

5CS037

Concepts and Technologies of AI

Title: Analysis of the World Happiness Report : Exploring
South East and Middle East Perspectives

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Introduction

The World Happiness Report is a comprehensive study that assigns a happiness index to each nation. It helps us comprehend what makes us happy on a global scale based on metrics like GDP per capita, social support, healthy life expectancy, etc. Through statistical interpretation and exploratory data analysis, we will try to examine happiness patterns in two specific locations in this paper i.e. the Middle East and South Asia.

Objectives:

1. To understand the dataset's structure and key metrics, investigate it.
2. Examining happiness levels with an emphasis on South Asia, looking for outliers, and correlating.
3. Racial and ethnic differences affect measures of pleasure and well-being, particularly in the Middle East and South Asia.

1. Getting Started with Data Exploration

This segment gives an overview of the dataset, calculates some basic statistics and produces some initial visualisations in order to start understanding worldwide happiness trends.

1.1.Dataset Overview:

	Country name	score	Log GDP per capita	Social support	Healthy life expectancy	Freedom to make life choices	Generosity	Perceptions of corruption	Dystopia + residual
0	Finland	7.741	1.844	1.572	0.695	0.859	0.142	0.546	2.082
1	Denmark	7.583	1.908	1.520	0.699	0.823	0.204	0.548	1.881
2	Iceland	7.525	1.881	1.617	0.718	0.819	0.258	0.182	2.050
3	Sweden	7.344	1.878	1.501	0.724	0.838	0.221	0.524	1.658
4	Israel	7.341	1.803	1.513	0.740	0.641	0.153	0.193	2.298
5	Netherlands	7.319	1.901	1.462	0.706	0.725	0.247	0.372	1.906
6	Norway	7.302	1.952	1.517	0.704	0.835	0.224	0.484	1.586
7	Luxembourg	7.122	2.141	1.355	0.708	0.801	0.146	0.432	1.540
8	Switzerland	7.060	1.970	1.425	0.747	0.759	0.173	0.498	1.488
9	Australia	7.057	1.854	1.461	0.692	0.756	0.225	0.323	1.745

Country name	object
score	float64
Log GDP per capita	float64
Social support	float64
Healthy life expectancy	float64
Freedom to make life choices	float64
Generosity	float64
Perceptions of corruption	float64
Dystopia + residual	float64
dtype: object	

Number of rows: 143
 Number of columns: 9

1.2. Basic Statistics:

The dataset analysis shows that there is moderate variability in the levels of happiness around the world, with a mean score of 5.53, median of 5.79, and standard deviation of 1.17. Afghanistan is the country with the lowest happiness score, and Finland has the best.

1.3.Missing Values:

Three entries in the columns of log GDP per capita, social support, healthy life expectancy, freedom to make life decisions, generosity, and perceptions of corruption are missing from the dataset. Every other column is complete, including the score and the name of the country.

Country name	0
score	0
Log GDP per capita	3
Social support	3
Healthy life expectancy	3
Freedom to make life choices	3
Generosity	3
Perceptions of corruption	3
Dystopia + residual	3
dtype: int64	

1.4.Filtering and Sorting:

The dataset was filtered for countries with a happiness score greater than 7.5 and then sorted in descending order by Log GDP per capita. Finland, Denmark, and Iceland are the top three countries, with high GDPs and excellent social support.

	Country name	score	Log GDP per capita	Social support	Healthy life expectancy	Freedom to make life choices	Generosity	Perceptions of corruption	Dystopia + residual
1	Denmark	7.583	1.908	1.520	0.699	0.823	0.204	0.548	1.881
2	Iceland	7.525	1.881	1.617	0.718	0.819	0.258	0.182	2.050
0	Finland	7.741	1.844	1.572	0.695	0.859	0.142	0.546	2.082

