

The Finnish Adoptive Family Study of Schizophrenia

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Received November 5, 1984

A nationwide Finnish sample of schizophrenic mothers' offspring given up for adoption has been compared blindly with matched controls; i.e., adopted-away offspring of non-schizophrenic biologic parents. The families have been investigated thoroughly by joint and individual interviews and psychological tests. In the 91 pairs where both the index and control families have already been investigated and rated, the total number of severe diagnoses (psychosis, borderline, character disorder) is 28.6 percent (26/91) in the index group and 16.5 percent (15/91) in the matched control group. Of the seven psychotic cases, six are offspring of schizophrenics and only one is a control offspring. However, no seriously disturbed offspring has been found in a healthy or mildly disturbed adoptive family, and those offspring who were psychotic and seriously disturbed were nearly all reared in disturbed adoptive families. This combination of findings supports the hypothesis that a possible genetic vulnerability has interacted with the adoptive rearing environment.

In seeking to assess and separate the effects of hereditary and family-dynamic factors, psychiatric research is faced with the difficulty that disordered parents who have transmitted genetic factors to their offspring have generally also brought them up. In a study of children given up for adoption at an early age, discrimination between these two sets of factors is possible. The biologic parents have given to their child the genetic characteristics and, often, the very early environment; the adoptive parents have provided the family environment and rearing.

Some well-known adoption studies of schizophrenia have been carried out. Heston [1] reported a very high age-corrected rate (16.6 percent) for schizophrenia in the offspring of schizophrenic mothers reared in foundling homes and eventually adopted or reared in foster homes, usually with paternal relatives. There were methodologic problems with Heston's study, however. Rosenthal et al.'s [2] Danish study corrected some of these weaknesses: the offspring were all formally adopted by a non-relative; the interviewer and raters were blind as to whether the adoptees were an index or a control offspring.

The Danish study by Kety et al. [3], which examined the genetic hypothesis, began with adopted schizophrenics and studied the types and prevalence of mental illness in the biologic and adoptive relatives. This study was not designed to study the family-rearing environment or gene-environment interaction.

In the earlier adoption studies, rearing variables were studied in an extremely limited manner, focusing mainly upon the hypothesis that diagnosis of the rearing parent is a rearing variable. Wender et al.'s [4] results in an American adoption study

were reported as support for genetic theory because they found less psychopathology in the adoptive parents of the schizophrenic index cases than in the biologic parents (who had reared their schizophrenic offspring), but more psychopathology than adoptive parents of normal controls. Wynne, Singer, and Toohey [5] reexamined Wender et al.'s results and pointed out that the results depended on how the parental schizophrenia spectrum diagnoses were delimited. Wynne, Singer, and Toohey [5] used a parental "communication deviance" measure with Wender's Rorschach protocols and they were able to discriminate blindly the two groups of rearing parents (*both* the biologic parents who reared their schizophrenic offspring *and* the adoptive parents who reared a schizophrenic) from the parents who reared normal adoptees.

No adoption study of schizophrenia has thus far reported data using measures of direct family interaction. Rosenthal et al. [6] assessed the quality of the relationship between the child and the adoptive parents on the basis of individual interview reports from the children. The degree of psychopathological disorder in the child was then correlated with the reported quality of the parent-child relationship.

MATERIALS AND METHODS

A nationwide sample of all women hospitalized in Finland because of schizophrenia was collected. The sample included both consecutive admissions (after January 1, 1960) and resident population (on January 1, 1960)—a total of 19,447 schizophrenic women [7]. Through registers, it had been found that 289 offspring of 263 schizophrenic women had been officially adopted. Of these 289 offspring, 196 had been placed in Finnish non-relative families before the age of five years (143, or 72.9 percent before the age of two years). Our clinical study thus far has been focused on those offspring (and their adoptive families) who were born in 1968 or earlier; in other words, on those who are now at the age of risk for schizophrenia. These adoptees have been blindly compared with matched control offspring and their adoptive families; that is, adopted-away offspring of biological parents who have not been hospitalized because of psychosis. The matching was done by persons outside the clinic who were given the matching criteria and who carried out the procedure independently. The adoptive index and control series were numbered randomly so that the psychiatrists conducting the personal interviews did not know whether the adoptees had an index or a control biologic mother.

