children at risk: the search for the antecedents of schizophrenia. part I. conceptual models and research methods*

Norman Garmezy
with the collaboration of Sandra Streitman

The dedication of this issue of the *Schizophrenia Bulletin* to research on individuals at risk for schizophrenia is but one indication of the vitality and potential significance of an emergent area of research. Other indicators include three meetings which have been devoted to the topic: an NIMH workshop in June 1969 (see Mosher and Wynne 1970) and conferences at Bled, Yugoslavia, in July 1972 [1] and at Dorado Beach, Puerto Rico, in October 1972.[2] The most important indicators of all, of course, are the dozen or so research programs now underway in the United States and Europe, all prospective in design, experimental in orientation, and clinical in the sensitivity with which they are oriented to the child predisposed to the subsequent development of schizophrenia or other forms of severe psychopathology.

The Background of Risk Research

Why have risk studies begun to emerge at this point in the history of psychiatry? To understand this phenomenon better we must begin by distinguishing two major streams of research in psychopathology. The first is *structural*, emphasizing symptoms, diagnosis, and classification. Rooted in the Kraepelinian tradition, this approach is now undergoing revitalization as computer-based structured interview schedules (Wing et al. 1967, Endicott and Spitzer 1972, Spitzer and Endicott 1969, Spitzer et al. 1970, and World Health Organization 1973) begin to reveal the power inherent in the classification of mental disorders. Its key purpose is to provide substantive understanding of the formal properties of psychopathological phenomena observed in the patient. The second, or *dynamic*, approach (for which we can substitute other terms, all evocative of the Freudian epoch—the *developmental*, the *psychological*, the *motivational* approach) focuses on the patient in the present only as a way station for moving back to the past to gain an understanding of the origins of his disorder. What can be said of these contrasting, but not antithetical, views of disordered man? Perhaps the most striking comparison is provided by the empirical literature of schizophrenia. The structural study of this disorder has produced a solid base of observations on the patterning of anomalies (both biological and psychological) characteristic of the adult schizophrenic patient, while the study of the development of such deviant manifestations unfortunately remains imprecise and uncertain. If one considers what is known about the nature of schizophrenic *thinking* in contrast to what is known about its *origins* (Chapman and Chapman, in press), the substantive differences between these two approaches become evident. That this disparity exists should occasion no surprise, given the paucity of our knowledge of the etiology of schizophrenia. But there is an element of the problem that transcends the issue of the restricted state of our current knowledge. This lies in the orientation of psychiatry to investigating the sources of psychopathology. Psychiatric clinicians and experimental psychopathologists typically share as their focus of attention the disordered adult patient. Whether one's per-

*Sections of this report have drawn upon a series of papers (Garmezy 1970, 1971a and b, 1972a and b, in press, and in preparation) written under NIMH-USPHS contract grant (PH43–68–1313). The review of earlier risk research is based, in part, upon a summa thesis written by the collaborating author (Streitman 1968) under the direction of the senior author.

[1] The Bled Conference was sponsored by the International Study Group of the International Association for Child Psychiatry and Allied Professions with support funding provided by the Grant Foundation.

[2] The Dorado Beach Conference was organized under NIMH auspices with supplemental support from the Grant Foundation.

Copyright © 1973 by Norman Garmezy

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

suasions are biological or psychological, contemporaneous observations are often used to infer not only the structure of mental disorder but its significant antecedents as well. For the structuralist—perhaps even for the therapist whose concern with veridicality may not be essential to the process of treatment—the focus on the adult informant is appropriate. But for the etiologist such an inferential enterprise poses problems. To suggest that case history information gathered in the present is an accurate reflection of the past—and to do so in the face of many confounding variables—only confuses the scientific effort to untangle causation in psychopathology.

Kety (1969) sounded the warning to those studying the biology of schizophrenia when he wrote:

> Those interested in exploring the biologic aspects of schizophrenic disorders cannot with impunity ignore the psychologic, social, and other environmental factors which operate significantly at various stages of their development. Leaving aside etiologic considerations, it is clear that exogenous factors may precipitate, intensify, or ameliorate the symptoms and confound the biologic picture. To what extent the classical psychologic features of chronic schizophrenia are created by prolonged isolation and hospitalization will become apparent with the increasing adoption of community-oriented treatment. Examples are readily found in which uncontrolled nutritional, infectious, or pharmacologic variables may have accounted for specific biochemical abnormalities in populations of chronic schizophrenics. [p. 165]

And Mednick and McNeil (1968) addressed a comparable note of caution to those pursuing psychological studies:

> It may be difficult . . . to isolate etiological factors through studies carried out with individuals who have lived through the process of becoming and being schizophrenic. The behavior of these individuals may be markedly altered in response to correlates of the illness, such as educational, economic, and social failure, prehospital, hospital and posthospital drug regimens, bachelorhood, long-term institutionalization, chronic illness, and sheer misery. [p. 681]

Recent studies of normal mothers and normal children indicate the need for caution in relying on retrospection and historical reconstruction to reveal significant elements in the past. These studies have amply demonstrated the inaccuracy of normal mothers' recollections of the early years of their children's lives. Significantly, their lack of reliability

> . . . is heightened when they are asked to recall events that were once associated with anxiety or other negative affects. Since such factors are assumed to be the most significant for the development of maladjustment in children, evidence of a lack of correspondence between recall and earlier recorded data poses a particularly difficult problem for developmental conceptualizations of disorder that are derived largely from case history contents. [Garmezy, in press]

Yarrow, Campbell, and Burton (1970) have provided telling evidence of the limitations of retrospection in a comparison of cumulative case record information about nursery school children with retrospective information obtained in interviews with these children's mothers. The elapsed time between the retrospective interviews and the children's nursery school experiences ranged from 3 to 30 years. In summarizing their elaborate study, the researchers caution that the issue posed by retrospective data is not one of accounting for "purely random guesses" but, rather, that systematic biases are introduced into such reports by a variety of nonrandom effects—effects that have great significance for those concerned with issues in developmental psychopathology.

These biases, as drawn from the Yarrow, Campbell, and Burton monograph, are several:

1) *The distorting role of the time interval of the retrospective report.*

> It is possible that once the child has reached maturity and is well-adjusted, events and characteristics of the early years that seemed important lose their salience. Stressful happenings and disturbing behaviors in childhood seem less problematic when the "child" appears no longer vulnerable in ways that concerned the mother at the time of the events; hence, mothers from longer intervals tend to view the past more "positively." [p. 44]

2) *The influence of contemporary adaptation on recall of past adjustment.*

> . . . if children were seen now as shy, their mothers tended to recall them as having

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

been more shy in early childhood than appeared in baseline evaluations. On the other hand, if a child was now described as outgoing, he was rated more outgoing in recall than in baseline records. Similar reorganizations occurred on the dimensions of response to authority and of independence. [p. 50]

3) *The operation of nonrandom effects.*

. . . to a considerable degree we also observed non-random effects. We saw the operation of uniformly shared ego involvements that systematically revised recollections of earlier states of affairs. We found mothers' reports conforming to child care values current at the time of reporting. Even more clearly, the idiosyncratic perceptions and expectations of the interviewee impressed themselves on the data of recall. Mothers' definitions of specific aspects of their children's behavior at the time of reporting significantly defined these same attributes of their children in the past, thus magnifying developmental continuities in personality.

Investigators intending to obtain subjects' recall of years ago—or only yesterday—would do well to reflect on the perspectives of their informants. Many of the respondents in psychological studies, as in our sample, have been indoctrinated by theories of development and behavior. The interviewee knows what is believed to be "good" in behavior and what are accepted as antecedents and consequences in behavior relations. This knowledge can enter into his observing, retaining, and reporting on behaviors. . . . Thus the returns to the scientist could well be predetermined. [p. 72]

These observations serve as the best disclaimers for an exclusive reliance on retrospection as the method for educing patterns of antecedent-consequent relationships in behavior pathology. But an increasing awareness of the limitations imposed by traditional methodologies would not alone have sufficed to reorient psychopathologists to the need for developmental-prospective-longitudinal studies of the child at risk. Other forces in the milieu were also important.

Professor John Romano, well versed in psychiatry's history, has suggested[3] that we are now entering an era of renewed interest in the psychoses, after a long period of preoccupation with neurotic states. He sees many factors at work that have ushered in this important change, including the sociopolitical climate of these revolutionary times—a climate of concern about civil rights and egalitarianism which draws attention to areas of human neglect. Growing concern with the problems of the underprivileged, the powerless and the neglected has increased our awareness of the plight of the most underprivileged and voiceless of all—the countless patients who have long made up the populations of monolithic public mental institutions. This concern represents one driving, elemental force in the community mental health movement and in the effort to secure the release of patients from institutions removed from the community and to place them in halfway houses, foster homes, and community centers. The new drug therapies which have been introduced have been accompanied by a renascence in biological psychiatry which now seeks to amalgamate exciting new findings derived from genetics, neurophysiology, biochemistry, and allied fields. Concurrent with these developments, notes Dr. Romano, has been "the rediscovery of the human family and of the human community . . . with an enrichment provided by the contributions of social psychologists, social scientists and others." A growing awareness of the significance of language and cognition in the context of interpersonal exchange within the family and the larger community has opened the study of communication and its derivatives to experimental study, while providing a context for evaluating complex social determinants of disordered personality development. Paralleling the growth of these new avenues to understanding has been the introduction of a revitalized developmental psychology enriched by the insights and observations of Piaget, Bruner, and others. It is this powerful discipline, joined by a resurgent interest in the psychoses, advances in related biological sciences, and a heightened social concern with the long-term, negative effects on children exposed to deprivation, disadvantage, and neglect, that has led to the growing number of projects devoted to the study of children at risk for schizophrenia.

The Nature of Risk Research

A child is "at risk" if there is a greater like-

[3] Personal communication.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

lihood that he will develop a mental disorder than a randomly selected child from the same community. This simple statement camouflages some inordinately difficult methodological problems. Alluding to predisposition is comparable to opening a Pandora's box of psychiatric questions, the most prominent being: 1) Who are the predisposed children in society? 2) What determines their predisposition?

These questions raise anew the basic etiological issue in schizophrenia, with all its attendant difficulties. Defining for risk implies either that the etiology of a disorder is known or that the related empirical data are sturdy enough to predict, with reasonable accuracy, behavioral outcomes in adulthood based upon specific characteristics evident in infancy or childhood.

In the absence of valid and reliable data, we are forced to lean on etiological models which share many qualitative imprecisions:

> . . . the domain of psychopathology consists largely of descriptive phenomena that are couched in what Kaplan (1964) in *The Conduct of Inquiry* has termed the *literary style* (with its emphasis on persons, individuals and events), the *academic style* (with its flavor on the verbal rather than the operational) or, in some instances, the *eristic style* (which is characterized by deduction, experimentation and data collection). But the more advanced styles of the *symbolic*, the *postulational* and the *formal*, in which rigorous and logical conceptualizations are accompanied by explicit rules for deriving propositions and testing them by equally rigorous mathematical proof, are not (and for now cannot be) the working modes of psychopathologists. Our scientific efforts are often primitive, our observations too frequently imprecise, or the phenomena we observe unreliable; even when reliability does exist, the data often allow for a choice of seemingly discrepant but apparently tenable interpretations.
>
> . . . It is not surprising, therefore, that in the study of behavior pathology contradictory hypotheses readily coexist, proof is often a fragile verity, and disproof is a rare claimant of our scientific enterprise. We cannot suggest, then, in the present stage of our science, that only a single model will suffice or prove to be the one true portrait of reality. Such an assignment would be one made largely on faith and less in keeping with the data base of our discipline. . . .
>
> . . . Diversity of formulation can, in this instance, be a virtue. In Kaplan's words, "The dangers are not in working with models, but in working with too few, and those too much alike, and above all, in belittling any effort to work with anything else." [Garmezy 1972a, pp. 16–18]

Certainly etiological models in schizophrenia have not been in short supply. For the sake of exposition and simplicity, we can identify three basic models in terms of the emphasis placed on biogenetic, psychological, and sociological factors. The number of models increases, since the current, prevailing view is an interactive one. But, despite the steady erosion of exclusivity in etiological formulations of schizophrenia, advocates of each of these three views tend to reflect their biases in the weights they assign to specific factors. Such weightings, despite their qualitative cast, influence the modes of selection for risk observed in ongoing research programs. The three models with their differential stress on gene, molecular family, and molar environment [4] have been joined more recently by a fourth model which emphasizes factors associated with early neglect, deprivation, or trauma in mother or child experienced in the course of pregnancy and birth or during the perinatal and neonatal periods.

The Genetic Model

The power of genetic factors in the etiology of schizophrenia has been enhanced by a recent set of distinguished investigations conducted by

[4] This category set differs in some respects from Rosenthal's (1963) tripartite classification of etiological theories of schizophrenia: monogenic-biochemical, diathesis-stress, and life-experience. Rosenthal's classification takes cognizance of inborn metabolic errors, potential biochemical factors, possible constitutional predispositions, unspecified environmental events which may activate the predisposition, and such broad-gaged psychogenic factors as faulty familial relationships, disturbed patterns of socialization, acquisition of faulty learning patterns, and depriving social milieus. The imprecision of the category system lies not with Rosenthal but with the state of our knowledge of psychopathology. Since little hard data have been yielded by efforts to tap biological anomalies, specific genetic factors, or precise environmental events that may conduce to risk, we have contented ourselves with the broad indicators of risk: genetic predisposition as evidenced by manifest psychopathology in a parent, intense family conflict, or familial disorganization which may find its reflection in disordered thinking and communication, and pathogenic environmental factors associated with poverty, deprivation, and neglect.

535-812 O - 74 - 2

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Gottesman and Shields (1972), Heston (1971), Kety et al. (1968), Rosenthal et al. (1968), Zerbin-Rüdin (1967), and others. Without considering the various issues that are currently argued by advocates of a genetic model (e.g., single major gene versus polygenic model, the validity and utility of a schizophrenic spectrum concept, and the specificity of the schizophrenic genotype), it is safe to say that as a basis for selecting vulnerable children the genetic model, as exemplified by the choice of cohorts of mothers and/or fathers who carry a previous diagnosis of schizophrenia, is preferred over all current alternatives. Most ongoing risk studies use selection criteria developed systematically during the past decade by Mednick and Schulsinger (1968 and 1970) and less systematically by such earlier investigators as Bender (1937), Canavan and Clark (1923-a and b), Lampron (1933), Preston and Antin (1932), and Ramage (1925).

Bender's monograph (1937), largely clinical in its focus on mothers exhibiting different mental disorders—schizophrenia, affective psychoses, mental defect, epilepsy, syphilitic psychoses, alcoholic psychoses, and criminality—represented the first large-scale effort to survey systematically the effects of maternal pathology on children. The stress on hereditary factors was specifically disallowed "since [the study] is concerned with children who have not reached the age of expectancy of mental disease." Disallowed but not disavowed, since Bender took the position that "there is now little doubt but that heredity must play some part in schizophrenia"; she added, however:

> In a family where a serious mental illness occurs, other members of the family may be vulnerable to mental disorders because of constitutional inferiority, they may experience emotional crises and behavior disorders if the family life is disrupted or the emotional relationship to the other members of the family is disturbed. The nature of the disorder is not specifically related to the psychosis in the first member of the family, but is related rather to the relationship between the two members of the family and the disturbance in the life history of the second member.[5] [p. 234]

[5] Bender's reference in the passage above was to the impact of a *reactive* psychosis on families. More recent studies indicate, however, that this suggestion of unrelatedness in disorder within families does not appear to apply to more process forms of schizophrenic disorder (Garmezy 1968 and Kety et al. 1968).

Reporting on 24 families with one parent schizophrenic, Bender reported "evidence for constitutional defects" in one-third of the cases—e.g., schizoid personality, defects in physique, motility, intelligence, perception and emotionality. In the other two-thirds of the cases:

> . . . the behavior problem is not due to constitutional disturbances but to disturbances in the normal development of the child's personality in the early years of life, due to the presence of the psychotic parent, the abnormal parent-child relationships and identification process, the broken homes, and the resulting deprivation of normal parent-child relationship and identification. [p. 280]

Such clinical observations, of course, do nothing to negate the genetic model, for in the words of Dobzhansky (1962):

> The dichotomy of heredity and environmental traits is . . . untenable: in principle any trait is modifiable by changes in the genes and by manipulation of the environment. [p. 42]

The problem for risk research is to ascertain which biological, psychological, and sociological factors may be relevant to the development of schizophrenia. In recognition of the relevance of environmental forces, the genetic model is embroidered by students of schizophrenia into a diathesis-stress model in which the biological predisposition is joined to environmental events presumed to potentiate disorder. Despite its inexactness, this formulation finds some support in the risk literature. Fish et al. (1965, 1966 and 1973) and Fish (1957, 1959, 1960, 1963, 1971a, 1972, and 1973) have described follow-up studies of children who in infancy showed erratic and disorganized maturational patterns in activity, alertness, vestibular function, autonomic stability, and proprioception. Having selected three of 16 infants as vulnerable to schizophrenia on the basis of their abnormally uneven development at 1 month of age, Fish and her colleagues intensively studied their later adaptation. The three infants differed initially in the degree of irregularity evident in their development. Peter, the most uneven of all, was born into a family in which a schizophrenic mother who was incapable of caring for him was assisted by a dull and disorganized grandmother. Later a violent stepfather who actively disliked the boy entered the picture, followed 1½ years later by the rehospitalization of

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

the mother. Frank, who showed a lesser degree of irregular development, was born to a mother who was sensitive, responsive, intelligent, fragile, and lonely. Conrad, whose maturational patterns showed the greatest consistency, was described as having "the most stormy and chaotic family experiences of the three infants," having been placed in a succession of foster homes after his mother's acute paranoid break. Blind independent psychiatric evaluations made when the children were 9–9½ years old revealed Peter to be a childhood schizophrenic; a diagnosis of schizophrenia was reaffirmed at age 18 (Fish 1971a). Frank, on the other hand, was found to be a "moderately well-compensated neurotic child" who was "spontaneous and forthright but under constant control." Finally, Conrad was described as "more psychopathic than schizophrenic . . . related to his early deprivation and traumatization, with possibly some early schizophrenic anlage" (Fish et al. 1966, p. 344.)

If large-scale studies could affirm the predictive power of deviant neurological development as an indicator of vulnerability to schizophrenia in later childhood (and Fish and her colleagues cite other evidence from additional cases which indicates that such data were not merely fortuitous), these three case studies suggest that an interaction of biological and familial factors operates to enhance later maldevelopment.

> We believe that the child's ultimate personality organization depends upon the interaction between his environment and his unique pattern of assets and impairments. The most . . . severe early impairments are less modifiable; in children with less extreme deviations, experience plays a larger role in the outcome, as in Frank and Conrad. In a more recent study of infants born to schizophrenic mothers, a number of "vulnerable children" with moderate developmental deviations appeared to improve when placed in foster homes where optimal conditions were prescribed, depending on their particular developmental lags. [Fish et al. 1966, p. 351]

Gene-Environment Interaction

Sameroff and Zax (1972b), while praising this research program's pioneering approach, have criticized the absence of specific control groups which might have permitted a separation of constitutional and environmental factors—a criticism accentuated by the fact that the mothers seen by Fish were all institutionalized [6] at the time of their children's birth. One child subsequently had both rearing experiences with a grossly disordered mother as well as institutional placement, conditions which obviously add environmental stress to the factor of genetic predisposition. Nine other infants, according to Fish, were reared in "optimal" environments.

Citing the work of Koel (1969), Sameroff and Zax refer to similar deviations arising out of atypical child-rearing practices. They argue that the criterion of growth retardation can be shown to be a function of the infant's caretaking environment, a fact reaffirmed by Gardner (1972) and Patton and Gardner (1969) in studies of deprivation dwarfism. Thus there remains the necessity of using a variety of controls in an attempt to partial out the effects produced by genetic and environmental disadvantage. As will be cited later, more recent research by Sameroff and Zax (1972b) has provided for different maternal groups (schizophrenic, neurotic depressed, personality disordered, and normal) in the hope of indicating the contributions of schizophrenia to the perinatal characteristics of the offspring of mothers bearing the diagnosis.

The importance of controls is indicated by recent studies by Mednick et al. (1971). A prior investigation cited by Mednick (1970) had indicated a heightened frequency of birth complications (as derived from medical records) in children born to mothers who later became mentally ill. Subsequently Mednick and his colleagues (1971) reported that the frequency of these com-

---

[6] Fish and Alpert (1962) indicate that the infants born to schizophrenic mothers in two New York State mental hospitals were observed from birth on. Apparently the 1962 paper is based upon an *N* of 13 infants. Since the mothers had been described as "having been ill for periods ranging from six months to twenty years," a clinical analysis of the children's behavior as a function of the acuteness or chronicity of mothers' psychopathological status might have provided additional information relevant to the effects on children of the process or reactive status of their mothers, as cited earlier. Dr. Fish has indicated, in private correspondence, that her plans for a larger scale study with appropriate controls failed to receive support in 1958 because risk studies were then viewed as too "far-fetched."

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

plications in the deliveries of women diagnosed schizophrenic exceeded those evident in women with personality disorders as well as normal controls. (Recently, Mednick et al. (1973) have reported an error in the earlier analysis which attenuates the reported differences among the groups except for the factor of birth weight.) Pollin and Stabenau's report (1968) of monozygotic twins discordant for schizophrenia had also indicated that index cases had a high proportion of asphyxia and low weight at birth. Sameroff and Zax (1972b) provide a cautionary note regarding the inferences to be drawn from such findings:

> The data from our two studies replicate these earlier findings but also suggest an explanation related less to diagnostic category than to severity of mental illness. Severe psychopathology in any diagnostic group probably results in an inadequate concern about physical health and nutrition. Schizophrenic women generally are most pronounced in these incompetencies, but more because they represent an extreme of mental disorder rather than a diagnosis of schizophrenia. When compared with other women who are severely disturbed mentally but not schizophrenic, as in our neurotic-depressive group, no difference in the degree of delivery complications is found.
>
> Whatever the eventual conclusions about the importance of birth complications, or any other variable proposed as being important to the etiology of schizophrenia, these conclusions will not be reached unless experiments include proper control groups which can isolate the diagnostic characteristics of schizophrenia from other characteristics of the schizophrenic sample.

These data, provocative for etiological speculation, generate new complexities. Mednick et al. (1971) originally perceived birth variants as stressors in a diathesis-stress interaction with "the possibility of a genetic predisposition being precipitated by the perinatal stress." In a discussion of their findings, both Heston [7] (1971) and Fish (1971b) argue that symptomatic low birth weight may not reflect a stressor event but rather a developmental immaturity associated with the schizophrenic genotypes per se. Fish comments:

> It's possible that in some of these infants the active schizophrenic process, whatever it is, can start not simply at birth, but may begin before, and that the low birth weight may actually be one manifestation of existing schizophrenic illness, rather than being an external precipitating event. [p. 119]

Pragmatics of the Genetic Model

The genetic model remains a dominant one in etiological debate about schizophrenia. But although the data mobilized in its support are commanding, advocacy alone does not appear to have been the major determiner of decisions to study the children of schizophrenic parents. There is an understandable methodological opportunism at work in risk studies. Mednick [8] has indicated that initially his position with regard to the etiology of schizophrenia was a behavioral one. Although his early hypotheses required biological supports (i.e., assumptions of heightened levels of autonomic responsivity in the schizophrenic patient), allegiance to a genetic model was not a perceived requisite. The critical reality for Mednick was one of determining how to raise the base rate for predicted schizophrenia. Fortunately for society, and unfortunately for risk researchers, that base rate remains low.

According to Yolles and Kramer (1969), incidence of schizophrenia in the United States ranges from 6 percent in high risk geographical areas to approximately 2 percent in low risk settings. In Europe where the incidence rate is significantly lower [9] the base rate problem is accentuated for those doing risk studies. (The compensating virtue lies in the more stringent requirements for diagnosing *true* schizophrenia.) Even if one were to accept the highest figures suggested by Yolles and Kramer and choose large random samples, the number of children at risk who would become available for study by this selection procedure would preclude intensive longitudinal studies. The need to increase the

[7] Heston makes the important observation that, since the schizophrenic parents were identified through hospital records, a bias toward more severe forms of illness in the parents may be present. Such biases are relevant in the context of other data that suggest the genetic transmission of process schizophrenia.

[8] Personal communication.

[9] Slater and Roth (1969) suggest a median incidence rate of 0.8 percent as does Rosenthal (1970), but there are wide-ranging variations in rate depending upon the method of calculation used and the geographical setting studied.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

projected number of cases in which breakdown could be anticipated directed investigators' attention to the genetics literature. Subject selection based on empirical probabilities drawn from that literature clearly indicated a pragmatic solution to a difficult logistical problem; by selecting children whose mothers were severely disordered, the incidence rate for an ultimate schizophrenic process could be heightened some five- to ten-fold. Thus, genetic susceptibility has become a prime method for selecting samples of vulnerable children; however, the intensity of advocacy of a genetic model of etiology seems to vary rather widely among those involved in risk studies.

High Genetic Risk: Offspring of Dual-Mated Pairs

To extend the genetic model by including dual-mated pairs of parents, of course, heightens anticipated incidence rates for disorder in the offspring. Erlenmeyer-Kimling (1968a) has indicated that herein lies the truly "high risk" group. (She would designate children who have only one schizophrenic parent as being at "intermediate" risk.) The empirical supports for such a statement are substantial. On the basis of five studies, the probability of an ultimate outcome of schizophrenia in these children approximates 35–45 percent (Rosenthal 1970).

Obviously, locating such children for systematic study poses major logistical problems. Considering the critical issue of feasibility, Erlenmeyer-Kimling (1968a) observed:

> Surprisingly, the frequency of fertile marriages between schizophrenic patients is not so low as has been thought. At least, it did not prove to be especially low in a survey which has recently been completed by my colleagues and myself on the marriage and fertility rates of schizophrenic patients admitted to State Hospitals in New York during 1934–1936 and 1954–1956. In the sample of admissions during 1954–1956, for example, we found that one in 73 white female patients and one in 94 white male patients was married to another schizophrenic patient. The rates are somewhat higher for non-white patients and markedly higher if the unmarried patients are first screened out and the search is confined to married patients. The ascertainment probability for an assortative mating case is, therefore, between two and five times greater than the probability of locating a schizophrenic monozygotic twin with surviving cotwin. Just as the ascertainment of monozygotic twins has been considered well worth the trouble, so, too, is the ascertainment of families containing two schizophrenic parents.

In her initial survey Erlenmeyer-Kimling located 62 families having a total of 160 children, 145 of whom survived to age 15 or older. Of these children, 111 were born prior to the hospitalization of the second parent; 76 of these 111 children were under 10 years of age. Thus the size and the youthfulness of the sample would appear to support a developmental study. But a confounding element lending itself to a heightening of the risk factor also became apparent in the survey. Many of these children's lives had been marked by profound family disorganization. For example, only 22 percent had remained continuously housed in the parental home in which either one or both parents resided. Sixteen percent had been reared by relatives, while 38 percent had been placed in foster homes and under the care of social agencies; no placement histories were available for 24 percent of the children. The implications of these realities have been expressed by Erlenmeyer-Kimling:

> Fewer children will fall into a continuous home-reared group, and even those who do will probably experience serious upheavals from time to time as the parents are rehospitalized and released.

Since family disorganization influences output measures of adaptation, this factor must be controlled for in the design of risk studies—an observation more easily stated than actuated, given the restricted numbers of risk children available for investigation.

The Psychogenic Model

When the genetic model is used to define risk, one begins with a manifestly disordered parent and an assumed heightened probability of subsequent disorder in the biological offspring. When these offspring are seen in childhood, the ascription of risk in most instances is one of "potential" vulnerability, for signs pathognomonic of schizophrenia typically are absent. An alternative

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

strategy for selection, then, is to begin not with psychiatrically disordered adults but with already severely disturbed children, on the assumption that such children will contribute heavily to the future pool of adult psychopathology. Followup studies such as those contributed by Robins (1966) and Shea (1972) offer proof that the assumption has substance. The important point to make, however, is that the selection of disordered *children* rather than disordered *parents* bears a heavier imprint of a psychogenic model of etiology, although those who espouse a genetic viewpoint would suggest that clinical and experimental investigations of such children typically have been notoriously defective in obtaining adequate genetic histories, thus leaving the issue of a more fundamental predisposition unresolved.

In the context of risk studies the longitudinal research program of Rodnick and Goldstein (Goldstein et al. 1968 and Rodnick, in press) at UCLA is the most significant in its joint focus on specific symptom configurations in adolescence (age 13–18 when first seen), family interaction patterns, and the manifestations of severe maladjustment, including schizophrenia, in early adulthood. A detailed quotation from these investigators provides the rationale for selecting particular forms of adolescent psychopathology while rejecting others:

> Using . . . observational procedures . . . we were deeply impressed with how radically a psychotic adolescent could limit and distort the pattern of interaction with his parents. Therefore, it seemed more pertinent to search for familial determinants of schizophrenia utilizing a more oblique research strategy. This led to the decision at this time to not study families containing a schizophrenic child. We chose to study less extreme patterns of abnormal behavior, which may possess some continuity with more severe psychotic disturbance.
>
> In this study, we have restricted our attention to adolescence, the age range immediately prior to the peak onset of schizophrenia. We have searched for subgroups of disturbed adolescents who demonstrated contrasting types of coping with stress which would allow for meaningful comparisons between the groups. Some of these modes of coping can be seen as containing components of the coping patterns of the schizophrenic, such as *withdrawal* and *social isolation,* while others, such as acting *out* and *passive aggression,* seem unrelated or at best only indirectly related to the manifest complex of behaviors which we call schizophrenia. If relationships could be found between specific family patterns and specific types of coping styles in the adolescent, and if these relationships were congruent with studies of families containing a schizophrenic offspring, then possibly our understanding of family dynamics in psychopathology could be advanced. [Goldstein et al. 1968, pp. 233–234]

Emphasizing an analysis of personalized conflictful interactions among the members of the family, Rodnick and Goldstein have reported that the most vulnerable adolescents appear to be those caught up in active family conflict, and those who are excessively dependent on their parents and withdrawn, passive, and isolated in their relationships with others. Another group they have studied is one characterized by antisocial behavior in the community; these children, too, are poor prognostic risks for later adaptation but do not necessarily become schizophrenic.

These results require further exploration, for they raise a very significant question regarding ultimate outcomes for the antisocial child. Shea (1972) has used Achenbach's (1966) procedure to delineate *externalizing* (acting against others) and *internalizing* (acting against the self) children who have been seen in clinics and followed into adulthood. In general, and this finding is consistent with those of other investigators (Bennett 1960, Morris, Escoll, and Wexler 1956, Morris, Soroker, and Burruss 1954, and Robins 1966), there is a markedly higher rate of serious adult disorders seen in the antisocial (externalizing) group than in either internalizing or normal control children. In externalizing males Shea found that antisocial behavior often continued in adulthood, as reflected in a high divorce rate, job instability, and lessened social competence. Internalizing males were found to be somewhat retiring but, in general, were not severely disturbed. Externalizing females showed a significantly higher incidence of schizophrenia, a higher divorce rate and lower social competence than did normal controls. They also spent more years in mental hospitals than the other groups. By contrast, the internalizing females had few serious problems in adulthood.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Such investigations suggest the potential importance of symptom clusters in predicting whether disturbed children will become severely disordered adults. The interesting point, however, is that Rodnick and Goldstein, too, have noted a heightened frequency of severely disordered adults, enough of whom show schizophrenic symptomatology to suggest the viability of using not only markedly disordered parents but markedly disordered children as well in selecting for risk.

The UCLA project is more than the exemplification of an alternative method of selecting children for risk. It stresses potential psychogenic components in such children's disturbance. In doing so, it doesn't necessarily imply the absence of a genetic factor; rather, a differential weighting is given to psychological factors in risk. In this sense the UCLA project is in the tradition of those investigators (Jackson 1967, Lidz 1968 and 1972, Lidz et al. 1958, Lidz, Fleck, and Cornelison 1965, Singer 1967, Singer and Wynne 1963, Wynne 1967, 1968, and in preparation, and Wynne and Singer 1963 and in press) who have seen the family as a "social system" in which disordered communication, disfiguring alliances, and disorganized relationships can serve as major factors heightening risk. Such concepts as the *double bind, pseudomutuality, marital schism* and *marital skew, family symbiosis* and *shared focal attention* provide the flavor given to variables presumed to exacerbate risk. Wynne (1969) has written:

> Parental communication deviances, a far more subtle measure than symptomatology, appear to be a far more consistent indicator of schizophrenic symptomatology in an offspring than does symptomatology of the parents. If these parental deviances predate the offspring's symptomatology, they should constitute a good device for identifying the families of preschizophrenics before the diagnosis of schizophrenia has been made.

We can thus summarize two current orientations to vulnerability in childhood: the first emphasizes genetic vulnerability in which the criterion for risk in offspring is defined by manifest schizophrenia in a cohort of mothers or fathers. Genetic linkage is the explicit given and presumably provides the source of the diathesis in a diathesis-stress model of schizophrenia (Rosenthal 1963). The second method of selection assumes that vulnerability can arise in a more generalized pattern of familial disorganization without the presence of explicit identifying signs of schizophrenia in a parent. Although the latter model can include genetic factors, greater weight is given to faulty parent-child and parent-parent relationships as the locus of perceived deviance in the child. Fortunately, a sophisticated appreciation of communication networks, role structure, and transactional patterns has resulted in the dismissal of simple old-fashioned notions of parental dominance and parent-child conflict as concepts of central significance. The fact that the UCLA group finds evidence of a relationship among specific forms of pathologically disturbed family relationships, adolescent symptom patterns, and the potential for schizophrenia is supportive of this second strategy for subject selection. For these investigators the diathesis, if one exists, is less central to their search for causative agents than the familial stressors that may potentiate severe psychopathology.

