Final Report of Traineeship Program 2024

On

Analyzing Age Difference at Death Between Left-Handers and Right-Handers

MEDTOUREASY

ACKNOWLDEGMENTS

The traineeship opportunity that I had with MedTourEasy was a great change for learning and understanding the intricacies of the subject of Data Visualizations in Data Analytics; and also, for personal as well as professional development. I am very obliged for having a chance to interact with so many professionals who guided me throughout the traineeship project and made it a great learning curve for me. Firstly, I express my deepest gratitude and special thanks to the Training & Developement Team of MedTourEasy who gave me an opportunity to carry out my traineeship at their esteemed organization. Also, I express my thanks to the team for making me understand the details of the Data Analytics profile and training me in the same so that I can carry out the project properly and with maximum client satisfaction and also for spearing his valuable time in spite of his busy schedule.

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ABSTRACT

A National Geographic survey in 1986 resulted in over a million responses that included age, sex, and hand preference for throwing and writing. Researchers Avery Gilbert and Charles Wysocki analyzed this data and noticed that rates of left-handedness were around 13% for people younger than 40 but decreased with age to about 5% by

the age of 80. They concluded based on analysis of a subgroup of people who throw left-handed but write right-handed that this age-dependence was primarily due to changing social acceptability of left-handedness. This means that the rates aren't a factor of *age* specifically but rather of the *year you were born*, and if the same study was done today, we should expect a shifted version of the same distribution as a function of age. Ultimately, we'll see what effect this changing rate has on the apparent mean age of death of left-handed people, but let's start by plotting the rates of left-handedness as a function of age.

1.1 About the Company

edTourEasy, a global healthcare company, provides you the informational resources needed to evaluate your global options. MedTourEasy provides analytical solutions to our partner healthcare providers globally

1.2 About the Project

we will explore this phenomenon using age distribution data to see if we can reproduce a difference in average age at death purely from the changing rates of left-handedness over time, refuting the claim of early death for left-handers. This notebook uses pandas and Bayesian statistics to analyze the probability of being a certain age at death given that you are reported as left-handed or right-handed.

Introduction:

The purpose of this project is to investigate the age difference at death between right-handers and left-handers, aiming to provide insights into mortality patterns associated with handedness. By utilizing Bayesian statistics, historical data on handedness rates, and death distribution data, we seek to understand whether there exists a significant age gap at death between the two groups and explore the underlying factors contributing to any observed differences.

Methodology:

Data Acquisition and Preprocessing: We obtained death distribution data from the United States for the year 1999, which includes the number of deaths at each age for both sexes. Additionally, we utilized historical data on left-handedness rates to estimate probabilities of handedness given age. Bayesian Analysis: Employing Bayes' theorem, we calculated the probability of dying at a certain age given an individual's handedness (left-handed or right-handed). This involved combining death distribution data, overall probabilities of left-handedness and right-handedness in the population, and estimated probabilities of handedness given age. Comparison and Interpretation: We compared the calculated probabilities of dying at various ages for left-handers and right-handers to understand any differences in mortality patterns between the two groups. Additionally, we analyzed the average age at death for both groups and examined the implications of our findings.

Utilize death distribution data from the US in 1999. Apply Bayesian statistics to calculate conditional probabilities of age at death given handedness. Conduct data visualization to compare mortality patterns between left-handers and right-handers.