Adoptive index and control families have been investigated in their homes directly and intensively by means of procedures that usually require two days (14–16 hours). Family relationships were studied through family and spouse interviews, as well as the Spouse and Family Consensus Rorschach and the Interpersonal Perception Method [8]. Both the adoptive parents and the offspring were interviewed personally, and individual Rorschachs were given after the Consensus Rorschach. In the adoptive families, the MMPI was given only to the adopted offspring (and later, independently, to the biologic parents). An abbreviated version of the WAIS was used with the adoptees for screening intellectual deficiencies, various visual or other perceptual disorders, and organic difficulties. All the interviews and most of the test examinations were tape-recorded. This recording will make it possible for other investigators to carry out blind ratings later on. Personal interviews and testing of biologic index mothers have also been instituted. Eighty-one of the biologic index mothers have already been interviewed and been administered the Present State Examination, the individual Rorschach, and the MMPI.

TABLE 1
Mental Health Ratings of Offspring

| | Index | Control |
|-----------------------|-------|---------|
| 1. Healthy | 1 | 8 |
| 2. Mild disturbance | 41 | 38 |
| 3. Neurotic | 23 | 30 |
| 4. Character disorder | 11 | 8 |
| 5. Borderline | 9 | 6 |
| 6. Psychotic | 6 | 1 |
| Total | 91 | 91 |
| "Mean" | 3.0 | 2.7 |

$z = -1.45; p = 0.07$

PRELIMINARY RESULTS

By May 1984, about 260 families had been contacted for field work, of whom 225 had been preliminarily scored (233 offspring). We must point out that all results in this phase are quite preliminary indeed, because all the families have not yet been interviewed.

Mental Health Ratings of Adoptive Offspring

Of the index and control offspring interviewed and tested so far, a total of 233 have been rated from 1 to 6 according to the level of disturbance. Ratings 1 and 2 mean "healthy in the clinical sense" and 3-6 refer to "clinical cases." Eight have been given diagnoses at level 6, psychosis; 19 were "borderline cases"; and 24 had character disorders (other severe personality disorders). We must point out that "borderline" here does not mean the same as borderline personality disorder in DSM III, for we have used the term in a broader sense. The total of disturbances more serious than neurosis was 22 percent.

One might expect that the longer the delay in age of transfer to an adoptive family and away from the schizophrenic mother, the worse would be the global ratings of the offspring. This does not seem to be the case. Of the offspring of schizophrenics, those placed in the adoptive family between the ages of seven and 18 months have had, on an average, better ratings than those adopted before six months of age. Offspring of controls placed after 18 months have the best functioning in adolescence and adulthood [9].

Many of the offspring interviewed so far are relatively young; one-third (77) of them are less than 20 years old. A follow-up study will be essential because these offspring have only in part passed the age of risk for schizophrenia.

Table 1 shows the mental health ratings of the offspring separately in the index group and in the control group of the 91 pairs for whom both the index cases and their matched controls have been investigated. Of seven psychotic cases, six are offspring of schizophrenics and only one a member of the control group. One of the psychotic index cases has received the diagnosis (confirmed by a separate rater) of manic-depressive psychosis; all the others are schizophrenic or probably schizophrenic. The number of psychoses 6/91 (6.6 percent), corresponds to Rosenthal et al.'s [2] finding of 3/44 (6.8

percent). The total percentage of severe diagnoses in the index group is 28.6. This figure is near the 27 percent of spectrum cases in the Rosenthal et al. study of adopted-away offspring of 44 biologic parents whose diagnosis of schizophrenia was confirmed. In the Finnish control group, 16.5 percent of the offspring had severe diagnoses, while in Rosenthal et al.'s study, 17.9 percent of the controls had schizophrenia spectrum disorders. Overall, there is a trend for the offspring of schizophrenics to be more disturbed than the offspring of controls ($p = .07$, one-tailed sign test). The differences between index and control groups for cases of psychosis were 6 versus 1 ($p = 0.0539$); 15 versus 7 ($p = 0.0345$) for cases of psychosis and borderline together; and 26 versus 15 ($p = 0.0255$) for all severe diagnoses.

Family Mental Health Rating

The total interview material has been used for global ratings of the mental health of the adoptive families as well. We have used five classes:

1. "Healthy": Usually families where anxiety is slight and the boundaries between individuals and generations and to the outside world are clearly defined. Primitive interactional defenses are not used and interaction is unambiguous and mutual. There is no overt or chronic transactional conflict in the family.

