

# Geography of Joy

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## Problem Statement

We aim to investigate the geographic variation in happiness levels and to identify key predictors that explain differences between countries. Metrics reflecting people's well-being, with data found in the *World Happiness Report (WHR)*, can be valuable for mission-focused nonprofit organizations. By examining correlations between the life ladder score and variables like income, social support, and health outcomes, nonprofits can design targeted program to improve humanitarian aid across different regions of the world.

## Introduction

To structure the analysis of the *World Happiness Report (WHR)* dataset (2005-2023), we aim to answer the following questions:

1. **What are the relationships between the variables, and how do they correlate with the life ladder score?**
2. **How do scores vary across countries, and what are the patterns and similarities in neighboring regions?**
3. **How have life ladder scores evolved over time, particularly in response to the COVID-19 pandemic?**
4. **What unique insights can we gather by focusing on the United States in the context of global trends?**

To address these questions, we organized our analysis in the following manner:

1. **Correlation Analysis:** We first examined the relationship between the life ladder score and variables that help predict a respondent's ladder score. This helped us lay a foundation for understanding what factors contribute most to happiness.
2. **Spatial Analysis:** Using a heat map, we visualized each country's life ladder score, allowing us to explore geographic patterns. This helps us identify similarities and differences in happiness levels between neighboring countries and regions. We paid particular attention to how these patterns differ across continents.
3. **Temporal Analysis:** We examined the change in life ladder scores over time, highlighting trends on a continental scale. Special attention was given to significant global COVID-19 pandemic, and their impact on happiness across continents.

## Methodology

The production of the *WHR* requires the *WHR* Editorial Board to partner with Gallup, the Oxford Wellbeing Research Centre, and the UN Sustainable Development Solutions Network. *WHR* report uses World Poll from Gallup, which is an annual collection of data measuring multiple criteria, one of which is life ladder. The Cantril Ladder questions asks respondents to picture themselves on a ladder with the top rung being the best possible life for yourself (10) and the bottom rung being the worst possible life for yourself (0). Respondents then give the number that best represents their current situation. The *WHR* took this variable and determined that there are six other criteria that can be used to determine a respondent's **ladder score** (log GDP per capita, social support, healthy life expectancy at birth, freedom to make life choices, generosity, and perceptions of corruption). **Log GDP per capita** is how much each country produces divided by the number of people in that country. **Social support** is measured binarily when respondents are asked if they have friends or family they can count on if they need help. **Healthy life expectancy at birth** takes both physical and mental health into consideration using data from the WHO's Global Health Observatory data repository. **Freedom to make life choices** is a binary variable determined by a respondent's answer to whether they are satisfied or not with their freedom to choose what to do with their life. **Generosity** is measured by asking respondents if they have donated money to charity in the last month. For this reason, this variable was removed because the idea of donating to determine generosity is a very western idea. **Perceptions of corruption** is the average of two binary variables asking if respondents feel that corruption is widespread in businesses and/or the government.

