



Statistics and Human Rights Directed Reading Program Spring 2022

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Life, Liberty and the Pursuit of Happiness

- ▶ My academic background is in the Middle East.
- ▶ I want to go to graduate school in statistics because I want tools to quantify how societies achieve sustainable development and end poverty. We can use statistics to not only help describe the world, but to help change it.
- ▶ I am excited to work on topics that use statistics to improve human rights
- ▶ This quarter we studied articles about using statistics to
 - ▶ discover responsibility for deaths in civil war,
 - ▶ comparing international health systems metrics and perceptions,
 - ▶ quantifying the number of refugees and country of origin through representative sample surveys
 - ▶ measure world hunger

My Final Project

- ▶ I also wanted to learn more R code,
- ▶ Interact with real world data,
- ▶ And create a project that is meaningful given my academic interests

Female Happiness Index

- ▶ Using the World Happiness Report by the United Nations Sustainable Development Solutions Network and Gallup World Poll as a model, I collected data that looks at several categories for each country in the world
- ▶ I wanted to see if their approach still held up for a subpopulation, specifically females and quantitative indices

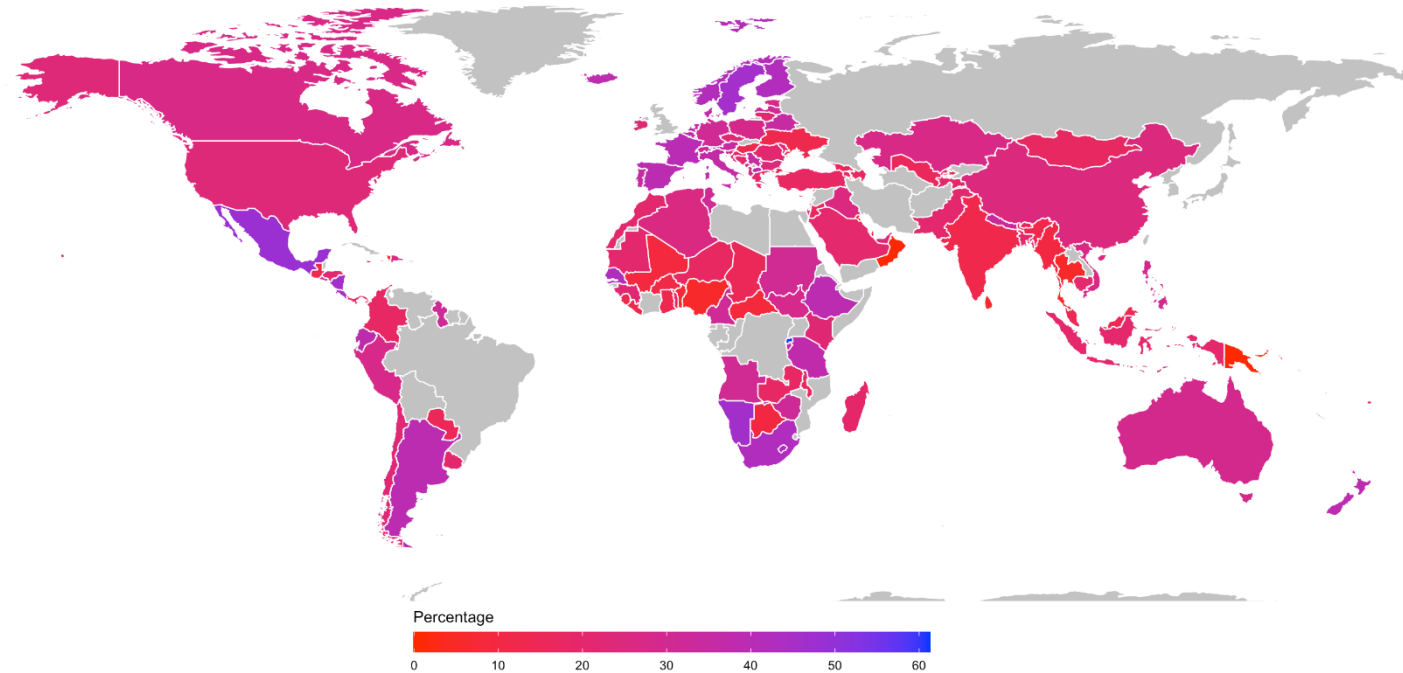
Happiness Report	Our Report
Gross Domestic Product (GDP)	Female to Male Pay Ratio
Life Expectancy	Life Expectancy of Females Maternal Mortality Rates
Individual Freedom	Freedom to Access and Use Birth Control Education Rates of Females and Males
Social Support	Paid Family Leave Domestic Violence Rates
Government Corruption	Percentage of Female Participation in Government
Personal Generosity	NA

