

6 October 1956

Dr. Sidney L. Halperin  
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Honolulu, T.H.

Dear Dr. Halperin:

Linus sent me a reprint of your interesting article on the inheritance of mental illness, and said that you would like my opinion of it.

First, I must say that I do not know very much about mental disease as a whole, and mental illness in particular. I have been learning a good bit during recent months, about mental retardation, and I have no doubt that mental retardation is often caused by a single gene abnormality. I think that it is likely that the mental well-being of a person depends upon a great number of chemical factors, and that a quantitative deviation from the optimum for these factors may cause mental illness or may cause a strong predisposition to mental illness, which would then result under environmental stress. I think that it is likely that there may be a large number of genes that are represented by allelomorphic sets in the population of the world, and that some of the alleles may cause the concentration of one or more of these chemical factors to be somewhat too small or somewhat too large for good mental health.

I have no doubt that environment is important in causing or preventing mental illness; but I feel that in almost all cases of mental illness there is a significant genetic factor.

I think that I am saying that I believe that some people are genetically predisposed to emotional breakdown. However, I do not think that this is a pessimistic approach to human behavior, because I believe that during the next few decades much will be discovered about the chemical factors that are involved, and simple methods of chemotherapy that will be really effective will be developed.

I do not know how much direct evidence there is that people inherit predisposition to schizophrenia and the affective psychoses. Even without knowing what the evidence is, however, I think that it is very likely that this predisposition is inherited, and that it is inherited in a specific way, through the inheritance of one or more abnormal genes. I think that it is likely that there are a great many chromosomal loci that are involved. Estimates that have been made

of the probability of occurrence of abnormal genes lie in the neighborhood of 1 percent: for example, 1 percent in 80 is a carrier of phenylketonuria, which corresponds to a probability of occurrence of the phenylketonuria gene of 1 in 160. I have guessed that every human being has somewhere around 100,000 genes, and we may accordingly make a rough estimate that everyone carries around something like 500 abnormal genes, in general deleterious. This estimate may be somewhat too high - Muller has, if I remember correctly, suggested that everyone carries a dozen or two deleterious abnormal genes. I have a feeling that a good number of the genes affect mental behavior.

I trust that you will not rely upon me as an authority in this field. I should be pleased to have you write to me about any matter that interests you.

Sincerely yours,

Linus Pauling:W