Final Project

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Introduction

Across the world, national wealth is commonly assumed to translate directly into a better life for citizens. Yet recent findings from the World Happiness Report reveal a puzzling pattern. **Countries with high economic prosperity do not always achieve correspondingly high levels of life evaluation**. The United States, for example, consistently ranks among the richest nations in terms of GDP per capita but lags behind several lower-income countries in life satisfaction. This discrepancy raises an important question about what truly drives human well-being and whether economic growth alone is sufficient to improve people's lived experiences.

To contribute to understanding this puzzle, this project analyzes data from the **World Happiness Report (2021-2024)**, covering **566 country-year observations** across dozens of nations. The **unit of analysis** is the **country-year**, and the outcome variable is **life evaluation**, a 0-10 measure of how individuals assess their overall life quality. The main explanatory variable is **log GDP per capita**, representing economic prosperity. Additional variables are **social support**, **healthy life expectancy**, **freedom to make life choices**, **generosity**, **perceptions of corruption**. This leads to the central research question: **How strongly is log GDP per capita associated with life evaluation across countries, and do social and institutional factors help explain cross national differences?**

Theory and Hypothesis

Understanding why economic prosperity does not always translate into higher life evaluation has been a central question in the study of well-being. While GDP per capita is often used as a proxy for national progress, prior research shows that income alone may be insufficient to explain how people assess their overall life satisfaction. This project seeks to explain **why countries with similar levels of economic development differ in reported well-being**, and whether social and institutional conditions account for part of this variation.

A large body of research in economics and psychology highlights the limits of income as a driver of subjective well-being. The **Easterlin Paradox** argues that increases in national income do not continuously raise happiness once basic needs are met, suggesting diminishing returns to wealth (Easterlin 1974). Other studies emphasize the role of **social supportc**, **trust in institutions**, and **health** in shaping individuals' life satisfaction **(Helliwell & Putnam 2004; Deaton 2008; Helliwell 2003)**. Cross-national analyses consistently find that people report higher well- being when they feel supported by communities, perceive governments as fair and trustworthy, enjoy strong physical health and longevity **(Diener & Biswas-Diener 2002; Inglehart et al. 2008)**. Together, these findings imply that well-being is multidimensional and shaped by more than economic resources alone.

Based on this literature, the causal mechanism is that **economic prosperity (X)** influences **life evaluation (Y)** partially through its effect on social and institutional factors. Income may improve well-being by enabling access to healthcare, improving living standards, and supporting stable social environments.

However, when social support is weak, corruption is high, or individuals lack freedom in making life choices, these institutional shortcomings may limit the impact of GDP on subjective well-being. Thus, countries with similar economic output may yield different well-being outcomes depending on social structures and governance quality.

From this theoretical foundation, the following hypotheses are developed:

- H_0 (Null Hypothesis): Log GDP per capita has no association with life evaluation once social support, health, freedom, and corruption are accounted for.

$$\beta_{log\ GDP} = 0$$

- H_1 (Alternative Hypothesis): Log GDP per capita is positively associated with life evaluation even after accounting for social support, health, freedom, and corruption.

$$\beta_{log\ GDP} > 0$$

These hypotheses reflect the expectation supported by previous research that economic prosperity improves well-being, but its impact is only partial, with social and institutional factors also playing meaningful roles.

Data and Visual Analysis

Data

This project uses data from **World Happiness Report** covering years **2021-2024**. After filtering to include only these years and removing incomplete cases, the final dataset contains **566 country-year observations**. The **unit of analysis** is the country-year, meaning each row represents a specific country observed in a specific year.

The dataset is **observational**, not experimental because no treatment was randomly assigned, causal inference is limited. Instead the analysis focuses on identifying associations between economic, social, and institutional factors and the outcome variable, **Life Evaluation**. Potential confounding is likely, especially because variables such as social support, perceptions of corruption, and health are correlated with each other and with GDP. No variable transformations were necessary beyond renaming, since all variables are already scaled on comparable 0-10 Cantril ladder units.