2.3 Language and Platform Used

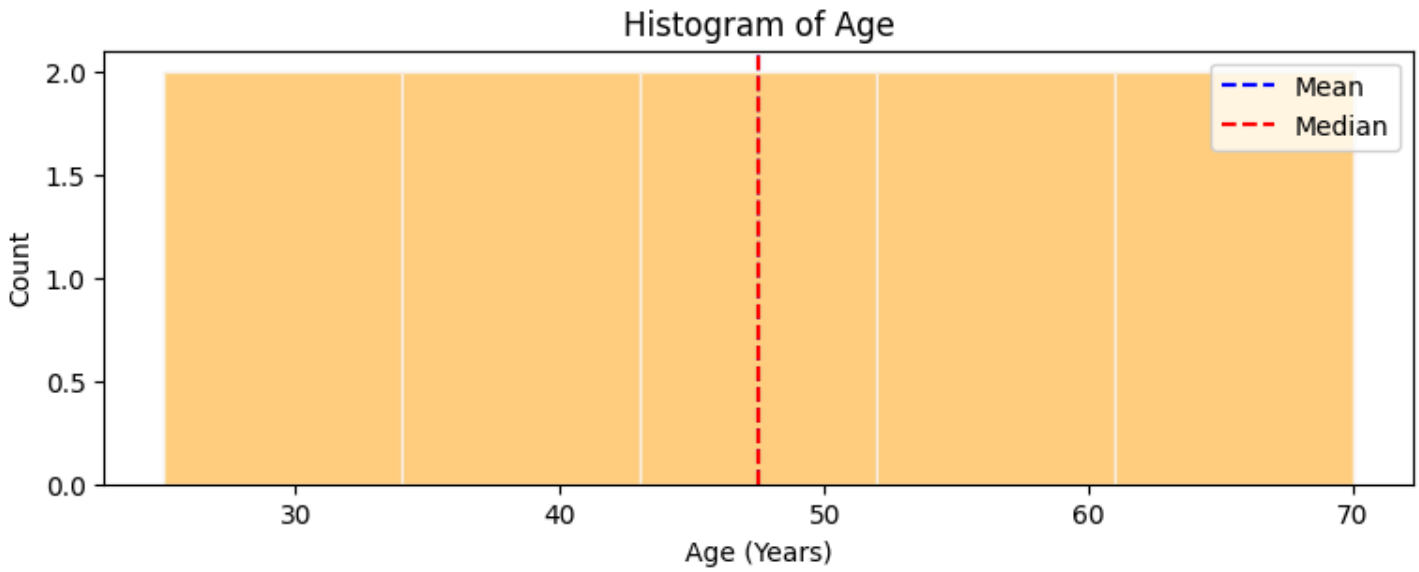
Python is a high-level, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation.[32]

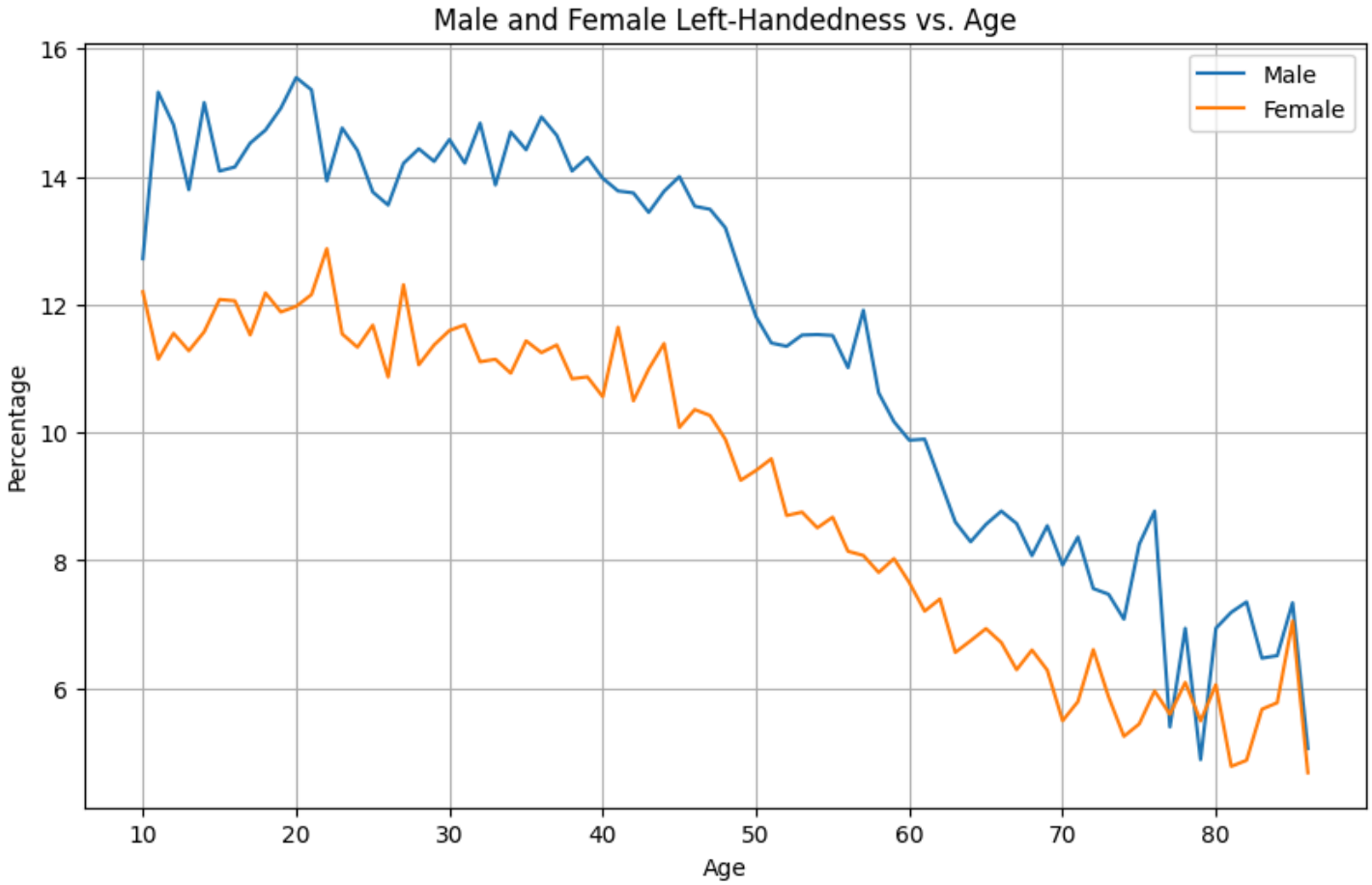
Python is dynamically typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly procedural), object-oriented and functional programming. It is often described as a "batteries included" language due to its comprehensive standard library.[33][34]