The Sociogenic Model

Concern about roles, interactional patterns, and the concept of the family as a miniature social system moves the discussion of risk selection toward the third major etiological model for schizophrenia—namely, vulnerabilities rooted in deviant social settings in society. The most powerful correlate of schizophrenia—with a demonstratable reliability shared only by genetic studies—is the inverse relationship which has been repeatedly shown to exist between incidence and prevalence rates for schizophrenia and social class position (Dohrenwend and Dohrenwend 1969, Kohn 1968 and 1972, Mishler and Scotch 1963 and Roman and Trice 1967). But despite the power of the relationship which has led to sociological hypotheses about the predisposing contributions made by the climate of deprivation to schizophrenia, the sociogenic model proves to be a rather weak one in providing defining criteria for selection for risk. Conducting studies of lower class children, without identifying attributes of subsets of these children who may have a greater risk potential, is an imprecise procedure. The implicit assumption that *all* lower class individuals share the roots of a social pathogenicity would run contrary to other observations of dif-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

ferential strengths in ghetto dwellers (Robins 1966, Suttles 1968 and Garmezy and Nuechterlein 1972).

That low social status and schizophrenia are related is evident, but as Kohn (1972) and Mechanic (1972) have recently written, discussions of this relationship have stressed interpretations designed to "explain away its theoretical significance": The data may be, in part, artifactual, indices of status are inadequate, incidence and prevalence statistics have been found to be biased by nonreportage from private psychiatric sources, patient search procedures have been incomplete, social class indices are based on patients' status rather than the family of orientation, genetic selection and downward drift may be the more likely explanation of the poverty-schizophrenia correlation, the poor are more vulnerable to stigmatization and labeling than middle class populations. Other views, however, have emphasized social stresses generated by slum environments and the high incidence of family disorganization within the lowest social class grouping (Srole et al. 1962 and Langner and Michael 1963). Dohrenwend and his colleagues (1970) have summarized the controversy:

> Is low social status more a cause or is it more a consequence of psychiatric disorder? On the basis of research to date, it has been impossible to tell: for this relationship can be explained with equal plausibility as evidence of social causation, with the environmental pressures associated with low social status causing psychopathology; or by contrast, it can be explained as evidence of social selection with preexisting psychiatric disorder leading to low social status. The latter interpretation is compatible with the position that genetic factors are more important than social environmental factors in etiology. [Dohrenwend et al. 1970, p. 197]

Thus the critical question remains. Is low social status merely an additional index of an incompetence reflective of the diathesis suggested by genetic studies of schizophrenia (Mechanic 1972), or is it a powerful stressor in a diathesis-stress formulation? If the latter, how then does social class contribute to the genesis of schizophrenia, and how can risk research assist in clarifying the relationship? To answer that question it is necessary to become more specific about social class dynamics—Block (1971) has termed this "psychologizing social class"—and thus the factors which may contribute to a heightening of risk potential in the deprived and disadvantaged. Kohn (1968) has assayed this difficult task in what is clearly a speculative, albeit a provocative, formulation:

> Social class indexes and is correlated with so many phenomena that might be relevant to the etiology of schizophrenia. Since it measures status, it implies a great deal about how the individual is treated by others—with respect or perhaps degradingly; since it is measured by occupational rank, it suggests much about the conditions that make up the individual's daily work, how closely supervised he is, whether he works primarily with things, with data, or with people; since it reflects the individual's educational level, it connotes a great deal about his style of thinking, his use or non-use of abstractions, even his perceptions of physical reality and certainly of social reality; furthermore, the individual's class position influences his social values and colors his evaluations of the world about him; it affects the family experiences he is likely to have had as a child and the ways he is likely to raise his own children; and it certainly matters greatly for the type and amount of stress he is likely to encounter in a lifetime. In short, social class pervades so much of life that it is difficult to guess which of its correlates are most relevant for understanding schizophrenia. Moreover, none of these phenomena is so highly correlated with class (nor class so highly correlated with schizophrenia) that any one of these facets is obviously more promising than the others. [p. 164]

This viewpoint does not negate the power of biogenetic factors. In his most recent statements on the problem, Kohn (1972) accepts the thrust of recent genetic findings ("genetics plays some substantial part in schizophrenia") but sees the relationship between low social class position and schizophrenia as too complicated to be dismissed by assuming a primary factor of downward social mobility or, contrariwise, unreservedly endorsed by assuming that poverty alone provides a necessary and sufficient condition for generating schizophrenia (Turner and Wagenfeld 1967 and Turner 1972). Although he recognizes the greater power-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

lessness of the poor to control environmental events or to have available those material resources that would allow them to escape from or mitigate the effects of stress, Kohn adds:

> Still, important as class differences in the modifiability of stress-producing situations and in the availability of external resources may be, they do not provide a complete explanation of lower-class people's greater difficulty in dealing with stress. There is one more element that need be taken into account: lower-class conditions of life also limit people's internal resources (cf. Dohrenwend & Dohrenwend, 1969, 140–143). Understanding how lower-class conditions of life may impair people's internal resources for dealing with stress is, I believe, crucial to understanding how class contributes to schizophrenia. . . .
>
> . . . [I]nterpreting the role of social class in the genesis of schizophrenia requires an explanation of how lower-class conditions of life adversely affect people's ability to deal with stress, with complexity, and with change. [p. 299]

This linkage to internal resources leads Kohn to reappraise the role of the family as the child's primary base for socialization—a reappraisal no longer in terms of interpersonal and interactional conflicts, but rather in terms of the instrumental role of the family in the transmission of a specific set of values:

> The family . . . is important principally because of its strategic role in transmitting to its offspring conceptions of social reality that parents have learned from their own experience. In particular, many lower-class families transmit to their offspring an orientational system too limited and too rigid for dealing effectively with complex, changing, or stressful situations. This point of view is, I believe, consonant with psychiatric thinking about the family and schizophrenia, which emphasizes those communicational and cognitive processes in schizophrenia-producing families that contribute to the schizophrenic's difficulties in interpreting social reality. What is new is the assertion that these conceptions of reality, far from being unique to families whose offspring become schizophrenic, are widely held in the lower social classes, in fact arise out of the very conditions of life experienced by people in these segments of society. [Kohn 1972, p. 300]

What are these conditions of life? In his volume on *Class and Conformity: A Study of Values*, Kohn (1969) concludes that, whereas higher social class position is characterized by a heightened valuation of self-direction and increased confidence that one's decisions and actions are consequential, those who occupy lower social class positions value conformity to external authority and see themselves "at the mercy of forces and people beyond one's control, often, beyond one's understanding." Resistance to change, distrust of others, rigid conservativism, low self-esteem, heightened anxiety, self-depreciation—all accrue to persons in lower social class strata and represent the products of a limited education and "constricting" occupational experiences. Kohn suggests that this conformist-orientational system—transmitted to children by parents—heightens the child's vulnerability to the stresses of lower class living.

> The crucial family processes are less a matter of role-allocation (domineering mothers, for example) than many past discussions have emphasized, and more a matter of how children are taught to perceive, to assess, and to deal with reality. The orientational system that lower-class parents transmit to their children is not likely to provide sufficient sense of the complexity of life or the analytic tools needed to cope with the dilemmas and problems men encounter. These deficiencies could be overcome by later educational and occupational experience; but often they are not, in part because people who have learned this orientational system are unlikely to want to overcome them, in larger part because circumstances probably would not be propitious even if they were.
>
> Certainly there is a vast gap between the inadequacies of a conformist orientational system and the severe disabilities of schizophrenia. What makes the possibility of a connection seem worth taking seriously, nevertheless, is the pointed correspondence of the two phenomena. Schizophrenia is quintessentially a disorder of orientation—a severe defect in men's ability to accurately comprehend the world about them. If one looks at it clinically, it is a caricature of precisely the outstanding features of the conformist orientation—an oversimple and rigid conception of reality, fearfulness and distrust, and a lack of empathic understanding of other people's motives and feelings. One reason for the disproportionately

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

> high incidence of schizophrenia at lower social class levels may be that the disorder builds on an orientational system firmly grounded in the experiences of these social classes. (Kohn 1969, pp. 199–200)

Kohn's formulation has been challenged by Mechanic (1972), who presents several reasons for his strong disagreement. Mechanic argues that data related to the low social class status/schizophrenia relationship are most strongly supportive of "social failure of limited mobility potential" which is a consequence of the disabling disorder itself. He finds Kohn's correlations between social class and conformity values "modest" (many are in the + .20 to + .30 range); nor are there data to support the conformity orientation/schizophrenia relationship, nor, more significantly, the belief that such an orientation would inhibit coping flexibly with persons or environment. Finally, Mechanic advances the strong belief (also espoused in a later section of this paper) that one cannot consider lower status persons as a "monolithic" group but, rather, that adaptive adequacy, as well as adaptive failure, characterizes the behavior of the poor.

> It has been too readily assumed by many writers in this field that the poor are always at a disadvantage, but it seems reasonable to anticipate that the poor are equally capable or superior to higher-status persons in dealing with some kinds of misfortunes. The development of coping capacities comes frequently through experience and practice, and in some areas of living, persons of lower economic status get greater opportunity to develop skills. Moreover, successful mastery builds confidence and a sense of effectiveness, and many persons of lower socioeconomic status, despite their low incomes, develop a strong sense of self. To talk of lower-status persons as a monolithic group on the basis of modest statistical differences among the social classes is conducive to asking the wrong research questions. I personally find it more challenging to inquire why so many lower-status persons do so well in facing adversity than why some fail. For despite the contentions of some sociologists, the vast majority of lower-status persons have frequently shown themselves to be extremely resourceful and adaptive in dealing with the difficult circumstances of their lives. I think a careful review of the literature on health and social pathology would support the view that the most important dependent variables measuring health are related to social status primarily by virtue of the fact that difficulties predominate in the very lowest social segments where lives are characterized not only by low income but also by profound disorganization, deprivation, and alienation. I question whether it is appropriate to generalize from studies involving the working class, such as in Kohn's investigation, to the much smaller and more atypical population constituting the very lowest and most deprived socioeconomic stratum. [Mechanic 1972, pp. 307–308]

This observation by Mechanic is a cogent one for several reasons. It introduces the important consideration of differentiating subsets of lower status individuals who vary in their vulnerability potential; it raises anew the concept of invulnerability; and it finds empirical support in the observations made by Pavenstedt (1965 and 1967) of the child-rearing environments that differentiate upper-lower from very low-lower class families.

But with regard to some of his other criticisms Mechanic can be faulted. He would prefer to see resources devoted "to improving the conceptualization and measurement of various psychiatric conditions and to examining a variety of factors that may mediate their occurrence, their course, and their consequences" rather than to efforts to devise and test formulations of *why lower-class conditions of life contribute to schizophrenia* (p. 309). But it is the latter issue that assumes primary importance for the student of risk. Mechanic contends that "hypotheses are a dime a dozen," but testable, specific sociological hypotheses do not, in fact, appear to be in large supply; the market, despite Mechanic's view, gives no sign of being an inflationary one. The virtue of Kohn's formulation is that it is eminently testable by those who cathect a sociological orientation to risk.

We have quoted his formulation at great length not because Kohn is one of our favorite sociologists interested in the problem of schizophrenia (he is) but because his statement of predisposing conditions facilitates a test of a hypothesis implicating social class variables in the study of risk for schizophrenia. Simply to study the poor as a broadly envisioned group at risk seems fatuous. Schizophrenia is a complex disorder—that's why it has resisted scientists for centuries—and to provide simplistic etiological

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

models, whether these be the ultrabehavioristic views of Skinnerians or the labeling theory descriptors used by some sociologists and humanistic psychologists, is not merely inadequate but borders on the anti-intellectual in its neglect of a relevant biological literature.

Kohn begins with the premise of a genetic substrata, thus providing one needed criterion for selecting subsets of families of lower social status against which to compare other subgroups of the same social class. Second, he provides specifics to look for within high risk, lower status samples, sufficiently well defined to permit the researcher to incorporate such attributes as independent or dependent variables within a high risk research design. Third, he points the way to the use of specific control groups to test his hypotheses. Speaking informally at an NIMH workshop in June 1969, Kohn stressed that the high risk population to which he would address himself would be the lowest social class, with the test of his hypotheses centered in a variety of contrasting control groups: lower class families who teach their children atypical values and orientation; lower class families or persons who are spared the acute stress that their fellow poor suffer; and people of higher social class positions who share values and an orientation toward reality more typical of the lowest social class.

The Early Neglect Model: Pregnancy, Birth and Nutritional Defects

A fourth source of potential vulnerability in childhood is suggested by a literature centered in poor physical health status but with implications that far transcend the soma. Such factors as nutritional deficiencies, pregnancy and birth complications, birth defect and poor prenatal and postnatal care can influence adaptation and heighten risk for later disorder (Birch and Gussow 1970, Harper and Weiner 1965, Pasamanick, Constantinou, and Lilienfeld 1956, Pasamanick and Kawi 1956, Pasamanick and Knobloch 1960, Pasamanick, Knobloch, and Lilienfeld 1956, and Pasamanick, Rogers, and Lilienfeld 1956). Pasamanick and Knobloch's (1961) concept of "a continuum of reproductive casualty" that correlates with disorders ranging from cerebral palsy to disturbances in ego functioning is relevant to this fourth source of risk. Mention has been made of Pollin and Stabenau's (1968) study of early physical differences present at birth in monozygotic twins discordant for schizophrenia, data which are also relevant to this model:

> In 12 of 15 of our pairs the index twin was the one who weighed less at birth. . . . The great bulk of described episodes of physiological disequilibrium such as respiratory embarrassments, sleep and eating difficulties, and colic are present in the histories of these lighter index twins. The five twins in which there is well-documented evidence of cyanosis at birth are all index schizophrenic twins. The preponderance of neonatal medical complications such as infectious episodes, occurred in the index twins. The one instance of suggestive stigmata of birth defect, i.e., an abortive hairlip, occurred in an index twin. It is our impression that the constellation of these findings derive from a common subtle but significant difference in intrauterine experience, where, as a result of differences in fetal circulation, differences in fetal positioning and consequent crowding, and other similar mechanical factors, one twin is born at a different and higher state of physiological and biological maturation and competence than is the other. . . . [pp. 324–325]

Mednick's (1970) report of pregnancy and birth complications in high risk subjects who are beginning to show incipient signs of breakdown adds to an interest in the model. Results of a review of birth data pertaining to 20 "sick" and 20 "well" high risk subjects lead Mednick to speculate that the particular disposition to vulnerability in the "sick" group is a joint function of pregnancy and birth complications and a highly labile pattern of autonomic responsivity:

> . . . while it was true that no single complication significantly differentiated the groups, 70% of the members of the Sick Group had suffered one or more serious pregnancy or birth complications (PBC). This contrasted sharply with 15% of the Well Group and 33% of the Control Group with PBCs. The PBCs included anoxia, prematurity, prolonged labor, placental difficulty, umbilical cord complications, mother's illness during pregnancy, multiple births, and breech presentations. Careful perusal of these data brought out an additional striking relationship within the Sick Group (and the entire high-risk group). There is a marked correspondence between PBC and

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

the anomalous electrodermal behavior reported above. All the GSR differences between the Sick and Well Groups could be explained by PBC's in the Sick Group. In the Control Group and the low-risk group the PBC's were not strongly associated with these extreme GSR effects. This suggests that the PBC's trigger some characteristic which may be genetically predisposed. The PBC's seem to damage the modulatory control of the body's stress-response mechanisms. PBC's are associated with rapid response onset, poor habituation of the response, poor extinction of the conditioned electrodermal response, and very rapid recovery from the response. In terms of the theoretical orientation guiding this project this lack of modulation may be viewed as an important etiological factor in the development of mental illness, especially schizophrenia. [Mednick 1970, p. 56]

These findings require cross-validation. Apparently Zahn's analysis of the psychophysiological functioning of the discordant monozygotic twins studied by Pollin and Stabenau has not corroborated such psychophysiological differences. [10]

Data informally reported by Rosenthal at a recent conference similarly fail to confirm these earlier findings. In a doctoral dissertation recently completed by Van Dyke (1972), in which the subject sample was drawn from the now well-known Danish adoption studies (Kety et al. 1968), comparisions in electrodermal functioning were made between 47 adopted-away offspring of schizophrenics and 47 matched (for birth date, age of transfer, age of adoption, and socioeconomic status of adoptive parents) adoptees whose biological parents had no record of psychatric illness. Such a comparison (combining Heston's method for studying genetic attributes, and Mednick and Schulsinger's procedures for measuring autonomic responsivity) affords a better opportunity, Van Dyke indicates, to relate such psychophysiological responsivity to the presumed genetic diathesis of schizophrenia in opposition to the interactional effects of being reared by a schizophrenic mother. Van Dyke writes:

> Summarizing the findings of this study, some evidence has been found that the index adoptees as a group exhibit significantly larger and more frequent responses to mild stimuli. No evidence was found that the index group, compared to controls, had faster response latencies, higher basal arousal, or slower response recovery rates. In addition, there was no evidence that index cases were more conditionable than the controls, or that they exhibit an inability to habituate to mild stimuli. In sum, the study shows evidence of only a weak relationship between the diathesis for schizophrenia and electrodermal activity. [p. 106]

Van Dyke appropriately notes, however, that, whereas Mednick and Schulsinger were comparing control and well groups of adolescent risk samples with an already sick group of risk youngsters, his subjects were adults and reasonably healthy as well, since only one of the index adoptee cases has been incapacitated by illness. Furthermore, a chi square test for differences between index and control case in ratings of disorder as derived from a psychiatric interview proved nonsignificant, although 15 of the index cases as compared to eight of the controls had ratings suggestive of psychopathology falling within the schizophrenia spectrum. Van Dyke acknowledges that:

> . . . There would seem to be a high probability that there were control subjects in the sample whose biological parents had a spectrum disorder, but who were never treated at a psychiatric facility for their illness. Such cases may have caused the mean values for electrodermal measurements for the control group to be somewhat inflated beyond what they might have been had these subjects been identified and excluded from the analyses. [p. 99]

Van Dyke therefore suggests that a necessary study is one in which matched groups of high risk subjects and adoptees born to parents who have been diagnosed schizophrenic would be evaluated in terms of their electrodermal responsivity.

Pregnancy and Birth Complications (PBC's)

What about the PBC component of the Mednick-Schulsinger "equation" for risk? In their most recent article Mednick et al. (1971) report a new longitudinal study of children born to schizophrenic parents for whom excellent perinatal data were available as part of a large research project

[10] Informal communication from Dr. Loren Mosher.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

conducted during 1959–1961 at the University Hospital in Copenhagen on 9,006 consecutive pregnancies. Using the central registers of Denmark, Mednick and Schulsinger and their colleagues located all those mothers and fathers of the original perinatal study who had ever been admitted to a mental hospital. From these records, parents who had been diagnosed schizophrenic (N=83) were matched with a mixed psychiatric control group of "character-disordered" parents ("their hospital diagnoses covered a range including psychopathy, character disorder, inadequate personality, alcoholism, drug abuse, situational neuroses, suicidal attempts, and short-term depressive reactions," p. S105) and a normal control group made up of parents for whom there existed no record of hospitalization for mental disorder. In order of importance, the matching was for: 1) sex of the ill parent; 2) sex of the child; 3) race; 4) multiple-birth status; 5) pregnancy number; 6) social class; 7) mother's age; 8) mother's height; 9) father's age. Pregnancy and delivery scales were constructed on the basis of data available from the perinatal project to provide a sum weighted scale score and a severity score (based on the single most severe complication in the medical record).

Since the children originally had been examined at 5 days of life and at 1 year of age, these data too were available to the investigators. Data reported currently (Mednick et al. 1973) indicate that the index children tended to have lower birth weights—a finding that obtained in cases in which *either* mother or father was the patient. Difficulties in the course of pregnancy were suggested by the heightened frequency with which the presiding obstetrician had ordered X-rays for the schizophrenic mothers during their last month of pregnancy.

In the 5-day neonatal examination, children of the schizophrenic parent group continued to show more abnormalities, whereas even those children born to normal or character-disordered parents who had shown abnormalities at birth no longer exhibited signs of disturbance. At 1 year of age, despite a marked loss of data presumably due to the failure of schizophrenic mothers and character-disordered fathers to return with the infant for later examination, the "most outstanding" feature was the retarded motor development (holding up head, walking with support) of the children born of schizophrenic parentage and the superior rate of development evidenced by the children of character-disordered fathers.

With regard to pregnancy complications, low birth weight correlated with the presence of anomalies in the neonatal examination (but not with the child's status when 1 year old) as it did with pregnancy and delivery difficulties in the case of mothers in the index group.

Since Mednick and Schulsinger intend to follow-up these children for more intensive clinical and experimental study, further data will undoubtedly be forthcoming on the relationship between PBC's and psychophysiological responsivity in the several groups. In the meantime, however, investigators of the variable of pregnancy and delivery complications characteristic of schizophrenic women have also begun to encounter somewhat contradictory findings. As we indicated earlier, Sameroff and Zax, who conduct their studies on infants and children at risk at the University of Rochester Medical School, have examined perinatal complications of women bearing different psychiatric diagnoses. In an initial study comparing pregnancy and delivery complications manifest in schizophrenic, neurotic depressive, and normal women, these investigators found that, whereas both the psychiatric groups showed more complications than did the normal control group, they did not differ significantly from each other. When the dimension of chronicity was introduced into the analysis of the data, Sameroff and Zax (1972b) found that women who had had the greatest number of psychiatric contacts and hospitalizations also showed the most perinatal complications, irrespective of diagnostic group.

Recently, Sameroff (1972) provided a further report on these continuing investigations:

> In this second study we compared the deliveries of four groups of women—schizophrenics, neurotic depressives, personality disorders, and normals. The schizophrenics and neurotic depressive women were found to have more complications than either the personality-disordered or normal women but were not different from each other. When the four groups were divided into categories of severity of mental illness, again major differences were found. Irrespective of diagnosis the women who had the most previous psychiatric contacts, again demonstrated the most perinatal compli-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

cations. It appeared that increased risk of perinatal complications was not related to the psychiatric category of schizophrenia, but rather to the category of severity of mental illness in which the schizophrenic fitted.

What factors, other than schizophrenia, can account for the increased incidence of obstetrical complications found among schizophrenic women and others suffering from chronic psychiatric disorder? On the basis of the data he and Zax have obtained (a cautionary note deserves to be sounded in the light of relatively small N's) Sameroff rejects the diathesis viewpoint suggested by Heston (1971) and by Fish (1971b) in their commentaries on the Mednick et al. (1971) paper. Instead, he offers an alternate explanation that he believes to be potentially significant for the development of a deviant pattern of mother-infant interactions:

> A number of studies have demonstrated a relationship between anxiety and emotional upset during pregnancy and an increase in obstetrical complications (McDonald, 1968). These complications include longer labor, uterine rupture of membranes, and pre-eclampsia. There are a number of mechanisms that can mediate the effect of stress on the increase of complications. McDonald has hypothesized biochemical effects of anxiety on the fetus during the entire course of the pregnancy. Moreover, anxiety has an effect during the delivery process itself. The tenseness of the mother prolongs her labor and inhibits the help she could have provided in delivering her baby. In addition, her anxiety has the transactional quality of affecting how her obstetrician treats her. The anxious woman is typically given more medication and is more likely to have an instrumental delivery or Caesarean-section in order to speed her through this stressful period. In other words, the anxious woman not only is unable to contribute to the successful completion of her own pregnancy but elicits responses in others which would serve to increase the level of medical complication. [Sameroff 1972]

Sameroff affirms the role of anxiety by noting that in the Rochester sample both the schizophrenic and neurotic depressive groups (in whom the greatest incidence of pregnancy difficulties were to be found) had higher anxiety levels than either the control or personality disorder groups. We would merely add that such comparabilities are particularly significant in the light of genetically based evidence that neurotic depression does not occupy the schizophrenia spectrum, whereas the presence of personality disorders in that spectrum is at least suggested by some studies (cf., Heston and Denney 1968).

PBC's and Mother-Child Interaction

The complex role played by PBC's (when present) is accentuated by the manner in which they may ultimately condition negative transactional elements in the later mother-child relationship. This is expressed explicitly by Pollin and Stabenau (1968) who report:

> A consistent pattern of differences was observed in the way the family, particularly the parents, and especially the mother perceive the two twins and in consequence relate to them in a different manner. The lower birthweight twin has most often been seen as the vulnerable and weaker of the twins and is the one with whom the mother has become more involved. However, there tends to be a greater degree of ambivalence, frequently reaching levels of conscious rejection, with this greater involvement. The relationship with this twin is also characterized by being a more anxious and uncertain one. [p. 325]

These observations are, of course, subject to confoundings due both to the presence of manifest disorder in the index twin and the vagaries generated by retrospection.[11] But Sameroff adds support to the picture with his observation that the more complicated deliveries of schizophrenic women may have immediate consequences for the child, since the mother may perceive her child as the source of the physical and emotional dis-

[11] This criticism is countered by the investigators' observations that there were available to them the accounts of both parents and twins, that more than 100 hours of interview time were obtained with family members in structured group and individual interviews which allowed for "a continuing exchange, feedback, comparison, review and modification of the recollections and description given by one member of the family by the three other family members" (p. 321). Further, family photographs, home movies, and various objective records were available to corroborate or refute earlier commentaries. Finally, intensive analytic therapy ranging from six months to several years, conducted with the index twin allowed for reevaluation and refinement of the investigators' original formulations.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

comforts she has suffered during her complicated delivery. Sameroff and Zax have not as yet related PBC's directly to negative aspects of the mother-infant interaction. But they do find evidence of deviance in the caretaking relationship, noting that although the schizophrenic mothers respond vocally, as do control mothers, to their 4-month-old infants, "they tend to be physically more distant from them and to touch and play with their children less."

The transactional model espoused by Sameroff is a complicated one that involves constitutional factors in the infant, manifestations of pregnancy, birth and perinatal complications, and deviant mothering practices:

> . . . an analysis of potential risk for schizophrenia would require identifying those infants with perinatal complications, minor physical anomalies, and high autonomic activity levels. Of these infants, those having parents with the most deviant child-rearing practices would have the greatest potential for developing subsequent mental disorders.
>
> Can a transactional analysis add anything to the predictions based on the nature-nurture interaction model just described? The Rochester Study has preliminary evidence that transactional developmental changes do occur. At four months of age no differences were noted in the behavior of infants in the four diagnostic groups. By twelve months, the offspring of schizophrenic women were behaving differently from the children in the other groups. They were less disturbed when their mothers left the room and showed less distress when approached by strangers.
>
> Furthermore, there seemed to be a difference in the sensitivity of the women with psychiatric disorders to the characteristics of their infants as compared to the controls. In general, mothers tend to interact with their infant daughters more than their sons. Among the psychiatric groups these differences were exaggerated. The differences in caretaking elicited by the sex of the child were greater for women with a mental illness than for those without one. [Sameroff 1972]

We have concluded this section on models that help to determine selection for risk by quoting extensively from Sameroff, because his and Zax's investigation provides preliminary evidence that, although simplicity can and does characterize the basis for selecting children at risk, complexity will inevitably dominate predictions of the range of outcomes in these children. Children are at risk, notes Sameroff, not solely because mother has had a history of schizophrenia, but because her anxiety level and the stresses she has encountered, prior to and during pregnancy, generate a heightened likelihood of delivery complications. Such PBC's may predispose the infant to greater activity, more manifest discomfort, heightened autonomic lability and minor physical anomalies. (In the Rochester sample, the infants born to women with psychiatric diagnoses do tend to have higher heart and respiratory rates and more anomalies.) In some cases, this vulnerability in the infant is accentuated by deviant rearing practices which are a function of mother's psychopathology and her propensity for being unduly influenced by specific cue attributes of her infant.

Thus, predictions must take into account more than the presence or absence of complications attendant upon the birth of the infant, for the behavioral consequences for the child of such events tend to become attenuated over time (Sameroff and Chandler, in press). It is the reciprocal exchange between mother and infant (Bell 1968) in which the characteristics of each profoundly influence their long-term interactions, joined with the predispositional qualities of the child, which are presumed to influence the ultimate adaptation or maladaptation of the offspring.

Research Approaches to the Study of the Antecedents of Schizophrenia

Tracing a person's past with accuracy, comprehensiveness, and understanding is difficult in itself without adding the context of mental disorder; to do so generates untold complexities in tracking early and significant antecedent events in a life history. Despite the many disadvantages of retrospective reconstruction, data derived in this manner serve as starting points for efforts to uncover events and factors in the lives of schizophrenics which may anticipate later psychopathology. But the methodological problems inherent in reconstruction inevitably reduce the impact of the findings of such studies. Since one begins with the adult disordered patient, the issue of diagnostic reliability arises. Confounding

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

effects associated with the ubiquitous use of drugs often restrict the symptom picture and hamper diagnostic appraisal. Logistical problems posed by retrospective research often reduce sample size—*N*'s are invariably small, increasing the observed variance and restricting generalizations to be drawn from the data. Sample selection tends to be nonrandom; control groups matched for age, sex, and ethnicity are frequently absent; subtype composition and other patient distinctions within the disorder are too often ignored (Sanua 1961). Such shortcomings are not unique to developmental studies of schizophrenia, however; they are also evident in many investigations into the structure of the disorder.

In the sections which follow, four research approaches are described. What we have chosen to call type I studies are those that employ *clinical retrospective* methods; type II studies involve the method of *follow-back* in which the starting point is the disordered adult and premorbid status is evaluated from retrospective reports based upon society's records; type III studies utilize *follow-up* procedures for evaluating the adult adjustment of disturbed children who, initially, are likely to be selected from data available in the files of child guidance clinics; and type IV studies use the *follow-through* (or longitudinal-developmental) method to study children at risk.

Type I: Clinical Retrospective Methods

The case study, psychiatry's oldest investigative mode, provides a microcosm of the problems encountered in using clinical records for information about significant early events. These center on the issue of the validity of information gathered from patients and family respondents who are often disturbed, frequently guarded, guilt-ridden, defensive and denying, or whose memory lapses or memory coloration, generated by the offspring's psychotic status, invite selective recall. In the light of such distortion, it is not surprising that clinical studies of schizophrenic patients have suggested a wide range of prepsychotic personality patterns which tend to overlap with similar reports gathered on other diagnostic groups. In general, evidence drawn from clinical observations presents a varied and inconsistent picture of the preschizophrenic individual's early behavioral patterns. Reports of pervasive aggressiveness and severe temper outbursts, identifiable as early as in the nursery years, vie with other characterizations of the prepsychotic as one who is quiet, docile, timid, self-conscious, aversive to play activities, inept in relationships with others, dependent, inefficient, and resistant to change.

The very fact that evidence drawn from clinical observations has failed to reveal any consistent behavior that is identifiably preschizophrenic may variously suggest that 1) the end state of schizophrenia has several precursors; 2) there may exist several highly differentiated end points for the disorder, all sharing the common diagnostic label; 3) the reliability of many clinical reports is disputable, reflecting the theoretical dispositions of clinical observers and a bias in the samples of patients being observed; and 4) prepsychotic personality patterns may be a function of factors other than those that are disorder-induced.

Clinical Interviews with Parents and Relatives

Included among type I studies are investigations that have used anamnestic interview materials based upon case history records. Many histories must be rejected by researchers because of their incompleteness, a factor that distorts data provided by those residual groups of patients retained in such studies. For example, overprotective mothers tend to give more information about their children's background, thus providing a selective factor in the records accepted for study (Fontana 1966). Similarly, the theoretical bias of the interviewer will influence both the questions asked and the information recorded. In addition to investigations which use interview materials drawn from case histories, there are also studies which rely on interviews conducted directly with parents and relatives to derive information related to the recall of the patient's early personality development and the parental child-rearing practices and attitudes that prevailed during his childhood.

Fontana (1966) asserts that such retrospective studies rest upon four faulty and empirically disproven assumptions: 1) that people conceptualize their lives in the same language system used by the investigator so that all questions have similar meanings for both interviewer and interviewee (McGraw and Molloy 1941); 2) that individuals have the capacity to remember past events ac-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

curately (contraindications are provided by Yarrow et al. 1970); 3) that the affect and the content associated with the material to be recalled has no effect on the accuracy of recall (see Haggard, Brekstad, and Skard 1960 for evidence to the contrary) and 4) that reports of past events are uncontaminated by a variety of response sets such as those determined by social desirability or expert opinion. Fontana's (1966) conclusion that "the retrospective report method is . . . an inadequate foundation for a body of scientific facts" (p. 217) has sufficient substance to compromise the use of type I retrospective studies as a basis for accurately ascertaining the prepsychotic behavioral patterns of adult patients.

Interactional Studies

The case study of individuals has been broadened recently by clinicians interested in direct observations of the interpersonal behavior of schizophrenics and other family members. Attempting to infer earlier modes of family exchange from present observations, some investigators have gone into the patient's home, others have introduced the entire family into the hospital setting, and still others have brought the family into a laboratory setting where they live under "normal" conditions and may be observed for months at a time (Frank 1965). Many of these methods bear the hallmark of clinical observation as a basic mode of data gathering.

Examples of major drawbacks in the study of interactional patterns are observer bias, subjectivity in coding observations, and the confounding effects of ongoing therapies (Sanua 1961). Fontana (1966) reviewed 20 such interactional studies and found that they rest on several as yet unproven assumptions: 1) that present interactional patterns are unchanged from the earlier period of childhood to the present; 2) that the task itself does not alter basic interactional patterns; 3) that families will react to the situation in their typical and habitual manner; and 4) that family interactional patterns remain the same whether some members are absent or present. Discouraging, too, have been indications that task characteristics influence such interactions (Haley 1964), forcing Fontana to conclude that, although the study of family interaction may generate hypotheses to be tested in longitudinal studies, the etiological conclusions to be drawn from such contemporary observations "must indeed be seen as tentative." (p. 218).

In light of these many limitations, specific type I studies will not be reviewed in this report.