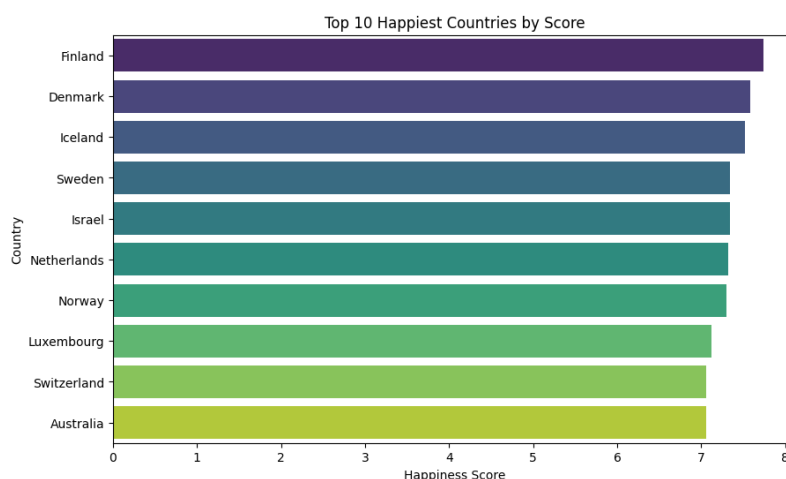
1.5.Added New Column:

Adding a new column called Happiness Category to the dataset allowed countries to be categorized according to their scores: Low for those under 4, Medium for those between 4 and 6, and High for those over 6. Finland, Denmark, and Iceland are among the top 10 nations that are classified as High.

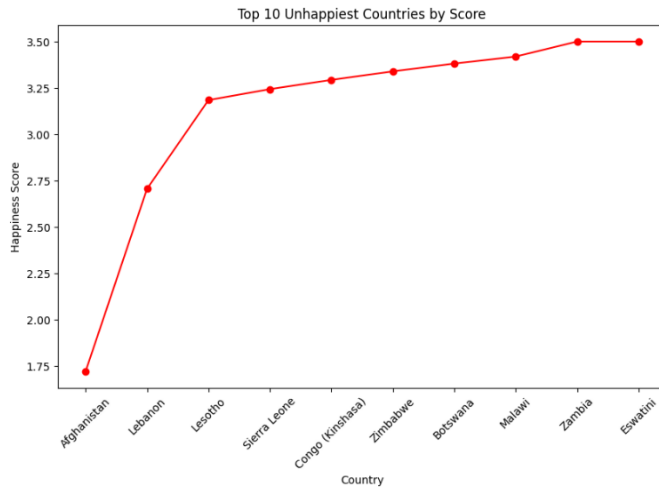
Added 'Happiness Category' column:			
	Country name	score	Happiness Category
0	Finland	7.741	High
1	Denmark	7.583	High
2	Iceland	7.525	High
3	Sweden	7.344	High
4	Israel	7.341	High
5	Netherlands	7.319	High
6	Norway	7.302	High
7	Luxembourg	7.122	High
8	Switzerland	7.060	High
9	Australia	7.057	High

1.6.Visualizations:

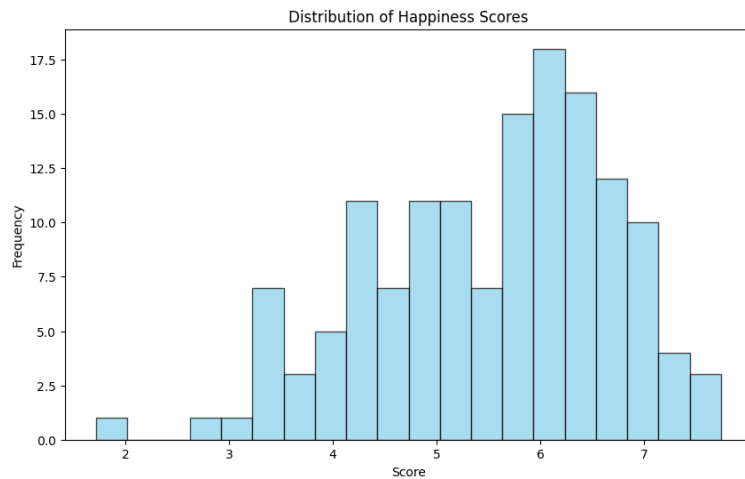
- Bar Plot: The bar chart shows the top ten happiest countries, led by Finland, Denmark, and Iceland, with Australia at the bottom.