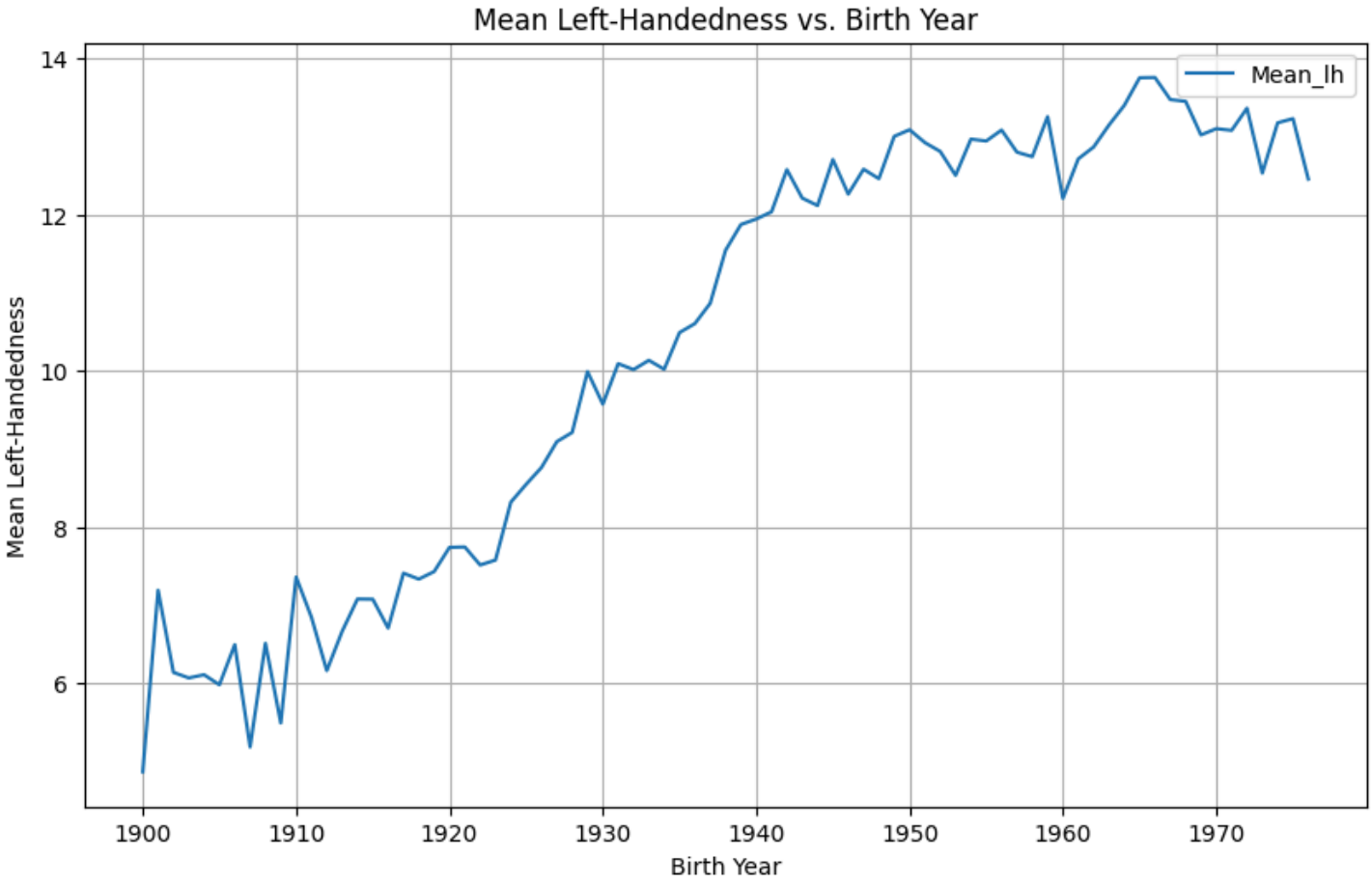
Guido van Rossum began working on Python in the late 1980s as a successor to the ABC programming language and first released it in 1991 as Python 0.9.0.[35] Python 2.0 was released in 2000. Python 3.0, released in 2008, was a major revision not completely backward-compatible with earlier versions. Python 2.7.18, released in 2020, was the last release of Python 2.[36]