Type II Follow-Back Studies: Retrospective Reports Based upon Society's Records

As with type I studies, investigators using a follow-back strategy begin with the adult schizophrenic patient and retrospectively review his childhood, relying more typically not on anamnestic data derived from interviews with patients, peers and parents but, rather, on a search of records maintained by more "neutral" observers. Typically, investigators use school data, teachers' assessments, and court and child guidance case records to reconstruct the psychotic's early years.

The follow-back strategy has many virtues which account for its popularity (Bell 1959-60). All cases are salient since the initial selection is based on the specific status of deviance the investigator wishes to study. (By contrast, prospective studies inevitably generate a large block of false negative and false positive cases.) The flexibility afforded by the procedure (in contrast to the fixity of a longitudinal study) is also noteworthy. As new leads appear in the data analysis, the researcher can return to the material to test suggested hypotheses. It is this hypothesis-generating quality which provides a powerful plus for the method.

But these virtues are more than overcome by a telling set of shortcomings: 1) Samples are biased, particularly if the record search is conducted through child guidance clinic sources (e.g., acting-out children tend to be seen in clinics more frequently than withdrawn children; and boys are seen in clinics in far greater proportion than girls). 2) The case recording methods used in child guidance clinics in decades past tended to be primitive: data have often been inadequately recorded; the case history frequently is found to be devoid of many important kinds of factual content; and the case contents may often be highly impressionistic. 3) Data on control subjects suffer from comparable inadequacies, and sometimes control samples are not readily available. 4) The theoretical predispositions of caseworkers

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

of one era frequently are not consonant with the data searches of other investigators decades later. 5) Finally, one can question whether a truly integrated picture of a human being can be portrayed by childhood records in which data are meager, partial or missing and, when present, typically bear a heavy demographic imprint.

Turning to studies of school records, assessment by teachers may be biased by the child's sex and social class: thus girls and middle class children are often seen as better adjusted than boys or lower class children (Gildea, Glidewell, and Kantor 1960)—a teacher bias that would seemingly operate against the preschizophrenic child who so frequently has known a disadvantaged background.

In general, however, data reports provided by type II studies tend to be more reliable than those of type I; they are also an interesting source of hypotheses about the prepsychotic personality of the adult schizophrenic patient.

But investigators involved in records research must constantly be chary of two problems. First, such studies suggest a continuity from childhood to adulthood that isn't necessarily present. Freud (1955) suggested the danger of fostering this assumption in elucidating a life history:

> So long as we trace development from its final outcome backwards, the chain of events appears continuous and we feel we have gained an insight which is completely satisfactory and even exhaustive. But if we proceed the reverse way, if we start from the premises inferred from the analysis and try to follow these up to the final result, then we no longer get the impression of an inevitable sequence of events which could not have been otherwise determined. We notice at once that there might have been another result, and that we might have been just as well able to understand and explain the latter. . . . Hence the chain of causation can always be recognized with certainty if we follow the line of analysis whereas to predict . . . is impossible. [pp. 167–168]

Of equal importance, follow-back studies accentuate the picture of pathology, since the subjects represent highly biased samples selected for their disordered outcomes. If one traces such individuals back to community agencies designed to service disturbed children (e.g., courts and clinics), the perceived intensity, pervasiveness, and continuity of pathology will be heightened even more.

Examples of Type II Follow-Back Studies

In illustrating the advantages and restrictions of a follow-back strategy, together with the types of data generated by studies of this type, several investigations are particularly pertinent. One such is Wahl's (1956) study of the hospital case records of 568 male schizophrenic naval personnel consecutively admitted to naval hospitals between 1953 and 1954. In tracing these patients' earlier histories, Wahl found that 41.4 percent had either lost or been separated from a parent (i.e., a parent was absent for 11 months of the year for a period of 5 consecutive years) prior to age 15, compared with an 11.4 percent loss rate among a control group of 100,000 naval recruits. Of the 117 male schizophrenic patients who lost a parent by death prior to age 15, 55 percent lost a father; 33 percent, a mother; and 11 percent, both parents. A greater number of father vs. mother deaths is also true of the general population, but the 11 percent figure for the death of both parents is exceedingly high. Thus, Wahl concluded that a father's death may be more important in the etiology of schizophrenia in males than has previously been thought likely. This supports the conclusion reached by Rosenzweig and Blum (as reviewed by Sanua 1961) that the histories of adult schizophrenics reveal a high incidence of same-sexed parental deaths. For 32 percent of the schizophrenic orphans in Wahl's study, parental death occurred before the child was 5 years old, in 23 percent the loss occurred between ages 5 and 9, and in 46 percent the loss occurred between ages 10 and 15. These data suggested to Wahl that a parent's death may have more deleterious effects for an adolescent than for a very young child.

Other studies commonly report that one-third to two-thirds of adult schizophrenics are the products of homes broken by parental death, desertion, or divorce (Frazee 1953, Oltman, McGarry, and Friedman 1952, Sanua 1961, and Wahl 1956). Rutter (1966) similarly adduced that parental deaths appear to be significantly associated with psychiatric illness in children. Based upon a retrospective investigation of the parents of 739 children first placed under psychiatric

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

care for neurotic and behavioral disorders (psychotic children were excluded) in the Maudsley Hospital for the years 1955 and 1959, Rutter found a heightened incidence of parental deaths in this group relative to control children seen in pediatric and dental clinics. These rates were also higher for the Maudsley sample adjudged to be "disturbed" in comparison with other children seen in the same setting who were judged to be without "psychiatric abnormality or to have some uncomplicated organic condition" (p. 18). Further, in comparison with population expectancy rates calculated for parental age, sex and marital status, the observed number of deaths of fathers and mothers was more than twice that expected in the general population. Rutter, too, noted an association between the incidence of psychiatric abnormality and loss of a same-sexed parent. In contrast to Wahl, however, Rutter found that psychiatrically ill children were most often bereaved in early childhood (ages 2–5) but failed to develop neurotic or behavioral abnormalities until early adolescence. Rutter concluded that his results supported earlier studies of bereavement rates among disturbed children:

> . . . the present results are in keeping with earlier studies that have noted the frequency with which children showing psychiatric disorder come from "broken homes" . . . but what has been already noted is that parental death is often associated with parental mental disorder and/or chronic physical illness and that the inter-relationships between these must be taken into account as each has been shown to be associated with disorder in the child. Contrary to Bowlby's views on the special importance of maternal deprivation and childhood grief . . . paternal death and maternal death were equally associated with psychiatric disorder in the child. [p. 52]

The Wahl and Rutter studies are, of course, markedly different in that Wahl studied schizophrenic adults, and Rutter evaluated disordered children of whom less than 25 percent had "severe" symptoms. Furthermore, the ultimate outcomes in Rutter's cases are not known. But Rutter's research suggests the complex correlates involved in the stressful experience of bereavement. The consequences of this unhappy event are complicated by many known major sources of variance assigned to death rates such as the age of the population at risk, sex, marital status, socioeconomic status, and shifts in health and nutritional care over time. It is necessary, therefore, to control for such factors in studying the effects of bereavement. But there is an additional caution to be noted in attempting to relate such experiences to a specific form of psychopathology. A high rate of broken homes is to be found in the background of individuals manifesting a wide range of behavior disorders. For example, Frank (1965) has reviewed one investigation which reported that the incidence of broken homes and parental deaths in families of schizophrenics was 34 percent in contrast to a 49 percent rate for neurotics and a 48 percent rate for psychopaths. Moreover, inconsistency is suggested in data of other investigators who did *not* find an increase in the percentage of broken homes in the background of adult schizophrenics (Gerard and Siegel 1950). The prospective studies of Newcastle infants (as reviewed by Rutter 1966), also failed to demonstrate any significant correlation between breakup of the home and disorder in the child (although the children have not been followed into adulthood). After reviewing the literature on bereavement and broken homes, Rutter concluded that:

> . . . the consequences for the child are complex, but that there are, as yet, not enough data upon which to build any coherent theory of reactions to bereavement. The effects on the child are probably as much a function of what happens before as of what happens after death. The immediate reactions probably depend on the cultural setting, the age of the child, the sexes of the child and parent, previous personality variables and family relationships, to mention but a few. Although bereavement may necessitate major readjustments, many children develop normally after bereavement and statistical associations between bereavement and child psychiatric disorders have still to be established. [p. 46]

Certainly if the association between parental loss and childhood behavioral deviance is not firm, the relationship to adult disorder is likely to be even more tenuous. Why then cite a variable which seems to suffer so greatly from inconstancy? Simply because Wahl's study points up clearly one major disadvantage of a follow-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

back strategy. If a relationship exists between childhood bereavement and a diversity of deviant outcomes in adulthood, then the selection of a given disorder in adulthood, followed by a retrospective review of the case histories of such types of patients, is likely to provide data suggestive of a potential etiological agent *specific* to that disorder—an assumption that would be negated were the investigator to use a broad-ranging set of deviant and normal control groups in a follow-back strategy.

Furthermore, bereavement can serve as an exemplar of the types of variables typically reported in follow-back research. The psychopathologist, particularly one looking for clues to a deviant adulthood, is vitally interested in early environmental stressors, particularly those events that are *most likely* to be found in case records and thus consistently available for tabulation. Family disruption, whether by parental death or separation, meets these twin criteria superbly, but obviously what is often not to be found in society's records are those complex interactions with the cultural setting, personality variables, and family relationships to which Rutter alludes.

School Records

Early school records can supplement, to some extent, data of the sort provided by Wahl, but here too there exist basic limitations which cannot be readily overcome. On the positive side as a base for expanding the information available to the researcher are the judgments and commentaries provided by teachers who are often in a unique position to observe behavior that occurs (presumably) prior to the advent of overt pathology. Such accounts may be more objective than the recordings to be found in clinic case histories which are formed from the statements of biased informants and the interpretations by professionals who are aware of the child's diagnosis. But these factors also contaminate school records. Further, one may ask whether school records are free of early manifestations of pathology in the child simply because they are generated in a period prior to a recognition of the formal trappings of disorder. To examine this question one can turn to findings relevant to the early school achievements of adult schizophrenic patients. Such data typically portray preschizophrenics as poorer achievers and/or socializers (Barthell and Holmes 1968) than their classmates. The former finding is often substantiated by lowered IQ scores on standardized tests and by evidence of progressively declining achievement and test performance as the preschizophrenic grows older.[12]

In an investigation of the high school records of 44 adult male schizophrenics and a control group chosen from among their former classmates, Bower, Shellhammer, and Daily (1960) found that 90 percent of controls had been graduated from high school as compared to only 65 percent of the preschizophrenics. Similarly, many more controls (62 percent) than preschizophrenics (38 percent) had followed a college preparatory course. The investigators observed a declining pattern of school achievement in 25 percent of the preschizophrenics but in only 6 percent of the controls. The mean grade point average of the preschizophrenics was one full grade lower than that of the controls; the two groups' mean IQ scores were 99.3 and 106.3, respectively.

In almost all cases, the preschizophrenic's overall level of mental health and school adjustment was rated as significantly poorer than the controls'. Staff members reported the preschizophrenic males to be more apathetic, passive, lacking in heterosexual contacts, inactive in groups and sports, and less well liked by peers relative to control subjects. Specifically, of the 44 high school adolescents who later became schizophrenic, teachers reported that 13 had had unusual personality traits and four had been pathologically shy.

Such descriptions suggest that a disorganizing process may already have been underway.

[12] The decline in IQ scores over time originally reported by Lane and Albee (1964) for preschizophrenic children in comparison with siblings and controls (matched for IQ and type of neighborhood) appears to have been subsequently vitiated (see Lane and Albee 1968), owing to a number of flaws in the original study: the use of inadequate comparison groups, a bias in the social class composition of the index cases, the failure to use standard scores rather than raw scores, and possible variations in the morbidity patterns assumed for the index and control cases (Mednick and Schulsinger 1970). This is interesting in the light of Lubensky's (1972) study comparing the school records of preschizophrenic children with those of matched controls and siblings; she reports that the test IQ's of the index cases fell somewhat below (103 vs. 108) the controls' but were comparable to their siblings'.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Observations of the Genain quadruplets are supportive. In Bayley's (1963) report of the quadruplets there are available for all four girls parallel IQ tests extending from fourth to ninth grade. These indicate a trend toward IQ test performance decline in all the sisters. However, the most striking deficit was contributed by the frailest of the quads (Hester), who suffered the earliest breakdown relative to her sibs. When one reads the magnificent anamnesis provided by Rosenthal, Raphling, and Quinn (1963) (see particularly the description on pp. 80–84 of the concurrent traumatic events that coincided with Hester's test decline), it becomes clear that such signs of deficit may not be a precursor condition to morbidity, as much as an early manifestation of disorder. Deficits in IQ, like parental loss, are measurable, quantifiable, and available; but their status as a *precursor* variable appears dubious.

Watt's Follow-Back Study

Of all of the follow-back studies the most sophisticated has been provided by Watt and his associates (Watt et al. 1970, Watt 1972, and Watt, in press). In this major effort Watt first reviewed a computer list "of every patient 15–34 years of age, who was first admitted to any public, private or VA mental hospital" during the fiscal years 1958–65 in the State of Massachusetts. Of this original list of 19,179 patients, 15,811 had been diagnosed with a functional disorder (psychosis, neurosis, or other personality disorders) on first admission. This subset was then compared against the files of a public high school in a large residential and industrial suburb of Boston, which Watt called "Maybury." Two samples of patients were matched to these files, the first composed of 90 nonmigratory patients who attended Maybury's high school and had had their first hospital admission from that suburb. The diagnostic assignments of these 90 patients were as follows: 32, schizophrenia; seven, manic-depression; 21, neurosis; and 30, some form of functional personality disorder. A second sample was primarily made up of a migratory group of 72 patients who had attended the same high school but had been admitted to hospitals from other communities. Data drawn from this second sample are currently undergoing analysis. Watt's published reports are based on findings reported for 30 of the 32 patients of the first sample who had received a hospital diagnosis of schizophrenia. (Two patients had to be discarded for lack of information.) This sample of 30 patients consisted of 17 males and 13 females, one-third drawn from lower social class families, 27 percent from the middle class, and 40 percent from the upper middle class. This distribution parallels that provided by a sampling of the file records of some 900 other students. Median intelligence of the group is described as average (IQ= 104) and comparable to data available on matched controls and the patient's own siblings. The control group consisted of a randomly selected set of persons whose school records were matched to the index cases for age, sex, race, and father's occupational and educational level; these individuals had never been hospitalized for mental illness in Massachusetts prior to 1965. Matching within the controls for the nonmigratory pattern of sample 1, however, could not be achieved. Another comparison group comprised the siblings of the schizophrenic index cases whose records in the Maybury school system were also analyzed by the investigators.

The typical cumulative record available to Watt contained data related to scholastic performance, personal characteristics of the control and index persons, and special help and guidance rendered to them. Other data included:

> . . . attendance, curriculum, parents' and pupils' plans for the future . . . school marks . . . special abilities, intramural activities, clubs, outside activities, vocational experiences, use of money earned and allowed, offices held, general health and [teachers' annual] notes concerning mental health, social adjustment, work habits, subject matter achievement, and the like. [Watt et al. 1970, p. 642]

The high school record also contained eight 5-point rating scales of personality traits as adjudged by 10th and 11th grade teachers.

Now, obviously, here is a heavy volume of data bearing on basic competencies that would seem to be highly relevant for the prediction of later psychopathology. Judgments of work competence and social adequacy appear to be extractable from these records and presumably free of the bias provided by psychiatric clinic records, since the school is an institution representative of the

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

total population and not merely of a biased and unrepresentative sample of disordered children.

What of the data provided by Watt's analyses? His published reports have dealt primarily with the social behaviors of his risk samples as derived from a procedure developed to quantify the written evaluations of teachers that had been recorded originally on the cumulative record. Watt's method of analysis is an important one that other investigators using a follow-through prospective strategy with children at risk have also found productive (Rolf 1972 and Rolf and Garmezy, in press).

The coding system consists of categories for rating units of content present in the recorded comments of the teachers. The system currently comprises 23 bipolar dimensions (reduced from the 37 dimensions originally used), each with a positive and negative category. These can be subsumed under five rational factors reflective of personality traits; a sixth factor has only a single negative pole. Watt's final revised set of categories, together with the results of an analysis based on the entire sample of 54 schizophrenics and 143 matched controls, appears in table 1.

A naive judge read the comments recorded in the cumulative record and classified those statements into one or several of the categories of the scoring schema. All teachers' statements were categorized, tabulated, and summed, with the totals divided by the number of years the child attended public school. This provided a ratio score which indicated the average number of comments per year in school for each category. Since comments within a category can be positive or negative, a difference score within categories was computed by subtracting the negative from the positive scores. (Broad categories of judgments tended to be reasonably reliable, achieving a median value of .80; range .51—.91.) A second measure, a global judgment, was derived from a blind reading of the school record in toto, using 5-point scales for *conformity* (acceptable classroom behavior, peer acceptance, adoption of peer group expectations), *social participation* (active in class discussions, group activities, a social participant in student groups and activities), *facial appearance* (attractiveness as judged from the child's photograph), and *emotional stability* (self-control, social poise, and even temperament, evident personal security).

Results of these early analyses have indicated that:

- Preschizophrenic boys and girls differ, with the boys showing "primary evidence of unsocialized aggression and secondary evidence of internal conflict or overinhibition, with a substantial component of emotional depression." The girls, on the other hand, are described as: "primarily overinhibited" with the strongest evidence (and these data are weaker than those presented by the boys) of "oversensitiveness, conformity, and introversion, and considerably better adjustment to the teachers' expectations of appropriate behavior in school" (Watt et al. 1970, p. 655).
- Relative to their controls, preschizophrenic boys achieve at a lower level, and are less cooperative, well behaved, and pleasant; girls are more immature and less attention-seeking. The agreeableness/disagreeableness dimension generates the most reliable differences. However, on the dimension of conscientiousness/unconscientiousness which reflects scholastic motivation and performance, no differences were found; family backgrounds are suggestive as correlates of these differing patterns. Parental repression appears to relate to the overinhibited pattern, whereas a disorganized and hostile family background may lead to the unsocialized, aggressive pattern.
- There is no evidence for sex-role reversal in the preschizophrenic children; boys tended to be aggressive; girls, expressive.
- Only one-half of the preschizophrenics could be distinguished as socially deviant by early adolescence, whereas early childhood produced few such indicators (Watt 1972). Heterogeneity of childhood adjustment patterns even among a preschizophrenic group was clearly evident. Nevertheless, the early adolescent years appear to be the most productive for prognostications of adult adjustment.
- A heightened frequency of parental deaths before completion of high school (19 percent) in comparison with matched controls (8 percent) was highly significant. This finding also obtained for a small group of manic-depressives (18 percent), but not for neurotics (3 percent) or the personality disorders (7 percent).
- Severe organic handicaps (neurological disorders, cardiac and sensory impairment, obesity)

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Table 1. Summary of the category-difference scores on which preschizophrenic children differed significantly from matched controls.[1]

Personality factors	Level of significance		
	Schizophrenic vs. control		Sex x diagnosis interaction
	Boys	Girls	
Scholastic motivation			
Careful—careless			
Attentive—distractible			
Achieving—underachieving	<.05		
Organized—disorganized			
Motivated—unmotivated			
Dependable—undependable	<.05		
Emotional stability			
Self-controlled—emotional	<.10		
Calm—nervous		<.01[2]	<.025
Secure—insecure		<.05	
Cheerful—depressed	<.05		
Mature—immature		<.10	
Adjusted—maladjusted	<.005	<.05	<.20
Extraversion			
Group participation—little			
Popular—unpopular			
Sociable—unsociable		<.05	
Talkative—quiet		<.025	
Assertiveness			
Assertive—passive			
Leader—follower			
Independent—dependent			
Agreeableness			
Pleasant—unpleasant	<.025		<.05
Cooperative—negativistic	<.001		<.01
Considerate—egocentric	<.025	<.10	
Well behaved—antisocial	<.05		<.025

[1] Adapted from Watt (in press).

[2] Based upon two-tailed test because the preschizophrenic girls were less nervous than their controls. All other comparisons show one-tailed tests because the preschizophrenics were more maladjusted, as expected. The interactions are based on two-tailed tests and all indicate greater maladjustment in the preschizophrenic boys.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Table 2. Discrimination of schizophrenics and controls with 5 postdictive indices of risk[1]

Index of risk	Schizophrenics (n = 54)		Controls (n = 143)	
	No.	Percent	No.	Percent
1. Parental death	10	19	11	8
2. Severe organic handicap	9	17	6	4
3. Extreme family conflict	9	17	10	7
4. Extreme emotional instability	28	52	37	26
5a. Extreme introversion (females only)	13	48	19	27
b. Extreme disagreeableness (males only)	12	44	13	18

[1] Adapted from Watt (in press).

also were more frequent in the preschizophrenic group, as opposed to their controls (39 percent vs. 21 percent).

Watt, drawing upon his data, suggests five postdictive indices of risk. These are reproduced in tables 2 and 3 to indicate the potential power of these factors as discriminators of risk.

Follow-Back: An Evaluation

Evaluating the area of follow-back studies, one encounters a curious pattern of reciprocal advantages and disadvantages that is a function of the locus from which investigators have drawn their records. In this strategy, the starting point—the disordered patient—is the same, whether the return be to school or clinic. And thus a shared disadvantage is reflected in the initially biased cohort. The use of clinic data heightens the bias, for it focuses on a subset of children already sufficiently disturbed to warrant the community's or parents' attention. But the bias is also substantive: more boys than girls are seen in clinics; the more typical behavioral pattern for boys is toward aggressive, externalizing symptoms; such signs of "turning against others" provide a more prognostically unfavorable picture. This triad of factors has implications for using the clinic as the source for follow-back studies: 1) It provides a vision of a continuity to disorder which is inappropriate since the clinic is a distorting mirror for viewing the antecedents of schizophrenia (or any other form of adult psychopathology); 2) it increases the probability that the cohort will be characterized by greater chronicity and a poorer prognosis; and 3) it tends to neglect the study of the development of schizophrenia in females, except for more malignant instances of the disorder.

There is a compensating factor, however, in the use of child guidance clinic records. The agency's observers tend to be more sophisticated and more experienced in looking at child and family through a clinical prism; they provide a view of the formative years which hopefully will be marked by a penetrating, insightful, and detailed analysis of the patterns of socialization and familial interactions the child has experienced.

By contrast, a return to the schools reduces the bias inherent in selecting a particular subset of truly disturbed children, for it emphasizes a universal setting which is the province of *all* children in the community. Thus, school records are more representative and less disfiguring of the image of the preschizophrenic child than his clinical history. On the other hand, however, the limitations on the use of school records are many:

First, there are the shortcomings that inhere in the cumulative record itself. The contents of such records tend to be sparse. For example, parents' occupations on which social class judgments are often based provide no adequate description of job activities or job

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Table 3. Discrimination of schizophrenics and controls by a simple formula combining 5 postdictive indices of risk.[1]

	Schizophrenics (n = 54)		Controls (n = 143)	
	No.	Percent	No.	Percent
Postdicted at risk by the formula	34	63	38	27
Postdicted not at risk by the formula	20	37	105	73

[1]Adapted from Watt (in press).

level. Teachers' commentaries are often minimal and may be influenced by prior judgments that are part of the child's record. Patterns of social promotions reduce the discriminability of grades (although it does make obtained differences even more significant). Further, interpretations of such data often require extended inference. . . . Finally, a growing (and rightful) concern with the invasion of privacy has alerted school authorities to the potential consequences of premature and inadequate judgments about children. Thus one can foresee even greater restrictions on both what will be recorded on cumulative records and how these evaluations will be used by researchers. Given these many faults, what does the cumulative record have to offer? Its importance lies in the fact that it provides one external criterion of economic (i.e. early work) competence—and thus provides measures which warrant correlation with other data related to the psychological and biological adaptation of the child at risk. [Rolf and Garmezy, in press]

Type III Followup Studies: The Child at Risk as Adult

In followup research one typically selects a sample of subjects at an earlier age (usually childhood) and then at a later period (usually adulthood) and searches out these individuals to evaluate their contemporary status. The method reduces the bias of follow-back research because it does not restrict the range of adaptations currently observed even if the initial selection of cases is predicated upon some form of early psychopathological status. As a result, the correlations between manifest disorder in earlier and later age periods are attenuated relative to those observed in follow-back investigations.

Because followup studies are so difficult and expensive to mount and maintain, one usually chooses samples of individuals considered to be at risk—often on the basis of characteristics relevant to the various etiological models discussed earlier—raising anew the issue of sampling biases in selection. A child guidance clinic sample ensures a disproportionate male:female ratio with all the attendant shortcomings described in the previous section of this paper; the more severe pathology present in young girls brought to psychiatric attention may increase the likelihood of observations of psychopathology when these children are seen in adulthood; the heightened incidence of destructive symptomatology among boys casts the adult data in a similar direction.

Since followup and follow-back research share some common disadvantages, under what conditions is the use of one strategy more efficacious than the other? Ricks (1970), in weighing the pros and cons of each procedure, offers this suggestion:

> . . . there are certain ways in which the two research strategies may be valuable for specific purposes. If the researcher is concerned with a wide variety of possible antecedents of some disorder, and if he has no strongly preferred hypotheses, then the strategy of beginning with an adult psychopathological population and looking for antecedents in their school, clinic, or court records will allow him to eliminate a great many possibilities quickly and so to narrow the field to the few most likely forerunners of the disorder. Many of the possible antecedents will simply not occur in the research population, or will occur with such low frequencies that they can hardly be considered as related to the adult outcome being considered. Beginning with the adult psycho-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

pathological sample, then, will ordinarily be the best way to get rid of wrong ideas. . . . A follow-back method is also likely to open up new possibilities that the researcher has not anticipated. . . . The method also has the economic advantage of locating large samples of specific adult outcomes. . . . Since this method begins with adults, it is possible to follow out the course of the adult disorder long enough to differentiate between antecedents of chronicity and recovery and to do reliability studies on various hospital diagnoses, within the lifetime of one investigator.

The alternative design, beginning with a specific group and following it into adult life, also has several advantages. . . . If [one] is wrong about the relevance of stress reactions, for example, or about the importance of genetic predisposition, in predicting schizophrenia, [a] clear miss offers only the cold comfort of negative success—that is, of showing as decisively as one can at this point that some important ideas are wrong. If . . . right, on the other hand, . . . control over the whole experimental procedure and the specificity and relevance of . . . long-term observations will make [the] data far more convincing than that gathered from the usual records available to an adult-anchored research strategy. [pp. 297–299]

Representative Type III (Followup) Studies

One of the truly classical followup studies of psychopathology, *Deviant Children Grown Up* (Robins 1966), had as its original focus the adult adaptation of antisocial children. The diversity of pathological outcomes observed by its author, however, has provided valuable spinoffs regarding precursor states that may anticipate schizophrenia. Robins and her coworkers investigated the adult adaptation of each of the 526 patients who had been seen during their childhood in the St. Louis Municipal Psychiatric Clinic between 1924 and 1929. The index children were matched with 100 elementary school children for age (at clinic contact the median age was 14, with a range from 7 to 17), sex (predominantly male), race, IQ, and neighborhood residence during childhood.[13] Although the followup investigation took place on the average approximately 30 years after the initial clinic contact, the researchers succeeded in locating 88 percent of the former child guidance clinic patients and 98 percent of the control subjects. Of those located, the investigators were able to interview 416 subjects and in 75 other cases they secured interviews with relatives. The researchers also used all available public records garnered from such sources as schools, juvenile courts, and police files. Thereafter each case was evaluated independently by two psychiatrists who noted the occurrence of any psychiatric illness during the 30 intervening years between the first clinic contact and the followup investigation.

On followup, 26 schizophrenics were found among 436 of the children who had attended the clinic, 20 percent of whom had at some time been hospitalized. Among the 65 male controls there were no adults diagnosed schizophrenic, but among the 25 female controls, two had been so diagnosed. On adult followup, only 20 percent of the index cases constituted a "no disease" group, in comparison with 52 percent of the controls. In the analysis of the data, the preschizophrenics were compared with: 1) a nonpatient control group, 2) former patients of the clinic who, in adulthood, were free of psychiatric disturbance, and 3) other clinic children who, as adults, had received various psychiatric diagnoses other than schizophrenia. Robins' findings indicate that the preschizophrenic's family history was marked by psychiatric illness, parental inadequacy, and marital disharmony, although there were no particular symptom clusters or family patterns predictive of the later development of a schizophrenic disorder. Psychosis in either parent seemed to predict a somewhat elevated rate of psychosis in the children, but these results were significant only for mothers diagnosed psychotic. (See table 4.) Specifically, over 33 percent of the preschizophrenics became wards of the state because of manifest maternal psychosis.

Fathers of the preschizophrenics had been considerably more antisocial than the fathers of the "no disease" control group and almost as antisocial as the parents of those children who were later diagnosed sociopathic. In 30 percent of cases, fathers of schizophrenics had had a history of unemployment at a rate higher than that of any other diagnostic group.

[13] There were three inclusion criteria for selection as a control subject: a history unblemished by a) psychiatric clinic contact, b) placement in a correctional institution and c) suspension or repetition of a grade in elementary school.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Table 4. Relationship between parental diagnosis (based on behavior problems, subjective complaints, prior diagnoses, and hospital records) and incidence of psychosis in offspring.[1]

Parental diagnosis	No. and percent of parents involved		Percent of parents rearing offspring diagnosed psychotic[2]		schizohrenic	
	Fathers	Mothers	Fathers	Mothers	Fathers	Mothers
Sociopathic & alcoholic	157 (36%)	48 (11%)	13%	4%	6%	2%
Psychosis (probable)	15 (4%)	35 (8%)	20%	28%	13%	11%
Neurosis (includes "severely nervous")	25 (5%)	62 (14%)	16%	16%	8%	13%
Feebleminded	4 (1%)	25 (6%)	0%	4%	0%	4%
No disease (or senility only)	235 (54%)	266 (61%)	10%	10%	5%	5%
Total	436 (100%)	436 (100%)				

[1] Adapted from Robins (1966), pp. 163, 164, and 168.
[2] "Psychotic" includes schizophrenia, chronic brain syndrome, manic-depression, and "undiagnosed."

The number of broken homes in the preschizophrenics' background (65 percent) was not significantly higher than that found in the rest of the sample; but of all diagnostic groups the preschizophrenics were reared least often by both parents. Although the preschizophrenics had not suffered more frequent loss of their parents through death than had the "no disease" group, more of the preschizophrenics' parents had been divorced or separated (26 percent) and more of the preschizophrenics had been removed from their homes due to parental neglect. Yet, even with such disturbing family patterns, fewer preschizophrenic children than presociopathic children had lived away from home.

From early childhood the developmental histories of the preschizophrenics had deviated from those of the clinic children who as adults did not develop any psychiatric disturbances. As compared with the "no disease" group, the preschizophrenics had had more severe infectious diseases in the first 2 years of life, more physical handicaps (particularly hearing problems), and greater difficulties in locomotion. They had displayed more eating and sleeping disturbances, more tics and mannerisms, fears and phobias, and feelings of depression and chronic unhappiness. For example, on clinic contact, 36 percent of the preschizophrenic children as compared with 2 percent of the "no disease" group had been afraid to let their mothers out of sight. Neurotic traits such as enuresis and thumb sucking failed to differentiate the preschizophrenics from the control group; the only common neurotic trait more often reported for the preschizophrenics was nail biting. Thirty-three percent of the preschizophrenics had had odd ideas or paranoid trends, phenomena never observed in the comparison groups. All of the symptoms that were specific in the childhood of these 26 schizophrenics have also been reported by Frazee (1953) to be somewhat more frequent in the clinic records of 23 hospitalized schizophrenic males as compared to matched controls. But

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Frazee also noted in the preschizophrenics more daydreaming, feeding problems, lying, temper tantrums, and shyness—attributes which appeared less frequently in Robins' case histories. The shy, withdrawn personality sometimes thought to be anticipative of schizophrenia did not prove an adequate predictor of the children's adjustment. None of the preschizophrenics were described as shy or withdrawn, and only 16.6 percent had been seclusive.

According to Robins, children with behavior disorders frequently have had difficulties in school no matter what their adult diagnosis or outcome: 75 percent of the preschizophrenics and of the "no disease" control group exhibited school problems. This finding agrees with the results of Huffman and Wenig's study (as reviewed by Robins 1966) of hospitalized patients who either had or had not been seen originally at the Chicago Child Study Bureau. These investigators found that an excessive proportion of future sociopaths, schizophrenics, and mental defectives—in contrast to future neurotics and manic-depressives—had come to the attention of school authorities as problem children.

Antisocial behavior as an indicator of poor prognosis is a highly reliable finding in the literature of child psychiatry. The preschizophrenics in Robins' study had been referred to the clinic for antisocial behavior with a history of physical aggression (50 percent), running away (33 percent), truancy (35 percent), incorrigibility or disobedience (50 percent), and pathological lying (telling unbelievable stories without a rational motive, but not lying to protect oneself or to involve others). Although 57 percent of the preschizophrenics had at some time appeared in juvenile court, it is difficult to make a definitive statement about the relationship between juvenile court appearance and a subsequent diagnosis of schizophrenia, since highly antisocial children (of the original 526 index cases) who had never appeared before a juvenile court similarly manifested a high rate of adult psychosis. Yet, in comparison with sociopaths, preschizophrenics were less often referred for antisocial behavior, had fewer symptoms, appeared less often in juvenile court, and were less often sent to correctional institutions.

Although the preschizophrenics exhibited antisocial behavior only slightly more frequently (as measured by a higher proportion of repeated arrests and offenses) than did the "no disease" group, their aggressive behavior had a more specific locus. A high proportion of the antisocial behavior (of those preschizophrenics not brought to juvenile court) was restricted to parents, siblings, and other child acquaintances. Significantly, the preschizophrenics in a study conducted at the Judge Baker Guidance Center (see p. 49) had also tended to restrict their acting-out behavior to the family and their immediate environment. The preschizophrenics in the Robins' study were alienated and hostile towards acquaintances, since their antisocial behavior was usually accomplished without the help of other antisocial children; in fact, the preschizophrenics' low rate of association with other antisocial children was a characteristic that differentiated them from the sociopaths.

