

# Analyzing the Relationship Between GDP and Happiness Index of G20 Countries Using Data Science

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## **Abstract**

The research paper attempts to understand and demystify the correlation between GDP of a country and Happiness Index of its citizens. It tests the hypothesis that an increase in GDP increases the happiness level of the people. As India hosted the recently concluded G20 summit this block of countries became an intriguing choice to undertake this study.

Data of the Happiness Index was culled out from World Happiness Reports published from 2013 to 2023. Pearson coefficients were calculated for each of the nineteen countries (EU being a union of twenty-seven countries was excluded) and arranged in ascending order. It has been observed that the coefficient varies from a high negative to high positive, thereby not giving any positive indication that an increase in GDP of a country does not ipso facto increase the happiness of its people and that there are other factors too that determine happiness.

**Keywords:** GDP, Happiness Index, Data Science, Statistics

## **1.0 Introduction**

*“We shouldn’t measure everything in terms of GDP figures or economics. There is something called quality of life.”* Nigel Paul Farage, British broadcaster, former politician and Member of European Parliament. (Farage, 2023).

This research will seek to explain Gross Domestic Product (GDP), Happiness Index (HI) and the relationship between them; to trace the origin of HI, its parameters and its significance. The World Happiness Index Reports from 2013 to 2023 will be utilized to understand the relationship between GDP and HI of G20 countries. The study will center on G20 countries, an intergovernmental forum, founded in 1999, comprising 19 countries and the European Union. Lastly the study will utilize data science to analyze the aforementioned relation.

The understanding of the relation between the two is important as it is a way to understand whether and to what extent, if at all, there is a correlation between them and can be a tool to keep in mind when policies are made for welfare of the people.

## **2.0 Literature Review**

Empirical research on happiness has focused basically on individual happiness and its cultural variations. The question of societal happiness in general has been of great interest to philosophers, political theorists,

and sociologists alike for centuries. For example, in *The Republic* (around 380 BC), Plato famously advocated a society governed by a philosopher king, saying that, “Unless communities have philosophers as kings ... there can be no end to political troubles ... there is no other way for an individual or a community to achieve happiness” (Waterfield, 1993, p. 193). Similarly, in *The Nicomachean Ethics*, Aristotle argued that the happiness of citizens is maximized when the rulers are virtuous who can think of what is the best for ordinary citizens (Thomson, 1953). At around the same time in China, Confucius proposed that a good society is a harmonious society governed by virtues.

In 1934, George Hartmann probably conducted for the time an investigation into the stability of happiness over time, while also looking at self-informant agreement of happiness ratings.

Economists, who are familiar with GDP, have emphasized that GDP is a measure of economic activity, not economic or social wellbeing. In 1934, Simon Kuznets, the chief architect of the United States national accounting system and GDP, cautioned against equating GDP growth with economic or social well-being. The US Bureau of Economic Analysis’ description of GDP states that the purpose of measuring GDP is to answer questions such as ‘how fast is the economy growing,’ ‘what is the pattern of spending on goods and services,’ ‘what percent of the increase in production is due to inflation,’ and ‘how much of the income produced is being used for consumption as opposed to investment or savings.’ To understand how GDP continues to be misused as a scorecard for national well-being, it is important to consider history and how the current national accounting system has evolved.

Despite earlier efforts to establish reliable and valid measures of happiness, happiness had not become a popular research topic in North America until the late 1980s. However, after several publications in the 1980s (Diener, 1984; Diener et al., 1985; Emmons & Diener, 1985; Ryff, 1989; Watson, Clark, & Tellegen, 1988), subjective well-being research took off and became one of the most popular research topics in America.

Within more interdependent East Asian cultural contexts, happiness tends to be defined in terms of interpersonal connectedness or a balance between the self and others (Uchida et al., 2004; Uchida & Ogihara, 2012), and the pursuit of happiness is not seen as a thing that the individuals can pursue, but is experienced within shared relationships. On the other hand, much research suggests that social relationships, not just goal attainment, are important within European-American cultures.