2. "Mildly disturbed family": There may be transient transactional conflict and observable mild anxiety or depressive mood. Primitive transactional defenses are seldom used. The boundaries between the generations and to the outside world are clear. The reality testing by the family is good.

3. "Neurotic family": There exists an unresolved transactional conflict of mild or moderate severity. The interactional patterns in the family are clear but to some extent restricted and repetitive. The boundaries between the generations and to the outside world are clear. Reality testing by the family is good.

4. "Rigid-syntonic family": Analogous to ego-syntonic functioning of individuals, the family that is syntonic feels its way of coping is adequate, but others see it as disturbed or dysfunctional. A major family conflict is unresolved and unacknowledged. Overt anxiety is usually low. Family members draw a sharp boundary between experience within the family and outside the family. Boundaries *within* the family (between the generations and between individuals) are blurred. Family patterns do not change despite major life events and role changes (rigid homeostasis).

5. "Severely disturbed family": Conflict is open and often chaotic. Anxiety level is high and basic trust low. All boundaries are unstable and unclear between individuals, between the generations, and between the family and the outside world. Agreement on reality (reality testing) is low. Primitive "transactional defenses" (such as projective identification and splitting) are common. Family patterns are seldom in stable equilibrium.

The above categories are an attempt to describe the most common characteristics of the families. We believe that the following factors contribute to our ratings: anxiety and its level; boundary function between the individual members, between the generations, and between the family and the outside world; parental coalition; quality of interaction; flexibility of homeostasis; "transactional defenses" [9]; conflicts, empathy, power relations; reality testing; and basic trust.

Of the 225 adoptive families (index and controls) interviewed and rated so far, 20 have been considered healthy, 72 as having mild disturbance, 50 neurotic, 48 rigid-syntonic, and 35 severely disturbed. The total number of families considered healthy is 41 percent and of those considered seriously disturbed 36 percent.

TABLE 2
Mental Health Ratings of Adoptive Families

| | Index | Control |
|-----------------------|-------|---------|
| 1. Healthy | 5 | 10 |
| 2. Mild disturbance | 34 | 26 |
| 3. "Neurotic" | 14 | 22 |
| 4. Rigid, syntonic | 19 | 22 |
| 5. Severe disturbance | 16 | 8 |
| Total | 88 | 88 |
| "Mean" | 3.1 | 2.9 |

$$z = -1.34; p = 0.18$$

If one examines those cases where both the index case and his or her matched control family have been investigated (88 pairs), it is evident that the number of severely disturbed families is higher in the index group, as is also the "mean" rating. The difference is not statistically significant ($p = 0.18$, two-tailed sign test) (refer to Table 2).

The p values for the difference between individual psychopathology ratings of index adoptive mothers and control adoptive mothers separately is 0.07, and for index and control adoptive fathers 0.08 (two-tailed test). At present, we cannot yet interpret these possible differences in rearing environments. We want to point out that in less than one-third of the cases did the mother have her psychosis before the adoption. In most cases, the psychotic symptoms of the mothers became manifest much later. One could, of course, also ask whether the vulnerable child might have had an impact on his or her adoptive parents.

In examining the relation of psychopathology in the adoptive families to the mental health ratings of the offspring, we have subdivided the families into "healthy," "neurotic," and "severe." "Healthy" includes healthy and mildly disturbed. "Severe" means rigid-syntonic and severely disturbed. In both the index and the control groups, the mean ratings of the offspring increase as the disturbance in the adoptive family becomes more severe. However, the *difference* between offspring of schizophrenics and offspring of controls becomes clear only when the adoptive family has been seriously disturbed [10].

Of the biologic offspring of schizophrenics reared in seriously disturbed adoptive families, only 8 percent have been rated healthy, and 63 percent have a severe disturbance. Of the control cases reared in severely disturbed adoptive families, 23

TABLE 3
Index Cases and Their Matched Controls
(in percentages)

| Offspring | Adoptive Family | | | | | |
|----------------------|-----------------|---------|------------|---------|----------|---------|
| | "Healthy" | | "Neurotic" | | "Severe" | |
| | Index | Control | Index | Control | Index | Control |
| "Healthy" | 82½ | 76 | 47 | 48 | 8 | 23 |
| "Neurotic" | 12½ | 24 | 47 | 43 | 29 | 40 |
| "Severe disturbance" | 5 | — | 6 | 9 | 63 | 37 |