> The potential schizophrenic, like the modal patient, was a boy referred for antisocial behavior. But to this picture was added his alienation from his contemporaries and overdependence on his mother. In addition to his antisocial behavior, he had somatic complaints, appeared worried and brooding. His parents were divorced or separated, his mother neglectful.
>
> The shy, withdrawn personality sometimes thought to be predictive of schizophrenia did not predict in these children. None of the schizophrenics had been described as a shy or withdrawn child, and only one-sixth as avoiding others or seclusive. In more than half the preschizophrenics were noted incorrigibility, running away from home, theft, and poor school performance. Restlessness, irritability and depression were all more common than was shyness. . . . The preschizophrenic who appears in child guidance clinics seems most often to be a child with antisocial behavior *accompanied* by severe non-antisocial symptoms. [Robins 1966, p. 258] [14]

[14] To these symptoms present in the preschizophrenic group should be added: somatic symptoms, nail biting, overdependency, and ruminativeness, (Robins 1966, table 6.9, p. 150). Although noted in other investigations, the following symptoms did not differentiate between the preschizophrenics and the normal controls in Robins' investigation: restlessness, distractibility, inattention, low energy level, laziness, and fatigue.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

As adults, the schizophrenics continued in their antisocial behavior and more than 58 percent of them met Robins' minimum criteria for a diagnosis of sociopathy. They were like the sociopathic subjects in their patterns of social isolation, poor work histories, belligerence, and financial dependency; but they did not share the sociopaths' pattern of "compulsive self-gratification." More schizophrenics than sociopaths had been rejected by the armed services; when accepted, their careers were brief and stormy. Schizophrenics required more army hospitalizations and had as much disciplinary action directed against them as the sociopaths. The schizophrenics had more marital, legal, and occupational problems in comparison to the "no disease" group. As with the chronic schizophrenics of the Judge Baker study, there were more bachelors among the male schizophrenics than in any other diagnostic group. When married, their divorce rate was higher than that for the "no disease" group; and only 67 percent of the married schizophrenics produced offspring. Like the sociopaths, the schizophrenics often married women who had behavior problems and admitted to frequent infidelities. Significantly, children of those patients referred for antisocial behavior (referring to the entire sample and not just to the antisocial preschizophrenics) showed more antisocial behavior (but less nervousness) than did the children of other patients or control subjects.

Of the 26 schizophrenics, 75 percent had been arrested as adults and 25 percent had been imprisoned; 31 percent had shown impulsivity, 31 percent had been vagrants, 8 percent had used aliases, and 31 percent had shown sexual misbehavior. Thus for a period of time the preschizophrenics' acting-out behaviors continued to be treated as criminal actions rather than as the symptoms of behavior pathology. Although their police records did not reflect the severity of acting out of those of the sociopaths, their transgressions were more frequent and more serious than those of the child patients who made up the "no disease" group. At followup, about 50 percent of the schizophrenics were out of the hospital and self-supporting; their jobs, however, were lower in occupational level than the jobs held by their respective siblings. Twenty-five percent of the schizophrenics were hospitalized at followup and none were considered improved; in some cases the amount of antisocial behavior had decreased appreciably with age.

In sum, the data suggest that the preschizophrenic child who appears in a clinic for treatment often presents a complaint of antisocial behavior. The more disturbed the antisocial behavior—whether measured by number of symptoms, number of episodes, or arrest for the behavior—the more disturbed will be the adult adjustment. Children who had been seen in the clinic but lacked numerous symptoms had no worse outcomes than control subjects. Thus, it was not the stigma attached to a "problem child" which created the difficulties revealed in adulthood but rather the nature and severity of the childhood behavior which occasioned the original referral.

Predictive Power of Externalizing vs. Internalizing Symptoms

Robins noted a continuity in the level of antisocial behavior from childhood to adulthood—a continuity that cut across diagnostic lines:

> The level of childhood antisocial behavior predicted sociopathy as well as those schizophrenics who when disordered would be combative and acting-out as opposed to those who would be relatively quiet and retiring.

Such tendencies appear to confirm other reports of the consistency of antisocial behavior from childhood to adulthood: externalizing symptoms, especially in male children, appear to be highly related to adult psychiatric disorder. By contrast, children with neurotic problems show a higher incidence of good mental health in adulthood.

The importance for the study of risk of symptoms of antisocial versus overinhibited behavior in childhood, touched on briefly in the discussion of Robins' findings, is pointed up by a recent investigation conducted by Shea (1972) as part of a large-scale adolescent followup study. This research program (directed by A.J. Hafner and W. Quast) focuses on the followup of 1,112 former adolescent psychiatric and medical patients seen at the University of Minnesota Hospitals. This large sample comprises all adolescent patients (ages 13–17) referred to the inpatient or outpatient psychiatric services of the hospital between 1938 and 1950. The original group numbered 864 children (434 males and 430 females),

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

all Caucasian. An additional group of 284 medical patient controls, matched to the index cases of age, sex and year of admission, was also studied. An exclusion criterion for the controls was any indication of a diagnosis, or even a problem, presumed to fall within the domain of child psychiatry. Demographic data analyses of the 1,112 psychiatric and medical patient controls revealed that the sample was representative of the entire state of Minnesota with reference to socioeconomic status, religious affiliation, and population density.

Of the original group of 1,112 adolescents, 1,025 have been located and 951 of these, of whom 656 had been psychiatric patients, had been interviewed by July 1972. A strikingly small percentage—40 in all or 5 percent of the sample--have refused to cooperate. On followup, subjects were interviewed by trained personnel who then administered the Minnesota Multiphasic Personality Inventory (MMPI).

Shea's study centered on the relationship between "externalizing" and "internalizing" symptom patterns in adolescence and later adult adjustment. The terminological distinction is Achenbach's (1966), as are the procedures for classifying children on the basis of manifest symptomatology at intake (cf., Bennett 1960 and Jenkins 1964). Shea first classified the available early case records on the basis of the presence of acting-out (externalizing) symptoms vs. behaviors characterized by excessive inhibition, anxiety, somatization, and depression (internalizing symptoms). In the final sample 85 internalizers (24 male, 61 female) and 81 externalizers (52 males, 29 females) were included as were matched subsamples of internalizers (I), externalizers (E), and controls (C). Seventy-two males were subdivided into groups of I, E, and C of 24 each, while 87 females constituted the respective I, E, and C groups, with 29 in each. The purpose of the matched subset was to evaluate the reliability of findings obtained on the larger group when potentially spurious sources of variance on the dependent variables were removed. The matching variables were as follows: sex, age, intactness of the family, socioeconomic status, intelligence, and area of residence (urban, suburban, rural).

All interviews were conducted without awareness of the subject's medical or psychiatric status in adolescence. The relatively structured interview was designed to obtain a comprehensive account of life history experiences from childhood to adulthood (average age = 38 years). Areas of family life and social, educational, occupational, sexual, and marital experiences were detailed. School, military, court, prison, hospital, VA and FBI records were also surveyed. In addition, a composite competence score based upon the research of Zigler and Phillips (1961a and b and 1962) to reflect adaptiveness in five areas (intelligence, education, occupation, employment, history, marital status) was calculated from an appraisal of the interview data.

Shea's findings provide a telling demonstration of the vulnerability to adult psychopathology characteristic of children whose antisocial behavior brings them attention.

Family pathology: 1) Fathers of externalizers show a heightened incidence of alcoholism (by contrast, internalizers' fathers manifest more physical disorders, suggesting a possible modeling of symptoms of "turning against the self"), greater job instability, and a trend toward greater absence from the home due to divorce, desertion, mental illness, or alcoholism. (Father absence among internalizers and controls was more often due to death). 2) Mothers of externalizers show a greater incidence of mental disorder (but not of schizophrenia). 3) Mothers and fathers of externalizers show marked marital conflict. 4) Although the groups did not differ in terms of the relationships with fathers, externalizers had markedly poorer relationships with their mothers.

Childhood adaptation: 1) Severe trauma marked the earlier years of the externalizers, as seen in a greater incidence of previous agency contacts and more frequent placement in orphanages and foster homes. 2) Externalizers have a history of more school problems, poorer performance and fewer years of school successfully completed. 3) The externalizing child had less adequate peer relationships, an observation more marked in the case of girls who acted out. This difficulty extended from adolescence into adulthood.

Adolescent and adult adaptation: 1) Externalizers tend to be diagnosed in adulthood as having behavior or personality disorders, whereas internalizers are more likely to be termed neurotic

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

or psychophysiologically disordered, thus affirming the continuity of symptomatology from adolescence to adulthood. 2) Externalizers in adolescence are more disturbed as measured by global mental health ratings. In adulthood, males are more likely to be committed to correctional institutions while females tend to be committed to mental hospitals. 3) A high divorce rate (65 percent) characterizes female externalizers. 4) The externalizing group shows lower social class status and lower occupational level in adulthood, whereas internalizers and controls improve their social class standing over the parental social class. 5) There is a higher incidence of schizophrenia in externalizing females. Although the diagnostic status of externalizing males in adulthood does not support higher incidence rates for schizophrenia,

> . . . it was the investigators' impression that many of them could have been so diagnosed. Instead the more conservative criterion of diagnoses already given was used. The Externalizing males tended to be in correctional rather than psychiatric institutions, an occurrence which reduced their likelihood of diagnosed schizophrenia unless the disorder was quite blatant. [Shea 1972, pp. 214–215]

Shea notes that the two psychiatric groups did not receive different treatments at the University hospital; further, the complete absence of drug therapy in childhood is a particular strength of this study, since drugs often confuse the clinical picture. In adulthood few males were receiving treatment, while some females were on tranquilizing medication and functioning well. 6) The total years spent in institutions by externalizing males was 252 years; for externalizing females, 83 years. 7) MMPI data affirm the striking psychopathology evidenced by the externalizing group.

The above is a most cursory summary of a superb and significant investigation. It speaks, however, to the critical significance for risk research of that significant proportion of manifestly deviant children whose symptomatology is marked by "turning against others."

Introversion-Extraversion and the Symptom Dimension of Externalization-Internalization

Antisocial behavior is one pole of the externalizing internalizing dimension. Yet, several retrospective child guidance clinic and school record studies also characterize the preschizophrenic as sensitive, dreamy, listless, withdrawn, shy, and seclusive (Frazee 1953, Wittman and Steinberg 1944, and Bowman 1934). From retrospective accounts of the Genain quadruplets, Rosenthal (1963) also mentions the overlay of introversive qualities, suggesting that such a trait may have a genetic basis.

The belief that internalizing behaviors in childhood anticipate later schizophrenia is based on the assumption that an isomorphism revolves around such factors as shyness, inhibition, withdrawal from social contact, and the like. Yet shyness in childhood lacks predictive power for the diagnosis of later schizophrenia. Morris, Soroker, and Burruss' (1954) followup study of child guidance clinic cases is revealing. These investigators examined the incidence of schizophrenia in 54 shy, withdrawn children who had been seen 16 to 27 years earlier in a child guidance clinic. They interviewed 34 of the subjects and talked with parents and relatives of an additional 20 cases. Although the authors had expected to find a relatively high incidence of mental illness in the group, only two of the 54 individuals could be considered mentally ill, and only one of these had been hospitalized.

In a subsequent study not limited solely to children with introversive personality traits, Michael, Morris, and Soroker (1957) randomly selected 606 males who had been seen in a Dallas child guidance clinic approximately 26 years earlier and classified the cases into three personality types: *introverts* ($n = 164$), *extraverts* ($n = 268$), and *ambiverts* ($n = 174$). The authors then cross-checked all State mental hospitals in Texas to determine which, if any, of these subjects subsequently had been admitted to such institutions. They did not, however, follow the adult adjustment of nonhospitalized cases. Of the 606 former child guidance cases, only 10 individuals had been hospitalized in adulthood for schizophrenia. Of this group, one had been classified previously as an introvert, three as extraverts, and six as ambiverts. Various neuropsychiatric disorders were found in an additional 14 cases, but in no case had the individual, on the basis of the early clinic picture, been labeled as introversive. Obviously such personality traits as introversion/extraversion cannot predict future severe psychopathology.

If one compares such findings with those de-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

rived by Morris, Escoll, and Wexler (1956) who studied 90 children with aggressive behavior disorders (64 boys and 26 girls) hospitalized between 1925 and 1935 in the psychiatric division of the Pennsylvania Hospital, the contrast is striking. Unlike children seen in child guidance clinics, these children apparently showed more intense manifestation of psychopathology, since in many instances the hospitalization had been considered an "action of last resort." On admittance, the children were approximately 10 years of age; they remained hospitalized an average of 10 months (range: 1 to 39 months) and received from 10 to 100 hours of individual therapy. Not surprisingly, their familial backgrounds were often markedly disturbed; 54 of the 90 children had multiple parental figures; of the 180 parents involved, 85 showed marked personality disturbances; 12 parents had a history of psychosis, 14 others had a diagnosis of neurosis, and 49 others had a history of miscellaneous difficulties (e.g., alcoholism, law breaking, etc.).

Followup study in adulthood of these aggressive children (via interviews with patients and relatives and the use of public records) revealed that a large proportion suffered from various types of psychiatric illness. Of 66 cases followed to the age of 18, 12 had become schizophrenic (a 13th became schizophrenic by age 26) and all but one of these 13 had remained chronically ill. The study also revealed that judgments of the success of treatment when made in childhood may be misleading; at discharge, 66 percent of the children had been rated as improved, while on prolonged followup only 21 percent had maintained a good adjustment. Until age 18 the behavior of these children fluctuated markedly; however, the quality of adjustment at 18 years of age proved to be an excellent indicator of subsequent adult adaptation.

Several characteristics at the time of the original hospital contact in childhood proved to be significantly associated with the subsequent development of schizophrenia in adulthood: 1) a history of parental rejection (defined as desertion of the child; voluntary placement of the child in a foster home or institution; court removal of a child due to parental inadequacy; marked parental preference for another sibling; open and constant dislike for the child); 2) a greater frequency of symptoms than had been manifested by individuals who were well adjusted in adulthood; 3) an inability to adjust to peers while undergoing a group experience in the hospital; and 4) sexual acting out (by female children who subsequently developed schizophrenia). The development of schizophrenia in adulthood was also associated with: 1) the onset of the problem before 5 years of age; and 2) the sex of the patient. Although the original ratio of males to females was 2.5 to one, seven females and six males had become schizophrenic in adulthood suggesting that the young girls of the original sample may have been more disturbed on initial contact.

Two related studies using the 606 cases drawn from the Dallas Child Guidance Clinic cited earlier reaffirm this relationship between "extraverted" symptoms in childhood and disordered adaptation in adulthood (Michael 1956 and Michael, Morris and Soroker 1957). Reporting on the incidence of adult schizophrenia and criminal behavior, Michael and his collaborators indicated the predominance of such severe disorders among those who had been categorized as the "ambiverts" and "extraverts" during childhood.

It is clear, however, that the terms introvert, extravert and ambivert, as used in the published articles, are misnomers. Michael's (1956) comments make clear the true status of these clinic children:

> Introverts were those children showing predominantly shy, withdrawn, anxious or fearful behavior, those who were tending to develop neuroses, or those who were bothering themselves rather than others. Extraverts were those who were acting out their difficulties, or those who were bothering other people. Ambiverts were those showing some characteristics of each of the above groups. [p. 377]

It is important that terms such as extraversion/introversion not be confused with externalizing and internalizing symptom formation; the distinction has been set forth most clearly by Eysenck (1971a and b).

First introduced into the literature by Jung in his volume *Psychological Types* (1923), the dimension of extraversion/introversion was not addressed to the issue of psychopathology but, rather, to the classes of forces that influenced an individual's behavior. For extraverts, these were to be found in objects and relationships in the outer world; for introverts, the determiners

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

tended to be inner, subjective states. While such determinants, of course, can influence the ease of adaptation to society's demands, they do not reflect the predisposition to psychopathology. Were disorder to occur, however, the structure of its manifestations would be likely to reflect the balance of extraversive/introversive tendencies characteristic of the individual. Although the major thrust of Eysenck's work supports the orthogonality of the dimensions of *extraversion/introversion, neuroticism* and *psychoticism,* he believes that certain forms of deviance can be categorized as reflecting extraverted neuroticism, while others can be viewed as indicators of introverted neuroticism. The presumed relationship of extraversion/introversion to externalizing/internalizing symptomatology is suggested by studies (Eysenck and Eysenck 1963 and Sparrow and Ross 1964) of the factorial composition of extraversion in which sociability and impulsiveness have been found to be prominent components. In discussing neuroticism, Eysenck is thus led to pair hysteria and psychopathy as expressions of extraverted neuroticism, a discomforting linkage for most clinicians who see these as distinguishable and differentiated entities. However, the inclusion of impulsiveness, invoking elements of control, begins to approximate some critical qualities in the externalizing child (Weintraub 1968) that may predispose toward acting-out behavior, although impulsivity, per se, is an attribute evident in disordered and nondisordered individuals alike, and clearly may facilitate coping under specific environmental circumstances.

A recent review by Rachman (1969) and a study by Eysenck and Eysenck (1969) lend support to the stability in childhood (ages 8 or 9 to 16) of the dimensions of extraversion/introversion and neuroticism and to the possible comparability of such childhood personality dimensions to adult trait structures. The relationship of these dimensions, as evidenced in symptom expression, was demonstrated by Eysenck (1953) through a factor analysis of behavior problems in children. Although Eysenck's analysis of the placement and type of symptoms clearly indicates that extraversion/introversion concepts are related to Achenbach's dimension of internalizing/externalizing, the distinction between the two dimensions is quite clear and should not be obfuscated by the careless use of terminology.

Judge Baker Guidance Center Study

The finding that severely disturbed, aggressive children often develop schizophrenia is further supported by findings of a large scale research program conducted at the Judge Baker Child Guidance Center (Waring and Ricks 1965, Nameche, Waring and Ricks 1964, Ricks and Nameche 1966, Ricks and Berry 1970 and Fleming and Ricks 1970). After cross-checking Massachusetts mental health records for the names of almost 18,000 children who had been seen in childhood at the clinic from its inception in 1917, investigators located 175 adult schizophrenics, of whom 69 males and 31 females have since been fully studied.[15] These 100 schizophrenic patients were carefully matched on the following eight variables with 100 control subjects who had also attended the clinic: age, sex, social class (66.6 percent were from the lowest social class), IQ (the group mean was 98.5), ethnicity, the clinic era in which the subject was seen, length of treatment, and presenting symptomatology.[16] Working on a case-by-case basis, the researchers used naturalistic descriptions to map out a longitudinal portrait for each child, after which certain rearing patterns were dimensionalized and then tested for significant differences between schizophrenics and controls.

[15] Whereas Morris, Escoll, and Wexler (1956) eliminated those children already diagnosed psychotic on hospital contact, the Judge Baker investigators did not do so. A total of 15 percent of the adult schizophrenics had already been diagnosed psychotic or schizophrenic during childhood.

[16] Matching to sample in this case presents a complex problem that has been discussed by Meehl (1970) in a superb article which deserves reading. The Judge Baker study used a nonnormal control group that was probably more disordered than a random, normal control group would be. As such the attributes of this group would be expected to parallel to some extent the characteristics of the index cases. In line with this expectation, a preliminary follow-up revealed that 16 percent of the adult controls had been hospitalized for mental illness; these individuals were discarded from the control group. Further study of the adult adjustment of the usable control group revealed that approximately one-third were socially marginal as defined by a poor work history, financial dependency, police contact, a poor marital history or lack of a spouse. Matching appears to have resulted in patterns of poor premorbid adaptation not dissimilar to the type revealed in the histories of process schizophrenics (Garmezy, 1968).

535-812 O - 74 - 4

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

"Chronic" vs. "released" schizophrenics: Recognizing the heterogeneity of hospital diagnoses of schizophrenia, the Judge Baker investigators dichotomized their schizophrenic sample into a *chronic* group (45 individuals who were still hospitalized at the study's inception) and a *released* group (55 persons whose hospitalization had been terminated at the time of followup and who were participating in community life to some extent). Overall, both groups were more disturbed than the controls, but this was particularly true of the chronics—a finding which was strengthened by developmental histories that often described the chronic patients as retarded, in contrast to the more normal developmental patterns reported for the released group. A comparison of 20 of the chronic and 30 of the released schizophrenics revealed that the chronics had significantly lower IQ's, had more seriously disturbed siblings, and were more frequently drawn from the lower social class. Finally, case histories more frequently revealed a history of schizophrenia in the families of the chronic group (77 percent) than in those of the released group (50 percent) (Nameche, Waring, and Ricks 1964).

Maternal psychopathology: Mothers of children who became chronic schizophrenics in adulthood were the most disturbed among the three groups (i.e. chronic, released, and controls). In 48 percent of the cases they were classified as psychotic, schizoid, or borderline schizophrenic as compared with 13 percent of mothers of released schizophrenics and 16 percent of control mothers. Although these women revealed "grossly deficient patterns of mothering," the classic schizophrenic mother appeared least frequently in the chronic group and with only relative infrequency in all groups. When interviewed about their children, however, mothers of chronic cases showed serious disturbances in language and thought, often responding inconsistently and incoherently. Thus, their distorted communication patterns may have been passed on to the child as a "transmission of irrationality." (Lidz et al. 1958). Differences between mothers were greater within the schizophrenic group (chronic vs. released) than between the released and control samples. Disturbances in thinking and tendencies to "move away from others" also characterized mothers of the schizophrenic sample. By contrast, mothers of the control sample more frequently exhibited impulsive behaviors suggestive of a character disorder than did mothers of the chronic and released schizophrenics; interestingly, impulsive mothers tended to rear children who were also impulsive, delinquent, and inclined to act out against others. Predominantly compulsive mothers were found with equal frequency in the released and control samples, but were less frequent in the chronic group.

Using these same Judge Baker case records, Gardner (1967) analyzed the role played by maternal psychopathology in 60 males later diagnosed schizophrenic (32 chronic and 28 released) and 48 comparable females (25 chronic and 23 released). The schizophrenics' mothers were compared with mothers of 28 males and 29 females who had been seen at the clinic during childhood but had achieved a satisfactory psychiatric adjustment as adults. Concurring with Rosenthal (1962), Gardner noted that the severity of maternal psychopathology was related to daughters' later mental status but was not significantly related to such disturbances in sons. These findings are also in accord with those of Rutter (1966).

Paternal psychopathology: An analysis of paternal psychopathology in the 100 preschizophrenic and 100 control cases revealed a greater proportion of "normal-neurotic" fathers in the control sample. Generally these fathers were married to equally healthy women, or at least to women free of extreme pathology. Even among the control group, however, only 12 percent of mothers were classified as "normal-neurotic" (this designation indicated the best possible adjustment in the set of classifications used). It is significant that severe pathology was reported in over twice as many mothers of chronic schizophrenics as fathers.[17] The fact that the pathological groups could not be differentiated on the

[17] In initially comparing 50 schizophrenics and 50 controls, the investigators reported that 40 percent of chronic schizophrenics, 17 percent of released schizophrenics, and 10 percent of controls had had a psychotic or schizoid father. Moreover, both parents were found to be psychotic or near psychotic in 20 percent of the chronic schizophrenic group, as compared with five percent of the released group and four percent of the controls. Similarly, in a study of psychiatrically ill children, Rutter (1966) observed, that "children in families where *both* parents were ill or where parental illness is accompanied by break-up of the marriage seem to be especially at risk" (p. 107).

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

basis of fathers' status raises the issue of the relative impact of mothers' vs. fathers' psychopathology on the degree of risk engendered in the child.

Marital factors: Even more pathognomonic was the finding of many unhealthy marriages in the families of the schizophrenic patients (Ricks and Berry 1970). Two types of marital relations—*emotional divorce* and *mutuality* (Bowen 1960)—significantly differentiated the three samples. Emotional divorce signified that both parents lived in separate worlds, a phenomenon also elaborated upon by Sampson, Messinger and Towne (1965). While emotional divorce was virtually nonexistent among the families of controls (2 percent), it was found frequently (27 percent) among parents of chronic patients and, to a lesser extent, among parents of released patients (13 percent). The second differentiating type of marital relationship, mutuality—characterized by normal parental interaction with a "give-and-take" relationship—was scarcely present in the schizophrenic sample but was evident in many control families.

Home environment: Of the four variables used to study family patterns, type of home environment was the best discriminator among the three groups of subjects. *Symbiotic unions* (parent and child forming an inseparable bond) were most typical of the families of schizophrenics, especially chronic schizophrenics. Interestingly, more than 50 percent of the symbiotic unions occurred in families in which emotional divorce was the primary marital pattern. In such a relationship, mothers often infantilized their adolescent child, even to the extent of bathing him; the child was considered "good," if he did nothing to disturb the tenuous balance within the family. If the preschizophrenic child attempted to break this symbiotic tie in adolescence as he struggled for independence from the family, he often became overwhelmed by anxiety and progressively decompensated into a schizophrenic state. Thus the data indicated the possibility that traumatic experiences per se, such as deaths and divorce, were less debilitating than a child's continued existence in an "outwardly serene but covertly pathogenic family."

Environments in which the child was rejected and excluded from the family, designated as *family sacrifice*, were more frequently found in the released schizophrenic sample than within the control group. Most significantly, while 50 percent of the home environments of the control cases were classified as only "mildly disturbed" (along a continuum of mild, moderate, and severely disturbed environments), none of the schizophrenics' home environments were so adjudged. Finally, familes were scored as *open* if they had friends, entertained, or were active in the community and *closed* if case histories contained no references to such activities. Based on these criteria, one-third of the families of schizophrenics were considered open as compared to two-thirds of the families of controls (Nameche and Ricks 1966).

Followup of the preschizophrenics' families (Nameche and Ricks 1966) revealed that 50 percent of parents had shown an increase in manifest psychopathology over a 30-year period extending from the first clinic contact to the followup study. Whereas at the time of the initial clinic contact 25 percent of the parents were rated as extremely disturbed, 65 percent as moderately so, and 10 percent as normal, on follow-up 51 percent of the parents showed extreme pathology, 43 percent were rated as showing moderately severe pathology, and only 6 percent were deemed normal. This suggests a possible deteriorative process over time in the schizophrenics' parents as well as in the patients themselves. To some unknown extent too, however, it may represent a biasing effect by interviewers aware of the status of the index cases.

Development histories: The Judge Baker researchers also sought information related to each child's developmental history (Nameche and Ricks 1966). Normal births were found to have occurred in less than 40 percent of the preschizophrenic cases. During childhood, the preschizophrenics had shown both slower motor development and poorer coordination than the controls, although no significant physical differences were observed during their stay in the clinic. As compared with controls, more preschizophrenics had a delayed development of speech or speech anomalies; this was particularly true of two language attributes: unclear speech and a "driven overproduction of talk." In addition, the preschizophrenics were regarded as more pre-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

occupied, anxious, defensive, and unable to communicate in early childhood than controls.

Examination of the preschizophrenics' case histories revealed so much evidence of pervasive social isolation that the investigators deemed it "the fundamental dimension" that is most integral in the developmental histories of schizophrenics. During childhood and at the time of clinic contact, the chronic schizophrenics had been the most socially and sexually isolated, while released schizophrenics and control cases were less isolated and were more similar to each other than they were to the chronic schizophrenic group. Seventy-five percent of the chronic group had had no heterosexual experience, while 58 percent of the controls had dated socially. Of the released schizophrenics, 40 percent had had homosexual contacts (at the time of their Judge Baker contact) and a total of 33 percent of all the preschizophrenics had had overt or extreme homosexual fears. Basically these results of sexual and social adjustment are congruent with research conducted with process vs. reactive schizophrenics in which the Phillips Scale has been used to measure premorbid adaptation (Garmezy 1968).

A substantial proportion of the preschizophrenics had been referred to the clinic specifically for acting-out behavior of the type shown by delinquents. However, only the preschizophrenics who were eventually released from the hospital tended to act out in the community; the preschizophrenics who became chronic had limited their acting-out behavior to their home and family. In total, only 25 percent of the chronic schizophrenics, as compared with 65 percent of the released schizophrenics and 50 percent of the control group, had acted-out in the community. As children, released schizophrenics had been more active, rebellious, and defiant. Stealing, running away, truancy, and promiscuity occurred with much greater frequency in the released and control samples than in the chronic group. Thus acting-out behavior that involves an adolescent with his peers (as in the case of the released schizophrenic) may be less malignant and destructive than that which occurs in isolation. [18]

[18] Acting-out within the family vs. within the community at large suggests the importance of examining the *locus of action* of behavior.

In summary, the Judge Baker research found 14 variables that reflect the major differences between chronic and released schizophrenics. These findings are summarized in table 5.

Provided with these data, Ricks and Berry (1970) have suggested a life history model for schizophrenia:

> Taking into account the research just reported, we can begin to sketch out some routes into a schizophrenic life history. The child headed toward schizophrenia, particularly . . . chronic disorder, is one whose biological and social equipment offers small margin for error in development. Lacking some of the components of integrated, competent adjustment, or having these elements seriously underdeveloped, the child is vulnerable to disorder. He often, perhaps usually, knows that he is vulnerable, and he makes various efforts to defend himself. If these succeed he may move into a low stimulation pattern of living . . . stabilize at some intermediate stage of breakdown, or recover. If they fail, and fail progressively over a long period of time (the typical adolescent we have studied came to treatment at 14, and was not hospitalized and diagnosed schizophrenic until he was about 21), then the ultimate outcome may be schizophrenia. [p. 45]

The authors characterize the stages of retreat into psychosis as *protest, despair,* and finally *apathy.* They conclude that:

> Whether the process moves on from protest or despair to apathy does not seem to depend so much on intolerable feelings as it does on neurological integration and the set of social and vocational capacities that White (1959) sums up in the concept of competence. If one can be active, effective, and successful protest can work. If one can extrapolate from past solutions to future solutions, so that hope is not lost, then despair need not develop even after extreme losses or disappointments. On the other hand, if one has a long history of failure, then even a minor disappointment can have a subjective meaning of disaster. . . . Our results are consistent . . . in indicating that the determinants of regression or recovery, staying in the hospital or getting out, are not such ephemeral things as feelings, but the clear, hard data of IQ, social and vocational success, and a reasonably receptive environment. When we ask, in turn, what determines competence,

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Table 5. Characteristics of patients (at time of Judge Baker Child Guidance Clinic contact) who in adulthood were diagnosed schizophrenic and were rated as chronic or released.[1]

Chronic schizophrenics	Released schizophrenics
Psychotic, schizoid, or borderline pathology in mothering person	Mothers' pathology not so severe as to be designated psychotic, schizoid, or borderline
Familial history of schizophrenia	No familial history of schizophrenia
No separation from the pathological family during childhood	Several separations from disturbed family during childhood
Premorbid schizoid personality	Premorbid personality not schizoid
Pre-illness history of poor social adjustment (no peer relations)	Some peer relations during childhood
No heterosexual experience	History of homosexual experience or extreme homosexual fears during childhood
Treatment during childhood at guidance center less than 3 months	Long-term therapy during childhood at the guidance center
No history of acting out in the community	History of acting out in the community
Long-term onset of symptoms (over 6 months)	Short-term onset of symptoms (less than 6 months)
No clear precipitating events necessitating hospitalization	Clear precipitating events necessitating hospitalization
Not disoriented or confused on admission	Disoriented and confused on admission
No symptoms of depressive psychosis	Symptoms of depressive psychosis
Not concerned with dying during acute phase of illness	Concerned about dying during acute phase of illness
Unmarried status as an adult	May have been married in adulthood

[1] Adapted from Nameche and Ricks (1966).

then the characteristics of the parents, the home environment, and the presence or absence of biological handicap all are relevant. [Ricks and Berry 1970, p. 47]

Followup Research and the Prediction of Psychopathology

The effectiveness of a followup strategy for revealing the antecedents of future psychopathology remains in question. Robins and O'Neal (1969), outstanding advocates of the methodology, have presented a view that warrants quotation:

> Can follow-up studies of children tell us what causes adult psychiatric illness?
>
> To argue that certain events contribute to the occurrence of illness, i.e. are "causes," you have to be able to show that when these events occur among well persons, more of them are thereafter found to be sick than when the events do not occur. This is not proof, of course, but it is the best one can do in *the absence of an experimental demonstration*

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

[italics ours]. Some workers, recognizing that retrospective studies have trouble in establishing temporal connections between events and the onset of illness, have thought that follow-up studies would solve these problems. It is our opinion that while follow-up studies, like cross-sectional studies, suggest *hypotheses* about causes when certain events and illnesses are found to occur in the lives of the same persons, they can rarely offer direct evidence that these events *preceded* the illness. Let us suppose that a follow-up study is done with child patients and child control subjects. The patients *are* patients because they already have symptoms. We are obviously, then, not in a position to witness the onset of their illnesses. Indeed, except for being closer to the starting point, and therefore better able to get accurate information, we are in no better position to know whether certain events preceded the symptoms or followed them than we would have if we had first seen the patient as an adult and obtained a history from him. In either case we would be getting a *retrospective* history. But what about the control subjects? Since they are *well* as children, will we be able to explain the illness of those who are found to be ill at follow-up? There are two sets of events that might explain their illness: events occurring before the beginning of the study, and events occurring in the interval between intake and follow-up. For events occurring in this interval, we have the same problem as with the patients. When we find control subjects who are sick at follow-up and who have suffered possibly causal events in the interval since intake, we cannot be sure that the events preceded the onset of symptoms. For both patients and such control subjects, we can only develop causal hypotheses based on the observation that more subjects, who experienced such events became sick than those who did not. But even in building hypotheses, we will need to be cautious about assuming the order of occurrence, since personality changes associated with psychiatric illness commonly create personal difficulties such as job loss, disruption of relationships, and geographical moves. Follow-up studies have a real advantage over cross-sectional studies, however, in relating events present at intake to the outcome of control subjects. If the control subjects, well at intake, who have had family patterns, class status, or presumably traumatic experiences similar to those of patients are found at outcome to be psychiatrically ill, we do have *both* a correlation between environment and psychiatric illness and the certainty that the events presumed noxious *predated* the illness. This is much better evidence for a causal connection than is mere correlation. We will still be a long way from proving cause or knowing the mechanisms through which these events cause illness.