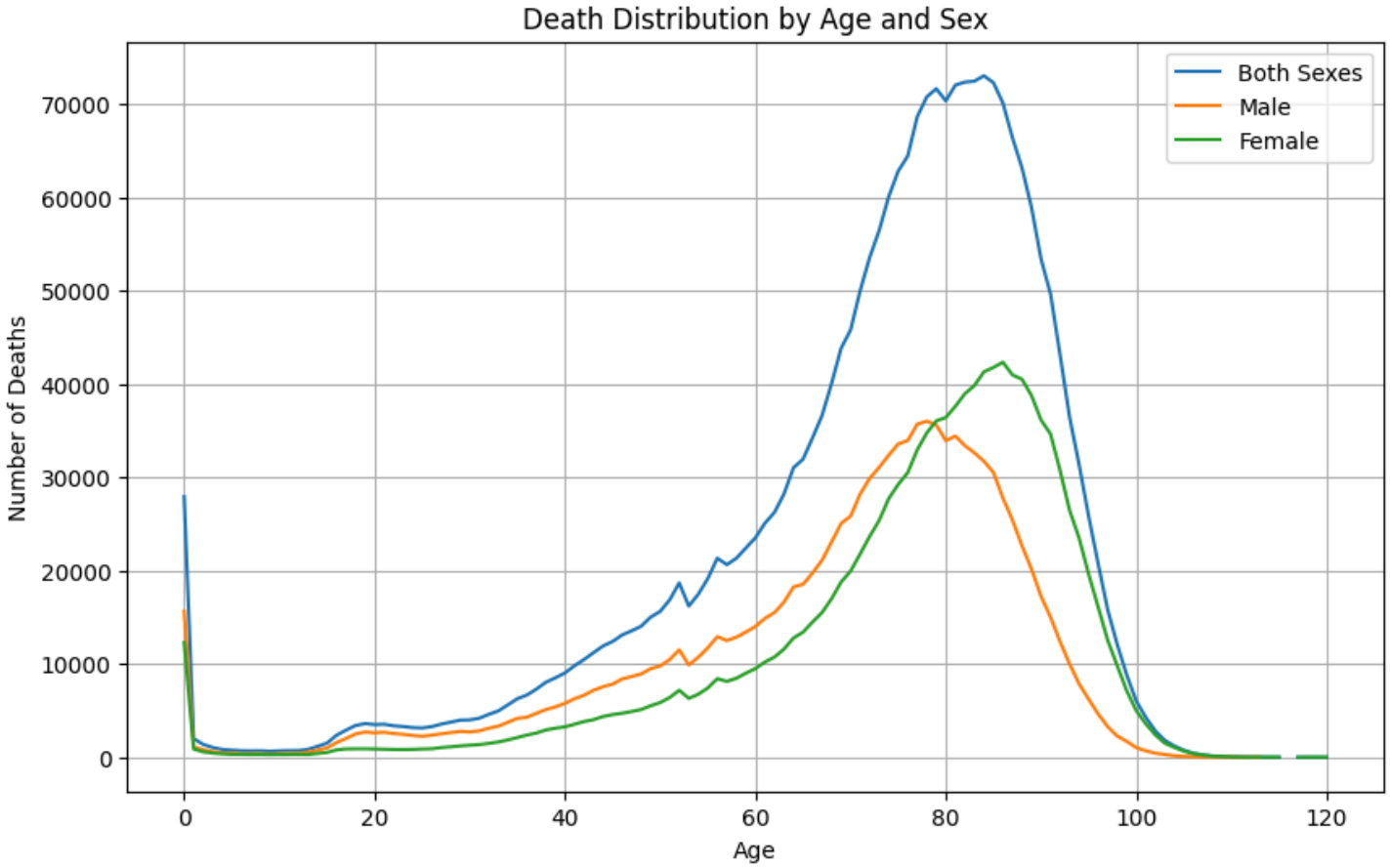
Python consistently ranks as one of the most popular programming languages, and has gained widespread use in the machine learning community.[37][38][39][40]