TABLE 4
Index Cases

| Offspring | Rearing Environment | | | | | |
|--|---------------------|----|---------------------|----|-----------|---|
| | All | | Seriously Disturbed | | "Healthy" | |
| | (n = 103) | % | (n = 39) | % | (n = 43) | % |
| Psychotic | (7/103) | 7 | (5/39) | 13 | (0/43) | 0 |
| Psychotic + Borderline | (17/103) | 17 | (15/39) | 38 | (0/43) | 0 |
| Psychotic + Borderline + Character disorder | (31/103) | 30 | (25/39) | 64 | (2/43) | 5 |

percent of the offspring have been rated as healthy and only 37 percent as severely disturbed. It seems likely that a possible genetic vulnerability has interacted with the adoptive rearing environment. The biases of interviewers cannot be significant here because they worked blindly with regard to the identity of index versus control assignment. (Refer to Table 3.)

This trend becomes clear if one examines the 103 index cases rated thus far. Seven percent of the cases have been diagnosed as psychotic; 17 percent as either psychotic or borderline, and a total of 30 percent have received a severe diagnosis (Table 4). In the sample (39 offspring) reared in seriously disturbed adoptive families, the figures are almost doubled: 13 percent for psychotics, 38 percent for psychotic and borderline together, and 64 percent for those having a severe diagnosis. In contrast, there are no psychotic, no borderline diagnoses, and only two character disorder cases among the offspring reared in healthy or mildly disturbed adoptive families. The *p* values for differences between index and control offspring are for schizophrenics (5 versus 0) 0.02289, for psychotics and borderline together (15 versus 0) 0.000006, and for all serious diagnosis (25 versus 2) 0.000002. These data support the hypothesis that interaction between heredity and family environment is significant.

Age-corrected risk figures in this sample are rather high; using Weinberg's shorter method, the corrected risk for schizophrenia is 12.2 percent and for all psychoses 14.3 percent. Corresponding figures based on Strömberg's [11] age calculations are 15.3 percent for schizophrenia and 17.9 percent for all psychoses.

In Table 5 the mental health ratings of the 99 index cases (offspring of schizophrenic mothers) are shown in relation to their adoptive families. The ratings of the children and the family ratings are not independent. This result is highly significant. We can see that of the seven psychotic cases (where the family has also been rated), two grew up in a neurotic family, three in a rigid-syntonic family, and two in a severely disturbed adoptive family, whereas the borderline cases had *all* grown up in rigid-syntonic or severely disturbed families. There are no borderline or psychotic offspring who were reared in healthy or mildly disturbed families, and only two mildly disturbed offspring who were reared in rigid-syntonic or severely disturbed adoptive families.

The preliminary data concerning the adoptive families could be regarded as a result of having had the same psychiatrist interview and test the families both as units and as individuals. In order to obtain permission to see these families, however, the condition was set that not more than one person see each family. Table 6 demonstrates that all the clinical ratings do correlate with each other significantly. Therefore, the question

TABLE 5
Clinical Ratings of Index Offspring and Their Adoptive Families

| Ratings of Offspring | Ratings of Adoptive Families | | | | | Total |
|-----------------------|------------------------------|---------------------------|------------------|--------------------------|--------------|-------|
| | Healthy: 1 | Mild Disturbance: 2 | "Neurotic": 3 | Rigid, Syntonic: 4 | Severe: 5 | |
| 1. Healthy | 1 | 1 | 0 | 0 | 0 | 2 |
| 2. Mild disturbance | 6 | 27 | 8 | 2 | 0 | 43 |
| 3. Neurotic | 0 | 6 | 7 | 5 | 7 | 25 |
| 4. Character disorder | 0 | 2 | 0 | 6 | 4 | 12 |
| 5. Borderline | 0 | 0 | 0 | 4 | 6 | 10 |
| 6. Psychotic | 0 | 0 | 2 | 3 | 2 | 7 |
| Total | 7 | 36 | 17 | 20 | 19 | 99 |

$$\chi^2 = 69.635; p < .001$$

of whether the family interviews and ratings, which were conducted first, may have influenced the later ratings of the offspring can be raised. Several procedures can be used to evaluate this possibility of a kind of halo effect that may have biased the rating of the offspring.

One methodologic check has been carried out using the MMPIs obtained from the adoptive offspring. The MMPI ratings were assessed blindly by a psychologist who was not aware of the clinical data from the families or of the mental health ratings made for the offspring themselves. The offspring who were individually classified as severely disturbed in their MMPIs had been reared significantly more often in disturbed adoptive families. Of the 16 offspring having a severe diagnosis on the MMPI, 12 have been brought up in disturbed adoptive families. The MMPI ratings of the offspring also varied according to the independent clinical ratings of the adoptive families ($p < .002$, one-tailed test). The result is highly significant. (Refer to Table 7.)

