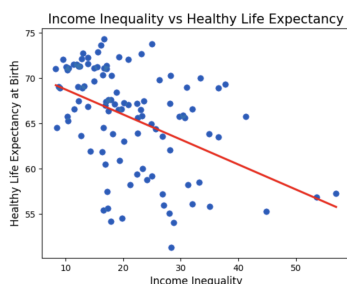


# Income Inequality and Happiness: Analyzing the Intricate Correlation within 104 Countries

Globally, the issue of income inequality has a profound impact on all aspects of society, and its importance cannot be ignored, especially when exploring individual well-being. Studying the correlation between inequality and happiness (subjective well-being) can help policymakers understand the extent to which unequal distribution of wealth affects overall life satisfaction in society. If a correlation is found, it can signal the need for policies aimed at reducing inequality. We want to shed light on the broader societal and psychological effects of economic disparities. So, in this study, we aim to answer: Is there a generalized correlation between income inequality and happiness in countries across the globe?

For analytical purposes, we use the **World Happiness Data 2024 | Emotions Analysis and Inequality in Income Across the Globe** datasets. The happiness data includes features such as Life Ladder (a measure of life satisfaction on a scale from 0 to 10), Log GDP per capita (reflecting economic prosperity), Social Support (a measure of perceived availability of reliable support networks), Healthy Life Expectancy at Birth (ranging from 20 to 85 years), Freedom to Make Life Choices (ranging from 0 to 1, 0 being complete dissatisfaction), Generosity (ranging from -0.5 to 0.5, lower values indicate lower occurrences of generosity), Perceptions of Corruption (ranging from 0 to 1, 0 indicating no corruption), Positive Affect (measuring the frequency of positive emotions from 0 to 1), and Negative Affect (measuring the frequency of negative emotions from 0 to 1). The data was collected by asking citizens of each country survey questions that pertain to the respective features. For instance, survey participants were asked whether they experienced specific negative emotions on the previous day, typically including worry, sadness, or anger, generating binary results for the 'Negative Affect' feature. All metrics and their respective values are aggregated at the national level to provide an average score for each country. The feeling of happiness is thus quantified into a dataset. Income inequality, measured using the Atkinson inequality index based on data from household surveys collected by the UNDP, is a key component of the Income Across the Globe dataset compiled by Sourav Banerjee on Kaggle.

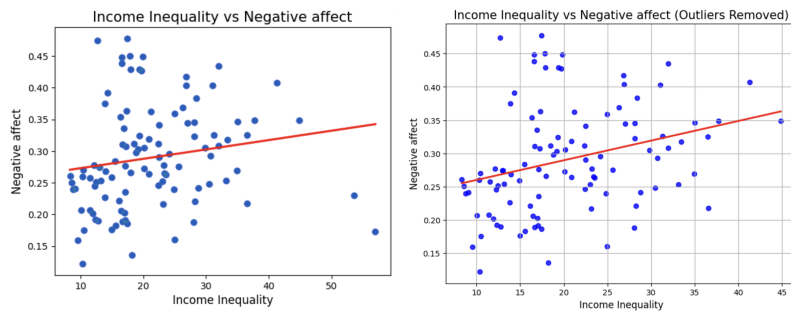
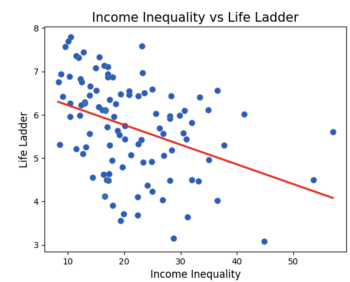
We start our study by preprocessing and cleaning our datasets, first by converting the inequality dataframe from wide to long in order to get the years as a column, the same as the happiness dataframe. The year column names contain irrelevant characters, so we remove the strings and leave only the year as an integer. We drop the columns that are irrelevant and do not contribute to our study such as 'Continent' and 'Hemisphere'. Some countries do not disclose their income inequality data, so we drop all NaNs from the 'Income Inequality' column. We do not impute these missing values with the mean of this column, because this may introduce bias and give countries inaccurate ratings. Since the latest year that is included in both datasets is 2021, we subset the years in both datasets to only include data from 2021. Now that both datasets are ready, we performed an inner merge on the two dataframes based on country names that are common in both datasets. We now have a merged dataframe that is ready for analysis.



With the data cleaned and merged, we begin examining the correlations between income inequality and various factors contributing to happiness. The scatterplot here shows a clear **negative correlation** between **income inequality** and **healthy life expectancy**. As income inequality rises, the number of years

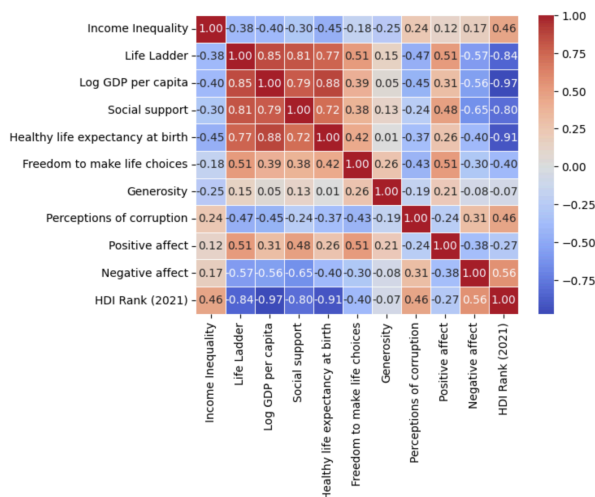
individuals are expected to live in good health decreases. This suggests that in countries with higher income inequality, citizens may have poorer access to healthcare and be subject to less feelings of happiness, resulting in a shorter life expectancy.

Similarly, this scatterplot indicates a **negative correlation** between **income inequality** and **Life Ladder** (subjective well-being). Countries with higher income inequality tend to have lower overall life satisfaction. This likely reflects the detrimental effects of income disparities on general happiness, where larger gaps in income may lead to higher stress, reduced access to opportunities, and a lower sense of well-being among citizens.



Moreover, these two graphs explore the relationship between income inequality and **negative affect**. The second version of the graph (with outliers removed) shows a strengthened correlation suggesting that in countries with moderate to high levels of inequality, citizens are more likely to

experience negative emotions. This points to the emotional toll of living in unequal societies, where people may face higher levels of stress and insecurity.



All in all, this heatmap summarizes the correlations between income inequality and various happiness indicators. The negative correlations between **income inequality** and factors such as **Life Ladder**, **Log GDP per capita**, **Healthy Life Expectancy at Birth**, and **Social Support** confirm that higher income inequality tends to decrease subjective well-being, economic prosperity, and access to social and health resources. Meanwhile, the positive correlation between **income inequality** and **Negative Affect** emphasizes the emotional challenges faced by individuals in unequal societies.

Based on our data and graphs, we can conclude income inequality negatively affects life satisfaction, economic prosperity, and healthy life expectancy. Countries with higher inequality are generally less happy, have lower life expectancies, and experience lower GDP per capita. Negative emotions (Negative Affect) increase as income inequality rises, indicating that people in highly unequal countries are more likely to feel stressed, anxious, or sad. These findings highlight the strong link between inequality and both material well-being (such as health and economic prosperity) and emotional well-being (such as life satisfaction and the experience of positive/negative emotions).