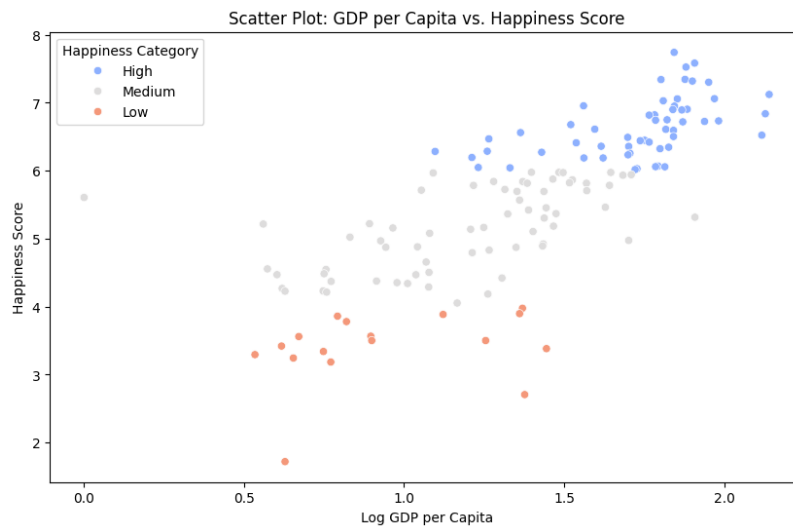
- Line Chart: The line chart depicts the ten unhappiest countries based on happiness scores. Afghanistan has the lowest ranking, followed by Lebanon and Sierra Leone, showing regions with considerable socioeconomic and political issues.



- **Histogram:** The histogram shows the distribution of happiness scores, with a peak around 5.5. Most countries have intermediate happiness ratings, with fewer on the extremes.



- **Scatter Plot:** The scatter plot shows a positive association between GDP per capita and happiness levels. better GDP often correlates with better happiness, with color-coded categories (Low, Medium, High) providing additional clarity.

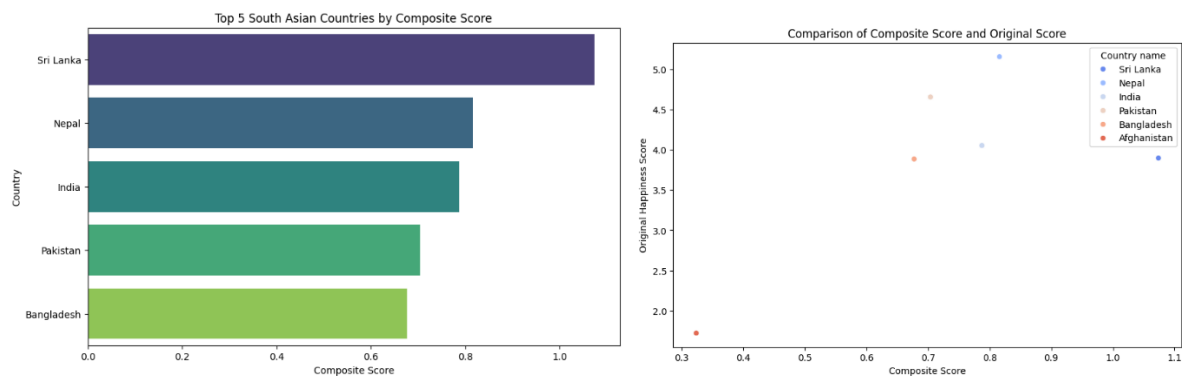


2. South Asia Analysis

This section focuses on analyzing happiness trends in South Asia, identifying outliers, and exploring metric correlations.

2.1. Analysis and Ranking of South Asian Countries Based on Composite Well-Being Metrics:

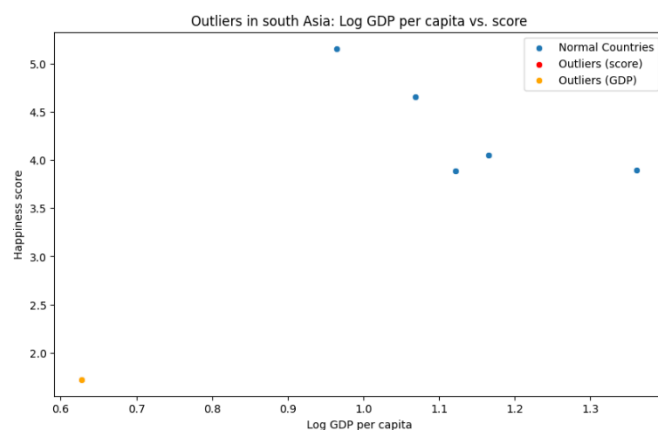
- The South Asia dataset was filtered to contain Afghanistan , Bangladesh , Bhutan , India , Maldives , Nepal , Pakistan , and Sri Lanka , and saved as 'SouthAsia_Happiness.csv'. A new 'Composite Score' column was added using the formula:
 $0.40 \times \text{Log GDP per Capita} + 0.30 \times \text{Social Support} + 0.30 \times \text{Healthy Life Expectancy}$, grading countries by their overall well-being. The rankings showed Sri Lanka topping (1.07), followed by Nepal (0.82) and India (0.79), while Afghanistan ranked lowest (0.32). A bar chart depicted the top five Composite Score rankings, with Sri Lanka dominating. A scatter plot combining Composite and happiness ratings demonstrated alignment, while some deviations suggested that other factors, like as freedom and corruption views, influence happiness levels in addition to the primary metrics examined.