Data Cleaning

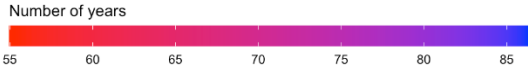
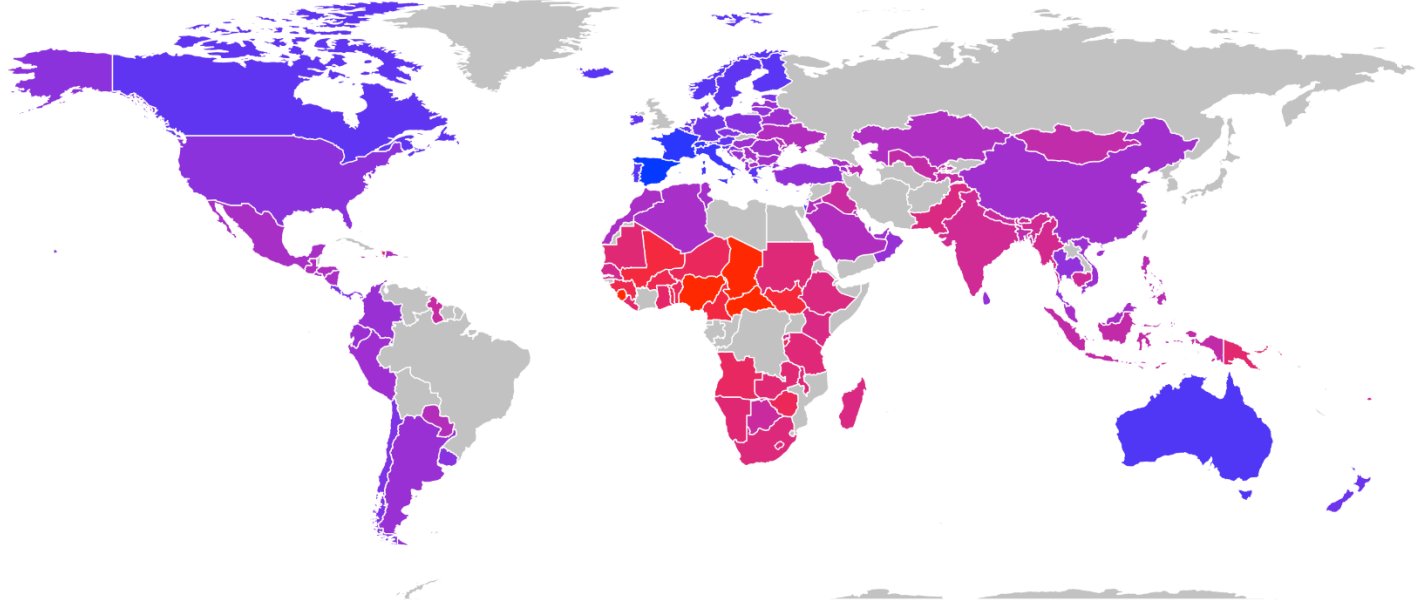
- ▶ I was able to find data on the 8 previous categories, mostly collected from the World Bank or the United Nations.
- ▶ I used R to clean the data, merge the final spreadsheet of 156 countries and compare across all the metrics.
- ▶ We had the most complete data for 2018, which obviously doesn't include some major recent events in the international community (Covid, Afghanistan, Ukraine, Roe v. Wade...)