Ever since 2012, the World Happiness Reports (WHRs) have brought into sharp focus the public, governmental and academic interest in happiness and well being of people. This interest is not only limited to WHRs but fans across public discussions, intellectual discourses and articles in periodicals and journals. There is a Well-Being Economy Government Alliance (an economy designed to serve people and the planet, not the other way around). The Alliance goes into the root of the various problems/crises of our times but puts our basic requirements of dignity, purpose, justice and participation before any act or decision is taken. At present, it constitutes 6 countries (Canada, Finland, Iceland, New Zealand, Scotland and Wales). Distribution of happiness across a wide spectrum of population and also to ensure well-being of future generations are two fundamental principles engaging intellectuals, NGOs, governmental authorities. The UN Universal Declaration of Human Rights (1948) and UN Sustainable Development Goals (2015) are in the forefront in being essential components of happiness.

### 3.0 GDP and Happiness Index

GDP is the sum total of the market values of all the goods and services produced in a defined area (usually a country) within a specified time (generally in a quarter or annually). It is widely used by economists,

governments, central banks and amongst business and financial communities. Generally, it indicates the economic health of a country. How robust, developing or struggling to develop an economy is.

GDP indicates the size of an economy. A bigger GDP means a larger economy. It may, also, throw light on the overall health of an economy. It is often used to compare how different an economy is as compared to previously. However, economists believe mere GDP is not the right or complete means to determine, say, the standard of living of the people or for that matter their developmental indices or how happy they are. GDP are of two types, Nominal and real. While the former is the current market prices without taking into account inflation, the latter also accounts for inflation.

In order to calculate GDP, consumption (whether public or private), government expenditure, investments, additions to private inventories, paid-in construction costs (total cost for the work done), and the foreign balance of trade (exports are added to the value and imports are subtracted). Accordingly, it includes all the goods and services brought in a market for sale but may also include non-saleable/non-tradable items like social services, education and defense services. However, it is to be understood that not all productive activities are within the ambit of GDP. Voluntary or unpaid work (like household or a family involved in farming) are, however, not taken into account while calculating GDP. The various components of GDP can therefore be summarized as (i) sum of all goods & services purchased by the people, (ii) sum of all domestic investments and expenditures, (iii) amount spent by government on goods & services, like education, health, defense, transportation, etc. and (iv) the net of export & import.

A modern Russian aphorism holds that “*a person who smiles a lot is either a fool or an American.*” (The history of happiness, 2012). One of the first tasks of McDonald’s, an American fast food chain, when it opened shop in Russia around 1990 was to train staff to appear more cheerful. Most East Asian cultures also tend to have lesser expectations of happiness than an average American. Surprisingly, some of the Latin American and African cultures tend to exhibit a happiness quotient in the opposite. The point is that cultural variations on happiness are considerable.

Webster's dictionary defines happiness as “relatively permanent state of well-being characterized by dominantly agreeable emotions ranging in value from mere contentment to positive felicity.”

The Happiness Index is a comprehensive survey instrument that assesses happiness, wellbeing, and aspects of sustainability and resilience. It all started in 1972 with the Bhutanese Gross National Happiness Index, a phrase coined by the fourth King of Bhutan Jigme Singye Wangchuk, the fourth Druk Gyalpo. This was the precursor to the World Happiness Index. The first World Happiness Index report was published in 2012 which is a culmination of surveys in various countries to determine and analyze the ratings (0 to 1) of people’s lives on various parameters. Ever since then a World Happiness Index report has been published every year.

**Parameters of Happiness Index:** The various parameters that contribute to Happiness Index can be summarized as below:

- 1. Income:** GDP or per capita GDP (GDP divided by population). It has a significant (though by no means decisive) contribution to calculation of happiness index.
- 2. Healthy life expectancy:** It is not just living long but an expectancy to live a healthy life (both in physical as well as in terms of mental health).
- 3. Someone to count on/ Social support:** Covid-19 has resurrected the importance of having societal support and to have someone to count in times of need, despair or grief.

4. **Freedom to make key life decisions (includes human rights):** A state of freedom to choose between alternatives and to decide the one best suited for oneself without being limited by societal repercussions.
5. **Generosity:** A situation that allows for basic human connections and to have a sense of empathy for all living beings.
6. **Absence of corruption:** A feeling whether the deliverables can be achieved without the use of corrupt means or not.