Followup studies of children then are particularly suitable for developing and testing causal hypotheses that relate events occurring early in life to illnesses that are most likely to develop between intake and follow-up, that is, illnesses that begin *neither* in early childhood nor late in life. [pp. 786—787]

Type IV Follow-Through Research: Longitudinal Prospective Studies of Children of Mentally Ill Parents

In "follow-through" research, a variant of the followup strategy, the investigator collects his data on index (and control) cases in childhood and then follows these subjects over a period of time until he is ready to measure those outcomes in which he is interested. During this period any number of intermediate outcome measures may be derived, a procedure not typical of the follow-up method.

Prospective studies may be of short- or long-term duration. The risk investigator whose primary interest is the study of schizophrenic outcomes in adulthood requires a long-range study. Another researcher who selects an intermediate outcome, such as the index child's qualities of competence in childhood, adolescence, or even early adulthood will assay a relatively short-term longitudinal investigation.

Advantages and Disadvantages of the Longitudinal Method

One of the most compelling attractions of a longitudinal research strategy (as opposed to earlier discussed retrospective methods) is that it allows the investigator to select research instruments he believes specifically applicable to his projected study; thus he is not dependent on procedures used by other data gatherers for other purposes. Couched within this virtue, however, is a refractory vice. There remains the ever-present problem of selecting measures that will still appear adequate at the conclusion of the study sev-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

eral decades later. Escalona and Leitch's (1952) comments on this issue are very much to the point:

> In the absence of specific questions to be asked of the data, all kinds of information that could be obtained about the subjects of the study have at times been unselectively accumulated. When the data were subsequently analyzed and reported, much of the available information held but was of little interest to the investigator, to wit, the files upon files of developmental data still gathering dust in many places. More frustrating yet, it has been a common experience that after a number of years investigators found that they lacked the very facts which they would currently find of greatest interest but which played no significant part in their thinking when the longitudinal study was begun. [p. 25]

Stated more specifically, the data collected on children in this beginning phase of risk research may prove to be completely inadequate for testing hypotheses that are likely to be derived in what, hopefully, will be a more sophisticated research climate decades hence.

On the other hand, the longitudinal study is unique in the effectiveness with which it delineates the phenomenon of growth and the relationships that exist between an individual's early characteristics and later patterns of development (Thomas et al. 1963). Related to this significant element is the utility of the method for studying age-stage characteristics of individuals with specific attention to continuities and discontinuities in behavior. Changes in individuals over time can only be determined by a longitudinal review. Guesses about such trends can be ascertained through cross-sectional studies, but these remain inferential until substantiated by a longitudinal replication.

The problem of *behavioral stability* is a particularly significant one in risk research—one best exemplified by a set of pressing questions in mounting longitudinal-prospective studies of vulnerable children. What can be said of the stability of behaviors over time? At what ages do behavioral indices of a particular type or style achieve stability, thus becoming predictive of later behavior? To what extent is such stability or change reflected in developmental norms that can provide the basal data from which deviance is to be measured for a given behavioral or biological parameter? Are data available to provide an understanding of the nature of transformations that may occur at different stages of development and yet engage related processes, despite the appearance of different phenotypic behaviors?

The issue of *salience* in case gathering deserves comment. Whereas retrospective investigations operate from the vantage point that all cases selected for study are salient, the longitudinal investigator too frequently finds his energies invested in cases in which the phenomenon under study either will not be manifested or will be only minimally revealed. To select for risk on the basis of manifest schizophrenia in the histories of mothers or fathers will uncover (in time) some 10 percent of offspring who will be disadvantaged by that disorder—allowing a huge proportion of instances to escape our limited predictive net. Only if the developmental process of schizophrenia were fully understood could we increase substantially the salience of our case selection procedure. But, once such data are available, the central reason for doing risk research disappears.

> For a prospective study to achieve even marginal degrees of salience, either a large sample must be followed in order to guarantee the emergence of appropriate cases merely on a chance basis, or some degree of prediction must be achieved with a smaller sample. The low incidence of many personality patterns makes predictions especially difficult. Investigators wishing to study the development of schizophrenia must cope with the fact that adult cases look numerous when one is working in an overburdened treatment center but are a very small part of the basic community population. . . . Failure to select cases initially which will maximize case density in later years may leave an investigator with a group of subjects either not containing pure and striking examples of the phenomena he is interested in or containing them in such negligible numbers that he has inconclusive data on critical variables. A small number of cases may be extremely valuable in an intensive clinical study in a treatment center. They are much less useful in the less probing and more superficial data collection situation adjusted to the limited motivations of individuals participating in a prospective study. [Bell 1959–1960, p. 137]

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

The problem of *sample size* is particularly acute when the base rate for the behavior under study is very low. Even heightening the likelihood of psychopathology by selecting children with a maximum genetic predisposition will still result in a comparatively low incidence of cases available for study. In the case of offspring born to dual-mated schizophrenic parents, the morbidity risk for "certain schizophrenia" ranges upward toward the relatively high base rates of 35 to 45 percent (Rosenthal 1970), but such parental pairings are in relatively short supply. The problem of a low base rate is exacerbated by another aspect of the life style of families predisposed to schizophrenia. The presence of schizophrenia in parents will typically be accompanied by patterns of family disorganization and instability that will include marked, if lateral, mobility within and among communities and neighborhoods, and the frequent dissolution of the family, with the children often placed beyond the environs in which the study is being conducted. Thus, a heavy attrition of study subjects over prolonged (or even brief) periods of time can be expected; and, needless to say, long periods of time often elapse before the child of schizophrenic parents himself develops schizophrenia.

The use of Scandinavia as a site for risk research stems from the geographical stability of their samples, the availability of data on mobility patterns, and the presence of folke and psychiatric registers which can help investigators to locate proband groups in homes and hospitals throughout the nation. But such technical aids typically are not available in the United States; furthermore, the mobility patterns of our people and the changing nature of the social structure of our society pose an effective challenge to the successful completion of any long-range longitudinal project.

An additional difficulty is presented by the inflexibility of the prospective-longitudinal strategy once a research program is underway. Although the investigator initially has freedom in selecting a sample and variables for study, once data collection has begun procedural alterations often require the sacrifice of data collected prior to such changes. It is this relative degree of inflexibility which, in turn, reduces the rapid generation of new hypotheses in longitudinal studies.

Integrating Cross-Sectional and Longitudinal Designs: The Convergence Procedure

Some of these problems have raised anew the need to modify traditional longitudinal research design when studying children at risk for schizophrenia. Bell's (1953) advocacy of "short-term prospective studies" via a "convergence" strategy employing cross-sectional samples obviates some of these problems. A description of the procedure, however, requires a brief discussion of the advantages of a cross-sectional versus a longitudinal strategy. Central to the discussion is a problem cited earlier—our lack of knowledge regarding the developmental properties of specific psychological attributes, including their long-range stability. Without such information, it is difficult to gage the pathological or nonpathological implications of the presence or absence of (or variations in) a behavioral component. Adequate developmental data on many behavioral variables are scanty at best, but cross-sectional studies, in contrast to longitudinal studies, can more rapidly suggest the nature of age-related changes in a behavioral parameter under investigation.

Describing some of the difficulties posed by longitudinal research on psychological characteristics, Thomas et al. (1963) have noted the following:

> 1) There is no general agreement as to the characteristics which have psychological importance at any stage of development;
> 2) Psychological functions in development change qualitatively in relation to time and the characteristics initially studied may no longer be present at a later age stage;
> 3) The relation between earlier and later attributes of psychological functioning, and thus the pertinence of the initial characteristic measured to later outcome is not immediately apparent; and
> 4) The selection of methods for the reliable and valid assessment of psychological characteristics and the measurement of the traits to be interrelated pose a considerable problem requiring the development of objective techniques. [p. 9]

By contrast, the cross-sectional method would appear to be more appropriate as an initial strategy for evaluating significant developmental trends in risk and control groups, although one must constantly be aware of the danger of in-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

ferring a developmental sequence from data gathered on different children at different ages. A compromise between the two methods is Bell's (1953) suggested *convergence* (i.e., *short-term* or *accelerated longitudinal*) *method* which combines the virtues of both strategies. Following this procedure, different age groups of children would be tested recurrently over short periods of time so that their data would bridge into the ages of the other groups of children.

A specific example of the application of this convergence method to risk studies is provided by a coordinated program of research that is now underway in the Department of Psychiatry of the University of Rochester (Wynne 1972). A short-term prospective study extending over 5 years will compare groups of risk (defined in terms of mother's psychiatric status) and control children at ages 4, 7, and 10 years. The variables under study comprise a variety of psychophysiological, behavioral, and assessment measures taken on parents and child; a complementary battery of family interaction procedures is also included. In the 4th year of the study those who initially were in the 4- and 7-year groups will be 7 and 10 years old, respectively. They can thus serve on retesting as cross-validating samples of the two older original subsets of target children. Thus, within the span of 4 years an estimate may be possible of the developmental characteristics of the variables under study for a period extending from ages 4 to 13.

In like manner it should be possible to use high risk samples that traverse the period from puberty to early adulthood when failures of adaptation begin to be more clearly evident in the preschizophrenic child. This significant short-term age span is reflected in the research programs of Goldstein et al. (1968) and Mednick and Schulsinger (1968).

What are the advantages of such a short-term prospective model? Several major virtues of a convergence strategy are immediately apparent (Wenar and Wenar 1963): 1) unlike one-time evaluation studies, change can be studied "on the basis of independent assessments of antecedent-consequent behavior;" 2) the research model is maximally suited to high frequency behaviors which undergo rapid change; and 3) it more clearly reveals the direction of the causal arrow in the study of social interactions and social responsiveness.

This last point (which was earlier alluded to in discussing Sameroff's espousal of a transactional model) points up the contrasting information provided by short-term prospective as opposed to cross-sectional studies. An example provided by the Wenars is particularly telling for investigators of gene-environment interactions in evaluating risk for schizophrenia:

> Some efficiency-minded researchers may suggest that it is possible to short-cut the prospective study by simultaneously evaluating closely matched groups at different age levels. Would it not be possible, for example, to determine direction of influence equally well while avoiding the time consuming features of the prospective model? The answer is No. We will illustrate why this is so by taking a hypothetical example which stacks the cards in favor of a short cut. Suppose we wanted to investigate the effects of mothering on early feeding behavior, and we carefully selected two matched groups of "warm" and "cold" mothers on each of three age levels. The first two groups of mothers would have 7-day-old infants, the second two groups would have one-year-old infants, and the third two groups would have two-year-old children. Now, suppose that we found that there was no correlation between mothering and feeding behavior in the first groups, a moderate positive correlation in the second, and a significant positive correlation in the third. Would this not be the equivalent of doing a three-year study in a matter of a few months, and would not the direction of influence obviously be from mother to child? Again the answer is No. In fact, it is equally possible that the infants were determining the goodness of the mothering behavior. Let us look at the initial groups with no correlation between mother and 7-day-old infants. This means each group of mothers will have some infants who are good feeders and some who are poor. Now, it may be that, as time goes by, the poor eaters begin to frustrate their warm mothers more and more, while the good eaters delight their cold mothers more and more. By the second year, the "constitutionally" bad eaters have thoroughly soured their once tender, loving mothers, while the "constitutionally" good eaters have warmed, then melted the hearts of their once cold mothers. The data themselves are mute in

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

revealing direction of influence. The approach assumes that, once a cold mother, always a cold mother; in reality, despite careful matching, there is no way of telling whether the groups are really equivalent in the sense of behaving consistently over time or whether they are dissimilar in that some mothers have been consistent while others significantly changed their attitudes and behavior. In other words, there is no way of telling whether the population of mothers from which the samples are drawn is the same at each of three time samplings. The most one can do is interpret direction of influence in the most reasonable manner. This may be time-saving, but it runs the risk of confusing what is reasonable with what is merely popular. [p. 702]

Substitute for the more specific behavior of eating the more generalized indicant of responsiveness, and one may begin to approach the heartland of the study of risk. But the very fact that dramatic shifts do occur in the interactive behaviors of persons suggests the importance of using multiple-time samplings to establish the reliability of those antecedent-consequent relationships that may be reflected in a prospective investigation.

Some Representative Type IV Studies: The Child at Risk During the Period of Childhood and Beyond

Prospective studies of children at risk for schizophrenia most frequently take as their starting point the offspring of parents who have been victims of the disorder. It is not surprising that children born into such families be given primacy in the selection for vulnerability, for they are inevitably involved in family stresses at a time when they are unable to defend against or perhaps even to comprehend the family events to which they bear witness (Doniger 1962). Furthermore, they may be singled out as scapegoats, or may become insidiously involved in the symptomatology of their parents (Anthony 1968); they are frequently subject to separation from parents, with the severe deprivations which occur upon the loss of a parent to rehospitalization or the breakup of the family; and they suffer the presence of inexplicable behaviors in parents which may reflect a psychotic episode or malignant personality process.

The shifting patterns of health delivery services in which mental hospitals are being closed down and mentally ill parents returned to the community may also accentuate the problems of child care if aftercare services prove inadequate (Goldstein and Rodnick 1972). In this context, Eisenberg (1962) has asked:

> *If* patients previously hospitalized are now kept afloat in the community although psychologically impaired, may there not be potential for damage to children reared by disturbed parents? [p. 816]

To illustrate the varied effects provided by differing degrees of parental impairment, a brief evaluation of the status of children of neurotic parents, followed by a more lengthy review of studies of children of psychotic and schizophrenic parents will be presented. Our major focus will be on: 1) degree of preservation of caretaking capacity in the disturbed mother; 2) ability of the father (or another surrogate figure) to facilitate the mother's efforts to regain her health and resume her family role, or to substitute for the mother in the event of her complete incapacity, decompensation, and/or hospitalization; 3) effect of inpatient versus outpatient status (hospitalization versus nonhospitalization) of the psychiatrically ill parent; and 4) child's effectiveness in using his own cognitive resources to cope (i.e., his awareness or lack of awareness of the parent's behavior as an illness rather than as a totally aberrant and incomprehensible sequence of actions).

Children of Neurotic Parents

Although there are no readily available data on large samples of adults with definable neuroses in terms of their manifest adequacy as parents, it has been stated that "as a matter of basic principle neurosis is inevitably a family neurosis" (Ehrenwald 1963, p. 71). Such a view suggests that neurosis has a transmittable quality, that neurotic family members are capable of eliciting behavior pathology in other family members. This view has been supported by Alanen et al. (1966) who, in a review of the literature of the adjustment of the family members of neurotics, concluded that first degree relatives (i.e., parents, siblings, and children) manifested a higher rate of neurosis than that found among the general population (Brown 1942).

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

As early as 1925, clinical observation of 18 cases of associated psychiatric disorders in natural fathers and their children, both male and female, and three cases of associated disorders in stepparents and children, forced Janet (as reviewed by Rutter 1966) to conclude that such an association was due less to a genetic link than to the "social fatigue" induced through living with neurotic parents.

More recent epidemiological surveys on the adjustment of children of neurotic parents have substantiated findings of increased neurosis in these children. In a general health survey, Hare and Shaw (1965), working with a very adequate sample of 499 families, found an association between poor health in one parent and poor health in the children. (This finding has also been confirmed by Srole et al. (1962) in their study of the prevalence of emotional disorder in Midtown Manhattan.) Moreover, Hare and Shaw found a strong association between the frequency with which children were seen by doctors and manifest neurosis in a parent. In contrast to what may have been anticipated, children's behavior disorders were significantly more common when the *father* (not the mother) had a neurotic disorder. Downes and Simon (1953) have also provided evidence that the presence of either major chronic disease or psychoneurosis in one member of a family tends to be associated with an above-average incidence of disease in other family members.

But perhaps the strongest evidence to support the presence of neurosis in children of neurotics has been presented by Buck and Laughton (1959), who used a 5 percent random sample of subscribers to a medical care plan in Canada. Checking over a 5-year period, the investigators found 65 families with 136 children in which there was a positive psychiatric history for the parents—i.e., during this period one or both parents had evidenced a mental psychoneurotic, or personality disorder. In cases where both parents had a positive case history (seven families with 17 children) or where only the mother had such a positive record (12 families with 20 children), children showed a larger number of behavioral and psychosomatic disturbances than when neither parent was neurotic. The authors examined two possible artifacts which could have accounted for such differences: 1) The physician, aware of psychiatric illness in the parents, may have been more apt to diagnose neurotic behavior and psychosomatic disorder in the children even in the absence of an actual illness. This was not thought likely to account for the differences, since the higher incidence of behavioral and psychosomatic disorders in children of neurotic parents was even more marked when the parents and their children had been seen by different physicians. 2) The presence of a psychoneurotic mother may have increased the frequency with which the children were taken to the doctor for various forms of illness. Children's minor illnesses, in cases where seeking medical attention depended largely on the mother, were used to measure maternal use of available medical services; even with this factor considered, the children of neurotic mothers still showed an excess of behavioral and psychosomatic symptoms. Thus the authors concluded that there was a relationship between minor psychiatric disorders in mothers and their children. But, in contrast to the findings of Hare and Shaw (1965), no comparable relationship was found to exist in the case of the psychoneurotic father. Given the inconsistencies, the observed excess of nonpsychiatric illness in children of neurotic mothers must be regarded as an equivocal relationship, but one worthy of efforts to replicate.

Children of Psychiatrically Ill Parents

While the studies cited thus far have taken as their starting point the ill parent and then focused primarily on the adjustive behavior of children, Rutter (1966) retrospectively investigated the parents of 739 children placed under psychiatric care for a neurotic or behavioral disturbance in Maudsley Hospital in the years 1955 or 1959. He found that, in comparison with two normal control groups of children seen on pediatric and dental services, the hospitalized children had three times the number of psychiatrically ill parents. Of this group, 137 (designated the *psychiatric group* children) had been reared by a parent who bore some psychiatric diagnosis; these children were then compared with the remaining 592 hospitalized children (designated the *other group*), all of whom had parents who were well. Seventy-one of the 137 parents of children in Rutter's "psychiatric group" had had a psychiatric hospitalization; their diagnoses included schizo-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

phrenia ($n = 11$), depression ($n = 43$), neurosis ($n = 42$), personality disorder ($n = 39$), suicide act only ($n = 12$), miscellaneous ($n = 9$), and unknown ($n = 15$).

A significantly higher proportion of the mothers, rather than the fathers, of children in the "psychiatric group" were ill, a finding in accord with that of Buck and Laughton (1959). Significantly, Nameche and Ricks (1966) using the Judge Baker case data also found the most pathological group of adult schizophrenics—the chronic group—to have had the highest percentage of psychotic, schizoid, or borderline schizophrenic mothers. Rutter has suggested that the greater contact, dependency, and opportunity for deviant interpersonal communication can explain the higher proportion of sick children who had a disturbed mother as opposed to an ill father. Rutter also found that the psychiatric illness of a mother increased the likelihood of illness in a daughter. Whereas children with two ill parents or with only an ill father showed the same high proportion of disturbance in male children as compared to female children (2:1), children of both sexes were equally apt to become disturbed when only the mother was ill.

Similarly, Gardner (1967) using the Judge Baker case data found that schizophrenia in females was related to serious psychopathology in the mother whereas the relationship was less strong for males. Rosenthal (1962) has suggested that the higher sex concordance ratios found in the nuclear families of schizophrenic females result, in part, from psychological influences in the family. Rutter also found that, in 20 percent of cases, both parents of children in his "psychiatric group" had had a psychiatric diagnosis. Thus, Rutter concluded that an environment containing two ill parents frequently results in personality disturbances in a child, although such consequences can be explained by a genetic, an environmental, or an interactional hypothesis. Finally, investigation revealed a temporal relationship between the onset of the parental illness and the child's illness, a finding that suggests an environmental interpretation of the potentiating factors in a child's disturbances.

Most significantly, a strong relationship did not obtain between the diagnosis or the severity of the parents' illness and the likelihood of disorder in the child. Similarly Beisser, Glasser, and Grant (1967) found that the adjustment of children of schizophrenic mothers was not ostensibly different from the adjustment of children of psychoneurotic mothers. Rutter also found no relationship between the parents' and the children's types of disorder; a variety of children's diagnoses were associated with each type of parental illness. The most important factor determining the child's adjustment was his degree of involvement with the symptoms of the parent's illness. These findings would suggest that any genetic hypothesis of the etiology of a child's disturbance, at least for the disorders dealt with in these studies, would require a highly complex interaction with environmental and social learning factors.

Comparison of Rutter's 137 children who had been reared by a parent bearing a psychiatric diagnosis (the "psychiatric group children") and the remaining 592 children all of whom had well parents (the "other group" children) revealed that, among the former group, several children within a family were often affected. But, when parents were well ("other group"), usually only one child in the family showed any disorder. As has been reported in retrospective investigations of adult schizophrenics, Rutter found that children in the "psychiatric group" more frequently were the products of broken homes and had more often been separated from one or both parents. Finally, when the children had been discharged from the hospital, those youngsters with ill parents were most often placed in a residential school or elsewhere rather than in the care of their parents—a decision that was usually forced by evidence of the child's regression while at home and his improvement when away from the family.

Children in the "psychiatric group" were more typically diagnosed with a mixed behavior disorder in which both neurotic and antisocial symptoms were evident. This last point is of interest in light of the fact that the precursor signs in childhood for later schizophrenia are more often antisocial and withdrawn traits than signs of pure "extraversion" or "introversion" (Michael, Morris, and Soroker 1957). Similarly, broken homes were also found to be related to a childhood diagnosis of a mixed or conduct disorder type. Although there was no strong association between a diagnosis of childhood delinquency and parental mental illness, children of disturbed

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

parents did reveal significantly more frequent behaviors reflecting disobedience, aggressiveness, temper tantrums, hyperactivity, and disorders of sleeping than did children of well parents. This finding too is consistent with the heightened probability of adult maladjustment in children with such symptoms (Robins 1966). Furthermore, not only had fewer of the "psychiatric group" children profited from treatment at the Maudsley Hospital, but followup revealed that in comparison to children in the "other group" fewer had recovered or could be rated as much improved.

Children of Depressed Mothers

In a series of recent clinical investigations the social and maternal role performance of 40 acutely depressed and 40 normal control women has been studied by a team of Yale investigators (Deykin et al. 1966, Paykel et al. 1971, Weissman, 1972, Weissman, Paykel, and Klerman 1972, and Weissman et al. 1972). The samples were primarily middle aged (mean age of 42), Caucasian, Catholic women of Italian-American descent who were married and who were predominantly drawn from the lower social classes. Most were in out-patient treatment, and their functioning was rated as "moderately impaired." Specific maternal impairments in these patients took the form of a lessened emotional involvement and resentment toward their children, accompanied by heightened guilt. Their difficulties in communicating appropriate affect disrupted the emotional climate of the family. Frictions which were expressed had their locus in spouse and children and were less evident in exchanges with friends, relatives, neighbors, and work associates. This impairment in mother-child relationships, suggests the investigative team, may remain after the mother's depression has cleared, thus having a continued impact on the children. This effect may be expressed in a variety of deviant behaviors including rivalries with peers and siblings for attention, states of isolation and depression, vulnerability to new separations, hyperactivity, school learning difficulties, rebelliousness, withdrawal, and guilt. Observations such as these may be particularly important in the search for the antecedents to schizophrenia, since there appears to be an increasing frequency of usage of nonpsychotic depressed women and their offspring as the psychopathological control group for studies of children born to schizophrenic mothers (e.g., Wynne 1972, Rolf 1972, Marcus 1972, and Sameroff and Zax 1972b). Unfortunately, the reports of the Yale group suggest that they have focused on the mothers without direct intensive contact with the offspring, and so their statements of the impairment of the children of acutely depressed women appear to be more heavily laden with inference than observation. Were such statements of impairment to be supported by clinical and experimental studies of such children, the selection of depressive mothers as controls would have to be counterbalanced by the introduction of children of normal control mothers as well.

Children of Psychotic Parents

What of the consequences for children of the more severe forms of mental disorder in parents? To investigate this question Cowie (1961a and b) studied 330 offspring of 152 hospitalized psychotics. These ill parents had various diagnoses including: schizophrenia (12 males, 33 females), manic depression (26 males, 41 females), involutional melancholia (four males, 16 females), and severe obsessive-compulsive reaction (six males, 14 females). The offspring had a mean age of 19.7 years but a discouragingly large range of 3 to 55 years. The psychotic parents were matched by age and sex with a group of patients (involving a total of 342 offspring) who had been treated in one of four hospitals for a physical illness. To determine the psychiatric history of the offspring, Cowie held interviews with one or both parents and supplemented this anamnestic data with information derived from other public resources. She also administered the Bowlby Teachers Report Form (completed by both parents and teacher when the child was of school age) and the Maudsley Personality Inventory (which was given only to offspring who had left school).

Significantly, although there was no psychosis evident in the control offspring, five of the offspring of the psychotics were themselves diagnosed as psychotic. Among the 96 offspring of the 45 schizophrenic parents (12 fathers and 33 mothers), only one female offspring had developed a psychosis and this of an affective type. However, the majority of the children of the schizophrenic patients were 15 years of age or below

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Table 6. Significant differences found between psychiatrically ill parents with disturbed children (hospitalized for neurotic or behavioral disorders) and those with well children.[1]

Psychiatrically ill parents with disturbed children (n=48)	Psychiatrically ill parents with well children (n=169)
Most often the mother	Most often the father
High anxiety	Anxiety was not high
Somatic symptoms	No somatic symptoms
Diagnosis of personality disturbance	Did not have diagnosis of personality disturbance
Symptoms directly involved child	Symptoms did not involve child
Overtly hostile to child; i.e., open attacks	Not overtly hostile to child
Had sick spouse (30%)	Did not have sick spouse
Long-lasting illness	Illness not long lasting

[1] Adapted from Rutter (1966).

and thus had not yet begun to traverse the period of greatest risk for schizophrenia. Thus, it would be premature to draw any conclusions with respect to the ultimate incidence of schizophrenia among this sample of children of schizophrenic parents.

There was no overall increase in neurotic disorders among the children of psychotic parents as measured by the Maudsley Personality Inventory or the Bowlby Teachers Report Form. On a rating scale of neurotic *symptoms*, the children of psychotics were more subject to persistent or severe symptoms. However, they were the equal of the control children in the number of cases of isolated instances of neurotic behavior; i.e., 72.4 percent of the children of schizophrenics evidenced no neurosis as compared with 75.1 percent of the children of the control group. Ratings by both parents and teachers on the Bowlby Teachers Report Form showed that the mean maladjustment score was slightly higher for children of psychotics than for children of controls. Interestingly, neurotic disturbances were more frequent among the offspring of 20 obsessional parents (although the numbers were too small for the differences to be significant). It would appear that parental psychosis is not necessarily accompanied by a heightened incidence of children's neurotic disorders.

Among those offspring of psychotics who had developed a neurosis, maternal illness exercised a greater effect on a child's adjustment than did paternal illness. When neurotic symptoms developed among the children of schizophrenic parents, they were more often associated with adverse circumstances in the environment than was the case of offspring of parents with other forms of disorder. In support of the findings of Bleuler (1941) and Mayer-Gross, Slater, and Roth (1960) (as reviewed by Cowie 1961b) that schizoid personalities were more frequently to be found in close relatives of schizophrenics, disturbed offspring of schizophrenic probands had features commonly assoicated with the schizoid temperament such as irritability, overexcitability, sensitivity, isolative behavior, and excessive daydreaming accompanied by a tendency to retreat into a world of fantasy. In accord with Rutter's findings, Cowie found a temporal correlation between the onset of the parental psychosis and the appearance of disturbance in the offspring: the neurosis that developed in the children occurred significantly more frequently in the 2-year period after the onset of the parental psychosis.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

However, in contrast to Rutter who found that disturbed children with psychiatrically ill parents frequently were younger than were disturbed children of control parents, Cowie found no support for the view that the onset of a parental psychosis provided a greater likelihood of disorder in children under 15 years of age than in older children. However, children of parents who had developed an affective psychosis early in life were more disturbed than those whose parents had become ill with such a disorder late in life.

That children of psychotics generally do not reveal an increased incidence of neurosis is also supported by a study by Post (1962) of 88 children born to 40 married working class patients who had been hospitalized at Bethlem Maudsley Hospital with a range of disorders from neurosis to psychosis. On the basis of questions administered to one of the parents and thereafter rated independently by a psychiatrist, Post found that 32.8 percent of the children were definitely disturbed, whereas 20 percent of the children were free of problems. However, the offspring of patients termed psychotic were far less often psychopathologically affected (14.3 percent) than were the children of nonpsychotic patients, a conclusion partially supported by Cowie. However, in contrast to Cowie who advocated a genetic interpretation for her findings, Post concluded that consistent interaction with a persistently ill parent rather than a hereditary factor seemed to be the most likely mechanism for the transmission of disorder.

The reasons for such findings (assuming their reliability) are not at all clear. Even in the case of a psychotic mother who may be unable to provide ordinary care for her children, numerous concomitant factors have been posited as affecting the quality of the child's adjustment. For example, it has been suggested that lower class families are better able to encapsulate an extremely disturbed person for longer periods of time, whereas the middle class family tends to call on outside help more rapidly when a major psychotic decompensation occurs (Sampson, Messinger, and Towne 1965). Not only can middle class parents better afford the services of practicing psychiatrists or psychologists, but, in addition, extensive education creates a climate in which parents may be more sensitive to the potential liabilities of rearing a child in a family with a manifestly psychotic parent. Thus a lower class child may have the misfortune of interacting with a psychiatrically ill parent for longer periods of time with all the anticipated debilitating consequences of such a prolonged exchange. This is not to suggest that there are no potentially redeeming influences in such families (the work of Romano and Geertsma at Rochester now underway provides preliminary evidence of the strengths in some mothers who have had a schizophrenic episode and the quality of "rally" which occurs in some families under the stress of mental illness) but merely that a greater likelihood exists that parents who have become schizophrenic may be less able to provide adequately for their children.

Mothering capacity in the disturbed mother: Mentally ill mothers may not be able to care for their children in the mundane terms of providing regular meals, in setting bedtime schedules, or in helping children to maintain regular patterns of school attendance. Therefore at home such children may show nutritional deficiencies or digestive complaints, while in school, when not truant, they may misbehave and do unsatisfactory work (Treudley 1946). In fact, studies of psychotic women often find that one of the first signs of encroaching breakdown is a diminished ability to organize the household adequately.

That caretaking behavior may not be subject to adequate cognitive control and thus may be expressed destructively and directly in the case of mental illness is seen in a study by Ekdahl, Rice and Schmidt (1962) of the children of 56 families each with a parent hospitalized for mental illness. Children of mentally ill parents sometimes suffer directly as a result of parental illness:

> . . . in one family the father destroyed all the children's toys, in another, the children did not want to stay in the same house with their father; in two families, children were abused and threatened with a knife; in several families, the parent frightened and confused the children by telling strange stories, in two families the daughters were sexually attacked; and in several others the mother physically neglected the children. [Rutter 1966, pp. 15–16]

Rutter (1966) also has suggested that overtly hostile psychotic mothers frequently produce disturbed children (see table 6). On the other hand,

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

if the mother is withdrawn, a child's emotional upset may not be so observable, but may be more insidious in its development and course. One study by Anthony, as reviewed by Rutter (1966), indicated that children of psychotic mothers may suffer if the mother is either predominantly hostile or withdrawn.

Behavioral effects can be induced by the mother's transmission of her own conflicts, fears, and psychotic distortions as in the case in which a sick parent insisted that her child sleep with her for protection against her own morbid fears (Treudley 1946). This pattern of interaction between parent and child has been observed by Rutter (1966) who found that when a parent's symptoms directly involved the child, the child had a significantly greater chance of developing a disturbance than if the parent's symptoms did not involve the child.

Anthony (1969) commenting on parapsychosis (an environmentally susceptible syndrome) in risk children has noted:

> The conditions favoring such developments include a symbiotic relationship between mother and child; a lower than average intelligence in the child, a close identification with the sick parent, a high degree of suggestibility, especially in relation to bodily feelings, an almost abject passivity and submissiveness, and a marked involvement in the psychotic manifestations of the parent. . . .
>
> In general the parapsychotic reactions mirror the parents' illness fairly closely, but unlike the prepsychotic reactions, they tend to disappear altogether when the child is permanently separated from the parent. The impact of a delusional system on a family of children can be roughly predicted from our measures of identification, involvement, suggestibility, and submissiveness. Conviction regarding the delusion may vary from child to child and in any particular child, depending on the presence or absence of the deluded parent and the presence or absence of other reality-oriented figures. [p. 68]

Doniger (1962) in a study of 87 women patients who had a total of 147 children of school age also noted the sharing by mother and child of primitive fantasies. Calling this shared inability to distinguish reality from fantasy "the fundamental danger" for children of schizophrenic mothers, Doniger observes that "the child is induced through his dependent relationship to accept (the mother's) phantasy world."

The Spouse of the Mentally Ill Parent

In the event of maternal psychosis, the child's level of adjustment will be vitally affected by the degree to which the father or another adult can support the mother's efforts to continue in her role in the family and in the household. Such support would, of course, be dependent upon several factors: the husband's continued presence in the home, his personal stability, and his attitudes toward mental illness and his spouse. Sussex, Gassman, and Raffel (1963) have suggested that a father's actual ability to substitute for the mother would predict a child's successful adjustment during the critical period of a maternal psychosis, a conclusion that has also been supported by Gerty (1955). The former investigated the adaptive qualities of 10 girls and six boys (ranging from 6 to 10 years of age) born to 10 mothers who were being treated for psychosis on an outpatient basis. The sample was racially mixed, containing 10 black and six white children. As determined by the WISC, the children's mean IQ was 92 (range: 78–124). On the basis of psychiatric and clinical ratings, the group as a whole showed a good adjustment, although the ratings also revealed the presence of traits such as slowness, inexpressivity, and inattention; 10 of the 16 children showed signs of passivity, while six revealed a potential for adjustment problems. However, according to teachers' ratings, 12 of the 16 offspring were seen as well adjusted; interestingly, the four children who were rated as showing impaired adaptations came from homes in which the mother failed to meet her children's emotional needs and in which moreover, there was no father to provide a more positive parental influence.