Individual Categories

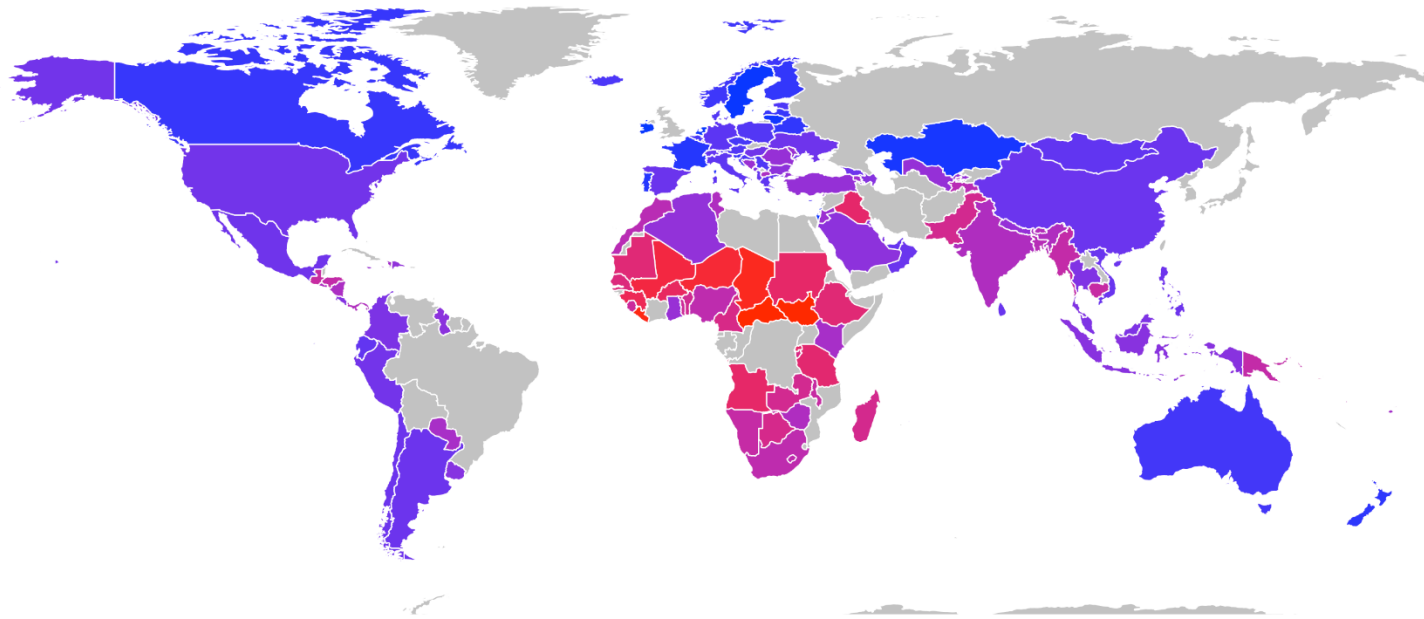
Proportion of females in parliament 2018