(World Happiness Report 2023)

Information from the Gallup World Poll is used to calculate happiness ratings and rankings. Based on responses to the questionnaire, the results are calculated. The Cantril ladder is a questionnaire that asks respondents to rank their present lives on a scale from 0 to 10, with 10 being the best possible life for them and 0 being the worst possible existence. The estimates are representative due to the use of Gallup weights and scores from the national sample for 2020-2022.

These factors are thought to be raising life assessments around the world. The best life is represented by a number closer to 10, while the opposite is represented with a score closer to 0. After the citizen responses are collected, they're averaged to have the country's happiness score. Countries worldwide are ranked top to bottom in decreasing order of happiness.

**4.0 Happiness ranks and index, and GDP of G20 countries.**

India, being the President of G20, recently hosted the eighteenth summit of G20 countries. In this background it will be interesting to document the relation between GDP and Happiness Index amongst these countries. The nineteen countries account for 85% of world's GDP, over 75% of world's trade and two-thirds of world's population. In that sense it is a highly significant group and therefore, tabulation of Happiness ranks and index, and GDP of G20 countries has been undertaken. For comparison the G7, a group of seven industrialized countries, contribute around 40% of the world's GDP.

The 19 countries and the European Union that constitute the G20 are spread throughout every continent and thus represent the world to a large extent. It encompasses some of the largest economies where an understanding of the correlation between GDP and Happiness Index becomes very relevant.

**Happiness Rank of G20 Countries from 2013 to 2023**

| Country   | Rank as per World Happiness Report (Year wise) |      |      |      |      |      |      |      |      |      |
|-----------|--|------|------|------|------|------|------|------|------|------|
|           | 2013   | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| Argentina | 29   | 52   | 52   | 52   | 52   | 52   | 52   | 52   | 52   | 52   |
| Australia | 10   | 12   | 9    | 12   | 10   | 11   | 12   | 11   | 12   | 12   |
| Brazil    | 24   | 49   | 49   | 49   | 49   | 49   | 49   | 49   | 49   | 49   |
| Canada    | 6  | 13   | 13   | 7    | 13   | 13   | 13   | 13   | 13   | 13   |
| China     | 93   | 64   | 64   | 64   | 64   | 64   | 64   | 64   | 64   | 64   |
| France    | 25   | 21   | 21   | 21   | 21   | 21   | 21   | 21   | 21   | 21   |
| Germany   | 26   | 16   | 16   | 16   | 16   | 16   | 16   | 16   | 16   | 16   |

|                     |     |     |     |     |     |     |     |     |     |     |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>India</b>        | 111 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| <b>Indonesia</b>    | 76  | 84  | 84  | 84  | 84  | 84  | 84  | 84  | 84  | 84  |
| <b>Italy</b>        | 45  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  |
| <b>Japan</b>        | 43  | 47  | 47  | 47  | 47  | 47  | 47  | 47  | 47  | 47  |
| <b>Korea</b>        | 41  | 57  | 57  | 57  | 57  | 57  | 57  | 57  | 57  | 57  |
| <b>Mexico</b>       | 16  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  |
| <b>Russia</b>       | 68  | 70  | 70  | 70  | 70  | 70  | 70  | 70  | 70  | 70  |
| <b>Saudi Arabia</b> | 33  | 30  | 30  | 30  | 30  | 30  | 30  | 30  | 30  | 30  |
| <b>South Africa</b> | 96  | 85  | 85  | 85  | 85  | 85  | 85  | 85  | 85  | 85  |
| <b>Turkey</b>       | 77  | 106 | 106 | 106 | 106 | 106 | 106 | 106 | 106 | 106 |
| <b>UK</b>           | 22  | 19  | 19  | 19  | 19  | 19  | 19  | 19  | 19  | 19  |
| <b>US</b>           | 17  | 15  | 15  | 15  | 15  | 15  | 15  | 15  | 15  | 15  |
| <b>EU**</b>         |     |     |     |     |     |     |     |     |     |     |

\* <https://worldhappiness.report/data/>

\*\*Since EU (European Union) is an economic and political union of 27 countries aggregate rank for it has not been calculated

