Analyse Death Age Differences of Right-Handers with Left-Handers

An Exploratory Data Analysis Project

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Abstract

Observations that the proportion of left-handers in the population decreases substantially with age have led to the suggestion that sinistrality may be associated with a decreased life span [1]. Studies have shown that laterality and longevity have a causal relation, i.e. right-handed people generally live longer than left-handed ones [4]. Many seminal articles which studied populations with a mix of laterality were published and when the samples were analysed for a possibly apparent correlation between handedness and the average life expectancy, the majority of authors reiterated the observation that left-handed people generally live less than their right-handed counterparts, at similar standard of living levels and other external factors. There was a variation between the average difference in the longevity reported, but none reported otherwise.

Researchers Avery Gilbert and Chuck Wysocki concluded based on their 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 [2].

In this project, we intend to approach the problem using modern data analysis tools and try to emulate the findings of researchers who have dealt with it using traditional population studies. We analyse the data using Python, a general-purpose programming language - the first choice of data personnel worldwide - for the analysis part, making use of some powerful and widely adopted third-party libraries like NumPy, pandas and Matplotlib.

Handedness and Longevity : Correlation?

According to Wikipedia, handedness is an individual's preferential use of one hand over the other. It is often defined by one's writing hand, as it is fairly common for people to prefer to do a particular task with a particular hand. Most of the current research suggests that left-handedness has an epigenetic marker - a combination of genetics, biology and the environment.

About 90% of people in the world are right-handed and 10% are left-handed. Handedness is associated with functional lateralisation for cerebral dominance, and may also be associated with various types of psychopathology. Broadly speaking, the vast majority of humans seem to have been right-handed since the emergence of the genus Homo, some three to four million years ago. Likewise, in all societies studied, there is a large excess of right-handers.

Different rates of left-handedness can reflect either environmental or genetic differences between societies, and rates alone cannot distinguish the two processes [3]. In 1991, Halpern and Coren claimed that on average, left-handed people die nine years younger than right-handed people. Most subsequent studies did not find support for the difference in age of death or its magnitude, primarily because of the realisation that there have been historical changes in reported rates of left-handedness. Nonetheless, the issue has been a hotly debated concept in population studies.

In 1992, Avery Gilbert and Chuck Wysocki, in their seminal publication, showed that sinistral subpopulations in their survey population of around 1.1 million displayed distinct and stable prevalence of sinistrality or laterality prior to age 50 and changing patterns of prevalence subsequent to age 50. They observed that the proportion of left-handers in the population decreased substantially with age, down from about 13% in 20-year-olds to under 1% in 80-year-olds. This led to the suggestion that sinistrality may be related to decreased lifespan. Based on their raw data, scholars like Halpern and Coren found out that the mean age at death in the right-handed sample was 75 years, as compared with the mean age at death of 66 years in the left-handers.

These and many other revelations have led to a scholarly debate over the issue of any possible correlation between handedness and longevity.

Data

National Geographic surveyed over a million respondents in 1986 for their sinistrality preferences for throwing a ball and writing, whilst recording their age and sex also.

Researchers Avery Gilbert and Charles Wysocki analysed this raw 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.

Based on this scenario, the data for our analysis is taken primarily from two sources -

1. The rates of left-handedness derived from the study titled 'Hand Preference and Age in the United States' by A. N. Gilbert and C. J. Wysocki, who in 1992 surveyed over a million U.S. men and women between the ages of 10 and 86 for their hand preferences for writing and throwing. The link to the paper is given below for further reference -
Link : https://pubmed.ncbi.nlm.nih.gov/1528408/

2. Death distribution data for 1999 collated and hosted by the National Centre for Health Statistics, Centre for Disease Control and Prevention, U.S. Link to the dataset is given below for further reference -
Link : https://www.cdc.gov/nchs/data/statab/vs00199_table310.pdf

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