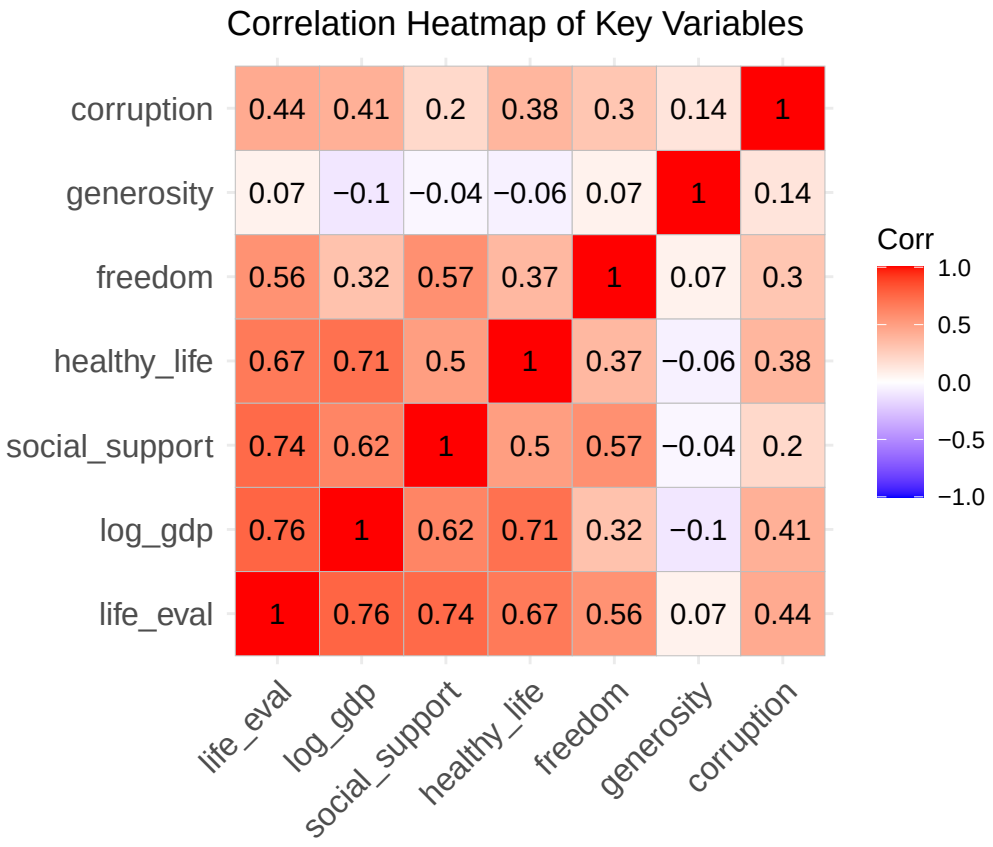
Statistic	Mean	St. Dev.	Min	Median	Max
life_eval	5.55	1.14	1.36	5.77	7.82
log_gdp	1.38	0.42	0.00	1.43	2.21
social_support	1.13	0.36	0.00	1.18	1.84
healthy_life	0.51	0.20	0.00	0.53	0.95
freedom	0.61	0.18	0.00	0.62	1.02
generosity	0.14	0.07	0.00	0.13	0.47
corruption	0.15	0.12	0.00	0.12	0.59

	life_eval	log_gdp	social_support	healthy_life	freedom	generosity	corruption
life_eval	1	0.76	0.74	0.67	0.56	0.07	0.44
log_gdp	0.76	1	0.62	0.71	0.32	-0.10	0.41
social_support	0.74	0.62	1	0.50	0.57	-0.04	0.20
healthy_life	0.67	0.71	0.50	1	0.37	-0.06	0.38
freedom	0.56	0.32	0.57	0.37	1	0.07	0.30
generosity	0.07	-0.10	-0.04	-0.06	0.07	1	0.14
corruption	0.44	0.41	0.20	0.38	0.30	0.14	1

The table shows considerable variation across the dataset. **Life Evaluation** averages 5.55, with a minimum of 1.36 and maximum of 7.82, indicating substantial differences in perceived well-being across countries. **Log GDP per capita** is moderately concentrated around 1.38, while **social support** and **healthy life expectancy** show smaller ranges, suggesting these factors vary less between countries. **Freedom** and **perceptions of corruption** show moderate dispersion, and **generosity** is generally low with minimal variation.

