

Book Reviews

The Etiological Question in Mental Illness

The Transmission of Schizophrenia. Proceedings of the second research conference of the Foundations' Fund for Research in Psychiatry, Dorado, Puerto Rico, June-July 1967. DAVID ROSENTHAL and SEYMOUR S. KETY, Eds. Pergamon, New York, 1968. xii + 436 pp., illus. \$15.

Despite decades of intensive research, the etiology and nature of schizophrenia remain obscure. To greater or lesser degree, both genotypic and experiential factors are recognized as playing some etiological role. In general, biologically oriented researchers tend to view schizophrenia as a disease resulting from an unidentified organic or hereditary biochemical or neurophysiological defect, whereas psychologically oriented investigators tend to view schizophrenia as a group of disorders resulting from disturbances in sociocultural, familial, and interpersonal processes. After paying homage to the concept of genotype-environment interaction, most investigators, unwittingly or by choice, slip back into more comfortable modes of thought and place their etiological bets on one or the other side.

In the 1940's and '50's the two conceptual approaches were strongly polarized. A book published nine years ago, *The Etiology of Schizophrenia* edited by Don Jackson, may be thought of as the final expression of that era. It displays a distinct antiheredity bias. Only two chapters are devoted to the evidence suggesting that genotypic factors are involved in the development of schizophrenia, and one of the two, written by Jackson himself, is an acrimonious critique of the work of F. J. Kallmann, who offered some of that evidence. The intervening years have brought a convergence of biological and psychological viewpoints which is clearly manifested in the volume here reviewed. A major portion of this book is given over to

discussions of genetic variables. In addition, several new studies are described which demonstrate convincingly that genotypic factors are involved in the etiology of schizophrenia.

The Transmission of Schizophrenia is the proceedings of a six-day "confrontation conference," the participants in which were a stellar group of American and European investigators representing diverse approaches in schizophrenia research. The individual contributions are in general of high quality; however, in the aggregate there is considerable redundancy and discontinuity. Occasional footnotes suggest the intensity of the discussions that took place in the course of the conference, but the discussions are not reproduced and the allusions to points brought out in them are sometimes not entirely understandable to the reader. Another defect of the book is the lack of a subject index.

The book consists of three major sections devoted respectively to genetic studies, sociocultural and interpersonal studies, and studies examining the interaction of experiential and genetic variables. Each section is aptly summarized by a discussant—James Shields for the genetics, John A. Clausen for the experiential, and Leon Eisenberg for the interaction sections. Finally, there is a *summa summarum* by David Rosenthal in which the conclusions of the various sections are integrated and the still unsettled issues are clearly exposed.

The classical evidence for genotypic effects in schizophrenia, summarized by Eliot Slater, essentially rests on the greater morbidity rates found among relatives of affected individuals and on the higher concordance rates among monozygotic twin pairs than among dizygotic pairs. The twin studies are the backbone of the evidence for

heredity. Pekka Tienari, Irving Gottesman, and Einar Kringlen each describe their recent studies on twin populations. With their improved diagnostic and sampling techniques and methods of calculating concordance (presence—or absence—of the disease in both twins of a pair), these studies support the older findings but yield substantially lower rates of concordance; the modal rate for monozygotic twins appears to be about 45 percent, which is not much higher than the familial morbidity rate Erlenmeyer-Kimling reports in children both of whose parents are schizophrenic. Despite the improvements in design in all these studies, their inability to distinguish between genotypic contributions and those due to psychological familial factors continues to limit their value. In another section of the book William Pollin and James Stabenau describe their study of *discordant* monozygotic twin pairs. Here the genotype is presumably a constant and full attention can be given to the biological and interpersonal variables which differentiate the affected and unaffected co-twins. When the classic twin studies are compared with studies of this kind, one realizes how little the former have contributed to our understanding of the nature of schizophrenia.

The study of monozygotic twins reared apart is a method of separating hereditary and environmental effects. Slater discusses 16 such cases, slightly more than half of which are concordant with respect to schizophrenia. These data suggest that heredity is involved, but the sample is too small for any conclusion to be entirely convincing.

Gottesman suggests that among monozygotic twins there is a positive correlation between the severity of schizophrenic illness and concordance and that there is a greater degree of genetic determination for hebephrenic and paranoid than for other Kraepelinian subtypes. Kringlen, however, interprets his own twin data more conservatively, pointing out that the role of social factors in the severity-subtype-concordance relationship cannot be excluded.

The mode of transmission of the genes involved in schizophrenia is still unclear. Jon Karlsson continues to adhere to a two-gene model and Slater to one that postulates a single dominant gene with decreased penetrance, although he grants that a polygenic model may be operative. Gottesman prefers

an additive polygenic model, and Erlenmeyer-Kimling a heterogeneous model in which multiple, independent genetic defects yield a distribution approximating one expected under polygenic theory. A polygenic explanation appears most plausible, since it seems to fit many of the known behavioral and genetic data better than other models do. Nevertheless, it is questionable whether this model will have much heuristic value for the biochemist, the psychologist, or the geneticist until the contributions of single genes to the polygenic system are isolated. The estimates of heritability (the proportion of the total phenotypic variance due to additive genetic variation) that have been made on the basis of a threshold polygenic model have been high, too high in fact, suggesting that a simple additive system is unlikely. Furthermore, one must question where, at the present stage of our knowledge, the strategy of heritability calculations is leading and what possible difference it would make for the clinician.