2.2. Outlier Detection:

Afghanistan was identified as a big score-based outlier in South Asia by outlier detection, with a very low happiness score of 1.72, which reflected the country's sociopolitical instability and substandard living conditions. Relative economic consistency among the nations is suggested by the absence of significant GDP outliers. A scatter plot showed the difference in Afghanistan, highlighting how it affects regional averages and how urgently targeted initiatives are needed to enhance stability and well-being.

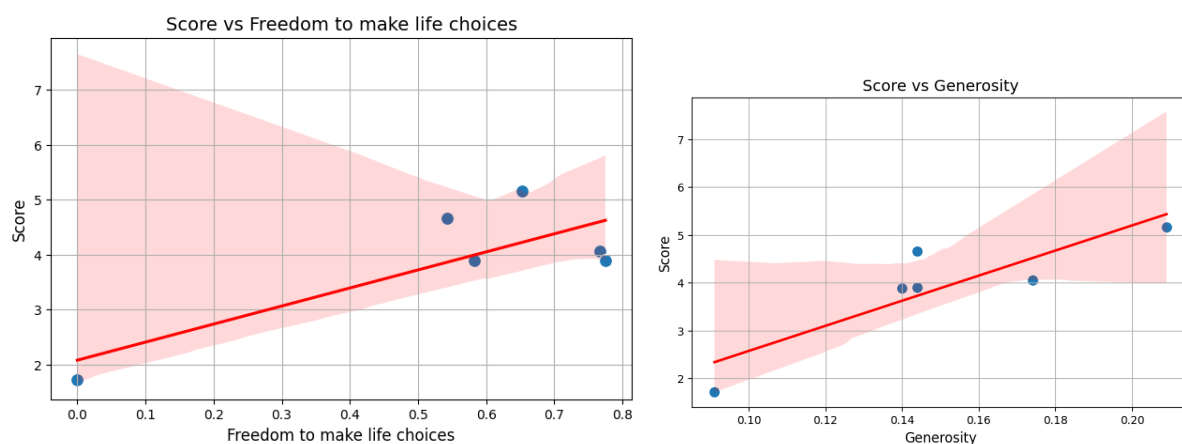
With the lowest GDP per capita (0.63) and a happiness score of 1.72, Afghanistan stands out as a strong negative outlier in the South Asia sample, showing sociopolitical instability, a lack of social support, and economic difficulties. Although there were no particularly notable positive outliers, nations with more balanced well-being, such as Nepal and Sri Lanka, demonstrate better alignment between their Composite Scores and happiness levels. Regional averages are skewed



downward by negative outliers like Afghanistan, which lowers the mean happiness score and draws attention to inequalities. These results highlight the necessity of focused measures to combat inequality, enhance governance, and promote social cohesion because, in the absence of addressing underlying social problems, economic advancements might not be enough to increase happiness.

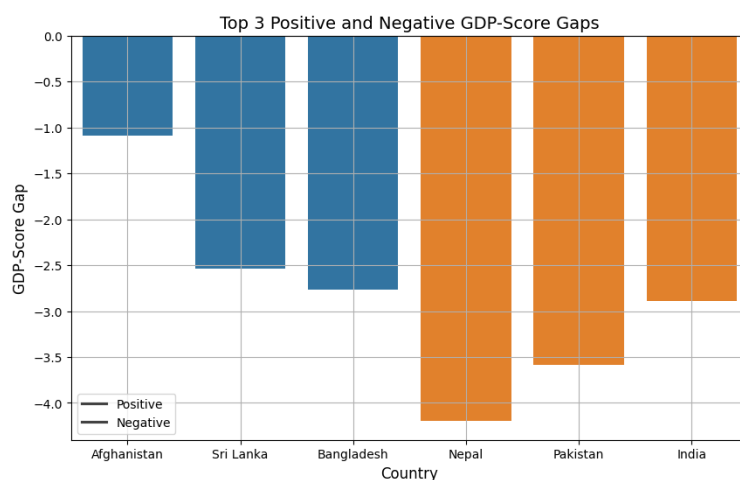
2.3. Metric Correlations:

Freedom to Make Life Choices has the strongest link with happiness in South Asia ($r = 0.76$), suggesting that autonomy greatly improves well-being. With a moderate correlation ($r = 0.43$), generosity has less of an effect. Trendline-based scatter plots validate these associations; freedom shows a steeper trendline than generosity, indicating that it has a stronger impact on the region's happiness scores.



2.4. Gap Analysis:

In South Asia, the GDP-Score Gap, which is the difference between Log GDP per Capita and Score, shows differences between economic production and happiness. The nations with the biggest positive gaps, like India and Sri Lanka, have high GDPs in comparison to their happiness ratings, which may indicate problems like social support deficiencies or inequality. On the other hand, negative disparities are seen in nations like Bangladesh and Nepal, where



happiness exceeds economic expectations and is probably fueled by community or cultural strength. A bar chart illustrates these extremes and underlines the significance of policies that address underlying social issues and guarantee that economic growth results in increased well-being.

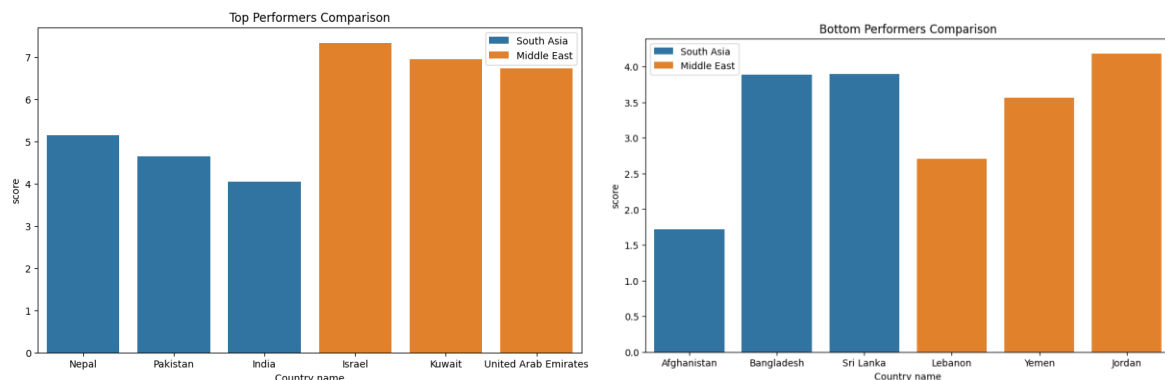
3. Comparative Analysis Between South Asia and the Middle East

This section compares happiness levels and disparities between South Asia and the Middle East, focusing on key measures and variations.

The Middle Eastern dataset contains 14 countries, including Israel, Saudi Arabia, and Yemen, and has a higher mean happiness score of 5.41 than South Asia's 3.90. However, with a standard deviation of 1.57 compared to 1.18 in South Asia, the Middle East is likewise more unpredictable. This shows that, while happiness levels are generally higher in the Middle East, there is more inequality among its states than in South Asia.

3.1. Top and Bottom Performers:

In the Middle East, Israel (7.34), the United Arab Emirates (6.80), and Saudi Arabia (6.77) dominate with noticeably higher ratings, while Nepal (5.16), Pakistan (4.66), and India (4.05) are the top achievers in South Asia. The lowest-performing countries are Lebanon (2.39), Syria (3.15), and Yemen (3.30) in the Middle East, and Afghanistan (1.72), Bangladesh (3.89), and Sri Lanka (3.90) in South Asia. Bar graphs demonstrate a clear disparity between the regions, with the Middle East displaying higher top ratings. Instability and economic problems plague both regions' lowest-ranking nations.