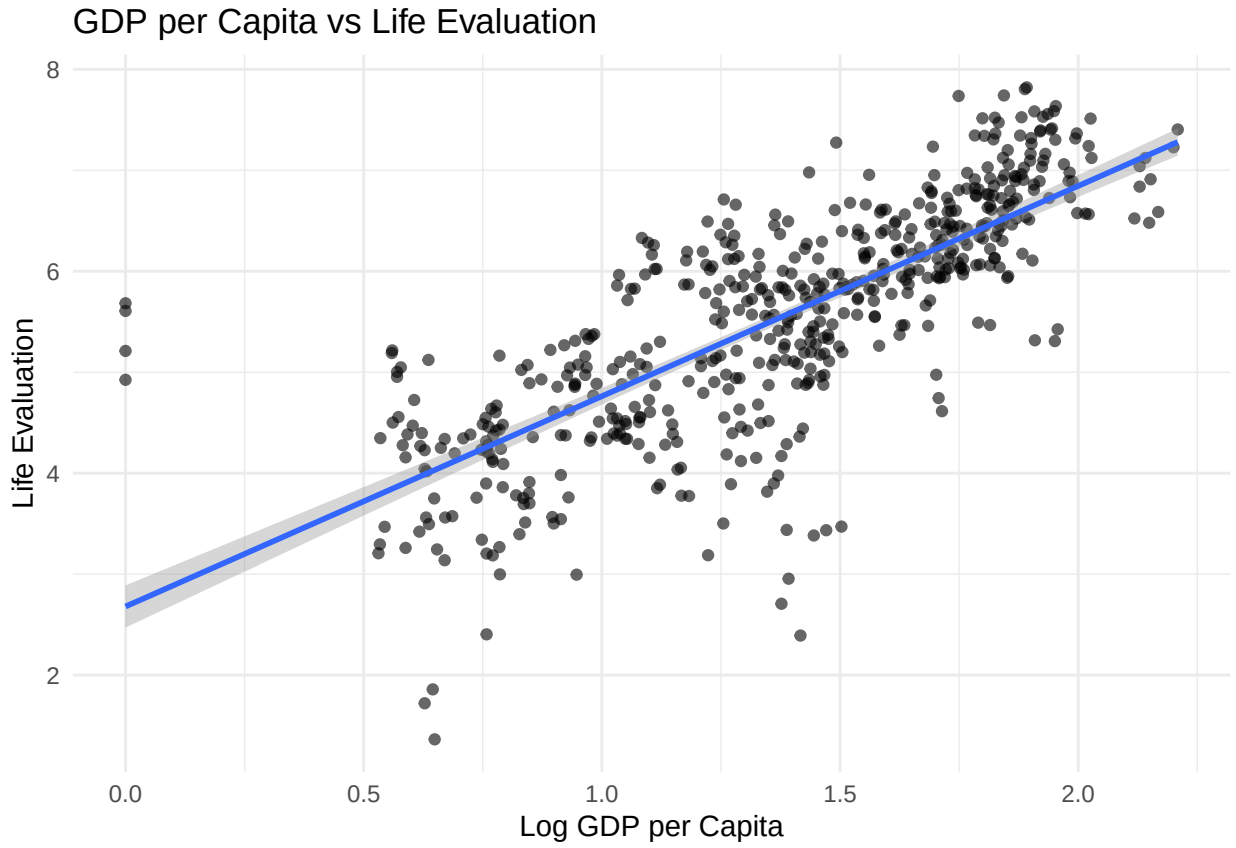
The correlation matrix shows the pairwise linear relationships among key variables. Life evaluation is most strongly associated with Log GDP (r = 0.76) and Social Support (r = 0.74), followed by Healthy Life (r = 0.67) and Freedom to make life choices (r = 0.56), indicating that higher economic prosperity, stronger social networks, better health, and greater freedom tend to correspond to higher life satisfaction across countries. In contrast, Generosity shows almost no linear association with Life Evaluation (r = 0.07), suggesting it is not a meaningful predictor in this context. Among the explanatory variables, some moderate correlations exist. For example, Log GDP and Healthy Life are correlated at 0.71. Though no pair of variables exceeds levels, they are typically considered problematic for multicollinearity. Overall, the matrix highlights which factors are most strongly related to Life Evaluation and supports the selection of Log GDP, Social Support, Healthy Life, Freedom, and Corruption as primary predictors in the regression analysis.