**Happiness Index of G20 Countries from 2013 to 2023**

| Country   | Happiness Index as per World Happiness Report (Year wise)A |       |       |       |       |       |       |       |       |       |
|-----------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|           | 2013   | 2015  | 2016  | 2017  | 2018  | 2019  | 2020  | 2021  | 2022  | 2023  |
| Argentina | 6.562  | 6.574 | 6.65  | 6.599 | 6.388 | 6.086 | 5.975 | 5.901 | 5.967 | 6.024 |
| Australia | 7.35   | 7.284 | 7.313 | 7.284 | 7.272 | 7.228 | 7.223 | 7.137 | 7.162 | 7.095 |
| Brazil    | 6.849  | 6.983 | 6.952 | 6.635 | 6.419 | 6.3   | 6.376 | 6.11  | 6.293 | 6.125 |
| Canada    | 7.477  | 7.427 | 7.404 | 7.316 | 7.328 | 7.278 | 7.232 | 7.025 | 7.025 | 6.961 |
| China     | 4.978  | 5.14  | 5.245 | 5.273 | 5.246 | 5.191 | 5.124 | 5.771 | 5.585 | 5.818 |
| France    | 6.764  | 6.575 | 6.578 | 6.442 | 6.489 | 6.592 | 6.664 | 6.714 | 6.687 | 6.661 |
| Germany   | 6.672  | 6.75  | 6.994 | 6.951 | 6.965 | 6.985 | 7.076 | 7.312 | 7.034 | 6.892 |
| India     | 4.772  | 4.565 | 4.404 | 4.315 | 4.19  | 4.015 | 3.573 | 4.225 | 3.777 | 4.036 |
| Indonesia | 5.348  | 5.399 | 5.314 | 5.262 | 5.093 | 5.192 | 5.286 | 5.345 | 5.24  | 5.277 |
| Italy     | 6.021  | 5.948 | 5.977 | 5.964 | 6     | 6.223 | 6.387 | 6.488 | 6.467 | 6.405 |
| Japan     | 6.067  | 5.987 | 5.921 | 5.92  | 5.915 | 5.886 | 5.871 | 6.118 | 6.039 | 6.129 |
| Korea     | 6.267  | 5.984 | 5.835 | 5.838 | 5.875 | 5.895 | 5.872 | 5.793 | 5.935 | 5.951 |
| Mexico    | 7.088  | 7.187 | 6.778 | 6.578 | 6.488 | 6.595 | 6.465 | 5.964 | 6.128 | 6.33  |
| Russia    | 5.464  | 5.716 | 5.856 | 5.963 | 5.81  | 5.648 | 5.546 | 5.495 | 5.459 | 5.661 |

|                |       |       |       |       |       |       |       |       |       |       |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Saudi Arabia   | 6.48  | 6.411 | 6.379 | 6.344 | 6.371 | 6.375 | 6.406 | 6.56  | 6.523 | 6.463 |
| South Africa   | 4.963 | 4.642 | 4.459 | 4.829 | 4.724 | 4.722 | 4.814 | 4.947 | 5.194 | 5.275 |
| Turkey         | 5.345 | 5.332 | 5.389 | 5.5   | 5.483 | 5.373 | 5.132 | 4.862 | 4.744 | 4.614 |
| United Kingdom | 6.883 | 6.867 | 6.275 | 6.714 | 6.814 | 7.054 | 7.165 | 6.798 | 6.943 | 6.796 |
| United States  | 7.082 | 7.119 | 7.104 | 6.993 | 6.886 | 6.892 | 6.94  | 7.028 | 6.977 | 6.894 |
| EUB            |       |       |       |       |       |       |       |       |       |       |

C: Since EU (European Union) is an economic and political union of 27 countries aggregate value for it has not been calculated

### 5.0 Correlation between GDP and Happiness Index

The objective is to seek whether there is any correlation between GDP and Happiness Index using data science.

The objective of this research paper is to understand the level of correlation, if any, between GDP and HI of the G-20 countries. Considering these two as variables X and Y, the correlation shall be worked out for each of the 19 countries (the twentieth being the European Union, a union of 27 countries, hence it is excluded from the category of a country). For purposes of simplicity, only linear correlation shall be evaluated.