The importance of a spouse as a surrogate figure has also been illustrated by Beskow (1955) in a study of 86 psychotic parents (68 mothers and 18 fathers) with a total of 154 offspring. The Child Welfare Board of Stockholm having intervened on behalf of these children found psychic trauma in 50 to 55 percent of these cases. Of the 154 children involved, 59 children from 30 families had been taken from the home; significantly 28 of the 30 homes from

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

which the children had been removed had previously been broken by divorce. Hence the author concluded that without the support of another parent, children have more difficulty adjusting to the sick parent's mental illness. It is possible, of course, that the absence of a strong parent may have been important in the decision of the Board to place the child elsewhere.

The role of the family, particularly the father, in determining a child's adjustment to a psychotic mother has also been noted by Sunier and Meijers (1951) in a study of 34 children born to 15 male and female schizophrenic and paranoid patients. Their investigation revealed that, if the father was not initially negligent, feebleminded, or absent, the children did not become more maladjusted after a mother's psychosis. The importance of a father was also noted by Gerty (1955), who studied 18 adolescent children born to 16 hospitalized schizophrenic women. The adolescents' ability to adjust seemingly "depended upon the continuous presence of the father, his emotional tone towards his wife's illness, and his ability to extend his role as head of the family."

These findings are also supported by Lampron (1933) who found that although offspring varied in the degree of their schizophrenic heritage, those children who had been reared in poor home environments were more often deviant. She investigated 186 offspring (144 of whom were over 15 years of age) born to 20 male and 55 female schizophrenics and found that 30 percent of the children were maladjusted. Of these maladjusted children, 60 percent were concentrated in 19 homes which by independent ratings were known to have a markedly poor emotional tone. In addition, 70 percent of the siblings residing in these same 19 homes manifested a variety of forms of childhood psychopathology. In interpreting such results, it is apparent that genetic and environmental deviance are likely to be highly correlated factors.

The support that a husband may give his ill wife is dependent, in part, on his own stability and tolerance for disordered behavior. Studies which have been conducted to determine the mental health of the spouse of a psychiatrically ill person reveal a discouraging picture. Post and Wardle (1962) in a review of the literature found 1) more neurosis and psychopathology in the wives of neurotic soldiers, 2) that both partners of the marriage were more likely to have been admitted to a mental hospital, and 3) that both had a strong likelihood of sharing the type of disorder developed. Finally, Kreitman (as reviewed by Rutter 1966) found that the correlation of neurotic traits between patients and their wives increased as a function of the duration of marriage—perhaps suggesting that a spread of ill health from one partner to the other may be at work. Data such as these are correlational and any causative implications are, at best, merely suggestive. What is indicated, however, is that supportive help from a spouse may be forthcoming even less in the families of psychiatrically disturbed persons than in normal families. Significant in this context is Rutter's (1966) previously noted conclusion that, although psychosis in *one* parent may not be a potent cause of disturbance, a child's risk of developing a psychiatric disorder is substantially heightened when *both* rearing parents are psychotic.

The role of other family members: In considering the child's potential adjustment one must also consider the effects produced on the child by other members of the family, such as siblings or grandparents, who could provide potential sources of affection and security (Ludy 1939). Although relatives and friends (both adult and peer) may be able to help a child adjust, this aid would be dependent upon such factors as the quality of the relationship and the length and intensity of the association. For example, Mass (1957) has described the case of a child who seemed comfortable about her mother's mental illness—an attitude that was probably modeled after the similar pattern of acceptance of the child's grandmother-caretaker. In addition, the mother's history of several previous hospitalizations had familiarized the child with mental illness.

The Child's Own Resources

The adjustment of a child to a psychotic mother partially depends upon his previous experience with psychotic behavior, and upon his degree of awareness that the mother's behavior arises from illness rather than premeditation. Repeated exposures to aberrant acts may bring to a child a partial realization that the parent's

535-812 O - 74 - 5

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

behavior reflects an illness; it may also provide for an environmental instability that will accentuate vulnerability in the child, however rational his understanding of the disturbing behavior. But if the child can gain some perspective on the behavior as an illness, he may be better able to protect himself from both the psychotic mother's behavior per se and the conflicts engendered within the family by the mental illness. Yet the problem, posed by the child's emotional investment in his mother, attests to the great difficulty such a child would be expected to have in seeing the illness in a wholly objective light. Rutter (1966) has suggested that a child, more than an adult, is likely to believe that, if mother is upset, he must have been the cause of it; this may be one factor (guilt) that leads to disturbed reactions in children exposed to parental psychosis. In addition, Rutter has also stressed that children have a particularly difficult time assessing the significance of strange behaviors because abnormality often alternates with offsetting normal interactions.

Both awareness and experience are interdependent with a child's chronological age. Researchers (Brock 1962, Rutter 1966, and Treudley 1946) have investigated children in various age ranges (i.e., infancy, childhood, pre-puberty and adolescence) in an effort to determine the age at which a child may be most vulnerable to the influences of a parental psychosis. These age-related studies of children of psychotic parents have arrived at variable conclusions. Apparently a child may be vulnerable at any age to the debilitating effects of a parent's psychosis. Further complicating matters is the fact that investigators are prone to use several different definitions of "age-linked vulnerability." In the studies to be reviewed, "vulnerability" can refer to either 1) the age range in which exposure to a psychotic parent is most deleterious to a child, or 2) after exposure to a parental psychosis, the age range in which an offspring's psychopathology (if it is to develop) is most likely to become manifest.

The Age Range for Heightened Vulnerability in Children

Studies of the children of psychotic parents frequently reveal that younger children are more susceptible to the disturbing effects generated by a psychotic parent. From studies of institutionalized youngsters, Yarrow (as reviewed by Weiss, Grunebaum, and Schell 1964) suggests that there is a critical period of high vulnerability that occurs between 3 and 12 months of age. It appears that the type and duration of the mother-child separation, ordinarily necessitated by the mother's admission to a mental hospital, is most likely to have serious developmental implications in the period between the child's earliest differentiation of the mother as a specific object (3 to 4 months) and the time when he can use locomotion and language to effect some control over his environment (15 to 18 months). Significantly, joint hospitalizations of mothers and their infants have been found to be most useful precisely during that critical period in which a prolonged separation of mother and child would be most harmful.

Both Beskow (1955) and Brock (1962), however, have extended the period of concern beyond infancy. Beskow reports that, of 154 children in Scandinavia who were born to psychotic parents, the greatest need for outside assistance was found 1) among infants and children up to 3 years of age and 2) when the duration of the parental illness was 2 or 3 years in length. In accord with Beskow, Brock (1962) has concluded that children up to and including 3 years of age tended to be more vulnerable than children 4 years of age and above. In her study of families in Germany, Brock evaluated the offspring of 143 psychotic and neurotic mothers (51 of whom were schizophrenic). Of the 300 offspring involved, 86 were personally observed by the author and 214 others were studied through a record review of case information secured from outside agencies (i.e., data provided by welfare workers, psychologists, etc.). Investigation revealed that 50 children (17 percent) had an unfavorable development, 33 children exhibited minor problems, while the remaining 201 (67 percent) children were making a good adjustment. More telling was her conclusion that, if the mother's illness had begun before a child's 3rd birthday, there was a greater probability that the child would be designated as maladjusted than in cases in which the mother's illness began after the child's 4th birthday. Corroboratively, Mednick and Schulsinger (1968) have indicated that the mothers of their "sick group" of risk

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

offspring had been lost to the family earlier and were more severely schizophrenic when ill. Furthermore, there was a tendency within the "sick group" for children separated earlier to have had a greater likelihood of subsequent hospitalization.

Brock's conclusions are also supported by the findings of Rutter (1966). In his comparison of 729 hospitalized children (137 of whom had ill parents, and 592 of whom had well parents) Rutter found that, although "easily defined episodes which could be related one to the other were rare" (p. 101), the child's disorder usually followed soon after the parental illness; moreover, parents and children often improved or deteriorated together. In addition the 137 children with ill parents were significantly younger than the other hospitalized children. These findings are particularly meaningful in view of the findings of Morris, Escoll, and Wexler (1956) that preschizophrenics had a significantly earlier onset of behavior problems (i.e., before 5 years of age).

Age of Manifestation of Psychopathology

In Rutter's study two groups of children were compared, each of whom had been born to and reared by psychiatrically disturbed parents. The first group of 183 psychiatrically disturbed children (137 of whom had been hospitalized for a neurotic or behavior disorder at Maudsley) were compared with a second group of 185 well children. The author found that, although younger children were generally more vulnerable, it was the preadolescent boy who was most likely to *manifest* a disorder (especially if he had been alive when the parent had first attended a psychiatric clinic). But in contrast to Yarrow's and Brock's views, offspring most resistant to the stress of a psychiatrically ill parent were either the very young, adolescents, or those not born until after the parental illness.

In agreement with Rutter, Bender (1937) has concluded that early puberty is a particularly vulnerable age for the *onset* of behavior pathology. Bender retrospectively studied 60 children aged 6–14, each of whom had a parent who was either psychotic or had a criminal record, and found that behavior disorders were present in 51 percent of the children and their siblings. More relevant to this inquiry, two-thirds of the children were in early puberty when their behavior problems became manifest, although more than this proportion of the parents had been mentally ill and hospitalized before the children were 10 years of age. An important additional finding was that all 24 children with a schizophrenic mother or father had a lower than normal IQ than was typical of other children on the ward in which they were located.

Adolescents commonly suffer from anxiety, a sense of inferiority, and hypersensitivity; and, with the addition of a mentally ill parent, teenagers may have great difficulty in adjusting, especially if a parent's aberrant behavior infringes on peer relationships. Yet Rutter found adolescents to be among the more stress-resistant of the children. The confusing nature of the picture is pointed up by Treudley (1946), who found that teenage children of psychotic parents seldom took part in school activities; adolescent daughters resolved conflicts by withdrawing from the community whereas sons resolved conflicts by running away. Robins (1958), in a 30-year follow-up of adolescent male runaways seen in the St. Louis Municipal Child Guidance Clinic, found that only 14 percent of the runaways were free of psychiatric disease in adulthood.

In sum, children of psychotic parents appear to be vulnerable to the negative effects of psychosis at any age, but particularly in early childhood. As the child grows older, parent-child relationships increase in complexity and thus children of preadolescent and adolescent age may have more overt difficulty in living with a mentally ill parent.

Inpatient Versus Outpatient (Hospitalization) Status of the Psychiatrically Ill Parent

Many studies provide evidence that a psychosis in a parent represents a severe threat to the future mental health of the offspring, irrespective of whether the parent is hospitalized or living at home. Yet hospitalization of a parent and the effects of the separation must be investigated as a concomitant of the parent's mental illness. The effects of parental hospitalization for psychosis on children have been studied under three conditions: 1) studies in which the child was born in a mental institution, 2) studies in which the child was separated subsequently from the hospitalized parent, and 3) studies in which the

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

child was jointly hospitalized with the psychiatrically ill mother.

Infants Born in Mental Institutions

In a study of 15 babies (nine boys and six girls) born to psychotic mothers in a mental hospital Gardner (1948) found that all but two did well in the hospital and were in good physical condition, alert and responsive on leaving. The children's well-being was partially due to the establishment of emotional ties with hospital personnel. Thus, the birth in the hospital, in itself, was not the primary factor in the type of adjustment the children made later. Yet, in a followup study shortly thereafter, Gardner found that three infants had died a few months after leaving the hospital (two from symptoms associated with psychological deprivation). The babies who had less adequate mothering were less well adjusted, and of the 12 remaining babies, two were badly disturbed, although not overtly psychotic. Those children who had been placed in foster homes were better adjusted than those who had been sent home to their own families where there was often a great deal of conflict and stress. Thus, the effects of separation of mother and child (at least in the instance of a psychotic mother) may be overstated; the effects on the child may be more closely related to what happens when the mother is absent, and more specifically to the quality of care given by those who take over the maternal role (Rutter 1966).

Children Separated from the Hospitalized Parent

Studies of institutionalized youngsters have revealed the effects of mother-child separation (Bowlby 1951), although the complexity of factors which generate distress make evident the oversimplifications of earlier formulations (Rutter 1972). Hospitalization of a mentally ill parent is one of the frequent causes of placement of children in foster care. For example, Radinsky (1960-61) reported mental illness in 62 percent of the families of children in the care of a voluntary child placement agency; in most cases it was the mother who had been hospitalized. The absence of a parent, for whatever reason, is difficult for children. But this is particularly true in the case of mental illness, since the child must carry the added burden of his parent's socially stigmatized disorder (Gerty 1955). Without advance warning of a parent's impending hospitalization, children cannot comprehend the event, and are uncertain as to how they will be affected; this heavy burden of uncertainty is one of the major traumatic consequences of a parent's hospitalization. Mass (1957) studied the reaction of children to a parent's hospitalization for mental illness and found some children wished to be reunited with the mother, while others had extreme fear of being with her; between these two extremes, there were varying degrees of indifference.

The negative effects of hospitalization on the child have been substantiated by Ekdahl, Rice, and Schmidt (1962), who compared children of 56 families in which a parent had been hospitalized for mental illness with children of 28 families in which a parent had been hospitalized for tuberculosis. Not surprisingly, the children of parents admitted to mental hospitals had a higher frequency of neurotic behavioral traits and more frequently manifested school difficulties. Both groups of families were subject to disruption, especially in living arrangements, particularly following the mother's hospitalization. Children in 22 (41 percent) of the 54 families of mothers admitted for mental disorder were removed from their own homes, and in 50 percent of these cases they were also separated from their siblings; by contrast in only one of 30 families in which the father had been admitted to the hospital were the children placed in other homes. Family informants in both groups of families said (in about 55 percent of cases) that their children were definitely upset by the hospitalization.

Overall, the families of tuberculosis patients fared far better than the families of mental patients because: 1) prior to the parent's hospital admission, there was more time to make suitable arrangements for the children's care; 2) community attitudes toward tuberculosis tended to be more favorable and assistance was more readily available; 3) the approximate length of hospital stay for TB was more often known—a factor that made family planning easier; and 4) despite longer initial periods of hospital care, TB patients had fewer subsequent readmissions.

Rice and Krakow (1966) in a study of 99 parents hospitalized for mental illness, found that children were separated from the home in 75 percent of one-parent families but in only 25 percent

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

of two-parent families. Ekdahl, Rice and Schmidt (1962) also found that problems of child care were greater if the hospitalized patient were the sole parent. Younger children in Rice and Krakow's study were most often separated from their mothers, and typically were sent to the homes of relatives. Twenty percent of the children had had a change of caretakers two or three times within 1 year. The largest number of problems in relation to their homes, peer groups, and schools occurred at the point of the parent's admission and seemingly decreased by the 2nd month.

Joint Hospitalizations of Psychiatrically Ill Mothers and Infants

A number of hospitals since 1948 have jointly admitted psychiatrically ill mothers and their babies; studies of joint admissions have reported a positive relationship between this hospitalization procedure and the child's subsequent adjustment (Douglas 1956, Main 1958, Glaser 1962, Baker et al. 1961, Weiss, Grunebaum, and Schell 1964, and Grunebaum and Weiss 1963). Under such circumstances mothers will often initiate their own protective efforts regarding their babies. For example, Weiss, Grunebaum, and Schell (1964) reported that, when a jointly admitted psychotic mother had destructive feelings, she tended to avoid rather than harm the child. More frequently the mothers played with their children and in no instance did they reveal any physical threat to the child.

Glaser (1962) cites the case of a neurotic young child who improved, paralleling his mother's improvement, a phenomenon also noted by Rutter (1966). Baker et al. (1961) also reported that, with babies 8 weeks to 1 year of age, the schizophrenic mother's presence appeared to have a normalizing effect. Each schizophrenic mother differed in her reaction to her child, ranging from great anxiety to constant warmth. The schizophrenic mothers tried to prolong babyhood into the toddler stage, but the clinicians felt that the younger children responded well, and easily formed play relationships with others. In general, these schizophrenic mothers showed little difficulty in caring for their young children while on the ward.

A followup investigation (Baker et al. 1961) of 20 jointly admitted mothers and 20 nonjointly admitted mothers revealed that on return home all jointly-admitted mothers were able to maintain responsibility for their babies' care, whereas only 13 of 20 nonjointly admitted mothers were able to function as well. However, even the jointly-admitted schizophrenic mothers had more difficulty with their school-age children than with their infants.

It would be erroneous to attempt to generalize from these limited findings to the behavior of psychotic mothers living at home, since the different age samples in studies of joint hospitalization have been extremely small. Moreover, there were many positive qualities in the hospital setting—the structured atmosphere, the presence of doctors and nurses (and patients) providing extra physical and emotional care, plus the professional reassurance given the mothers, all of which would tend to enhance the well-being of the infant. Furthermore, the favorable results may reflect a very selective sample of mothers picked for the joint admissions program, since it is likely that the decision to include them was based on a clinical evaluation of their ability to benefit from such a regimen. It is also possible that such mothers may not be nearly so disturbed as schizophrenic women in general. Finally, conclusions about the mental health of the baby may be premature since no extended followup study has been conducted with these children. Thus, although joint hospitalization studies of mothers and their children have obtained positive results, the prolonged effects on the child have not yet been ascertained, although immediate effects appear to be minimal.

A summary evaluation of the Joint Admission Program conducted at the Massachusetts Mental Health Center by Grunebaum and Weiss (1967) is relevant:

> We have compared the development of children of psychotic mothers in the Joint Admission Program with that of children of psychotic mothers who did not participate in the joint admission program and children of normal and non-hospitalized mothers. The children were compared on DQ, intra-test scatter, ratings of language development, intrapersonal relations, affect, cognitive functioning, object manipulation, and attention. Briefly, the conclusions are as follows:
>
> 1. The intrapersonal relations of children of

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

psychotic mothers are impaired. However, it has not been determined whether this impairment is due to maternal psychoses *per se* and the altered and deviant maternal behavior associated with it, or to the separation and surrogate mothering attendant upon the maternal psychosis.

2. Children of psychotic mothers do not differ consistently from children of normal mothers in language development, cognitive functioning, object manipulation, attention regulation, DQ and intra-test scatter. Deficits in these areas are sensitive to the influence of therapeutic interactions such as joint admission (joint admission children generally doing better than children of normal mothers, and non-joint-admission children doing more poorly than children of normal mothers), as well as to factors associated with maternal intelligence and severity of psychopathology.

An important caveat to the above. The sample of mothers in the Joint Admission Study was small (N=35 patients and 35 matched controls), and they varied markedly in the quality of their prepsychotic adjustment, the nature and chronicity of their symptom picture, and their potential for a favorable prognosis. A substantial number of these mothers, however, were given diagnoses of schizophrenia, schizoaffective and psychotic depression (Weiss, Grunebaum, and Schell 1964).

Effects of the Return of Hospitalized Parents

The recent trend toward the accelerated discharge of many parents from mental hospitals prior to total recovery adds a new dimension to the already complicated problem of evaluating the adjustment of their children. In the past, when a parent developed schizophrenia and the child was placed under foster home care, it was unlikely that the family would be rapidly reunited, since the parent's hospitalization was often of long duration. Now, however, agencies are being confronted with an increasing number of parents who, following a brief hospitalization, request that their child be released from foster-home placement. In addition, new patterns of health delivery are closing down many hospitals previously devoted to long-term care of patients. Such changes, insofar as they reintroduce into the child's life a parent who remains seriously ill and is unable to fill the caretaking role, may impose an additional burden on the child at risk.

Recent observations by Goldstein and Rodnick (1972) support these assertions. Two years ago the total mental health delivery system in California underwent a marked shift. The treatment role of the State hospital was deemphasized and replaced by a stress on brief, crisis-oriented hospitalization in county mental health centers, followed presumably by extensive aftercare in the community. Working collaboratively with the staff of the Ventura County Mental Health Center, these investigators and their colleagues have studied the effects of phenothiazine medication on the adaptation of acute, first admission patients following their discharge from the treatment center which has an average stay for schizophrenic patients of 9.54 days. Observations made in the homes of poor premorbid schizophrenic women (who tend to be young mothers of very young children) indicate that, 6 months after discharge, the mothering skills of these women remain markedly deficient. They are apathetic, indifferent, and unresponsive to their infants' needs. On the other hand, good premorbid women (whose children tend to be older) begin to show a recovery of caretaking functions 6 months following their discharge from the hospital. In the case of the process schizophrenic mother, the heavy weighting of genetic and environmental defect in combination with sustained caretaking deficiencies accentuates the potential vulnerability of her young children. Comparisons of the maternal behavior and mother-child interactions of process and reactive schizophrenic women would clearly be suggested by these preliminary data in future longitudinal studies.

Methodological Problems

Any attempt to summarize studies of neurotic and psychotic parents is difficult because of the great variations which exist across studies. A broad general statement (subject to a considerable number of exceptions) would be: children of neurotic parents show a heightened incidence of neurotic behavior, rarely exhibiting severe psychotic trends; children of psychotic parents reveal a broader range of disorder. The difficulty, however, in framing a generalization lies with the many methodological and design inadequacies which typify so much of the literature. Some examples are listed below:

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

• Curious instances of subject selection can be found: psychotic mothers and psychotic fathers may be lumped together without regard for the effects such heterogeneity imposes; parents are often grouped without adequate attention to such factors as length and frequency of hospitalization, severity of disorder, and inpatient-outpatient status.

• The nature of the sample—whether random or selected—may not be specified. For example, some studies have used welfare agency samples as part of a program of assistance to multiproblem families, clearly generating a selection bias that tips the scales toward disordered outcomes in offspring.

• Descriptive criteria that would validate diagnostic labels and other criteria upon which ratings of the children's adjustment have been made are often not provided.

• A variety of important factors may remain unspecified; e.g., acuteness or chronicity of illness, process-reactive status, age at first admission, and age of children at time of parents' hospitalization.

• Knowledge of parental status may bias clinical judgments of offspring.

• Most studies have been limited to Caucasian families, with very few studies available of diverse racial and ethnic groups.

• Often no mention is made as to whether the "well" parent has remained in a care-taking capacity at home, and the extent to which the parent is capable of assuming the role of the ill spouse.

• Case records provided by social workers, child guidance specialists, and adoptive agency personnel often provide only global and unsupported impressions of adjustment of child, mother, and family.

• Rating procedures, when used, are often instruments of questionable reliability and validity.

• A final criticism of studies of children of psychiatrically ill parents is the frequent lack of a control group. Yet the mere presence of a control group does not suggest scientific rigor, as is evidenced in a study by Prestin and Antin (1932). Without using actual observations, the investigators obtained psychiatric histories of 49 children under age 18 whose psychotic parents had been admitted to three public mental hospitals in Baltimore. Their control group consisted of 83 children in the third and fifth grades of a somewhat better than average public school. The investigators found a greater incidence of behavior problems in the children of normal parents, with only 13.2 percent of the school children considered normal; by contrast, 38.8 percent of the children of psychotics were considered normal. Study of the controls was more thorough, possibly because the investigators indicate that the parents of the children in the control group often were more sensitive to the children's behavior problems. Thus it could be expected that more abnormalities would be reported and described. However, as Rutter has observed: "one might also question the criteria (unstated) that enables 86.8 percent of a normal group to be regarded as abnormal" (Rutter 1966).

These criticisms of studies of the adjustment of children of psychotic parents have been partially overcome by a number of recent programs of research with children of schizophrenic parents. It is to these studies that we now turn our attention.

Type IV Studies: Children of Schizophrenic Parents

The preceding review of various observational and clinical studies of the behavioral adjustment of children of psychiatrically ill (but not necessarily schizophrenic) parents has suggested that: 1) a wide range of psychopathology is to be found in these offspring and 2) a variety of factors influences the magnitude of their maladjustment. Such findings are supported not only by the data of earlier genetically oriented studies (Hoffmann 1921, Schulz and Leonhard 1940, Oppler 1932, Gengnagel 1933 and Kallmann 1938) but by a more recent series of Danish investigations of adoptees born to schizophrenic parents; these adoptee investigations have led to the positing of a concept of a spectrum of schizophrenia-related disorders (Kety et al. 1968, Rosenthal et al. 1968, Wender 1969 and Rosenthal 1971 and 1972).

Many of these genetic studies are concerned primarily with the mental status of these children following their own hospitalization and the establishment of expectancy rates for the development of schizophrenia, while offering only scanty information about the childhood adjustment of those children who either manifest or fail to show later signs of psychopathology.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

(Some welcome exceptions: in part, the ongoing Danish adoptee studies; the recent volume on schizophrenia in twins by Gottesman and Shields (1972); and the efforts of Pollin and Stabenau in their studies of twins discordant for schizophrenia, particularly their, as yet, unpublished case history data.) The relative neglect of broad developmental case history data in genetic studies simply parallels the absence of genetic data in psychologically attuned investigations.

Countering this trend are a group of projects now to be described. In these studies of high risk children who have had one or both parents diagnosed as schizophrenic, the designs are prospective rather than retrospective; the starting point is still the psychiatrically ill parent, but the focus is primarily on the adaptive qualities of the offspring as derived through clinical observation and laboratory investigation of various biological and behavioral parameters presumed to be relevant to the predisposition to schizophrenia. Researchers intent on studying these children typically investigate the case histories of samples of adults diagnosed schizophrenic to determine initially their marital history (past and present) and whether such unions have produced offspring.[19] Parallel to the methods used in type III studies of the adult adjustment of former cases of childhood psychopathology, researchers of the children of schizophrenic parents attempt to followup the offspring by means of public records, interviews, and a variety of other clinical and laboratory techniques to determine their level of adjustment and some of their principal identifying attributes. While some investigators have studied the offspring during a specific age range (infancy, childhood, or adulthood), others have included both child and adult offspring in a single program of study. More recently, a number of research groups have begun longitudinal studies of such children, but the data are only now being collected, with publication of results promised for the future.

[19] Kallmann et al. (1964) have suggested that genetic investigations of schizophrenia require an evaluation of mating ability. According to Erlenmeyer-Kimling and Paradowski (1966) and Erlenmyer-Kimling et al. (1969), the fertility rate of schizophrenic women over a 20-year period (1934–36 to 1954–56) has increased 85 percent, while that of the general population has increased by only 25 percent. In marriages between two individuals diagnosed schizophrenic (whose unions have also increased in recent years) the reproduction rate is at least as high as in marriages in which only one marital partner has been diagnosed schizophrenic. Stevens (1969) in England has also affirmed a "lessening of fertility differentials between schizophrenics and women in the general population" (p. 169).

Infant Mortality among Children of Schizophrenic Parents

In the only known study to date designed specifically to investigate infant mortality among the children of schizophrenics, Sobel (1961b) investigated 222 newborn children of schizophrenic mothers who gave birth to their children in one of seven New York State mental hospitals from 1950 through 1958 (the births were recorded from the 5th month of pregnancy through the 13th postnatal day). Of the 222 infants involved, Sobel found a mortality incidence of 8.1 percent perinatal deaths; similarly Kallmann (1938) reported an incidence of 5.4 to 7.9 percent mortality rate among children of schizophrenic parents. By contrast, the death rate among newborns in the general population was 3.6 percent in 1950 according to the United States National Office of Vital Statistics with more recent data providing a figure of 23.7 per 1,000 live births (Wegman 1968). In addition, Sobel noted the presence of seven malformed children (3.2 percent), one each with hydrocephaly, anencephaly, microcephaly, cleft palate, cyst of lung, hypospadias, and absence of sternum. Again, by contrast, two other studies of malformations among newborns in the general population have reported rates of 0.8 percent (Newtown and McLean 1946 as reviewed by Sobel 1961b) and 1.3 percent (Carter 1950).

The Incidence of Child Mortality

In the course of studies of the adjustment of children of schizophrenic parents, researchers have also noted high rates of child mortality. Canavan and Clark (1923a and b) found that, of 463 children born to male and female hospitalized schizophrenics, 82 children had died in childhood—a rate higher than that of a comparable group of children born to medical outpatients. An astonishing rate of child mortality has also been reported by Kallmann (1938) among children with one parent schizophrenic: 44.5 per-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

cent had died before the age of 5; the mortality of children with both parents schizophrenic was reported to be 35 percent. In terms of the percentage of the total mortality rate, 43.5 percent of the children had had a schizophrenic mother, while 38.8 percent of the children had had a schizophrenic father. Rosenthal (1962) has concluded that the mother's schizophrenic state, expressed by noxious uterine influences on the fetus, may in part contribute to the higher perinatal mortality rate evidenced in the offspring of schizophrenic mothers.

Clinical Followup Studies of the Childhood Adjustment of Children of Schizophrenic Parents

In the United States many investigators of schizophrenia have focused on the familial conflicts and social learning patterns which may influence the development of schizophrenia. Contributing to the environmentalist's view of the etiology of schizophrenia, Sobel (1961a) followed the monthly development of eight neonates, each a product of a dual mating for schizophrenia.[20] In the fashion of an experiment-in-nature, four of the infants had been placed in foster homes while the other four infants had been returned to the homes of their natural parents. Of the four children raised by their original schizophrenic parents, three developed clear-cut signs of depression and irritability whereas, by contrast, none of the four infants raised by foster parents were so affected. Concomitantly, the mothers of the same three infants developed clear signs of acute psychosis and severe depression, and after some months, each, in turn, was hospitalized.

[20] Aside from Sobel (1961a), Kahn (1923), Elsasser (1952), Schulz (1940), Lewis (1957), and Kallmann (1938), the literature contains only one other study of dual-mated children (a term coined by Kallmann to identify the children of two schizophrenic parents)—an investigation begun by Kallmann et al. (1964) before Kallmann's death. (This neglect, fortunately, is being undone by Erlenmeyer-Kimling (1968a and b) and her colleagues.) Through random sampling and a special inquiry, Kallmann et al. located 170 such children who at the time had a mean age of 15.7 years. Their investigation revealed that 16 of the dual-mated children had already been diagnosed schizophrenic (this included a sibship of 10 children, seven of whom were definitely schizophrenic); but, as in the majority of genetically oriented studies, very little descriptive information is presented on the adaptative patterns of either the ill or the non-ill children.

Thus, although each of the eight children was genetically predisposed to the disease, only those offspring in daily contact with the schizophrenic mother (or father) developed a behavioral (but not schizophrenic) abnormality, while those children placed in foster homes had not developed any significant abnormalities at the time of study. As with so many studies, Sobel's investigation can be fitted to a psychological or a genetic model. Multiple separation experiences and deleterious caretaking as expressed in depression with concomitant neglect of play with the infant, characterized the mother-child relationships of the four disturbed infants. Since 40 percent of the children developed abnormalities, if such early deviances were to eventuate in schizophrenia, the rate would closely correspond to the risk estimate of 35 percent calculated by Rosenthal (1962) for children of two schizophrenic parents. The data, given these ambiguities, suggest that a diathesis-stress model of schizophrenic etiology would be the more comfortable position from which to assay the findings. Caution, however, is suggested by the research of Sussex, Gassman, and Raffel (1963) who studied 16 6- to 10-year-old children of acutely psychotic mothers in outpatient treatment and concluded that "the children as a group did not show marked evidence of being adversely affected by the presence of a psychotic mother in the home . . ." (p. 854).

To lend support to the postulated hereditary factor in the transmission of schizophrenia, Fish and Alpert (1962), as cited earlier, studied a group of 13 infants born to hospitalized schizophrenic women. Immediately after birth the infants were separated from their mothers, nine to be placed in foster homes, three to be placed with grandparents, while one was sent to a foundling home. Using naturalistic observation and studies of responsiveness to a series of auditory stimuli (ranging from mild to strong intensity), the investigators observed each of the infants on the 1st and 4th days of life and, thereafter, at regular monthly intervals. "Although generally conforming to clinical descriptions of arousal states in the first months of life," four of the infants showed marked deviations accompanied by irritability in response to stimulation. By 2 years of age, the most irritable infant was

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

exhibiting grossly maladaptive behavior, while the other three quiet infants showed attenuated motor impulses, minimum responsiveness to proprioceptive stimuli, and in the most extreme cases, flaccid muscle tone and irregular postural development.

These early abnormalities, difficult to explain from an environmentalist position (since the children were separated from their schizophrenic mothers at birth), correspond more closely to a genetic interpretation of the etiology of schizophrenia. The abnormalities were reported to have appeared as early as the first 2 weeks following birth, suggesting a constitutional component in the etiology of such disturbances. Four of the 13 children, or approximately 30 percent, developed abnormalities (although not schizophrenia), a risk estimate almost double that calculated in 1938 by Kallmann (i.e., 16.4 percent morbidity estimate) for the children of one schizophrenic parent.

According to Gottesman (1966) the kinds of abnormal behaviors found in studies of children of schizophrenic parents (i.e., as in the case of Fish and Alpert's four infants and Sobel's three infants) can be explained by data from recent twin studies and longitudinal studies of child development. These investigations support the existence of a constitutional component underlying such dimensions of personality as extraversion-introversion which emerge despite variations in age, sex, socioeconomic status, and (within limits) culture.[21]

The Quality of Adjustment of School-Age Children

An environmentalist viewpoint regarding the etiology of schizophrenia is suggested by the report of Beisser, Glasser, and Grant (1967) on findings of the first 2 years of an investigation into the level of psychosocial adjustment of children of schizophrenic mothers. Their findings were derived from: 1) a child behavioral questionnaire given by a project interviewer to both parents of 224 children and 2) independent blind ratings contributed by classroom teachers on 165 of these children. The experimental sample was composed of 101 children of schizophrenic mothers, 45 children of psychoneurotic mothers, and 78 children of normally adjusted mothers. The schizophrenic and psychoneurotic parental groups were selected from the hospital files of discharged patients (who had had only one psychiatric hospitalization); the children of normal parents were selected from within the same school classrooms as the children in the other two groups and were matched with the experimental groups on age, sex, and father's occupational level. With an age range extending from 5 through 12 years and school placements from kindergarten to seventh grade, there were an equal number of boys and girls represented in both the younger (5 to 8 years) and older (9 to 12 years) age groups.