Exploratory Data Analysis

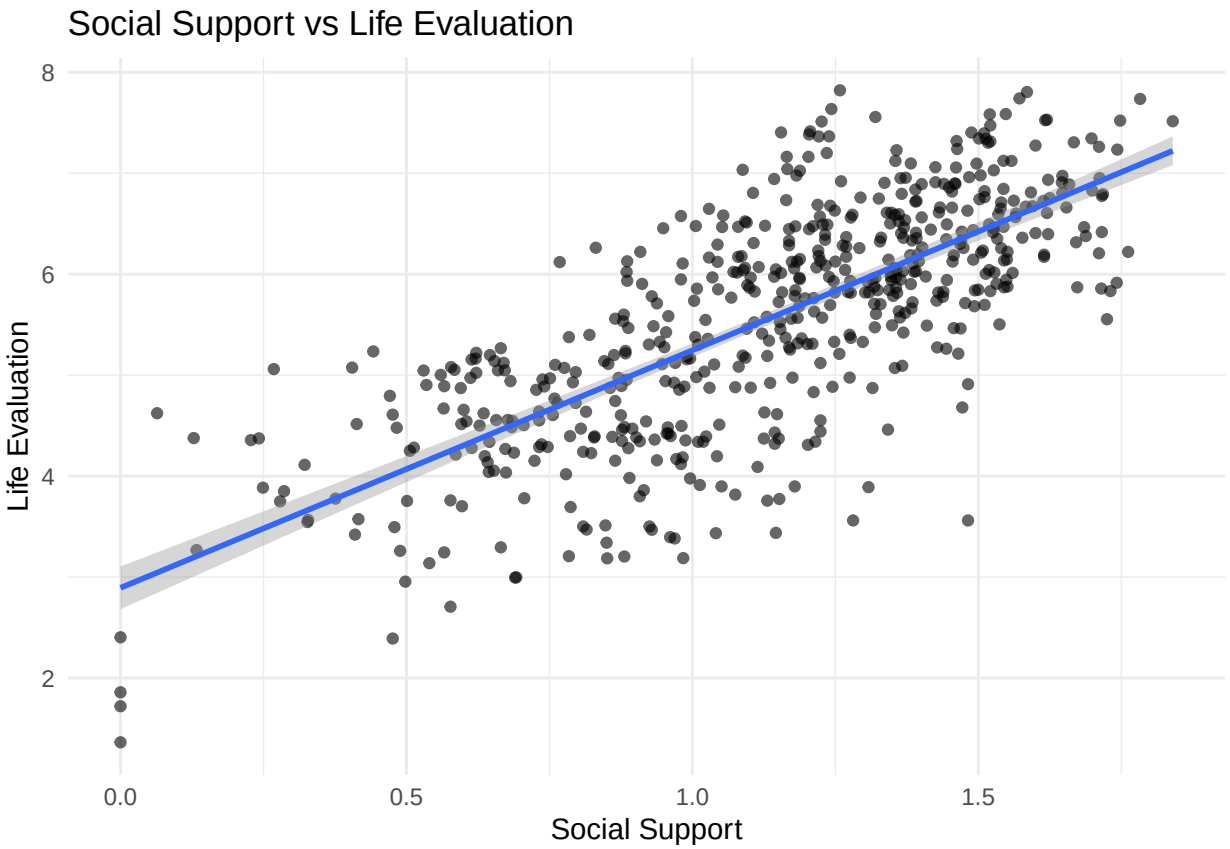


To explore the relationships among the key variables in the World Happiness dataset, I began by examining a correlation heatmap. This visualization provides a compact view of linear associations and reveals clear clusters among variables related to well-being. Life evaluation is strongly correlated with Log GDP per capita, social support, and healthy life expectancy, suggesting that economic and social conditions are major contributors to national well-being. Freedom shows a moderate positive relationship, while generosity and perceptions of corruption display weaker associations. These patterns indicate that GDP, social support,