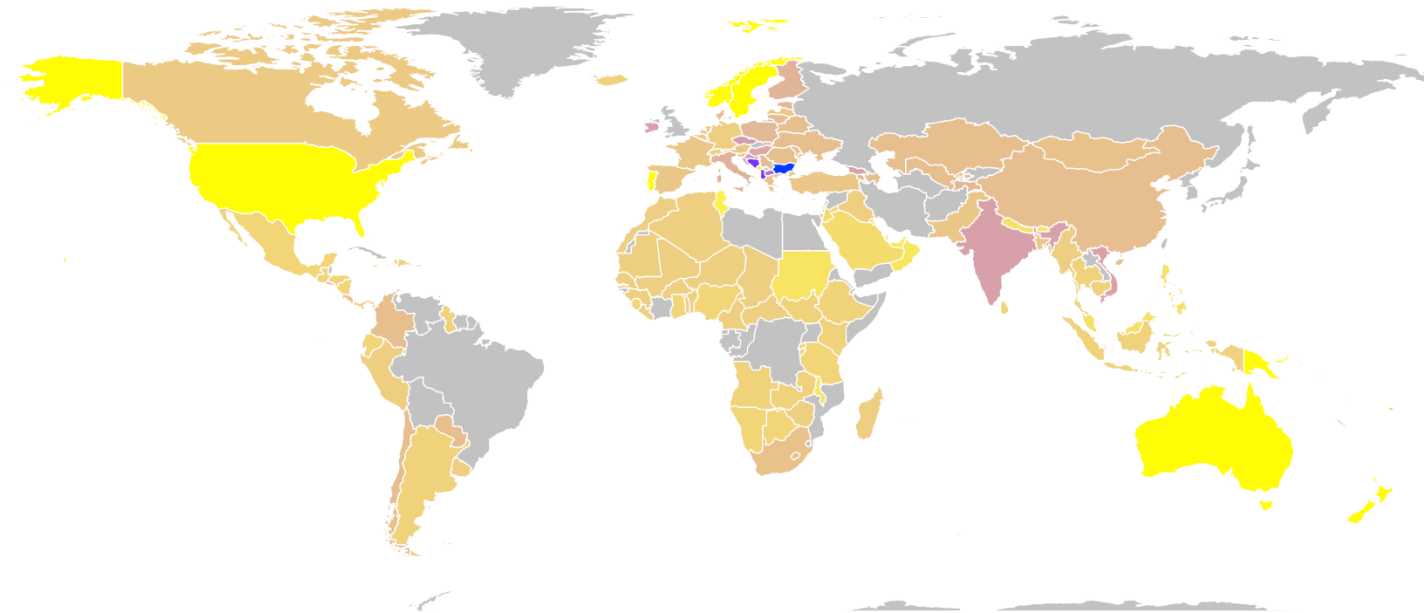
Life expectancy of females 2018



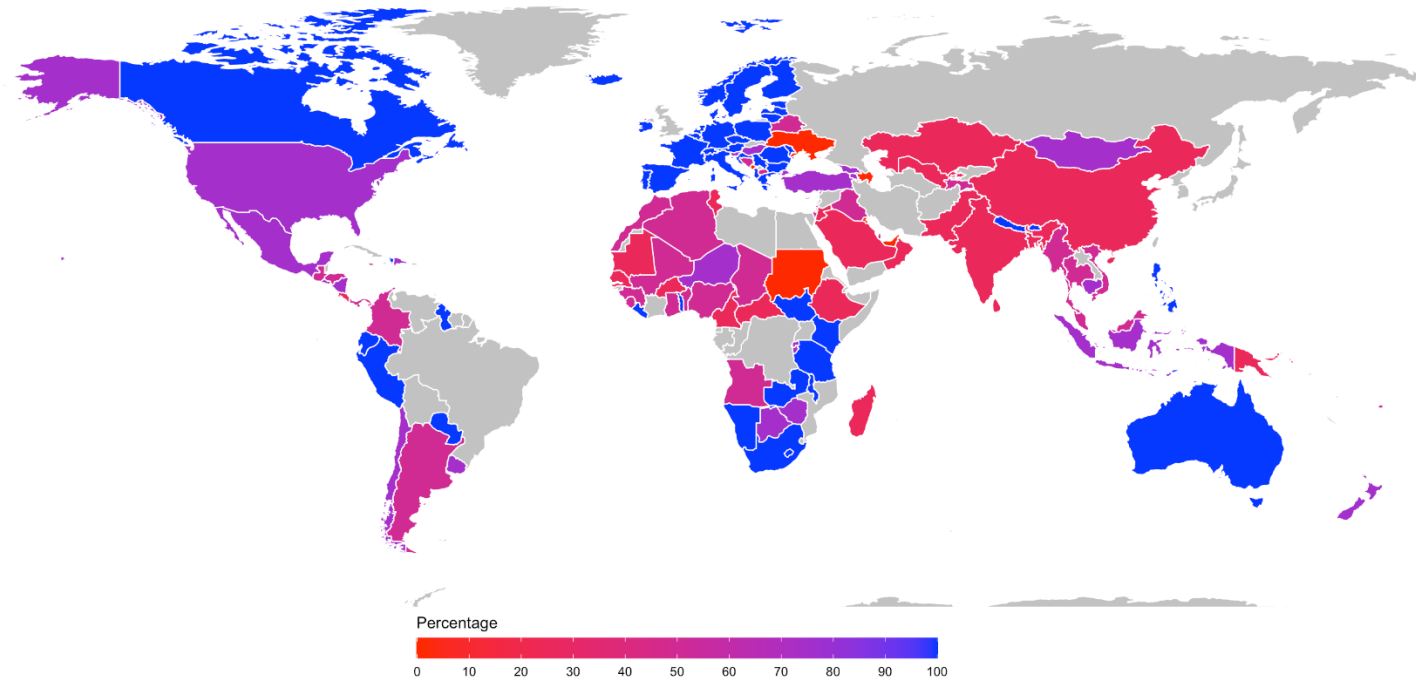
Expected years in school 2018



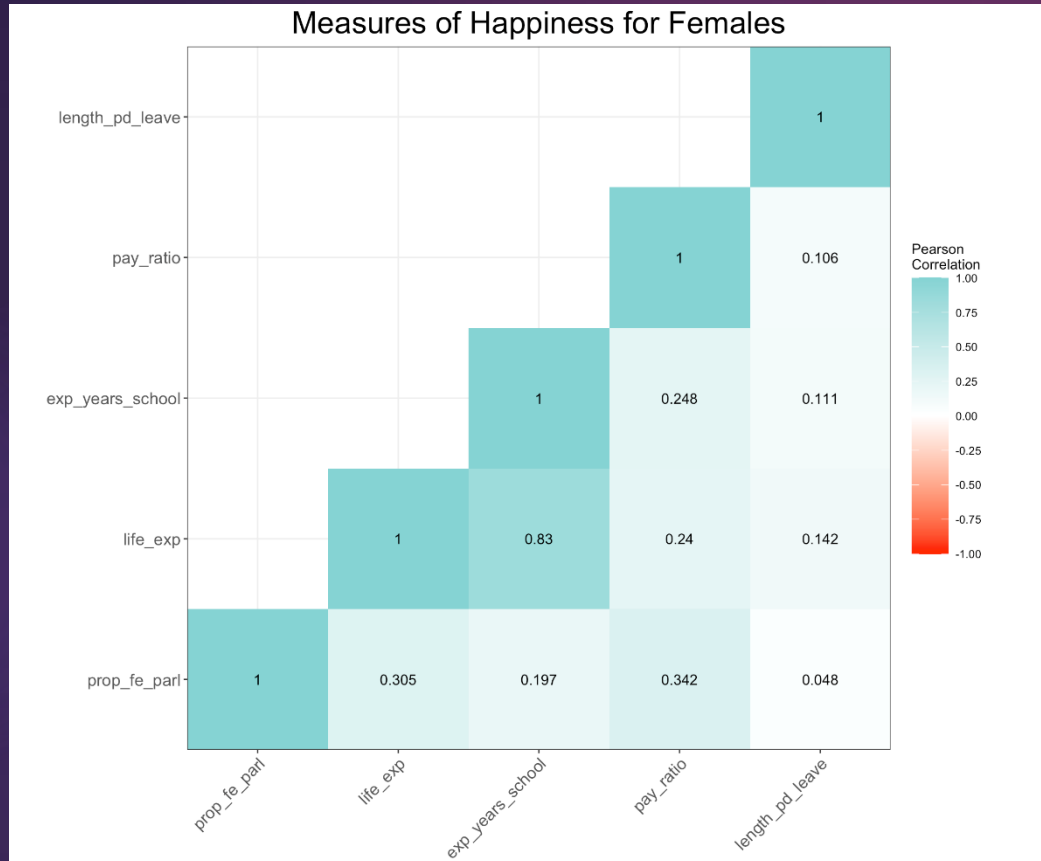
Length of paid family leave 2018



Female to male pay ratio 2018



Regression

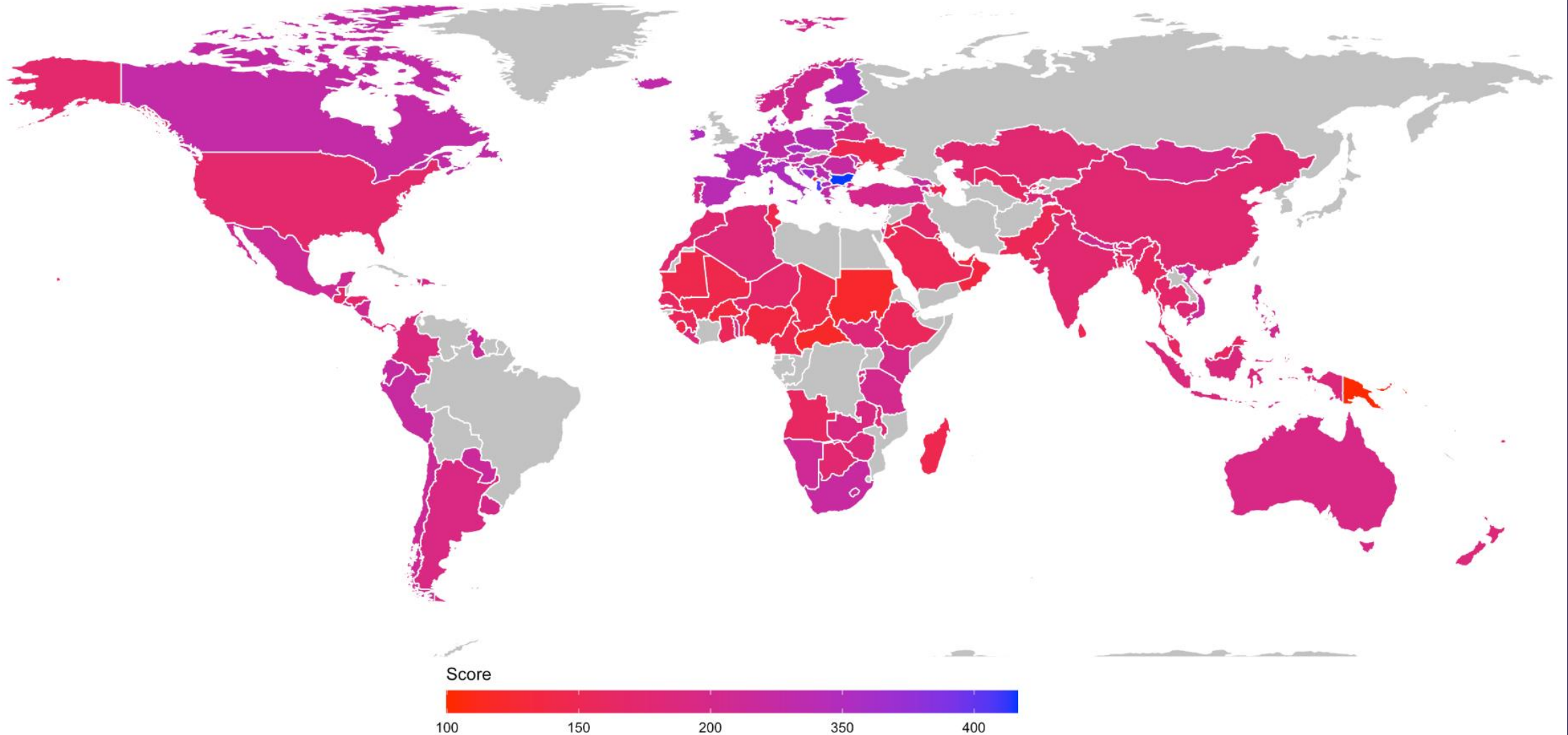


Notes:

- ▶ The variables that were theoretically correlated actually had little correlation in our data.
- ▶ (This could be sampling error, an anomaly in this sample year, countries sampled, or actually uncorrelated in general etc.)
- ▶ This makes Principal Components Analysis less reliable (it only accounts for 44% of the variance in the data.) But we still attempted an index.