The MMPI ratings of the offspring (Table 8) correspond to the clinical ratings independently made of them ($p < .001$). The result is highly significant. Of the 16 cases having a severe diagnosis on the MMPI, nine have had a severe diagnosis based on the interviews. Further assessment along these lines will be carried out using other MMPI scoring procedures as well as individual Rorschach assessments of communication deviance and of thought disorder in order to assess the individual characteristics of

TABLE 6
Spearman Rank Correlation Coefficients
Clinical Ratings in Relation to Each Other

| | Family Ratings | Ratings of the Mother | Ratings of the Father |
|--------------------------|-------------------|--------------------------|--------------------------|
| Ratings of the mother | 0.6345 | | |
| Ratings of the father | 0.6232 | 0.4699 | |
| Ratings of the offspring | 0.6267 | 0.3998 | 0.3722 |

In all $p < 0.001$

TABLE 7
MMPI Ratings of Offspring in Relation to Clinical Ratings of Adoptive Families

| Offspring MMPI Ratings | Clinical Ratings of Adoptive Families | | | Total |
|---------------------------|---------------------------------------|----------|-----------------------|-------|
| | "Healthy" | Neurotic | Severe Disturbance | |
| Healthy | 39 | 27 | 19 | 85 |
| Neurotic | 13 | 2 | 13 | 28 |
| Severe pathology | 2 | 2 | 12 | 16 |
| Total | 54 | 31 | 44 | 129 |

$$\chi^2 = 24.381; p < .002$$

the adopted-away offspring as separately as possible from the family system evaluation.

The Beavers-Timberlawn Family Evaluation Scales [12] were then applied independently to the Spouse Consensus Rorschachs. A psychiatrist who had no clinical contact with the families made global ratings of their functioning by listening to the audiotape discussions of the adoptive parents trying to reach agreement on Rorschach percepts. Table 9 shows that the ratings correspond to the clinical ratings made by the psychiatrists who interviewed the same families. The result is highly significant. It is noteworthy that the offspring was not present during administration of the Spouse Rorschach, so his or her behavior does not bias this Consensus Rorschach rating. This same psychiatrist then made a prediction of the degree of disturbance of the offspring from the Spouse Rorschach. (Refer to Table 10.) Again, a highly significant ($p < .0002$) prediction of the global ratings of the offspring was made.

The Interpersonal Perception Method (IPM) [13] uses 60 dyadic issues around each of which twelve questions must be answered. Each member of the dyad answers the questions separately. The issues are presented as phrases that express interaction and interpersonal experience; for example, "I am disappointed in him" or "He finds fault with me." Each issue is rated for four relationships; for example, (1) husband's relation with himself (view of himself); (2) husband's relationship with wife; (3) wife's relation with herself; (4) wife's relationship with husband.

In the test, the individual is asked to express his views of each of the four

TABLE 8
MMPI and Clinical Ratings of Offspring
(index and controls)

| MMPI Ratings | Clinical Ratings | | | Total |
|--------------------|------------------|----------|---------------------|-------|
| | "Healthy" | Neurotic | Severe Pathology | |
| Healthy | 54 | 23 | 8 | 85 |
| "Neurotic" | 13 | 11 | 5 | 29 |
| "Severe pathology" | 2 | 5 | 9 | 16 |
| Total | 69 | 39 | 22 | 130 |

$$\chi^2 = 29.111; p < .001$$

TABLE 9
Ratings on the Beavers-Timberlawn Family Evaluation Scales in Relation
to the Mental Health Ratings of the Adoptive Families

| The Spouse Rorschach Test | The Family Ratings | | | Total |
|------------------------------|--------------------|------------|-----------------------|-------|
| | Healthy | "Neurotic" | Severe Disturbance | |
| Healthy | 21 | 8 | 2 | 31 |
| Mild disturbance | 16 | 6 | 12 | 34 |
| Severe disturbance | 9 | 8 | 17 | 34 |
| Total | 46 | 22 | 31 | 99 |

$$\chi^2 = 20.979; p = .0019$$

relationships for each issue, to postulate the way in which his partner experiences the same issue, and to conjecture what the other thinks his view of the matter to be. In our study an abbreviated version of the method was used—there are 30 questions including all of these three levels. Here the method is used to measure all the three relational pairs: mother to father, mother to child, and father to child. To promote understanding of the questions, a separate form was designed for each group, including the words father, mother, husband, wife, and child for better comprehensibility.