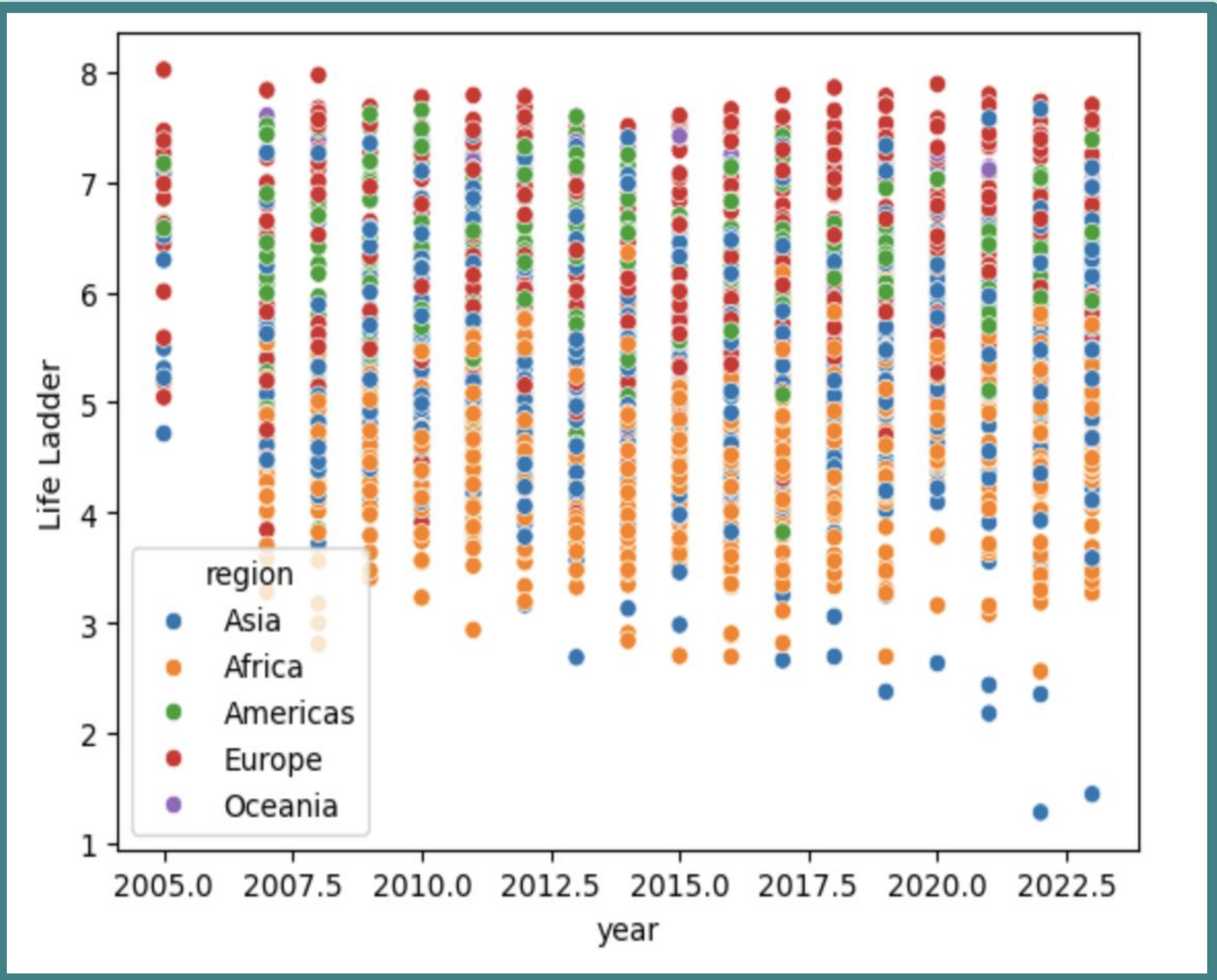


Figure 1 : Life ladder for all countries

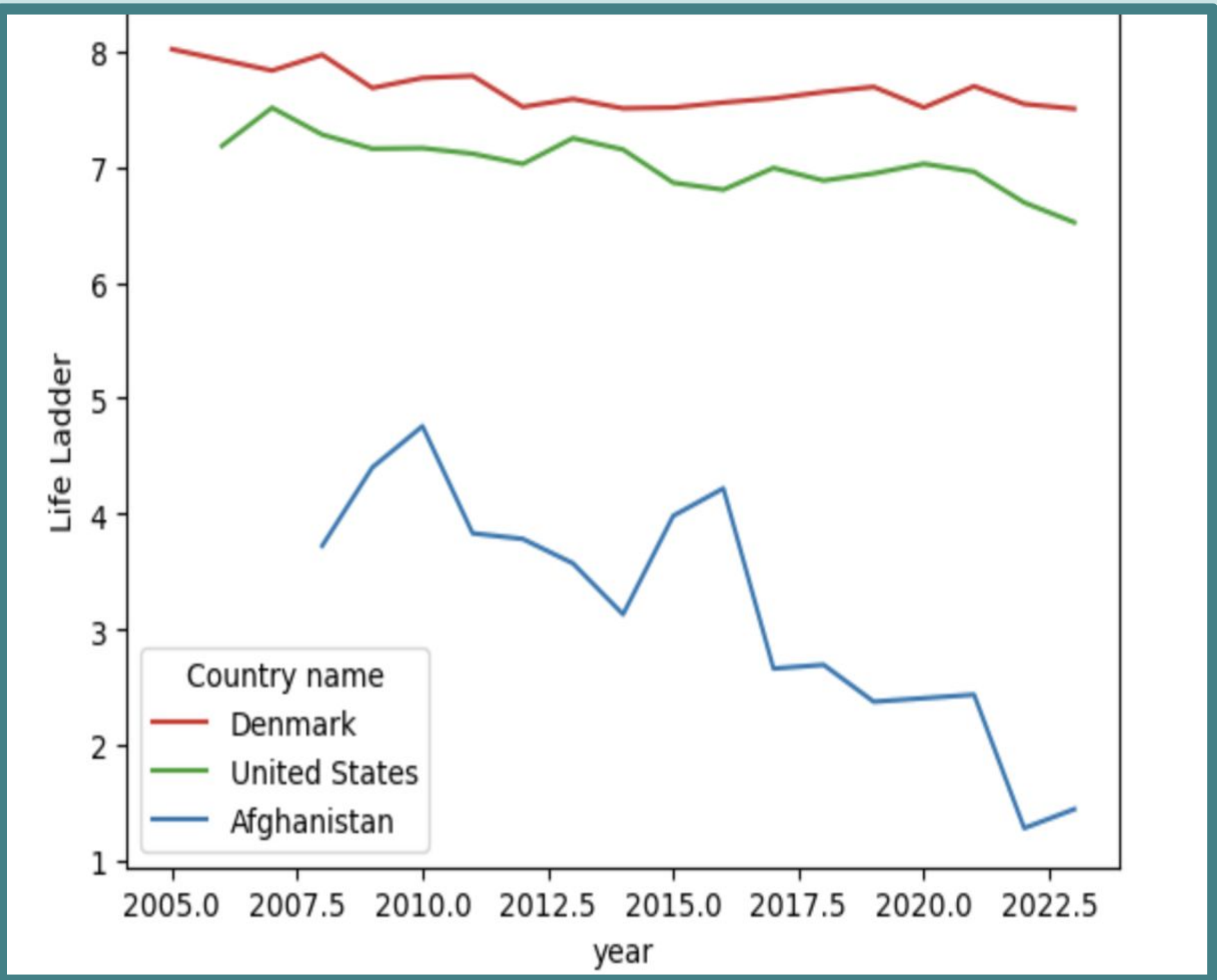


Figure 2 : Life ladder for the United States compared to the country with the highest life ladder score on average (Denmark) and the country with the lowest life ladder on average (Afghanistan).