Results suggest that the schizophrenic mothers reported their children to be more frequently and more seriously deviant: there were more extreme behavior scores in both the "schizophrenic" and "psychoneurotic" group children than in the control group children; the differences in behavior scores between the two pathological

[21] For example, Schaffer and Emerson (1964) observed "social attachment" (i.e., tendency of the young to seek the proximity of certain other members of the species) in 37 normal infants born to normal women from working-class backgrounds. From behavioral observation during the first 18 months of life, 19 of the infants were reported to be "pure cuddlers," nine to be "pure noncuddlers," and the remainder to be intermediate. Furthermore, all of the "noncuddlers'" siblings (n=5) were "noncuddlers" and similarly 14 out of 18 of the "cuddlers'" siblings were likewise "cuddlers." The cuddling and noncuddling behavior was not a function of the mother's customary mode of behavior toward the infant but rather seemed to reflect and stem from the infant's "innate response tendency" which had affected the initial development of the social attachment behavior. The authors concluded that attachment behavior had a largely genetic component and that the mother-child relationship could be considerably strained by frequent noncuddling behavior in the infant. The observations of early temperament variations observed by Thomas, Chess, and Birch (1968) of children best described as "difficult," "easy," and "slow to warm up" provide some parallel support for such a position, with the interactive elements with parents a significant determiner of longer-range outcomes of adaptation or maladaptation in the offspring. Important for risk research, however, are the longer-term inconsistencies observed by Schaffer and Emerson (1964) in the attachment-intensity parameter—a factor which obviously makes long-range predictions difficult. The authors write: "Though it would be difficult to produce conclusive evidence on this point, it is at least conceivable that a lack of stability is an inherent feature of the attachment function in its early stages and that constancy in the intensity with which the need is manifested cannot therefore be expected" (p. 69). This view opposes the feature of persistence of reaction patterns from infancy onward espoused by Thomas, Chess, and Birch.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

groups, however, were not significant. From mothers' ratings of behavioral deviations, 33 percent of the children of schizophrenic and psychoneurotic mothers were considered to be deviant as compared with 10 percent of the children of the control group. (Deviancy was defined as a score of 7 or above on a 13-point rating scale of adjustment). In contrast to normal mothers who generally reported boys as more deviant, schizophrenic mothers reported more behavioral deviations in their daughters—an interesting finding in view of the reports of a higher concordance rate for schizophrenia among related females (Rosenthal 1962). In accord with Rutter's (1966) study, the younger children (as contrasted with the older children) in the schizophrenic and psychoneurotic groups revealed more extreme behavioral deviations, but this pattern was not present in the control group. Although fewer children of schizophrenic mothers were well adjusted, their proportion did not differ significantly from the proportion of well-adjusted children in the total group.

In contrast to the mothers' ratings, ratings by fathers failed to differentiate the three groups of children; in general, fathers reported fewer and less serious instances of behavioral deviation. However, the schizophrenic mothers and fathers, as contrasted to the psychoneurotic or control mothers and fathers, showed a greater disparity in their judgments regarding the seriousness of their children's behavior.

Independent ratings of the children's behavioral adjustment by classroom teachers agreed in general with the parental ratings, once again confirming a significantly poorer adjustment for children of schizophrenic and psychoneurotic mothers. Although boys were generally rated more deviant than girls, female offspring of schizophrenic mothers were rated as equal in deviancy to the male offspring of such mothers; thus teachers' ratings followed the pattern noted for maternal observations. There was an especially high agreement between schizophrenic mothers and the classroom teachers regarding judgments of the adjustment of male children, possibly because those children in the schizophrenic group were so clearly maladjusted that there was no uncertainty in either mother or teacher regarding their manifest deviance. By contrast, children in the psychoneurotic and control groups fell more typically into the middle range of adjustment—a fact which made it more difficult to discriminate within their level of adaptation.

Schizophrenic parents considered aggressive behavior to be the most deviant indicant, whereas in the normal homes there was either a greater expressed tolerance for aggressive behavior or such behavior occurred less frequently. "Acting-out" behaviors such as stealing, destruction, temper tantrums, sibling conflict, and sleep interruption were more often displayed by children of schizophrenic parents; these parents also complained that their children suffered more frequently from digestive disturbances and had encountered more school difficulties. Such disturbances were also noted in the Robins (1966) and Judge Baker studies (Nameche and Ricks, 1966) as having been characteristic of the childhood behavior of adults later diagnosed schizophrenic. However, children of schizophrenics manifested more aggression toward adults whereas the preschizophrenics of the Robins and Judge Baker studies manifested more aggression towards other children. Beisser, Glasser, and Grant (1967) concluded that children of schizophrenic mothers were more maladjusted than the children of psychoneurotic mothers, a conclusion also supported by Rutter (1966).

Whereas Beisser and his colleagues investigated the adjustment of offspring of schizophrenic mothers who had had only one psychiatric hospitalization, Higgins (1966), in a component investigation of the Mednick-Schulsinger project, studied the offspring of chronic schizophrenic females (as indicated by their premorbid histories, symptoms, and course of disease) who had been hospitalized in one of four Danish hospitals between the years 1958 and 1963. Of the total of 200 children born prior to the mothers' hospitalization, Higgins selected 26 males and 24 females (mean age = 14.8 years; range: 9 years to 20 years). These 50 offspring were divided into two groups of 25 each: 1) The *mother-reared* group of offspring had lived their entire lives with the schizophrenic mother and had had a mean age of 7 years and 7 months when the mother had first entered the hospital. On the average, these children had witnessed four hospitalizations of the mother extending over a mean total period of 10 months' duration. In all cases the biological fathers were present in the home

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

and had never had a psychiatric hospitalization. 2) The *reared-apart* group of children had been separated from their schizophrenic mothers at a mean age of 1 year and 7 months and had been reared either in a children's home ($n = 6$), or by a substitute mother ($n = 11$), the biological father ($n = 4$), or by a combination of these ($n = 4$). These children had had no extended or frequent contact with their schizophrenic mothers (or any of her blood relations) and in all cases individuals with no psychiatric history had substituted for the schizophrenic mother as the primary rearing agent. However, the reared-apart group may too have been exposed to early maternal contact, inadequacy in rearing agents, traumatic separations, poor institutional environments, etc. The mother-reared and the reared-apart groups of children were matched for sex, age, and socioeconomic status. The author hypothesized that the mother-reared group would display greater maladjustment than would the reared-apart children. Each of the subjects were interviewed by a psychiatrist and two psychologists who completed a descriptive adjective checklist for each child. The children were also tested with a wide range of techniques including the Kent-Rosanoff Word Association Test, a test of stimulus generalization, and tests of psychophysiological responsiveness and recovery following stimulation; in addition, each subject's classroom teacher provided a rating of school adjustment.

The results of the study failed to support the hypotheses of less adaptive behavior in the mother-reared children. The indices which discriminated between the two groups at a statistically reliable level of significance indicated that the mother-reared children were more passive, inhibited, and uninvolved, more asocial in the classroom setting, generally more withdrawn, and relatively unresponsive to social rewards. On the adjective checklist 10 of the mother-reared children, as compared with one of the reared-apart children, appeared withdrawn: also, according to teachers' ratings, eight of the mother-reared children, as compared with one of the reared-apart children, were unresponsive to social rewards. On the other hand, the reared-apart children were more labile and irritable. According to teachers' ratings, six of the reared-apart children, as compared with none of the mother-reared children, were easily and overtly upset. Reared-apart children also showed more marked psychophysiological responsiveness to stress, giving a greater mean response to the stress stimuli on every trial. These differences in psychophysiological responsiveness to stress were attenuated apparently by the greater responsiveness of the *female* mother-reared children. A poorer adjustment in the female children of schizophrenic mothers has been suggested by Rosenthal (1962) and Beisser, Glasser, and Grant (1967). On the basis of the school report, only one of the 50 children (a reared-apart child) had been examined by a school psychologist, who had diagnosed the child as neurotic. In accord with other studies of children of schizophrenic mothers (i.e., Beisser, Glasser, and Grant 1967), teachers judged a reference sample of control children to be somewhat better adjusted than either the mother-reared or the reared-apart groups of risk children.

Higgins concluded that the mother-reared children were avoidance-oriented and the reared-apart children approach-oriented and "that rearing by a schizophrenic mother may have less to do with the child's level of adjustment than with the direction of his basic orientation to the world," i.e., approach or avoidance. The mother-reared children may have learned to avoid or ignore their schizophrenic mother and this habit may have generalized to diverse social relationships.

In sum, young children of schizophrenic parents reveal a wide range of behavioral pathology including an increased rate of prenatal and childhood mortality in addition to multiple infant anomalies which had often become manifest within 1 or 2 weeks after the child's birth. Similarly, a high incidence of abnormalities have been reported for adolescent children born into such families. The consistency of such findings gives rise to the question: What is the level of adaptation of the adult offspring of schizophrenic parents?

The Adjustment of Adult Offspring of Schizophrenic Parents

Data derived from short-term longitudinal studies of children tend to be consistent with the assumption of long-range stability in behavioral patterns from late childhood to adolescence and adulthood. Kagan and Moss (1962) have

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

reported that adults who tended to withdraw from stressful situations and who were passive in the face of frustration also revealed similar behaviors in childhood. Such findings for normal individuals would suggest that pathology, if existent among older children of schizophrenic parents, would also be evidenced in adulthood. Although most studies do not examine the important issue of continuity, there are data on the adult adaptation of these children. Reisby (1967) conducted a followup study of the adult adjustment of children born to 132 chronically schizophrenic (primarily paranoid) mothers, 50 percent of whom had been hospitalized more than 20 years in one of three mental institutions in Sjelland (Denmark). Interestingly, these schizophrenic mothers had had a lower fertility rate than the general population and their fertility rate had decreased rapidly after the onset of the psychosis: only 9 percent of the offspring were born after the onset of the illness. Through the use of three national registers, 322 offspring were located; of this number, 33 (9.3 percent) had died in childhood and 11 others had died during adulthood (three by suicide), leaving 278 living offspring who had, at the time of study, a mean age of 36.7 years.

Through interviews and a perusal of public records, it was found that 15 females and 15 males (born to 26 different mothers) had had a psychiatric hospitalization and at the time of study two percent of the offspring were psychiatric inpatients. In addition, 21 individuals were reported to have had a history of mental deviation but without being hospitalized (table 7). Specifically, three males and four females had been hospitalized with a diagnosis of schizophrenia and an additional 14 offspring had been diagnosed as having a schizophreniform psychosis. Together, these two diagnoses yielded a morbidity risk of 10.5 percent for children of one schizophrenic parent, an estimate closely resembling that calculated by Gengnagel (1933) (8.3 percent) and Kallmann (1938) (11 percent for the children of paranoid schizophrenics).

Of greater importance was Reisby's conclusion that the duration of contact with a schizophrenic mother was related to the course of the psychosis—whether chronic or remitting—in the child. The likelihood of an offspring developing a more severe disturbance was heightened with increased contact with a schizophrenic mother; offspring who developed severe or typical schizophrenia had lived with their schizophrenic mothers a mean of 13 years, while those who developed a milder or more atypical form of schizophrenia (or other less severe psychoses) had lived with their mothers a mean of 10 years and 5 months.

Although Rosenthal (1963) has suggested that no consistent relationship exists between subtypes of schizophrenia in family members, Reisby found an association between a diagnosis of paranoid schizophrenia in the mother and a similar diagnosis in the offspring. Of the 11 offspring diagnosed paranoid schizophrenic, eight of the 10 mothers involved bore the same diagnosis. Again in contrast to Rosenthal's (1962) finding of a higher concordance rate for schizophrenia in related females, Reisby reported no increased incidence of schizophrenia or schizophreniform psychosis among female offspring. Finally, Reisby found no relation between the age of the manifestation of the illness for the mother (mean age, 36.6 years) and the child (mean age, 27.0 years), a conclusion supported by Schulz (1940).

Perhaps the most skillful investigation of its kind yet published, both in its scientific precision and in its effort to separate the relative effects of heredity and environment, was conducted by Heston (1966), who studied the adult adjustment of foster-home-reared children of schizophrenic mothers. From a search of the records of an Oregon psychiatric hospital for the years 1915 to 1945, Heston located 47 offspring (30 males and 17 females) born to chronic schizophrenic mothers. Each of the infants had been separated from his or her mother immediately after birth; approximately 50 percent ($n = 22$) of the offspring had been reared in a foundling home for several years and had subsequently been adopted (with knowledge of the biological mother's status known to the adoptive parents); the 25 other offspring had been reared in foster homes (or by a paternal relative). But in each case the child had eventually lived in a home containing two parental figures. From the records of the same foundling home that had received some of the children of schizophrenic mothers, Heston selected 50 control children (33 male and 17 female) who had also been separated from

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Table 7. Incidence of psychiatric illness among 322 offspring of chronic schizophrenic-mothers.[1]

Diagnosis of offspring	Number involved	Hospitalized		
		Males	Females	Total
Schizoprenia	7	3	4	7
Schizophreniform psychosis Paranoid psychosis	5			
Atypical psychosis with mental deficiency	3	8	5	13
Atypical psychosis	2			
Paranoid reaction	1			
Pseudodebilitas (pseudo mental deficiency)	3			
Other psychosis (manic-depressive and depressive)	2	0	2	2
Neurosis	13	0	1	1
Character deviation	9	3	1	4
Mental deficiency	6	1	2	3
Total	51	15	15	30

[1] Adapted from Reisby (1967).

their biological mothers immediately after birth, but these biological mothers had had no known history of psychiatric disorder. These controls were then matched for age (mean age, 35.8 years), sex, type of placement, and length of time in child-care institutions. Followup information on the psychosocial adjustment of the adult offspring was comprehensively derived from a perusal of public records and a personal interview with 72 of the 97 subjects (this interview included the MMPI and intelligence testing). The interviews were blindly evaluated by two psychiatrists and the author.

Significantly, the investigation revealed that more than 50 percent of the children born to schizophrenic mothers had major psychosocial problems in adulthood (see table 8). In particular five of the adult offspring had themselves been diagnosed schizophrenic, while such a diagnosis had never occurred in the control group;

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Table 8. Significant differences found on followup in adulthood between foster-home-reared children of schizophrenic and nonschizophrenic mothers.[1]

	Foster-home-reared children of schizophrenic mothers	Foster-home-reared children of nonschizophrenic mothers	
Diagnosis	**Number involved**	**Number involved**	**P value**
Schizophrenia	5	0	0.024
Mental deficiency (IQ < 70)	4[2]	0	0.052
Sociopathic personality	9	2	0.017
Neurotic personality disorder	13	7	0.052
Never married	9	4	
More than one year in penal institution	11	2	0.006
Felonious acts	7	2	0.054
Armed Forces, number serving	21	17	
Discharged from Army for psychiatric or behavior disorder	8	1	0.021
Sample size	47	50	
Measure	**Mean score**	**Mean score**	
Menninger Mental Health Rating Scale (range 0–100)	65.2	80.1	0.0006
Mean IQ	94.0	103.7	NS

[1] Adapted from Heston (1966).
[2] One mental defective was sociopathic; another, schizophrenic.

that five individuals had developed schizophrenia in spite of the mother-child separation at birth may be interpreted as yielding strong evidence of a hereditary factor at work in schizophrenia. On the Menninger Mental Health Rating Scale (MMHRS) the foster-home-reared children of schizophrenic mothers manifested a significantly poorer adjustment than controls (a poor adjustment was defined as a score of 75 or below on the 100-point scale). However, the mean score on the MMHRS of the children of schizophrenics was weighted by the poor adjustment scores achieved by a group of some 50 percent of the schizophrenics' offspring who had a particularly troublesome adjustment. In addition, four of the 47 adult offspring of the schizophrenics were reported to be mentally deficient, whereas no mental deficiency was found among the adult controls. Hallgren and Sjogren (1959) and Kallmann (1938) also reported a familial association between a diagnosis of schizophrenia and mental deficiency.

The group of 50 percent of the offspring of the schizophrenic mothers who had had major psychosocial problems fell into two categories. First, eight male offspring gave evidence of a schizoid, psychopathic personality characterized by impulsiveness, multiple arrests, alcoholism, homosexuality, seclusiveness, and irregular employment. A second group of eight offspring (two males and six females) of the schizophrenic mothers and two controls had shown emotional lability which included such symptoms as anxiety, panic attacks, hyperirritability, depression, moodi-

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

ness, and psychophysiological gastrointestinal complaints. Heston concluded that this second group was emotionally unstable, cyclothymic and neurotic, and similar to the neurotic siblings of schizophrenics described by Alanen (1958). Heston's two subgroups of seclusive and neurotic offspring of schizophrenic mothers may also correspond to the two groups of children of schizophrenics found by Higgins (i.e., the withdrawn mother-reared group and the emotionally labile and neurotic reared-apart group). In comparison with the controls, the remaining 21 offspring of schizophrenic mothers who had no psychosocial impairment behaved more spontaneously when interviewed, held more creative jobs, and had more musical ability and more variable personalities; however, they also evidenced more drinking problems and more intense religious feelings.

In evaluating the Heston study, it is necessary to keep in mind a factor which may provide a partial environmental basis for at least some of the deleterious observations made on the index cases. Paternal relatives reared some of these children, introducing reflections on assortative mating and its consequences; none of the subjects were reared in typical or "normal" circumstances.[22] But despite these demurrers, the Heston study remains an impressive demonstration of the power of the schizophrenic genotype.

The Danish Adoption Studies

Under this rubric of the adult adjustment of offspring of schizophrenic parents belong the now classic Danish studies of adoption (Kety et al. 1968; and Rosenthal et al. 1968) and rearing of such children by foster parents free of a history of psychiatric hospitalization. These studies have used several techniques: 1) The *adoptees' family method*—One begins with children given up for nonfamilial adoption who by adulthood have been admitted to a psychiatric facility with a diagnosis of schizophrenia (index case), accompanied by nonpsychiatric adoptee controls, and then studies the incidence of mental disorder in adoptive and biological parents, sibs, and half-sibs of both groups. 2) The *adoptees study method*—One begins with biological parents who have given their children up for nonfamilial adoption and separates those with a history of psychiatric illness (index group) from a matched group free of disorder; offspring are then examined for evidence of mental disorder. 3) The *adoptive parents method*—One begins with known schizophrenics who have been either adopted early in life by nonrelatives or reared by their biological parents, and then compares psychopathology in adoptive vs. biological parents, accompanied by an additional set of adoptive parents whose adopted children are free of mental illness.

Results of these studies (Rosenthal 1972) indicate that "schizophrenic spectrum" disorders occur significantly more often among the biological relatives of index cases than among the biological relatives of controls, but this is not true of the comparisons made on the two sets of adoptive parents. Kety et al. (1972) have recently reported additional confirmatory evidence based on extensive psychiatric interviews with a substantial number of these same relatives (N = 321 of 363 available, 88 percent of the sample). All interviews are conducted by a single psychiatrist who ". . . completed a 35-page protocol of checklists and narrative information relating to physical and mental illness, mental status, social, educational and occupational history and other items of life experience." Psychiatric diagnoses were then made independently by three American clinicians after all status-identifying data had been removed. The interview results reaffirmed the previous investigation but heightened the incidence of mental illness in all classes of relatives. The incidence of schizophrenia in the biological relatives of schizophrenic vs. control adoptees was in the ratio of 10:3. Nearly 10 percent of index biological relatives of chronically ill and borderline adoptees were diagnosed as "definitely schizophrenic," compared to 2 percent of the controls; this latter figure was not significantly different from those obtained for the adoptive index and control families. However, such differences were not evident in the biological relatives of index cases with acute schizophrenic illness.

[22] It has been asserted by some that the adoptive parents had (by Oregon law) to be informed of the biological heritage of the index children. Heston in a personal communication has indicated that this is categorically untrue.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

In terms of this section of the report, data on the risk children's adaptation as derived from the adoptees study would be particularly relevant. Unfortunately, these results are still undergoing analysis. The incidence of schizophrenia in adoptees in the Danish study is relatively low (one out of 155 hospitalized for schizophrenia; three so diagnosed on interview, with an additional seven diagnosed "borderline," six of the seven being index cases). Other data related to birth, life events, separation, and transfer are being collected; testing data are still fragmentary. (*End of Part I*)

References

Achenbach, T.M. The classification of children's psychiatric symptoms: A factor analytic study. *Psychological Monographs,* 80(7):Whole no. 615, 1966.

Alanen, Y.O. The mothers of schizophrenic patients. *Acta Psychiatrica et Neurologica Scandinavica,* Vol. 33, Supplement 124, 1958.

Alanen, Y.O.; Rekola, J.K.; Stewen, A.; Takala, K.; and Tuovinen, M. The family in the pathogenesis of schizophrenic and neurotic disorders. *Acta Psychiatrica Scandinavica,* 42: Supplement 189, 1966.

Anthony, E.J. The developmental precursors of adult schizophrenia. In: Rosenthal, D., and Kety, S.S., eds. *The Transmission of Schizophrenia.* Oxford: Pergamon Press Ltd., 1968. pp. 293–316.

Anthony, E.J. A clinical evaluation of children with psychotic parents. *American Journal of Psychiatry,* 126(2):177–184, 1969.

Baker, A.A.; Morison, M.; Game, J.A.; and Thorpe, J.G. Admitting schizophrenic mothers with their babies. *Lancet,* 2:237–239, 1961.

Barthell, C., and Holmes, D. High school yearbooks: A nonreactive measure of social isolation in graduates who later became schizophrenic. *Journal of Abnormal Psychology,* 73:313–316, 1968.

Bayley, N. Intellectual and physical development. In: Rosenthal, D., ed. *The Genain Quadruplets.* New York: Basic Books, Inc., Publishers, 1963. pp. 193–201.

Beisser, A.R.; Glasser, N.; and Grant, M. Psychosocial adjustment in children of schizophrenic mothers. *Journal of Nervous and Mental Disease,* 145(5): 429–440, 1967.

Bell, R.Q. Convergence: An accelerated longitudinal approach. *Child Development,* 24:142–145, 1953.

Bell, R.Q. Retrospective and prospective view of early personality development. *Merrill-Palmer Quarterly of Behavior and Development,* 6:131–144, 1959–60.

Bell, R.Q. A reinterpretation of the direction of effects in studies of socialization. *Psychological Review,* 75:81–95, 1968.

Bender, L. Behavior problems in the children of psychotic and criminal parents. *Genetic Psychology Monographs,* 19:229–339, 1937.

Bennett, L. *Delinquent and Neurotic Children.* New York: Basic Books, Inc., Publishers, 1960.

Beskow, B. Psychic trauma in children of insane parents. (Abstract) *Nordisk-Medicin,* 53S233, 1955.

Birch, H.G., and Gussow, J.D. *Disadvantaged Children: Health, Nutrition, and School Failure.* New York: Harcourt, Brace & World, Inc., 1970.

Bleuler, M. *Course of Illness, Personality and Family History in Schizophrenics.* Leipzig: Georg Thieme Verlag, 1941.

Block, J. *Lives Through Time.* Berkeley, Calif.: Bancroft Books, 1971.

Bowen, M. A family concept of schizophrenia. In: Jackson, D.D., ed. *The Etiology of Schizophrenia.* New York: Basic Books, Inc., Publishers, 1960. pp. 346–372.

Bower, E.M.; Shellhammer, T.A.; and Daily, J.M. School characteristics of male adolescents who later became schizophrenic. *American Journal of Orthopsychiatry,* 30:712–729, 1960.

Bowlby, J. Maternal care and mental illness. *Bulletin of the World Health Organization,* 3:355–534, 1951.

Bowman, K.M. A study of the prepsychotic personality in certain psychoses. *American Journal of Orthopsychiatry,* 4:473–498, 1934.

Brock, H. Untersuchungen über die Entwicklung der Kinder Nervenkranker Mütter. *Acta Paedopsychiatrica,* 29:116–123, 1962.

Brown, F.W. Heredity in the psychoneuroses. *Proceedings of the Royal Society of Medicine,* 35:785–790, 1942.

Buck, C., and Laughton, K. Family patterns of illness: The effect of psychoneurosis in the parent upon illness in the child. *Acta Psychiatrica et Neurologica Scandinavica,* 34:165–175, 1959.

Canavan, M., and Clark, R. The mental health of 463 children from dementia praecox stock. *Mental Hygiene,* 7:137–148, 1923a.

Canavan, M., and Clark, R. The mental health of 581 offspring of nonpsychotic parents. *Mental Hygiene,* 7:777–778, 1923b.

535-812 O - 74 - 6

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Carter, C.O. Maternal states in relation to congenital malformations. *Journal of Obstetrics and Gynecology,* 57:897, 1950.

Chapman, L., and Chapman, J.P. *Disordered Thought in Schizophrenia.* New York: Appleton-Century-Crofts, in press.

Cowie, V. Children of psychotics—a controlled study. *Proceedings of the Royal Society of Medicine,* 54:675–678, 1961a.

Cowie, V. The incidence of neurosis in the children of schizophrenics. *Acta Psychiatrica Scandinavica,* 37:37–71, 1961b.

Deykin, E.Y.; Jacobson, S.; Klerman, G.; and Solomon, M. The empty nest: Psychological aspects of conflicts between depressed women and their grown children. *American Journal of Psychiatry,* 122:1422–1426, 1966.

Dobzhansky, T. *Mankind Evolving.* New Haven, Conn.: Yale University Press, 1962.

Dohrenwend, B.P.; Chin-Song, E.T.; Egri, G.; Mendelsohn, F.S.; and Stokes, J. Measures of psychiatric disorder in contrasting class and ethnic groups. (A preliminary report of ongoing research.) In: Hare, E.H., and Wing, J.K., eds. *Psychiatric Epidemiology.* London: Oxford University Press, 1970. pp. 159–202.

Dohrenwend, B.P., and Dohrenwend, B.S. *Social Status and Psychological Disorder.* New York: Wiley-Interscience, 1969.

Doniger, C.B. Children whose mothers are in a mental hospital. *Journal of Child Psychology and Psychiatry,* 3:165–173, 1962.

Douglas, G. Psychotic mothers. *Lancet,* 1:124–125, 1956.

Downes, J., and Simon, K. Characteristics of psychoneurotic patients and their families as revealed in a general morbidity study. *Psychosomatic Medicine,* 15:463–476, 1953.

Ehrenwald, J. *Neurosis in the Family and Patterns of Psychosocial Defense.* New York: Harper & Row, Publishers, 1963.

Eisenberg, L. Possibilities for a preventive psychiatry. *Pediatrics,* 30:815–829, 1962.

Ekdahl, M.C.; Rice, E.P.; and Schmidt, W.M. Children of parents hospitalized for mental illness. *American Journal of Public Health,* 52:428–435, 1962.

Elsasser, G. *Die Nachkommen Geisteskranker Elternpaare.* Stuttgart: Georg Thieme Verlag, 1952.

Endicott, J., and Spitzer, R.L. Current and past psychopathology scales (CAPPS). *Archives of General Psychiatry,* 27:678–687, 1972.

Erlenmeyer-Kimling, L. "Studies of the Children of Schizophrenic Parents: Pointers for the Analysis of Gene-Environment Interaction." Presented at the Symposium on Psychotic Parents and Their Children: Etiology and Intervention, Annual Meeting of the American Psychiatric Association, Boston, Mass., May 1968a.

Erlenmeyer-Kimling, L. Studies on the offspring of two schizophrenic parents. In: Rosenthal, D., and Kety, S.S., eds. *The Transmission of Schizophrenia.* Oxford: Pergamon Press Ltd., 1968b. pp. 65–83.

Erlenmeyer-Kimling, L.; Nicol, S.; Rainer, J.D.; and Deming, W.E. Changes in fertility rates of schizophrenic patients in New York State. *American Journal of Psychiatry,* 125(7):916–927, 1969.

Erlenmeyer-Kimling, L., and Paradowski, W. Selection and schizophrenia. *American Naturalist,* 100 (916):651–665, 1966.

Escalona, S., and Leitch, E. Early phases of personality development: A non-normative study of infant behavior. *Monographs of the Society for Research in Child Development,* 17(1): Serial No. 54, 1952.

Eysenck, H.J. *The Structure of Human Personality.* London: Methuen & Co., Ltd., 1953.

Eysenck, H.J., ed. *Readings in Extraversion-Introversion. Theoretical and Methodological Issues.* Vol. I. New York: Wiley-Interscience, 1971a.

Eysenck, H.J., ed. *Readings in Extraversion-Introversion. Fields of Application.* Vol. II. New York: Wiley-Interscience, 1971b.

Eysenck, H.J., and Eysenck, S.B.G. *Personality Structure and Measurement.* San Diego, Calif.: Robert R. Knapp, 1969.

Eysenck, S.B.G., and Eysenck, H.J. On the dual nature of extraversion. *British Journal of Social and Clinical Psychology,* 2:46–55, 1963.

Fish, B. The detection of schizophrenia in infancy. *Journal of Nervous and Mental Disease,* 125:1–24, 1957.

Fish, B. Longitudinal observations of biological deviation in a schizophrenic infant. *American Journal of Psychiatry,* 116:25–31, 1959.

Fish, B. Involvement of the central nervous system in infants with schizophrenia. *Archives of Neurology,* 2:115–121, 1960.

Fish, B. The maturation of arousal and attention in the first months of life: A study of variation in ego development. *Journal of the American Academy of Child Psychiatry,* 2:253–270, 1963.

Fish, B. Contributions of developmental research to a theory of schizophrenia. In: Hellmuth, J., ed. *Exceptional Infant: Studies in Abnormalities.* Vol. II. New York: Brunner/Mazel, Inc., 1971a. pp. 473–482.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Fish, B. Discussion: Genetic or traumatic developmental deviation. *Social Biology,* 18(Sept. supplement):S117–S119, 1971b.

Fish, B. "Visual-Motor Disorders in Infants at Risk for Schizophrenia." Presented at Annual Meeting of the American Psychiatric Association, Dallas, Texas, May 1972.

Fish, B., and Alpert, M.S. Abnormal states of consciousness and muscle tone in infants born to schizophrenic mothers. *American Journal of Psychiatry,* 119(5):439–445, 1962.

Fish, B., and Hagin, R. Visual-motor disorders in infants at risk for schizophrenia. *Archives of General Psychiatry,* 28:900–904, 1973.

Fish, B.; Shapiro, T.; Halpern, F.; and Wile, R. The prediction of schizophrenia in infancy. III. A ten-year follow-up report of neurological and psychological development. *American Journal of Psychiatry,* 121: 768–775, 1965.

Fish, B.; Wile, R.; Shapiro, T.; and Halpern, F. The prediction of schizophrenia in infancy: II. A Ten-year follow-up report of predictions made at one month of age. In: Hoch, P.H., and Zubin, J., eds. *Psychopathology of Schizophrenia.* New York: Grune & Stratton, Inc., 1966. pp. 335–353.

Fleming, P., and Ricks, D.F. Emotions of children before schizophrenia and before character disorder. In: Roff, M., and Ricks, D.F., eds. *Life History Research in Psychopathology.* Vol. I. Minneapolis: University of Minnesota Press, 1970. pp. 240–264.

Fontana, A. Familial etiology of schizophrenia: Is scientific method possible? *Psychological Bulletin,* 66:214–227, 1966.

Frank, G.H. The role of the family in the development of psychopathology. *Psychological Bulletin,* 64: 191–205, 1965.

Frazee, H.E. Children who later became schizophrenic. *Smith College Studies of Social Work,* 23: 125–149, 1953.

Freud, S. The psychogenesis of a case of homosexuality in a woman. In: Strachey, J., ed. *The Standard Edition of the Complete Psychological Works of Sigmund Freud,* Vol. 18. London: The Hogarth Press and the Institute of Psychoanalysis, 1955. pp. 146–172.

Gardner, G.G. Role of maternal psychopathology in male and female schizophrenics. *Journal of Consulting Psychology,* 31:411–413, 1967.

Gardner, L.I. Deprivation and dwarfism. *Scientific American,* 1:76–83, 1972.

Gardner, N.H. The later adjustment of children born in a mental hospital to psychotic mothers. *Smith College Studies in Social Work,* 19(1):137–138, 1948.

Garmezy, N. Process and reactive schizophrenia: Some conceptions and issues. In: Katz, M.M.; Cole, J.O.; and Barton, W.E., eds. *The Role and Methodology of Classification in Psychiatry and Psychopathology.* Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1968. pp. 419–466. Reprinted in *Schizophrenia Bulletin,* No. 2:30–74, Fall 1970.

Garmezy, N. Vulnerable children: Implications derived from studies of an internalizing-externalizing symptom dimension. In: Zubin, J., and Freedman, A.M., eds. *Psychopathology of Adolescence.* New York: Grune & Stratton, Inc., 1970. pp. 212–239.

Garmezy, N. Commentary on Shakow's "Observations." *Journal of Nervous and Mental Disease,* 153:317–322, 1971a.

Garmezy, N. Vulnerability research and the issue of primary prevention. *American Journal of Orthopsychiatry,* 41:101–116, 1971b.

Garmezy, N. Models of etiology for the study of children who are at risk for schizophrenia. In: Roff, M.; Robins, L.; and Pollack, M.M., eds. *Life History Research in Psychopathology.* Vol. II. Minneapolis: University of Minnesota Press, 1972a. pp. 9–23.

Garmezy, N. "The Study of Competence in Children at Risk for Severe Psychopathology. Working Paper." Presented at Conference on Risk and Mastery in Children from the Point of View of Genetic and Constitutional Factors and Early Life Experiences, Bled, Yugoslavia, July, 1972b.