3.2. Metric Comparisons and Happiness Disparity:

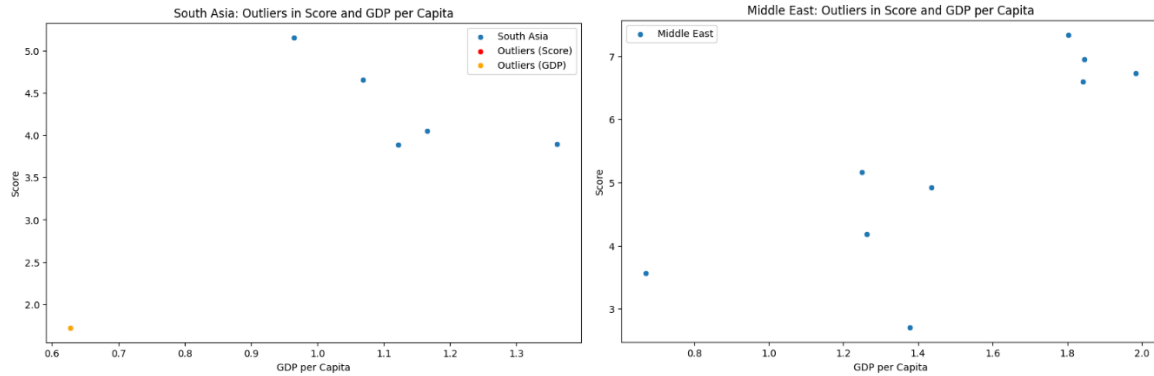
When comparing important indicators, the Middle East performs better than South Asia in terms of GDP per capita, social support, and healthy life expectancy, with GDP displaying the biggest difference. Despite having a somewhat lower coefficient of variation (0.29 vs. 0.30) and a wider range of happiness scores (4.63 vs. 3.44), the Middle East shows more overall fluctuation in happiness levels than South Asia, which has lower average scores.

3.3. Correlation Analysis and Outlier Detection:

In the Middle East, freedom ($r \approx 0.80$) has a greater influence than generosity ($r \approx 0.31$), but in South Asia, happiness is substantially correlated with freedom to make life choices ($r \approx 0.76$), and modestly with generosity ($r \approx 0.43$). Higher freedom is consistently associated

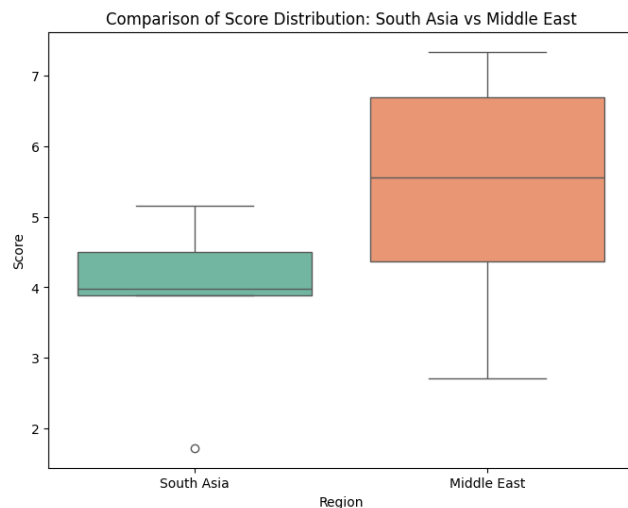
with greater satisfaction in both regions, as shown by scatter plots. Yemen in the Middle East and Afghanistan in South Asia were found to be substantial score outliers using outlier analysis, indicating their respective socioeconomic difficulties.

These results highlight how important stability and autonomy are for raising happiness levels.



3.4. Visualizations:

According to the boxplots, South Asia has a compact distribution and a lower median happiness score than the Middle East, which has a higher median and more variability. The influence of instability on happiness is highlighted by outliers such as Afghanistan and Yemen, which draw attention to regional differences in socioeconomic conditions.



Conclusion

- Economic and social factors have a significant impact on global happiness, with GDP per capita serving as a major motivator.
- South Asia's happiness trends show significant challenges, and outliers provide information on particular issues within the region.
- A comparative analysis revealed that the Middle East had more differences in economic indicators and more variation in happiness levels.

Reflections:

This analysis emphasizes the necessity of targeted approaches for improving happiness at the regional level. Understanding the elements that contribute to happiness inequality allows policymakers to address underlying concerns more effectively. The paper emphasizes the importance of comparative analysis in finding best practices and areas for improvement.