#### Simple Linear Correlation:

- It is a degree to which two variables vary together, or a measure of the intensity of the association between two variables or how one variable is affecting another variable.
- Such intensity or association (called coefficient r) can be in range from -1 to +1, and is independent of units of measurement.
- The closer is the coefficient to +1 the stronger the association, -1 indicates a very weak association while a value of zero means there is no association.
- Scatter plots are a useful means of getting a better understanding of the data.

#### Types of Correlation:

1. Positive correlation (direct correlation)  $[r=1]$
2. Negative correlation (inverse correlation)  $[0 < r < 1]$
3. Uncorrelated  $[r=0]$
4. Perfect positive correlation  $[-1 < r < 0]$
5. Perfect negative correlation  $[r=-1]$

There are different Coefficients to measure Linear Correlation. In this paper Pearson's Coefficient of Correlation is being used to work out the correlation between GDP and Happiness Index.

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

r = Pearson’s correlation coefficient

$x_i$  = values of the x-variable in a sample

$\bar{X}$  = mean of the values of the x-variable

$y_i$  = values of the y-variable in a sample

$\bar{Y}$  = mean of the values of the y-variable

Applying the above formula, the Pearson’s Coefficients (r, in ascending order) of the nineteen G20 countries are as under:

| Sl.No. | Country      | Pearson’s Coefficient | Round Off |
|--------|--------------|-----------------------|-----------|
| 1      | Canada       | -0.8266533827         | -0.827    |
| 2      | India        | -0.6772178176         | -0.677    |
| 3      | Korea        | -0.6566802831         | -0.657    |
| 4      | US           | -0.5948482374         | -0.595    |
| 5      | Russia       | -0.5780097089         | -0.578    |
| 6      | Turkey       | -0.4537408901         | -0.454    |
| 7      | Japan        | -0.4480828055         | -0.448    |
| 8      | Mexico       | -0.3977108094         | -0.398    |
| 9      | Australia    | -0.3873125605         | -0.387    |
| 10     | Brazil       | -0.3266523882         | -0.327    |
| 11     | Indonesia    | -0.293768222          | -0.294    |
| 12     | Argentina    | -0.243947324          | -0.244    |
| 13     | UK           | 0.1760479174          | 0.176     |
| 14     | Italy        | 0.2518844118          | 0.252     |
| 15     | France       | 0.5277517731          | 0.528     |
| 16     | Germany      | 0.5294932211          | 0.529     |
| 17     | Saudi Arabia | 0.57881827            | 0.579     |
| 18     | South Africa | 0.7255859684          | 0.726     |
| 19     | China        | 0.8895048866          | 0.89      |

Pearson’s calculations for each of the 19 countries are as under:

| <b>Country</b>      | <b>Pearsons Correlation</b> | <b>Round off</b> |
|---------------------|-----------------------------|------------------|
| <b>Canada</b>       | <b>-0.8266533827</b>        | <b>-0.827</b>    |
| <b>India</b>        | <b>-0.6772178176</b>        | <b>-0.677</b>    |
| <b>Korea</b>        | <b>-0.6566802831</b>        | <b>-0.657</b>    |
| <b>US</b>           | <b>-0.5948482374</b>        | <b>-0.595</b>    |
| <b>Russia</b>       | <b>-0.5780097089</b>        | <b>-0.578</b>    |
| <b>Turkey</b>       | <b>-0.4537408901</b>        | <b>-0.454</b>    |
| <b>Japan</b>        | <b>-0.4480828055</b>        | <b>-0.448</b>    |
| <b>Mexico</b>       | <b>-0.3977108094</b>        | <b>-0.398</b>    |
| <b>Australia</b>    | <b>-0.3873125605</b>        | <b>-0.387</b>    |
| <b>Brazil</b>       | <b>-0.3266523882</b>        | <b>-0.327</b>    |
| <b>Indonesia</b>    | <b>-0.293768222</b>         | <b>-0.294</b>    |
| <b>Argentina</b>    | <b>-0.243947324</b>         | <b>-0.244</b>    |
| <b>UK</b>           | <b>0.1760479174</b>         | <b>0.176</b>     |
| <b>Italy</b>        | <b>0.2518844118</b>         | <b>0.252</b>     |
| <b>France</b>       | <b>0.5277517731</b>         | <b>0.528</b>     |
| <b>Germany</b>      | <b>0.5294932211</b>         | <b>0.529</b>     |
| <b>Saudi Arabia</b> | <b>0.57881827</b>           | <b>0.579</b>     |
| <b>South Africa</b> | <b>0.7255859684</b>         | <b>0.726</b>     |
| <b>China</b>        | <b>0.8895048866</b>         | <b>0.89</b>      |