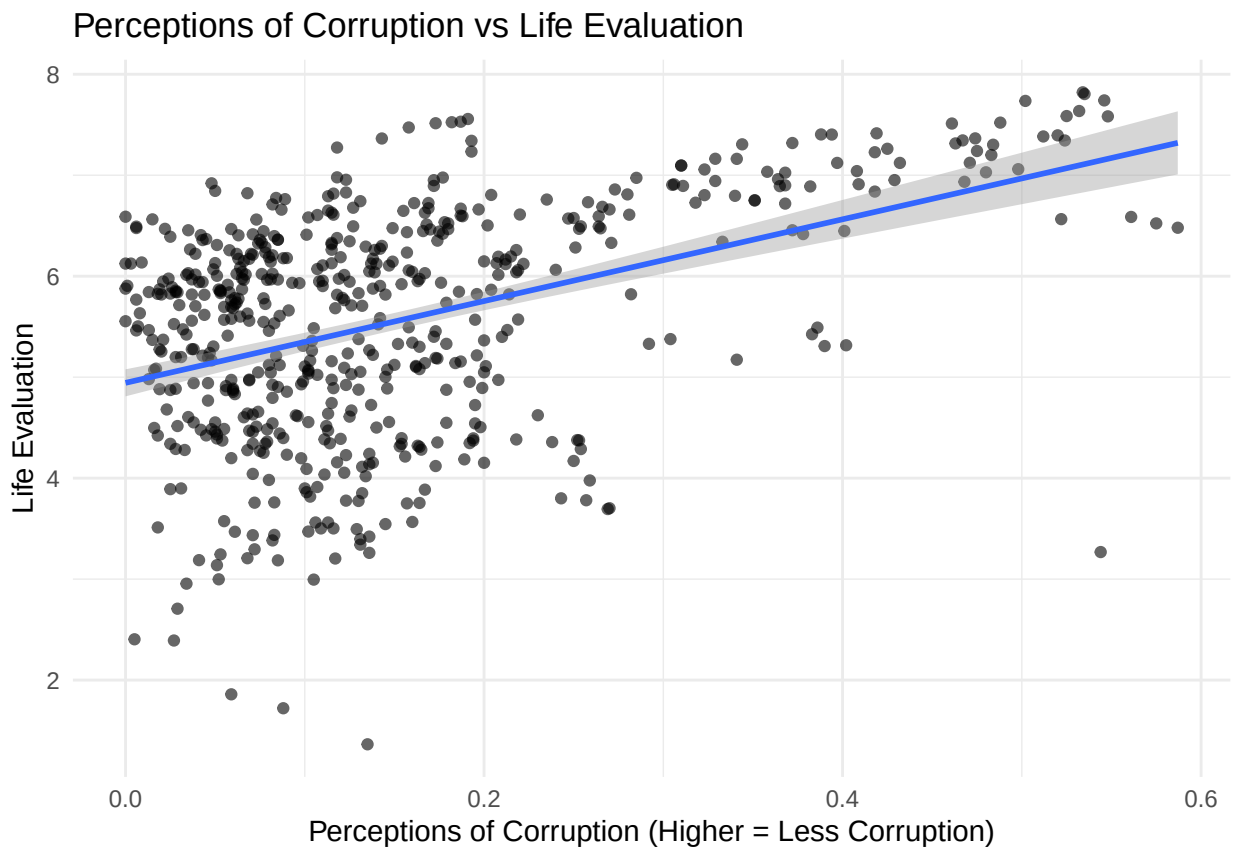
and health are the most promising predictors to include in the regression model, while generosity is unlikely to be influential.