- ▶ We were surprised that the data for Access to Free Family Planning was showing negative correlation when we tried to change it from qualitative to quantitative. We decided to remove it from our final analysis
- ▶ We also couldn't access the raw data for Domestic Violence so unfortunately couldn't include it in our analysis.

Heat Map of Our Index

Female Happiness



Results

- ▶ Most Happy Countries according to our Index are now

Country Name	Our Index
Bulgaria	316.2971
Albania	307.2931
Bosnia and Herzegovina	267.0824
Croatia	252.0172
Finland	251.7985
Czech Republic	251.1958
Ireland	249.4384
Italy	249.2837
North Macedonia	247.7789
Slovak Republic	244.1316

▶ Least Happy in the ranking are

Country Name	Our Index
Burkina Faso	131.6648
Montenegro	131.5539
United Arab Emirates	131.4327
Bahrain	130.3446
Kuwait	122.5793
Yemen, Rep.	122.4987
Eswatini	121.3135
Sudan	120.2298
Central African Republic	119.3585
Papua New Guinea	100

US

- ▶ US changed from # 19 in the World Happiness Index to #102 in our Female Happiness Index.

	Females in Parliment	Life Expectancy	Paid Leave	Pay Ratio	Years in School
World Averages	22.13668	74.88273	103.2051	66.1859	11.33784
US Data	23.50230	81.20000	0.0000	75.0000	12.93639

- ▶ This leads to many more questions about ways to approach this project in my future work, to refine the index, or recalculate it with more correlated data.

Thank you to Rita and Anna for all of your support to make this mentoring course possible!

▶ Questions?