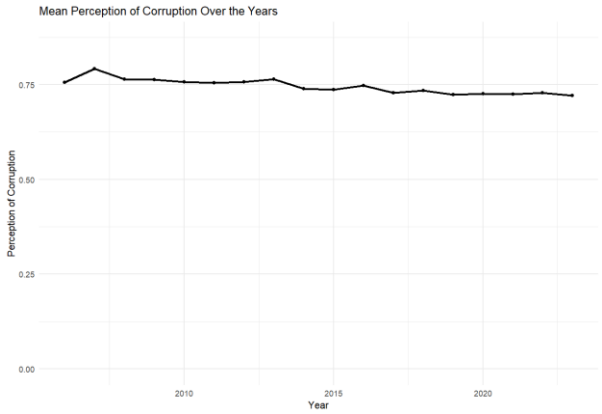
	year	meangdp	count
	<dbl>	<dbl>	<int>
1	2006	9.07	89
2	2007	9.19	102
3	2008	9.18	110
4	2009	9.27	114
5	2010	9.41	124
6	2011	9.31	146
7	2012	9.41	141
8	2013	9.39	136
9	2014	9.37	144
10	2015	9.39	142
11	2016	9.39	141
12	2017	9.39	147
13	2018	9.39	141
14	2019	9.45	143
15	2020	9.63	116
16	2021	9.60	122
17	2022	9.53	140
18	2023	9.52	138

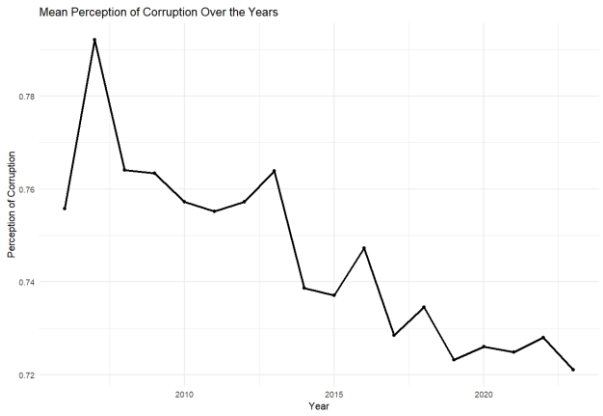
As with the previous question, the change in wealth isn't enormous year-over-year, but it is enough to zoom in on and examine. The right graph shows that wealth tends to steadily grow over time, like Life Ladder. This makes a ton of sense given the strong correlation between these two variables.

Life Ladder and Log GDP per Capita also share very similar trends from a line shape perspective. From 2010-2018, this figure remains stagnant, and then from 2019-2023, there is great fluctuation. Comparing this question to the last question, changes in happiness seem to happen *before* the changes in wealth. I think this insight is interesting because it may lend itself to the belief that happiness causes economic growth, not the other way around. Maybe a happy year leads to a year of increased productivity and spending overall. This theory certainly needs more research to be proven, but it is undeniable that happiness and wealth have some sort of causal relationship.

IX. Have perceptions of corruption decreased in recent years?

To answer this question, I will group by years and find the average Life Ladder for each year.





	year	meancorruption	count
	<dbl>	<dbl>	<int>
1	2006	0.756	89
2	2007	0.792	102
3	2008	0.764	110
4	2009	0.763	114
5	2010	0.757	124
6	2011	0.755	146
7	2012	0.757	141
8	2013	0.764	136
9	2014	0.739	144
10	2015	0.737	142
11	2016	0.747	141
12	2017	0.729	147
13	2018	0.735	141
14	2019	0.723	143
15	2020	0.726	116
16	2021	0.725	122
17	2022	0.728	140
18	2023	0.721	138

Perceptions of corruption have decreased in recent years. Again, not by a huge amount, but there certainly seems to be a consistent downward trend. However, this figure does seem to shift up and down more than GDP per Capita and Life Ladder.

This was an especially interesting topic for me because of the recent emphasis on social justice around the world. Have governments reacted to this and held themselves accountable? It seems that most governing bodies have done an increasingly better job in reducing (perceived) corruption.

Conclusion

The relatively richest countries in the world are not the capitalist giants you might guess. Small European and Middle Eastern nations dominated the top 5 list. While the bottom 5 did not appear to have overly populous countries, it would be incredibly interesting to research the effects of population growth on GDP per capita. Overall, wealth is far more evenly distributed than I would have guessed. The symmetry of the inter-quartile range is stunning. Additionally, the absence of the right-tail that you see in personal asset graphs was notable. The left-tail is somewhat discouraging, as it shows some countries tend to be left behind.

There were some intriguing variable relationships in this dataset. First, Log GDP per Capita, Healthy Life Expectancy at Birth, and Social Support were the variables with the strongest positive relationships to overall happiness factor. This stresses the importance of an economy that benefits the people, advanced physical health services, and a society that promotes community and social well-being. The last factor is one that is not talked about enough when thinking about the success of a nation. There was a moderate, positive relationship between generosity and freedom to make life choices. I thought there would be a stronger relationship there, as freedom and generosity seem to be qualities that go together. The fact that there is a positive correlation reinforces my faith in human nature slightly at least. Finally, seeing a negative correlation between corruption and Log GDP per Capita was expected yet poignant. Wealth seems to only increase suspicion of the people in power.

Unsurprisingly, Life Ladder and Log GDP per Capita fluctuate similarly over time. What I thought was surprising was the sequence in which they fluctuate. The two jumps in happiness score occurred before the two jumps in Log GDP per Capita. Interpreting this off so little information is difficult, but could it mean that happy populations lead to wealthy populations, as opposed to the other way around? That would be a finding that changes the way many people think about financial and economic success, but more information could be useful. Perceived corruption has decreased throughout the years, which makes sense due to the rise in social justice advocation over the course of the past few years. Governments are more aware of their public image and are doing better with corruption according to the scores.