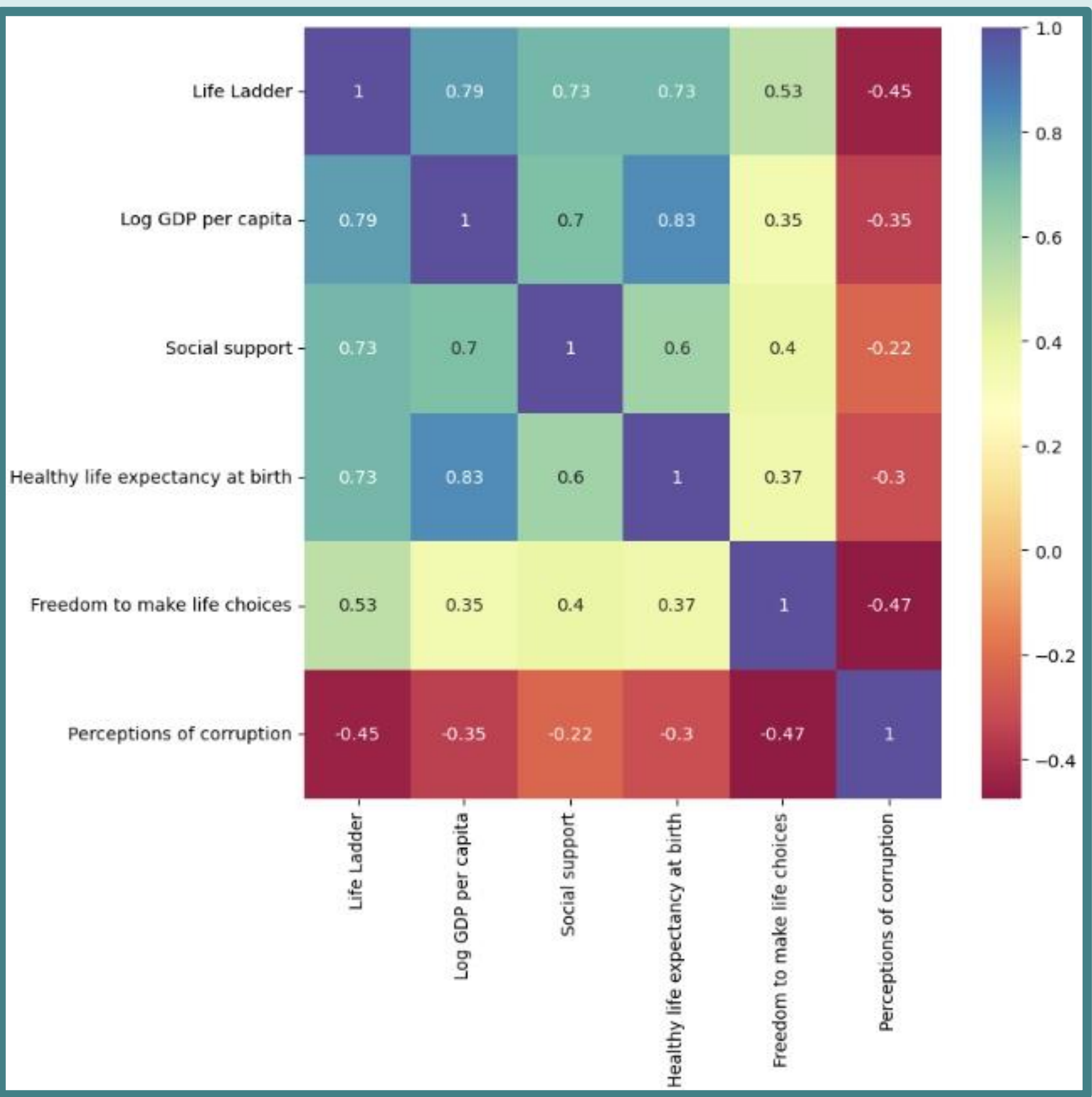


Figure 3 : Correlation table shows the relationships between the five variables and life ladder.