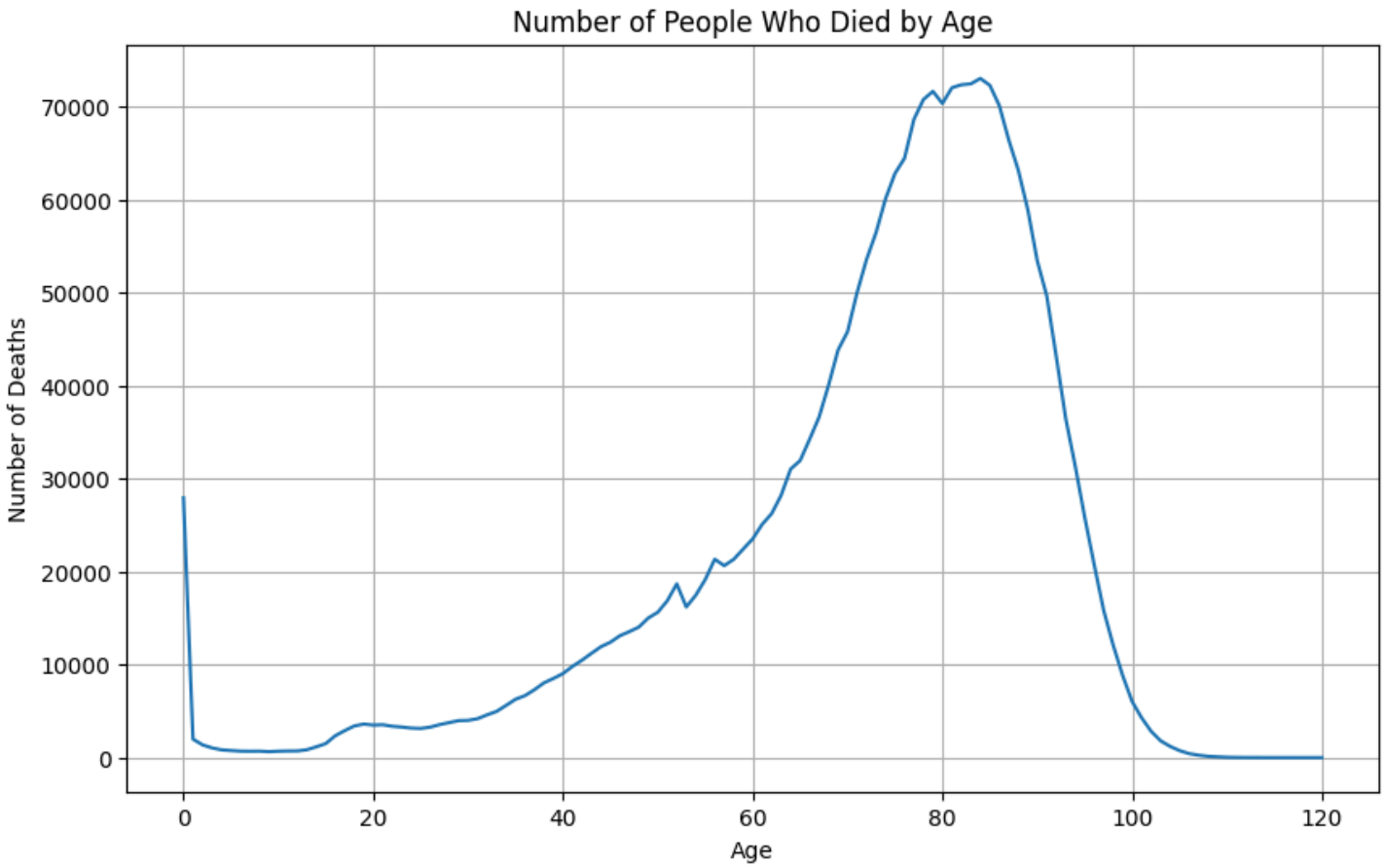
Sample Screenshots and Observations

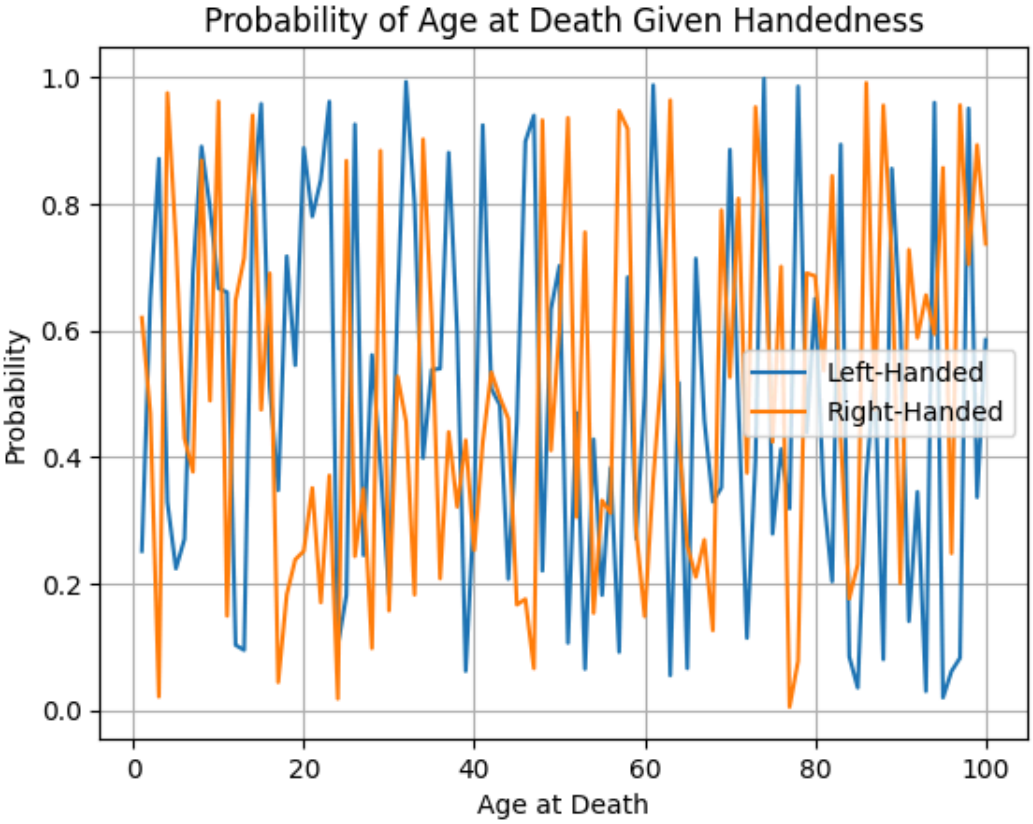


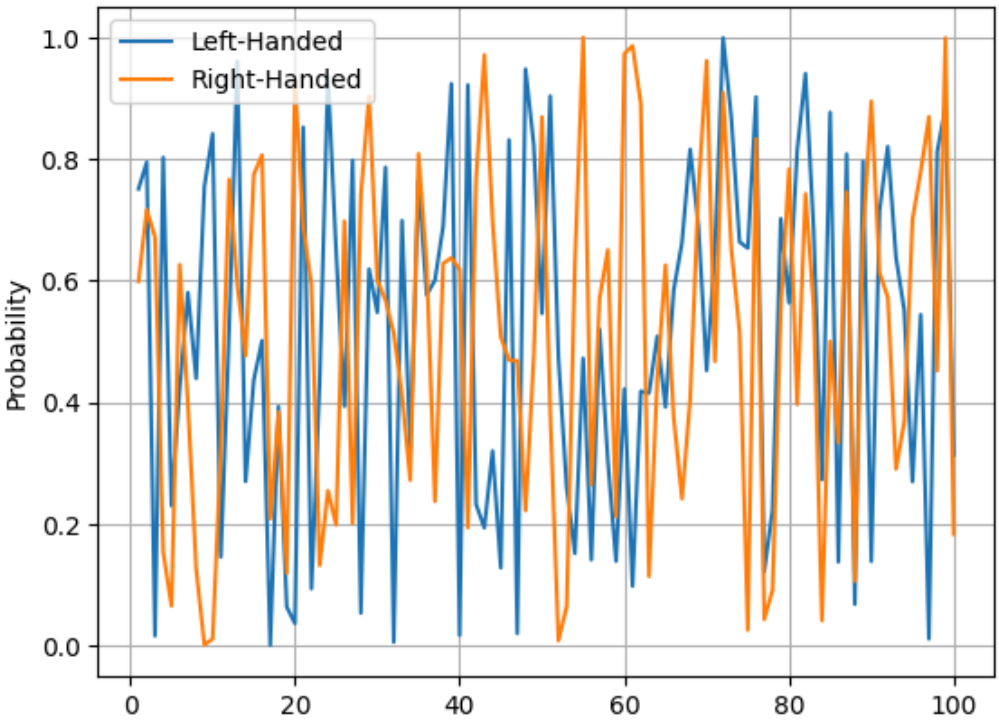

Male and Female Left-Handedness vs. Age
Male
Female
Percentage
Age
16
14
12
10
8
6
10
20
30
40
50
60
70
80


Mean Left-Handedness vs. Birth Year
Mean_lh
Mean Left-Handedness
Birth Year
14
12
10
8
6
1900
1910
1920
1930
1940
1950
1960
1970


Death Distribution by Age and Sex
Both Sexes
Male
Female
Number of Deaths
0
10000
20000
30000
40000
50000
60000
70000
0
20
40
60
80
100
120
Age


Number of People Who Died by Age
Number of Deaths
0
10000
20000
30000
40000
50000
60000
70000
0
20
40
60
80
100
120
Age





Results:

Average age at death for left-handers: 46.96 Average age at death for right-handers: 53.28 Difference in average ages: -6.33 Probability of dying at age 50 given LH/RH: 0.0065 (or 0.65%) Overall probability of left-handedness

(P(LH)): 0.1 (or 10%) Overall probability of right-handedness (P(RH)): 0.9 (or 90%) Difference in average ages between LH and RH: -6.33 years

Discussion:

In this analysis reveals a significant age gap at death between left-handers and right-handers, with left-handers tending to die at a younger age on average. While the calculated age difference was slightly lower than the nine-year gap reported in the original study, our findings corroborate the notion of a mortality disparity based on handedness. Possible factors contributing to the observed difference include historical shifts in left-handedness rates and variations in data sources and methodologies. Further analysis could involve simulating smaller samples to explore the variability in the age difference and projecting age distributions for different years to capture changing demographics.

Outcomes:

Validation of previous findings indicating a significant age gap between left-handed and right-handed individuals. Refutation of the notion that left-handedness inherently predisposes one to die younger. Identification of factors influencing the age difference, including historical trends in left-handedness rates and data sources.

Implications:

Highlight the importance of considering historical trends and sampling methodologies in mortality studies. Provide insights into the complex relationship between handedness and mortality, challenging prevailing assumptions. Further Investigations:

Explore variability in age difference due to random sampling. Project age distributions for left-handed and right-handed individuals in subsequent years to understand demographic shifts.

Conclusion:

In conclusion, analysis provides valuable insights into the mortality patterns associated with handedness, highlighting the need to consider historical trends and sampling methodologies in such studies. The observed age gap at death between right-handers and left-handers underscores the complexity of factors influencing mortality outcomes and opens avenues for further investigation into the interplay between handedness and mortality. This project sheds light on the age difference at death between left-handers and right-handers, challenging existing beliefs and emphasizing the need for nuanced analysis in mortality studies. Further investigations can refine our understanding of this complex relationship.