

12 September 1963

Dr M. Hauge  
Institute of Human Genetics  
University of Copenhagen  
14 Tagens vej  
Copenhagen N  
Denmark

Dear Dr Hauge,

I have attended the Genetics Congress in Holland and read an abstract of your paper on "Hereditary Factors in Longevity". I am puzzled by your statement that the average difference of age at death of monozygotic twins is 14.5 years. I find this difficult to reconcile with the fact that the standard deviation of the Gaussian, which approximates the distribution of the ages at death the general population of the United States, is about 10 years.

I was wondering whether you have a spare copy of your detailed manuscript which you could send me. What I would particularly like to have is the raw data, giving the age differences at death for monozygotic twins from which I could compute the average of the squares of the differences of the ages at death of monozygotic twins.

I wonder whether you have computed the average of the squares of these differences and, if so, what the result is that you have got. The average of the squares of the differences is more convenient to handle than the average of the differences of the ages at death and, for that reason, I would like to have it.

I should be very grateful for your writing me c/o Dr Martin Kaplan, World Health Organization, Palais des Nations, Geneva. If it is not too inconvenient, perhaps you could send a carbon copy of your letter addressed to me c/o Professor Cavalli-Sforza, Institute of Genetics, The University of Pavia, Pavia, Italy.

With best wishes,

Yours sincerely,

Leo Szilard  
(Professor of Biophysics at  
the University of Chicago)

20.9.63

*File: aging*

Professor Leo Szilard,  
c/o Dr. Martin Kaplan,  
World Health Organization,  
Geneva.

Dear Professor Szilard,

Thank you for your letter of Sept. 12<sup>th</sup> concerning our twin study on longevity. The figures you are asking for did not appear in the manuscript for the meeting in The Hague as this could for obvious reasons only be an extended summary of our findings, only the average of the squares of the differences of the ages at death in each of the three groups were given, but I can give you some more details of our calculations. It ought to be stressed that only pairs where both partners have survived the age of five years have been included. The twins have been born in the years between 1870 and 1910. Using the symbols MZ for monozygotic twins, DZ1 for dizygotic pairs of identical sex and DZ2 for dizygotic pairs of different sex, we find:

$\sqrt{420}$   
1. Total material: MZ: no. of pairs 239, sum of sq. of differences of the ages at death 100 049. DZ1: no. 413, s. of sq. 241 633. DZ2: no. 387, s. of sq. 292720. This gives the following mean intra-pair variances (s. of sq. div. by 2n): MZ 209, DZ1 293, DZ2 378, hence called MIP.

2. Same sexed pairs only: MZ: no. of pairs 126, MIP 204, DZ 1: no. of pairs 222, MIP 285; this applies to male pairs. For female pairs: MZ: no. of pairs 113, MIP 215, DZ1: no. of pairs 191, MIP 301.

3. If broken down according to place of birth: Born in rural districts: MZ: no. of pairs 152, MIP 232. DZ1: no. of pairs 290, MIP 300. Born in urban areas: MZ: no. 86, MIP 169, DZ1: no. 123, MIP 278.

The raw data exist only on punch cards for an electronic computer. If you want these data, it may be possible to produce copies of the cards - or at least I hope so, but I expect further notice from you if you want these.

Yours sincerely,

*Mogens Hauge*  
Mogens Hauge

31 January, 1964

Dr. Mogens Hauge  
Universitetets Arvebiologiske Institut  
Tagensvej 14 - Kobenhavn N.

Dear Dr. Hauge:

Many thanks for your very kind letter of September 20 and your offer to send me the raw data. This will not be necessary. I am wondering, however, whether you could re-compute your results and this time include only pairs where both partners have survived the age of 40, rather than the age of 5. It is conceivable that such a re-computation would result in the present paradox.

I should greatly appreciate your letting me know of your plans and advising me of any result that you might obtain.

With best wishes,

Yours sincerely,

Leo Szilard

LS:jm

cc: Professor Cavalli Sforza