The scatterplot shows a strong positive linear relationship between log GDP per capita and life evaluation. Countries with higher economic prosperity correlate with higher levels of subjective well-being. The fitted regression line slopes upward, and the data points cluster tightly around it, suggesting that GDP is one of the strongest predictors of life evaluation. This visual reinforces the idea that economic resources provide important foundations for well-being but may not fully explain cross-national differences.



The plot demonstrates a moderate positive relationship between perceived freedom and life evaluation. While the upward slope is clear, the points are more dispersed compared to previous variables. This suggests that freedom meaningfully contributes to well-being, but its relationship is weaker and more context-dependent. Still, the visual indicates that autonomy and perceived control over life decisions are relevant predictors.



This scatterplot shows a positive slope, indicating that lower perceived corruption is associated with higher life evaluation. The relationship is weaker and more scattered, but the general pattern is upward. This suggests that governance quality and institutional trust contribute to subjective well-being, although the effect is smaller relative to GDP, social support, or health.

Statistical Analysis

To evaluate the relationship between GDP per capita and life evaluation, I estimate a multiple linear regression model that includes log GDP per capita as the main predictor and several theoretically grounded confounders: social support, healthy life expectancy, freedom to make life choices, and perceptions of corruption. These variables are included because they influence both national economic conditions and subjective well-being, and therefore satisfy the structure of potential confounders (log_gdp $\leftarrow$ Z $\rightarrow$ life_eval).

This specification allows us to isolate the association between GDP per capita and life evaluation while accounting for key social and institutional factors. The resulting model provides evidence on whether GDP per capita remains a significant predictor of life evaluation after adjusting for these confounding influences.

Results Discussion

The regression results provide strong evidence against the null hypothesis, indicating that GDP per capita is positively associated with life evaluation even after accounting for major confounders. Log GDP remains highly significant in all specifications, suggesting a robust relationship that does not disappear once social support, healthy life expectancy, freedom, and corruption are included. This consistency strengthens confidence that GDP captures a meaningful dimension of subjective well-being across countries.

Table 1: Regression analysis of Log GDP on Life Evaluation

	life_eval
log_gdp	0.981***
	(0.094)
social_support	1.011***
	(0.100)
healthy_life	0.840***
	(0.174)
freedom	1.100***
	(0.166)
corruption	1.062***
	(0.222)
Constant	1.803***
	(0.101)
N	566
R-squared	0.756
Adj. R-squared	0.754

***p < .01; **p < .05; *p < .1

At the same time, the results show that several non-economic factors contribute comparably or even more strongly to life evaluation. Social support, freedom, health, and perceived corruption all remain significant predictors in the fully adjusted model, underscoring that subjective well-being is multidimensional rather than purely economic. The stability of these findings across specifications indicates that the key associations are not driven by model choice or omitted-variable bias within the available data.

While the results are strong, they rely on cross-sectional comparisons between countries rather than changes within countries over time. Future work could use panel or longitudinal data to examine whether increases in GDP or improvements in social conditions lead to higher life evaluation within the same country. Additional variables—such as more detailed health measures, cultural factors, or institutional quality indicators—could also help clarify the mechanisms behind the observed relationships.

Conclusion

This project examined the relationship between GDP per capita and life evaluation using World Happiness Report data from 2021–2024 across 566 country-year observations. The research question asked whether higher national income corresponds to higher subjective well-being, and the analysis incorporated major confounders—social support, freedom, healthy life expectancy, and perceptions of corruption—to more accurately estimate this relationship.

The findings indicate strong support for the hypothesis: GDP per capita is positively and significantly associated with life evaluation. However, the results also reveal that several social and institutional factors play substantial and independent roles. Social support, health, freedom, and corruption are all significant predictors, suggesting that economic conditions alone cannot fully explain cross-country variation in well-being.

Overall, the evidence supports the view that subjective well-being is shaped by a combination of economic prosperity and broader social and institutional environments. While GDP matters, countries with strong social support systems, healthier populations, greater freedoms, and lower corruption tend to exhibit higher life evaluations regardless of income levels. These findings reinforce the importance of multidimensional policy approaches to improving national well-being.