The calculation of correlation between GDP and Happiness Index (HI) of 19 countries reveals no definite pattern, whereas in countries with negative Pearson’s coefficient like Canada, India, Korea, etc. there is a negative correlation between GDP and HI. There are some countries which fall on the other end of the spectrum like China and South Africa. They have a very strong positive correlation. In the remaining countries there is marginal to moderate correlation ranging between 0.176 and 0.579 like the UK, Italy, France, etc.

It can be inferred that in some societies with the growth in the economy the spending capacity of the citizens increases and the happiness levels are positively impacted. Some countries with moderate positive correlation show that growth in GDP moderately impacts, if at all, happiness. On the other hand, in a significantly large number of countries where there is negative correlation, it only reflects that happiness and growth in GDP do not necessarily go hand in hand.

A very simplistic assumption of taking only two variables (GDP and Happiness value) have been taken to calculate the correlation while there can be other factors (as enumerated under the heading “Parameters of Happiness Index”) also which have not been accounted for. However, one thing has been definitely proved based on the empirical data taken that the HI of any country does not necessarily depend

on or is positively correlated with the GDP. It depends on a vast number of socio (customs, traditions, beliefs), economic (labour hours and productivity), geographical (climate, availability of water) and political (political stability) are some of the factors which are beyond the scope of GDP of that country. Data Science can further be used to find correlation when more variables are involved which, however, is beyond the scope of this paper.

## 6.0 Conclusion

The intent behind undertaking this research was to understand in a logical way whether or not the general perception that economic power predominantly is a reason for happiness amongst citizens of a country. Whether this is a myth or a reality has been studied in considerable detail. GDP of any country incorporates consumption, government expenditure, investments, additions to private inventories, paid-in construction costs, foreign balance of trade, etc. So it is primarily an indicator of the economic condition of any country. On the other hand, the happiness index is a function of life expectancy, social security, freedom to choose, generosity and level of corruption. Both the indices GDP and HI incorporate a significant number of factors for their calculations. However, some important underlying conditions, social values, climatic conditions, cultural ethos and political stability of a nation are left untouched by one or both these indices. Nevertheless, understanding the relationship between the GDP of a country and its happiness index through the use of data science looks fascinating. Consequently, in the backdrop of the recent G20 summit held in India, the data for the G20 countries pertaining to their respective GDP and HI was taken for the last ten years. Linear correlation using Pearson's coefficient was calculated between the two indices for the nineteen countries (EU being a union of 27 countries was excluded from the scope of the calculations).

The calculations were done using Excel Results for the nineteen countries ranging between a negative correlation of -0.827 to a positive +0.89. No definite pattern is visible which would indicate a high degree of correlation between the GDP and happiness index for the sample data. On the contrary most of the countries exhibit either a strong negative correlation or at most a moderate positive correlation. This leads to the important fact that the economic situation of a country does not intrinsically determine the happiness levels of her citizens. It may also be construed that either economic conditions do not influence the happiness levels significantly or there are other predominant factors vis-a-vis random variables which may be having a more controlling impact on the happiness index of any country.

## Biography of Author

Kartik Gupta is a student of Grade 12 at Sanskriti School, Chanakyapuri, New Delhi, India. He studies Mathematics, Physics, Chemistry, Economics and English. He achieved 100/100 in Mathematics in Grade 10 in India's public examination and was overall placed in top 0.28% in 2022. He has written essays for Immerse and OxBright Essay competitions and shortlisted with scholarship. He secured a SAT score of 1560/1600 and AP 5/5 in both Statistics and Microeconomics in 2023. He likes to play tennis and cricket and hold Grade 5 certificate with merit in piano from Trinity College London. He intends to pursue higher education in Mathematics, Statistics and Data Science.

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