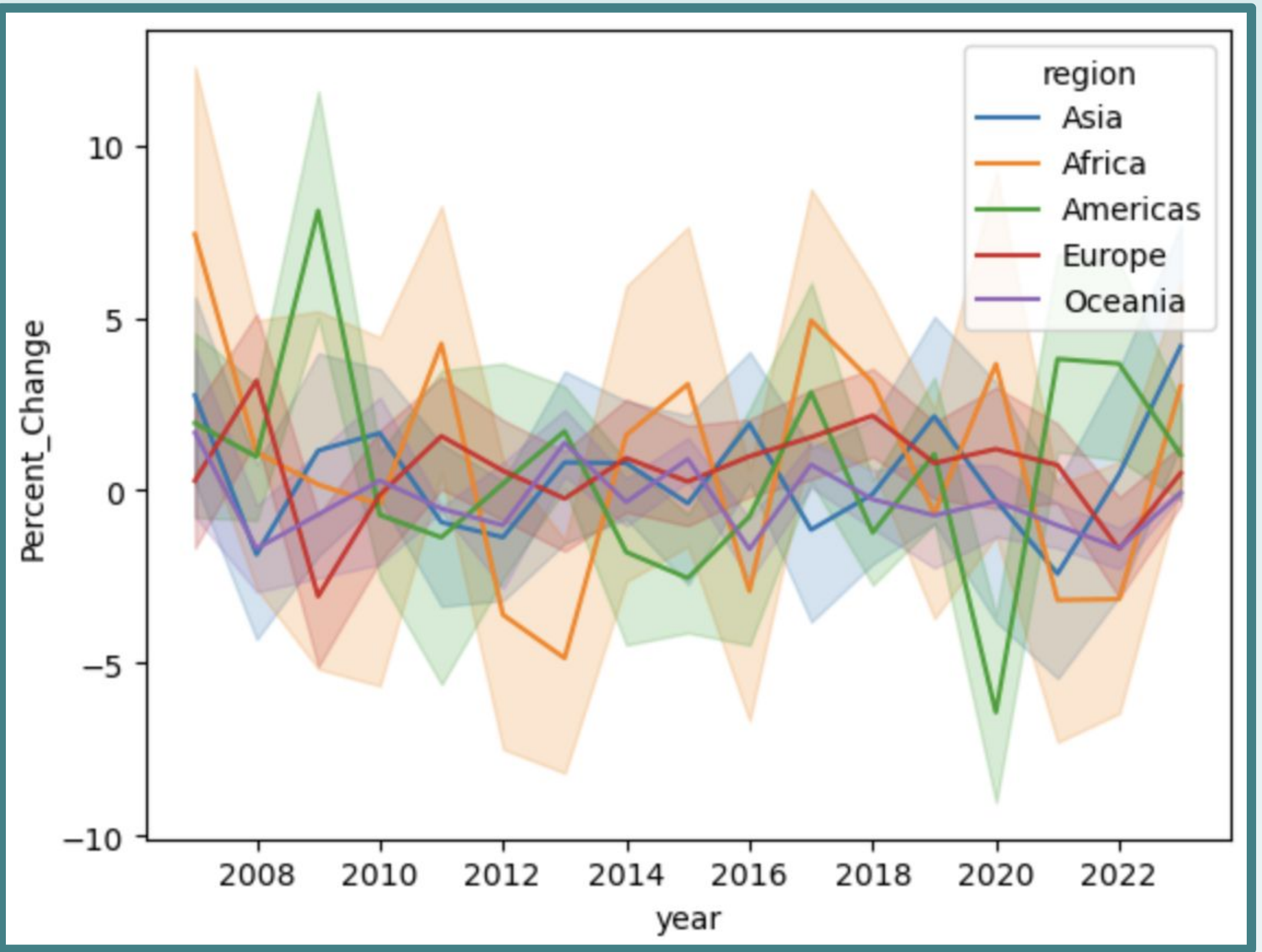
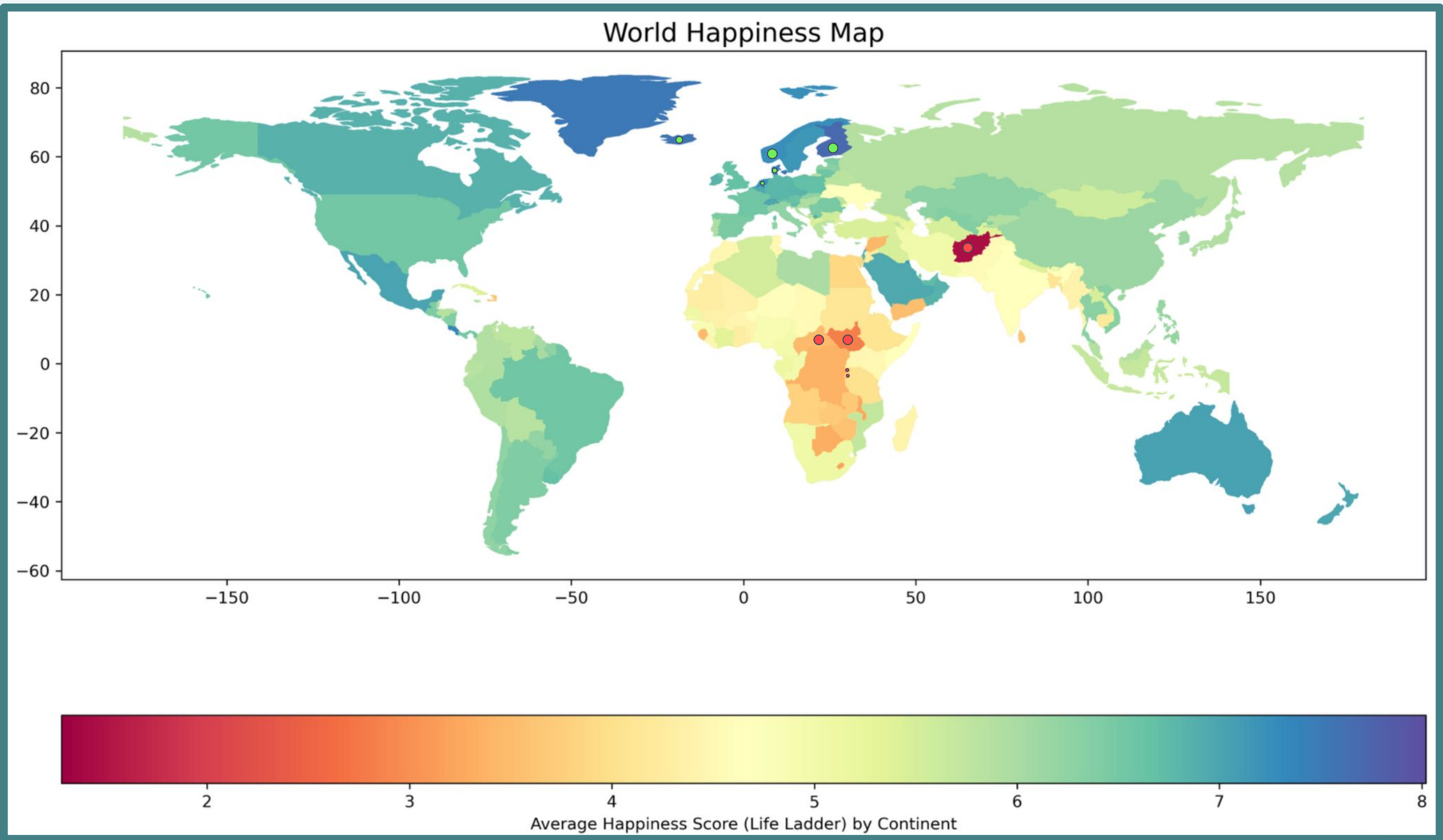