In contrast to the contributions of data in the genetics section, the papers dealing with experiential factors concentrate largely on conceptual and theoretical issues. The differential impact on family function depending on whether the husband or wife is affected is discussed by Lloyd Rogler. H. B. M. Murphy reviews the evidence regarding cultural factors in schizophrenogenesis, and Melvin Kohn summarizes the effects of social class. Kohn points out that the higher rates of schizophrenia associated with low socioeconomic status appear to hold in large metropolises but disappear in cities with smaller populations. The question of whether lower socioeconomic status is conducive to schizophrenia or individuals from higher classes "drift" downward in social status en route to becoming schizophrenic is largely unresolved, but Kohn thinks the evidence to support the drift hypothesis is not sufficient to explain the high concentration of schizophrenia in the lowest socioeconomic strata. His brilliant discussion of the inadequacies of the indices used in the social class studies and of various alternative hypotheses is one of the highlights of the volume. The families of schizophrenics are discussed by Theodore Lidz in respect to linguistic and cognitive disturbances, by Lyman Wynne in respect to shared foci of attention, by Yrjo Alanen in the context of psychoanalytic theory, and by

David Reiss in respect to family problem solving.

Research design and methodology have been major stumbling blocks in establishing the etiological significance of both genotypic and family-interaction variables in schizophrenia. The third portion of the volume is largely devoted to methodological issues focusing on studies of groups particularly vulnerable to the development of schizophrenia.

The keystone of the volume is a series of papers by the editors, in collaboration with Paul Wender and others. The studies focus on individuals adopted in infancy. Since these children are not reared by their biological parents, the agents of hereditary transmission are separated from those of experiential transmission. In one study, two groups of suitably matched individuals reared in unrelated adoptive homes were compared, one a group whose members each had a schizophrenic biological parent (index cases) and one whose members had nonschizophrenic biological parents; the prevalence of schizophrenia among the index adoptees was considerably higher than among the control group—a finding in accord with earlier data by Leonard Heston. In a second study, the frequency and severity of psychopathology among parents who reared their own schizophrenic offspring were found to be significantly greater than among adoptive parents of a group of schizophrenic patients, adoptive parents of nonschizophrenics showing the least psychopathology. In a third study, schizophrenia and related disorders were found to be randomly distributed in the adoptive families of a group of adoptees with diagnoses of schizophrenia (index cases) and of a group of control adoptees, whereas the biological families of the index cases showed a significantly higher prevalence of schizophrenia and related disorders than the biological families of the controls. In comparison with appropriate control groups, the higher prevalence of psychopathology among the adoptees with an affected biological parent and among the biological parents and relatives of affected adoptees argues for a mechanism of hereditary transmission. In sum, these studies provide the most straightforward, unambiguous evidence to date of genotypic influences in the development of schizophrenia.

The questions often posed in the past regarding schizophrenia (Is it inherited

or learned? What are the relative contributions of heredity and environment?) have not been productive. It has become obvious that the *nature* of the genotype-environment interaction is the central issue in the understanding of schizophrenia. I agree with Rosenthal when he singles out the question posed by Erlenmeyer-Kimling, "What kinds of environmental input trigger manifestations of the disorder in genotypically vulnerable persons, and why are these important, in a psychophysiological sense?," as the one most likely to lead to productive research in the future.

Elliot Mishler and others point out the difficulties of differentiating between the etiological antecedents and the consequences of psychopathology through retrospective studies. The Rosenthal-Kety volume reflects an almost total unanimity among its contributors regarding the need for long-range, methodical, prospective studies, along the lines pioneered by Sarnoff Mednick and his co-workers, on groups genotypically at high risk for the development of schizophrenia.

The opening of communication channels, the reduction of conceptual polarization, and the consensus on future research needs are the major achievements of the conference represented in this book. It is to be hoped that the publication of these proceedings will stimulate further discussion and promote the collaborative research efforts that are needed on a problem that has immense individual and social costs.

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Examples of Ingenuity

Simple Working Models of Historic Machines. (Easily Made by the Reader.) AUBREY F. BURSTALL. M.I.T. Press, Cambridge, Mass., 1969. 80 pp., illus. \$3.95.

The idea of a collection of plans for models of important mechanisms has been discussed by educators since the *British Report on the Classics* of 1921. Such a collection has seemed an excellent way to do four things: to interest vocational high school students in the history of science and society, to introduce the principles of mechanics into shop work in an effective way (instead of centering merely on tactics with the