Garmezy, N. Competence and adaptation in adult schizophrenic patients and children at risk. In: Dean, S.R., eds. *Prize Lectures in Schizophrenia: The First Ten Dean Awards.* New York: MSS Publications, in press.

Garmezy, N. Research strategies for the study of children who are at risk for schizophrenia. In: Katz, M.M.; Littlestone, R.; Mosher, L.R.; Roath, M.S.; and Tuma, A.H., eds. *Schizophrenia: Implications of Research Findings for Treatment and Teaching.* In preparation.

Garmezy, N., and Nuechterlein, K.H. Vulnerable and invulnerable children: The fact and fiction of competence and disadvantage. (Abstract) *American Journal of Orthopsychiatry,* 77:328–329, 1972.

Gengnagel, E. Beitrag zum Problem der erbprognose Bestimmung über die Erkrankungs aussichten der Kinder von Schizophrenen. *Zeitschrift für die gesamte Neurologie und Psychiatrie,* 145:52–61, 1933.

Gerard, D.I., and Siegel, J. The family background of

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

schizophrenia. *Psychiatric Quarterly,* 24:47–73, 1950.

Gerty, U.M. The adaptive behavior of adolescent children whose mothers were hospitalized at St. Elizabeths Hospital with a diagnosis of schizophrenia. *Catholic University of America Studies in Social Work,* No. 22, 1955.

Gildea, M.C.; Glidewell, J.C.; and Kantor, M.B. Maternal attitudes and general adjustment in school children. In: Glidewell, J., ed. *Parental Attitudes and Child Behavior.* Springfield, Ill.: Charles C Thomas, Publisher, 1960. pp. 42–89.

Glaser, Y.I. A unit for mothers and babies in a psychiatric hospital. *Journal of Child Psychology and Psychiatry,* 3:53–60, 1962.

Goldstein, M.J., and Rodnick, E.H. "Phenothiazine Effects on Acute Schizophrenic Behavior." Progress report to the Schizophrenia Research Committee of the Scottish Rite, Sept. 1972.

Goldstein, M.J.; Judd, L.L.; Rodnick, E.H.; Alkire, A.; and Gould, E. A method for studying social influence and coping patterns within families of disturbed adolescents. *Journal of Nervous and Mental Disease,* 147(3):233–251, 1968.

Gottesman, I.I. Genetic variance in adaptive personality traits. *Journal of Child Psychology and Psychiatry,* 7:199–208, 1966.

Gottesman, I.I., and Shields, J. *Schizophrenia and Genetics. A Twin Study Vantage Point.* New York: Academic Press, Inc., 1972.

Grunebaum, H.U., and Weiss, J.L. Psychotic mothers and their children: Joint admission to adult psychiatric hospital. *American Journal of Psychiatry,* 119:927–933, 1963.

Grunebaum, H.U., and Weiss, J.L. "Management and Evaluation of a Joint-Admission Program. Final Report." (USPHS-NIMH Grant No. 7–R11 MH 02436-01) Massachusetts Mental Health Center, Boston, Mass., Nov. 30, 1967.

Haggard, E.A.; Brekstad, A.; and Skard, A.G. On the reliability of the anamnestic interview. *Journal of Abnormal and Social Psychology,* 61:311–318, 1960.

Haley, J. Research on family patterns: An instrument measurement. *Family Process,* 3:41–65, 1964.

Hallgren, B., and Sjögren, T. A clinical and genetico-statistical study of schizophrenia and low-grade mental deficiency in a large Swedish rural population. *Acta Psychiatrica Neurologica Scandinavica,* 35: Supplement 140, 1959.

Hare, E.H., and Shaw, G.K. A study in family health: (2) A comparison of the health of fathers, mothers and children. *British Journal of Psychiatry,* 111:467–471, 1965.

Harper, P.A., and Wiener, G. Sequelae of low birth weight. *Annual Review of Medicine,* 16:405–420, 1965.

Heston, L.L. Psychiatric disorders in foster home reared children of schizophrenic mothers. *British Journal of Psychiatry,* 112:819–825, 1966.

Heston, L.L. Discussion: Schizophrenia—onset in infancy. *Social Biology,* 18 (Sept. supplement):S114–116, 1971.

Heston, L.L., and Denney, D. Interactions between early life experience and biological factors in schizophrenia. In: Rosenthal, D., and Kety, S.S., eds. *The Transmission of Schizophrenia.* Oxford: Pergamon Press Ltd., 1968. pp. 363–376.

Higgins, J. Effect of child rearing by schizophrenic mothers. *Journal of Psychiatric Research,* 4:153–167, 1966.

Hoffmann, H. Die Nachkommenschaft bei endogenen Psychosen. *Monograph aus Gesamtgebiete der Neurologie und Psychiatrie,* Heft 26. Berlin: Julius Springer, 1921.

Jackson, D.D. Schizophrenia the nosological nexus. In: Romano, J., ed. *The Origins of Schizophrenia.* Amsterdam: Excerpta Medica Foundation, 1967. pp. 111–120.

Jenkins, R.L. Diagnoses, dynamics, and treatment in child psychiatry. In: Jenkins, R.L., and Cole, J.O., eds. *Diagnostic Classification in Child Psychiatry.* Vol. 18. Washington, D.C.: American Psychiatric Association, 1964. pp. 91–120.

Jung, C.G. *Psychological Types.* New York: Harcourt, Brace & World, Inc., 1923.

Kagan, J., and Moss, H.A. *Birth to Maturity.* John Wiley & Sons, Inc., 1962.

Kahn, E. Studien über Vererbung und Entstehung geistiger Storungen. IV. Schizoid und Schizophrenie im Erbgang. *Monographien aus dem Gesamtgebiete der Neurologie und Psychiatrie,* 36:1, 1923.

Kallmann, F.J. *The Genetics of Schizophrenia.* New York: J.J. Augustin, 1938.

Kallmann, F.J.; Falek, A.; Hurzeler, M.; and Erlenmeyer-Kimling, L. The developmental aspects of children with two schizophrenic parents. In: Solomon, P., and Glueck, B.C., eds. *Recent Research on Schizophrenia.* Psychiatric Research Report No. 19. Washington, D.C.: The American Psychological Association, 1964. pp. 136–145.

Kety, S.S. Biochemical hypotheses and studies. In: Bellak, L., and Loeb, L., eds. *The Schizophrenic*

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Syndrome. New York: Grune & Stratton, Inc., 1969. pp. 155–171.

Kety, S.S.; Rosenthal, D.; Schulsinger, F.; and Wender, P.H. The types and prevalence of mental illness in the biological and adoptive families of adopted schizophrenics. *Journal of Psychiatric Research,* Supplement 1:345–362, 1968.

Kety, S.S.; Rosenthal, D.; Wender, P.H.; Schulsinger, F.; and Jacobsen, B. "Mental Illness in the Biological and Adoptive Families of Adopted Children Who Have Become Schizophrenic: A Preliminary Report Based upon Psychiatric Interviews with Relatives." Presented at Conference on Risk, Dorado Beach, Puerto Rico, Oct. 1972.

Koel, B.S. Failure to thrive and fetal injury as a continuum. *American Journal of Diseases of Children,* 118:565–567, 1969.

Kohn, M.L. Social class and schizophrenia: A critical review. In: Rosenthal, D., and Kety, S.S., eds. *The Transmission of Schizophrenia.* Oxford: Pergamon Press, Ltd., 1968. pp. 155–173.

Kohn, M.L. *Class and Conformity: A Study in Values.* Homewood, Ill.: The Dorsey Press, 1969.

Kohn, M.L. Class, family and schizophrenia: A reformulation. *Social Forces,* 50:295–313, 1972.

Lampron, E.M. Children of schizophrenic parents. *Mental Hygiene,* 17: 82–91, 1933.

Lane, E.A., and Albee, G.W. Early childhood intellectual differences between schizophrenic adults and their siblings. *Journal of Abnormal and Social Psychology,* 68:193–195, 1964.

Lane, E.A., and Albee, G.W. On childhood intellectual decline of adult schizophrenics: A reassessment of an earlier study. *Journal of Abnormal Psychology,* 73:174–177, 1968.

Langner, T.S., and Michael, S.T. *Life Stress and Mental Health.* New York: The Free Press of Glencoe, Inc., 1963.

Lewis, A.J. The offspring of parents both mentally ill. *Acta Genetica,* 7:350–365, 1957.

Lidz, T. The family, language, and the transmission of schizophrenia. In: Rosenthal, D., and Kety, S.S., eds. *The Transmission of Schizophrenia.* Oxford: Pergamon Press, Ltd., 1968. pp. 175–184.

Lidz, T. The nature and origins of schizophrenic disorders. *Annals of Internal Medicine,* 77:639–645, 1972.

Lidz, T.; Cornelison, A.R.; Terry, D.; and Fleck, S. Intrafamilial environment of the schizophrenic patient: VI. The transmission of irrationality. *AMA Archives of Neurology and Psychiatry,* 79:305–316, 1958.

Lidz, T.; Fleck, S.; and Cornelison, A.R. *Schizophrenia and the Family.* New York: International Universities Press, 1965.

Lubensky, A. "Intelligence and School Performance of Children Hospitalized for Schizophrenia as Adults." Unpublished doctoral dissertation, Harvard University, Cambridge, Mass., 1972.

Ludy, J. Social adjustment of children of psychotic mothers. (Abstract) *Smith College Studies in Social Work,* 10:148, 1939.

McGraw, M.B., and Molloy, L.B. The pediatric anamnesis: Inaccuracies in eliciting developmental data. *Child Development,* 12:255–265, 1941.

Main, T.F. Mothers with children in a psychiatric hospital. *Lancet,* 2:845–847, 1958.

Marcus, L.M. "Studies of Attention in Children Vulnerable to Psychopathology." Unpublished Ph.D. dissertation, University of Minnesota, Minneapolis, Minn., 1972.

Mass, A.L. "Children with Mentally Ill Mothers." Unpublished master's thesis, University of Southern California, Los Angeles, Calif., 1957.

Mayer-Gross, W.; Slater, E.; and Roth, M. *Clinical Psychiatry.* Baltimore, Md.: The Williams & Wilkins Company, 1960.

Mechanic, D. Social class and schizophrenia: Some requirements for a plausible theory of social influence. *Social Forces,* 50:305–309, 1972.

Mednick, S.A. Breakdown in individuals at high risk for schizophrenia: Possible predispositional perinatal factors. *Mental Hygiene,* 54(1):50–63, 1970.

Mednick, S.A., and McNeil, T.F. Current methodology in research on the etiology of schizophrenia: Serious difficulties which suggest the use of the high-risk-group method. *Psychological Bulletin,* 70 (6):681–693, 1968.

Mednick, S.A.; Mura, E.; Schulsinger, F.; and Mednick, B. Perinatal conditions and infant development in children with schizophrenic parents. *Social Biology,* 18 (Sept. supplement):S103–S113, 1971.

Mednick, S.A.; Mura, E.; Schulsinger, F.; and Mednick, B. Erratum and further analysis: Perinatal conditions and infant development in children with schizophrenic parents. *Social Biology,* 20(1):111–112, 1973.

Mednick, S.A., and Schulsinger, F. Some premorbid characteristics related to breakdown in children with schizophrenic mothers. In: Rosenthal, D., and Kety, S.S., eds. *The Transmission of Schizophrenia.* Oxford: Pergamon Press Ltd., 1968. pp. 267–291.

Mednick, S.A., and Schulsinger, F. Factors related to breakdown in children at high risk for schizophrenia. In: Roff, M., and Ricks, D.F., eds. *Life History Research in Psychopathology.* Vol. I. Minneapolis: University of Minnesota Press, 1970. pp. 51–93.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Meehl, P.E. Nuisance variables and the ex post facto design. In: *Minnesota Studies in the Philosophy of Science.* Vol. IV. Minneapolis: University of Minnesota Press, 1970. pp. 373–402.

Michael, C.N. Follow-up studies of introverted children. III. Relative incidence of criminal behavior. *Journal of Criminal Law and Criminology,* 47:414–422, 1956.

Michael, C.M.; Morris, D.P.; and Soroker, E. Follow-up studies of shy, withdrawn children: II. Relative incidence of schizophrenia. *American Journal of Orthopsychiatry,* 27:331–337, 1957.

Mishler, E.G., and Scotch, N.A. Sociocultural factors in the epidemiology of schizophrenia. A review. *Psychiatry,* 26(4):315–353, 1963.

Morris, H.H.; Escoll, P.J.; and Wexler, R. Aggressive behavior disorders of childhood—a follow-up study. *American Journal of Psychiatry,* 112:991–997, 1956.

Morris, D.P.; Soroker, E.; and Burruss, G. Follow-up studies of shy, withdrawn children: Evaluation of later adjustment. *American Journal of Orthopsychiatry,* 24:743–755, 1954.

Mosher, L.R., and Wynne, L.C. Methodological issues in research with groups at high risk for the development of schizophrenia. *Schizophrenia Bulletin,* No. 2:4–8, Fall 1970.

Namache, G.F., and Ricks, D.F. "Life Patterns of Children Who Became Adult Schizophrenics." Presented at the Annual Meeting of the American Orthopsychiatry Association, San Francisco, Calif., April 16, 1966.

Nameche, G.; Waring, M.; and Ricks, D. Early indicators of outcome in schizophrenia. *Journal of Nervous and Mental Disease,* 139(3):232–240, 1964.

Oltman, J.E.; McGarry, J.J.; and Friedman, S. Parental deprivation and the broken home in dementia praecox and other mental disorders. *Journal of Psychiatry,* 128:685–694, 1952.

Oppler, W. Zum Problem der Erbprognosebestimmung über die Erkrankungensaussichten. der direkten nachkommen von Schizophrenen in Schlesien. *Zeitschrift fur die gesamte Neurologie und Psychiatrie,* 141:549–616, 1932.

Pasamanick, B.; Constantinou, F.K.; and Lilienfeld, A.M. Pregnancy experience and the development of childhood speech disorders: An epidemiologic study of the association with maternal and fetal factors. *American Journal of Diseases of Children,* 91:113–118, 1956.

Pasamanick, B., and Kawi, A. A study of the association of prenatal and paranatal factors with the development of tics in children: A preliminary investigation. *Journal of Pediatrics,* 48:596–601, 1956.

Pasamanick, B., and Knobloch, H. Brain damage and reproductive casualty. *American Journal of Orthopsychiatry,* 30:298–305, 1960.

Pasamanick, B., and Knobloch, H. Epidemiologic studies on the complications of pregnancy and the birth process. In: Caplan, G., ed. *Prevention of Mental Disorders in Children.* New York: Basic Books, 1961. pp. 74–94.

Pasamanick, B.; Knobloch, H.; and Lilienfeld, A.M. Socio-economic status and some precursors of neuropsychiatric disorders. *American Journal of Orthopsychiatry,* 26:594–601, 1956.

Pasamanick, B.; Rogers, M.E.; and Lilienfeld, A.M. Pregnancy experience and the development of behavior disorder in children. *American Journal of Psychiatry,* 112:613–618, 1956.

Patton, R.G., and Gardner, L.I. Short stature associated with internal deprivation syndrome: Disordered family environment as cause for so-called idiopathic hypopituitarism. In: Gardner, C.I., ed. *Diseases of Childhood.* Philadelphia, Pa: W.B. Saunders Company, 1969.

Pavenstedt, E. A comparison of the child-rearing environments of upper-lower and very low-lower class families. *American Journal of Orthopsychiatry,* 35: 89–98, 1965.

Pavenstedt, E. *The Drifters.* Boston: Little, Brown and Company, 1967.

Paykel, E.S.; Weissman, M.M.; Prusoff, B.A.; and Tonks, C.M. Dimensions of social adjustment in depressed women. *Journal of Nervous and Mental Disease,* 152:158–173, 1971.

Pollin, W., and Stabenau, J.R. Biological, psychological and historical differences in a series of monozygotic twins discordant for schizophrenia. In: Rosenthal, D., and Kety, S.S., eds. *The Transmission of Schizophrenia.* Oxford: Pergamon Press Ltd., 1968. pp. 317–332.

Post, F. The social orbit of psychiatric patients. *Journal of Mental Science,* 108:759–771, 1962.

Post, F., and Wardle, J. Family neurosis and family psychosis. *Journal of Mental Science,* 108:147–158, 1962.

Preston, G.H., and Antin, R. A study of children of psychotic parents. *American Journal of Orthopsychiatry,* 2:231–241, 1932.

Rachman, S. Extraversion and neuroticism in childhood. In: Eysenck, H.J., and Eysenck, S.B.C. *Personality Structure and Measurement.* San Diego, Calif.: Robert R. Knapp, 1969. pp. 253–264.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Radinsky, E.K. Children of discharged mental hospital patients. *Children,* 88:7–8, 88–92, 1960–61.

Ramage, M. "Mental Health of Children of Psychotic Mothers." Unpublished Master's thesis. Smith College School for Social Work, Northampton, Mass., 1925.

Reisby, N. Psychoses in children of schizophrenic mothers. *Acta Psychiatrica Scandinavica,* 43:8–20, 1967.

Rice, E.P., and Krakow, S.G. Hospitalization of a parent for mental illness: A crisis for children. *American Journal of Orthopsychiatry,* 36:868–872, 1966.

Ricks, D.F. Life history research in psychopathology: Retrospect and prospect. In: Roff, M., and Ricks, D.F., eds. *Life History Research in Psychopathology.* Minneapolis: University of Minnesota Press, 1970. pp. 288–307.

Ricks, D.F., and Berry, J.C. Family and symptom patterns that precede schizophrenia. In: Roff, M., and Ricks, D.F., eds. *Life History Research in Psychopathology.* Minneapolis: University of Minnesota Press, 1970. pp. 31–50.

Ricks, D.F., and Nameche, G.F. Symbiosis, sacrifice and schizophrenia. *Mental Hygiene,* 50:11–15, 1966.

Robins, L.N. Mental illness and the runaway: A thirty-year follow-up study. *Human Organization,* 16: 11–15, 1958.

Robins, L.N. *Deviant Children Grown Up.* Baltimore, Md: The Williams & Wilkins Company, 1966.

Robins, L.N., and O'Neal, P.L. The strategy of follow-up studies with special reference to children. In: Howells, J.G., ed. *Modern Perspectives in International Child Psychiatry.* Edinburgh: Oliver and Boyd, 1969. pp. 785–804.

Rodnick, E.H. Antecedents and continuities in schizophreniform behavior. In: Dean, S.R., ed. *Prize Lectures in Schizophrenia: The First Ten Dean Awards.* New York: MSS Publications, in press.

Rodnick, E.H., and Goldstein, M.J. "A Research Strategy for Studying Risk for Schizophrenia During Adolescence and Early Adulthood." Presented at Conference on Risk Research, Dorado Beach, Puerto Rico, Oct. 1972.

Rolf, J.E. The academic and social competence of children vulnerable to schizophrenia and other behavior pathologies. *Journal of Abnormal Psychology,* 80(3):225–243, 1972.

Rolf, J.E., and Garmezy, N. The school performance of children vulnerable to behavior pathology. In: Ricks D.F.; Thomas, A.; and Roff, M., eds. *Life History Research in Psychopathology.* Vol. III. Minneapolis: University of Minnesota Press, in press.

Roman, P.M., and Trice, H.M. *Schizophrenia and the Poor.* Ithaca: New York State School of Industrial and Labor Relations, 1967.

Rosenthal, D. Familial concordance by sex with respect to schizophrenia. *Psychological Bulletin,* 59: 401–421, 1962.

Rosenthal, D., ed. *The Genain Quadruplets.* New York: Basic Books, 1963.

Rosenthal, D. *Genetic Theory and Abnormal Behavior.* New York: McGraw-Hill Book Company, 1970.

Rosenthal, D. A program of research on heredity in schizophrenia. *Behavioral Science,* 16:191–201, 1971.

Rosenthal, D. Three adoption studies of heredity in the schizophrenic disorders. *International Journal of Mental Health,* 1(1–2):63–75, 1972.

Rosenthal, D.; Raphling, L.S.; and Quinn, O.W. Anamnesis. In: Rosenthal, D., ed. *The Genain Quadruplets.* New York: Basic Books, Inc., Publishers, 1963. pp. 22–149.

Rosenthal, D.; Wender, P.H.; Kety, S.S.; Schulsinger, F.; Welner, J.; and Ostergaard, L. Schizophrenics' offspring reared in adoptive homes. In: Rosenthal, D., and Kety, S.S., eds. *The Transmission of Schizophrenia.* Oxford: Pergamon Press, Ltd., 1968. pp. 377–391.

Rutter, M. Children of sick parents: An environmental and psychiatric study. *Maudsley Monograph,* No. 16, 1966.

Rutter, M. Language, retardation and psychological development. In: Rutter, M., and Martin, J.A.M., eds. *Young Children with Delayed Speech.* London: Heinemann, 1972.

Sameroff, A.J., "Schizotaxia Revisited: Model Issues in the Etiology of Schizophrenia." Presented at the Conference on Risk Research, Dorado Beach, Puerto Rico, Oct 1972.

Sameroff, A.J., and Chandler, M.J. Perinatal risk and the continuum of caretaking casualty. In: Horowitz, F.D.; Hetherington, M.; Scarr-Salapatek, S.; and Siegel, G., eds. *Review of Child Development Research.* Vol. 4. Chicago, Ill.: Society for Research in Child Development, in press.

Sameroff, A.J., and Zax, M. "Neonatal Factors in Serious Mental Disorder. Progress Report." (NIMH Grant 16544) University of Rochester School of Medicine, Rochester, N.Y., June 1972a.

Sameroff, A.J., and Zax, M. "Perinatal Characteristics of the Offspring of Schizophrenic Women." Presented at the Annual Meeting of the American

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Psychological Association, Honolulu, Hawaii, Sept. 1972b.

Sampson, H.; Messinger, S.L.; and Towne, R.D. Family processes and becoming a mental patient. In: Sampson, E.E., ed. *Approaches, Contexts and Problems of Social Psychology.* Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1965. pp. 515–522.

Sanua, V.D. Sociocultural factors in families of schizophrenics. *Psychiatry,* 24:246–265, 1961.

Schaffer, H.R., and Emerson, P.E. Patterns of response to physical contact in early human development. *Journal of Child Psychology and Psychiatry and Allied Disciplines,* 5(1):1–13, 1964.

Schulz, B. Kinder schizophrener elternpaare. *Zeitschrift fur die gesamte Neurologie und Psychiatrie,* 168:332–381, 1940.

Schulz, B., and Leonhard, K. Erbbiologischklinische Untersuchungen an insgesamt 99 inn Sinne Leonhards typeschen beziehungsweise atypischen Schizophrenien. *Zeitschrift fur die gesamte Neurologie und Psychiatrie,* 168:587–613, 1940.

Shea, M.J. "A Follow-up Study into Adulthood of Adolescent Psychiatric Patients in Relation to Internalizing and Externalizing Symptoms, MMPI Configurations, Social Competence, and Life History Variables." Unpublished Ph.D. thesis, University of Minnesota, Minneapolis, Minn. 1972.

Singer, M.T. Family transactions and schizophrenia: I. Recent research findings. In: Romano, J., ed. *The Origins of Schizophrenia.* Amsterdam: Excerpta Medica Foundation, 1967. pp. 147–164.

Singer, M.T., and Wynne, L.C. Differentiating characteristics of parents of childhood schizophrenics, childhood neurotics, and young adult schizophrenics. *American Journal of Psychiatry,* 120:234–243, 1963.

Slater, E., and Roth, M. *Clinical Psychiatry.* Third edition. London: Bailliere, Tindall and Cassell, 1969.

Sobel, D.E. Children of schizophrenic patients: Preliminary observations on early development. *American Journal of Psychiatry,* 118:512–517, 1961a.

Sobel, D.E. Infant mortality and malformations in children of schizophrenic women. *Psychiatric Quarterly,* 35:60–65, 1961b.

Sparrow, N.H., and Ross, J. The dual nature of extraversion: A replication. *Australian Journal of Psychology,* 16:214–218, 1964.

Spitzer, R.L., and Endicott, J. Diago II: Further developments in a computer program of psychiatric diagnosis. *American Journal of Psychiatry,* 125 (Supplement 7):12–21, 1969.

Spitzer, R.; Endicott, J.; Fleiss, J.; and Cohen, J. The psychiatric status schedule. *Archives of General Psychiatry,* 23:41–55, 1970.

Srole, L.; Langner, T.S.; Michael, S.T.; Opler, M.K.; and Rennie, T.A.C. *Mental Health in the Metropolis: The Midtown Manhattan Study.* Vol. 1. New York: McGraw-Hill Book Company, Inc., 1962.

Stevens, B.C. *Marriage and Fertility of Women Suffering from Schizophrenia or Affective Disorders.* London: Oxford University Press, 1969.

Streitman, S. "The Behavioral Adjustment of Vulnerable Children with a High Risk for Schizophrenia." Unpublished summa cum laude thesis, University of Minnesota, Minneapolis, Minn. 1968.

Sunier, A., and Meijers, N.A. The influence of a chronic psychosis of the parents upon the development of the child. *Folia Psychiatrica Neurologica et Neurochirurgica Neerlandica,* 54:323–330, 1951.

Sussex, J.N.; Gassman, F.; and Raffel, S.C. Adjustment of children with psychotic mothers in the home. *American Journal of Orthopsychiatry,* 33: 849–854, 1963.

Suttles, G.D. *The Social Order of the Slum.* Chicago: University of Chicago Press, 1968.

Thomas, A.; Birch, H.G.; Chess, S.; Hertzig, M.E.; and Korn, S. *Behavioral Individuality in Early Childhood.* New York: New York University Press, 1963.

Thomas, A.; Chess, S.; and Birch, H.G. *Temperament and Behavior Disorders in Children.* New York: New York University Press, 1968.

Treudley, M.B. Mental illness and family routines. *Mental Hygiene,* 30:235–250, 1946.

Turner, R.J. "In Pursuit of Socially Malleable Contingencies in Schizophrenia: Some Next Steps in Epidemiological Research." Presented at NIMH Conference on Schizophrenia, Erich Lindemann Mental Health Center, Boston, Mass., March 1972.

Turner, R.J., and Wagenfeld, M.O. Occupational mobility and schizophrenia: An assessment of the social causation and social selection hypotheses. *American Sociological Review,* 32:104–113, 1967.

Van Dyke, J.L. "Electrodermal Functioning in Adopted-Away Offspring of Schizophrenics: A Study of the Inherited Diathesis in Schizophrenia." Unpublished Ph.D. dissertation, George Washington University, Washington, D.C., 1972.

Wahl, C.W. Some antecedent factors in the family histories of 568 male schizophrenics of the United States Navy. *American Journal of Psychiatry,* 113: 201–210, 1956.

Waring, M., and Ricks, D.F. Family patterns of children who became adult schizophrenics. *Journal of Nervous and Mental Disease,* 140:351–364, 1965.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Watt, N.F. Longitudinal changes in the social behavior of children hospitalized for schizophrenia as adults. *Journal of Nervous and Mental Disease,* 155:42–54, 1972.

Watt, N.F. Childhood roots of schizophrenia. In: Ricks, D.F.; Thomas, A.; and Roff, M., eds. *Life History Research in Psychopathology.* Vol. III Minneapolis: University of Minnesota Press, in press.

Watt, N.F.; Stolorow, R.D.; Lubensky, A.W. and McClelland, D.C. School adjustment and behavior of children hospitalized for schizophrenia as adults. *American Journal of Orthopsychiatry,* 40(4):637–657, 1970.

Wegman, M. Annual review of vital statistics. *Pediatrics,* 42:1005–1008, 1968.

Weintraub, S.A. "Cognitive and Behavioral Impulsivity in Internalizing, Externalizing and Normal Children." Unpublished doctoral dissertation. University of Minnesota, Minneapolis, Minn., 1968.

Weiss, J.L.; Grunebaum, H.U.; and Schell, R.E. Psychotic mothers and their children. *Archives of General Psychiatry,* 11:90–98, 1964.

Weissman, M.M. The depressed woman: Recent research. *Social Work,* 17:19–25, 1972.

Weissman, M.M.; Paykel, E.S.; and Klerman, G. The depressed woman as a mother. *Social Psychiatry,* 7, 1972.

Weissman, M.M.; Paykel, E.S.; Siegel, R.; and Klerman, G.L. "The Social Role Performance of Depressed Women: Comparisons with a Normal Group." Unpublished manuscript, Department of Psychiatry, Yale University School of Medicine, New Haven, Conn., 1972.

Wenar, C., and Wenar, S.C. The short term prospective model, the illusion of time, and the tabula rasa child. *Child Development,* 34:697–708, 1963.

Wender, P.H. The role of genetics in the etiology of the schizophrenias. *American Journal of Orthopsychiatry,* 39:447–458, 1969.

Wing, J.K.; Berley, J.L.T.; Cooper, J.E.; Graham, P.; and Isaacs, A.D. Reliability of a procedure for measuring and classifying "present psychiatric state." *British Journal of Psychiatry,* 113(498):499–515, 1967.

Wittman, M.P., and Steinberg, L. A study of prodromal factors in mental illness with special reference to schizophrenia. *American Journal of Psychiatry,* 100:811–816, 1944.

World Health Organization. *The International Pilot Study of Schizophrenia.* Vol. I. Geneva: World Health Organization 1973.

Wynne, L.C. Family transactions and schizophrenia. II.: Conceptual considerations for a research strategy. In: Romano, J., ed. *The Origins of Schizophrenia.* Amsterdam: Excerpta Medica Foundation, 1967. pp. 165–178.

Wynne, L.C. Methodologic and conceptual issues in the study of schizophrenics and their families. In: Rosenthal, D. and Kety, S.S., eds. *The Transmission of Schizophrenia.* Oxford: Pergamon Press Ltd., 1968. pp. 185–199.

Wynne, L.C. "Strategies for Sampling Groups at High Risk for the Development of Schizophrenia." National Institute of Mental Health, Washington, D.C., June 12–13, 1969.

Wynne, L.C. "Children and Families Vulnerable to Schizophrenia." (MH 22836–01) Department of Psychiatry, University of Rochester School of Medicine, Rochester, N.Y., 1972.

Wynne, L.C. Emerging trends in family research on schizophrenia. In: Katz, M.M.; Littlestone, R.; Mosher, L.R.; Tuma, A.H.; and Roath, M., eds. *Schizophrenia: Implications of Research Findings for Treatment and Teaching.* In preparation.

Wynne, L.C., and Singer, M.T. Thought disorder and family relations of schizophrenics: I. A research strategy. *Archives of General Psychiatry,* 9:191–198, 1963.

Wynne, L.C., and Singer, M.T. Schizophrenics and their families: II. Recent research methods. *British Journal of Psychiatry,* in press.

Yarrow, M.R.; Campbell, J.D.; and Burton, R.V. Recollections of childhood: A study of the retrospective method. *Monographs of the Society for Research in Child Development,* 35(5): Serial No. 138, 1970.

Yolles, S.F., and Kramer, M. Vital statistics. In: Bellak, L., and Loeb, L., eds. *The Schizophrenic Syndrome.* New York: Grune & Stratton, Inc., 1969. pp. 66–113.

Zerbin-Rudin, E. Endogene Psychosen. In: Becker, P.E., ed. *Human genetik einkurzes Handbuch.* Vol. V/2. Stuttgart: George Thieme Verlag, 1967. pp. 446–577.

Zigler, E., and Phillips, L. Case history data and psychiatric diagnosis. *Journal of Consulting Psychology,* 25:458, 1961a.

Zigler, E., and Phillips, L. Psychiatric diagnosis and symptomatology. *Journal of Abnormal and Social Psychology,* 63:69–75, 1961b.

Zigler, E., and Phillips, L. Social competence and the process-reactive distinction in psychopathology. *Journal of Abnormal and Social Psychology,* 65: 215–222, 1962.

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024

Acknowledgment

The preparation of this monograph was facilitated by several grants to the senior investigator. Primary support was provided by USPHS Contract No. PH 43–68–1313 and a Research Career Award MH–K6–14,914. Supplemental support was given by the Supreme Council 33° A.A. Scottish Rite, Northern Masonic Jurisdiction, USA (Schizophrenia Research Program). The authors gratefully acknowledge the assistance provided by the various researchers whose investigative work is reported herein. We also wish to thank Drs. Loren Mosher, Martin Katz, and A. Hussain Tuma of the NIMH staff for their contributions to the project. Ms. Beverly Kaemmer provided a most welcome editorial hand.

The Authors

Norman Garmezy, Ph.D., is Professor of Psychology, University of Minnesota, Minneapolis, Minn. Dr. Garmezy is also associated with the Department of Psychiatry, University of Rochester School of Medicine, Rochester, N.Y.

Ms. Streitman is now at the Department of Psychology, University of Houston, Houston, Tex.

Part II of the foregoing monograph, to be published in the next issue of the Schizophrenia Bulletin, *will include: 1) A review of 15 ongoing programs of risk research currently being conducted in the United States and abroad; 2) a critique of issues in risk research; 3) the study of invulnerable children; and 4) intervention with children and families at risk.*—The Editors.

an invitation to readers

Providing a forum for a lively exchange of ideas ranks high among the *Schizophrenia Bulletin's* objectives. In the section, **At Issue,** readers are asked to comment on specific controversial subjects that merit wide discussion. But remarks need not be confined to the issues we have identified. **At Issue** is open to any schizophrenia-related topic that needs airing. It is a place for readers to discuss articles that appear in the *Bulletin* or elsewhere in the professional literature, to report informally on experiences in the clinic, laboratory, or community, and to share ideas—including those that might seem to be radical notions. We welcome all comments.—*The Editors.*

Send your remarks to: **At Issue**
Center for Studies of Schizophrenia
National Institute of Mental Health
5600 Fishers Lane
Rockville, Md. 20852

Downloaded from https://academic.oup.com/schizophreniabulletin/article/1/8/14/1860408 by guest on 17 April 2024