Figure 4 : Percent change in life ladder for regions grouped by location.

Figure 5 : Choropleth map showing the average ladder score for countries across the globe from the past eighteen years.

- The top five happiest countries are Denmark, Finland, Iceland, Norway and the Netherlands.
- The bottom five happiest countries are Afghanistan, South Sudan, Central African Republic, Burundi, and Rwanda.



## Summary

- Figure 1: We observe that the region of Europe has the highest average ladder score, while the region of Africa has the lowest average ladder score. Additionally, we observe that countries in the region of Asia had a significant drop in ladder score in the years following 2020.
- Figure 2: We see that the United States has experienced a consistent decline in ladder score. The country's highest point was in 2007, with a drop in 2008. Another notable spike is in 2014, followed by a drop in 2016. The US is at its lowest in 2023.
- Figure 3: We observe that Log GDP per capita is most highly correlated with happiness, closely followed by healthy life expectancy at birth and social support. Notably, perceptions of corruption is negatively correlated with happiness, but not nearly to the magnitude that the other variables are positively correlated.
- Figure 4: We find that the region of Africa and the Americas have the most elastic ladder scores, while Asia and Oceania are relatively stable. There is a spike in percent change of happiness in the Americas in 2009. Notably, there is a drop in percent change of happiness in the Americas in 2020, while Africa spikes that year. The Americas percent change in happiness shoots back up in 2021, while Africa drops.
- Figure 5: We find that countries are generally similarly as happy as the other countries that surround them. The happiest countries are concentrated in Europe, while the least happy are concentrated in Africa.

### Call to Action

- As humans and Christians we should be concerned with the state of happiness across the globe. This data analysis can be used by people and/or organizations that are sending missionaries to other countries. When going to a country, one can observe their ladder score and then take into consideration the variables that play into that score. Based on human capabilities and our analysis, the most impactful way one can increase another person's happiness is by providing both physical and relational resources. By increasing social support and resources such as access to prenatal care could increase happiness in a certain area.

## Caveats

- When the 2023 *WHR* came out the **GDP per capita** had not been released yet. For this reason, the *WHR* used forecasts to determine each country's **GDP per capita**. These forecasts were country specific and looked at projected values for country's production in the Economic Outlook No. 112, as well as estimating the population by following the trend from the previous year.
- To determine **Healthy life expectancy at birth** in 2023, Interpolation was used. This was due to the fact that the WHO's Global Health Observatory data repository only has data for the years 2000, 2010, 2015, and 2019. While interpolation can be accurate, it could also lead to the over or under prediction of this variable.
- According to this dataset, Kosovo is not considered a country even though it has been a sovereign nation since 2008.
- Some countries have more years of data than others. For example, Oman has only one year represented in the data, whereas South Korea has been included in this report all eighteen years.