By the method of reciprocally matched comparisons we have direct access to the relationship itself as well as to each person in the relationship. The profile that this technique discloses shows the relationship between two points of view: one person's view and another's are compared on the same issue, telling us whether they are in agreement or disagreement. If one person is aware of the other's point of view, we say he understands him; and if he fails to recognize the other's point of view, we say he misunderstands.

The Interpersonal Perception Method has been somewhat problematic for us because all families were not able to provide us with the information. Agreement (that is, the same answers) between the parents did not correlate with any clinical ratings (family, mother, father, child). However, understanding (that is, how well each person knows how the other has answered) between the parents correlated with the mental health ratings of the child ($p < .05$). In other words, the better each parent knew what the other had answered, the less disturbed the child was likely to be.

TABLE 10
Ratings on the Beavers-Timberlawn Family Evaluation Scales in Relation
to the Mental Health Ratings of the Children

| The Spouse Rorschach Test | The Clinical Ratings of the Children | | | Total |
|------------------------------|--------------------------------------|------------|-----------------------|-------|
| | Healthy | "Neurotic" | Severe Disturbance | |
| Healthy | 26 | 3 | 2 | 31 |
| Mild disturbance | 24 | 8 | 3 | 35 |
| Severe disturbance | 9 | 13 | 12 | 34 |
| Total | 59 | 24 | 17 | 100 |

$$\chi^2 = 26.128; p = .0002$$

In addition, the following eight variables correlated significantly ($p < .01$) with the mental health ratings of the offspring ($n = 67$) based on independent clinical interviews:

Mother's relation to the child: (1) mother and child agreed on this relationship; (2) mother understood what the child had answered; and (3) the child understood what the mother had answered.

Child's feeling about him/herself: (4) mother and child agreed on the child's view; (5) the child understood what the mother had answered; and (6) the child understood what the father had answered.

Father's relation to the child: (7) the father knew what the child had thought about the father-child relationship.

Mother's feeling about herself: (8) the child understood how the mother had answered about her feelings toward herself.

DISCUSSION

All of these findings will need to be reevaluated when confirmed diagnoses for the biologic index mothers and, equally important, the diagnoses of the biologic index fathers are available. Furthermore, other ways of assessing the adoptive families will be applied, using other types of interview and test evaluations of the adoptive families in addition to the global family ratings used so far. At least three alternative interpretations of the findings will need to be considered:

1. *Genetic vulnerability and evocative family disturbance:* A plausible interpretation is that genetically transmitted vulnerability may be a necessary precondition for schizophrenia, but a disturbing rearing environment may also be necessary to transform the vulnerability into clinically overt schizophrenia. The hypothesis of an interaction effect is supported by the combination of two observations: (a) six adopted-away offspring who became schizophrenic had a schizophrenic biologic mother, while only one control offspring became schizophrenic; and (b) all of the schizophrenic offspring plus one manic-depressive offspring also had a disturbed adoptive family environment.

2. *Healthy family rearing as a protective factor:* Another version of the interaction hypothesis is supported by the data showing that none of the 43 offspring of schizophrenic mothers who were reared in a healthy family environment or in a mildly disturbed family environment had a schizophrenic or borderline diagnosis, while five (13 percent) of the 39 offspring of schizophrenic mothers who were reared in a severely disturbed family became schizophrenic, and 15 (38.5 percent) became psychotic or borderline when reared in a severely disturbed adoptive family.

3. *Effects of disturbed offspring on the family:* Another possibility is that the genetic vulnerability of the offspring manifests itself in a way that is disturbing to the adoptive family. If so, one would expect that there would be a greater frequency of severe family disturbance in the adoptive families with offspring having a presumed genetic predisposition; i.e., those who had a schizophrenic mother as compared to those born of a nonpsychotic mother. The preliminary findings show that 35 (39.8 percent) of the 88 adoptive families with an adopted-away offspring of a schizophrenic mother were severely disturbed. On the other hand, 30 (34.1 percent) of the 88 adoptive families in which an adoptive control offspring was reared are equally disturbed. These data suggest that the adoptive process is frequently associated with family disturbance, but that it may not make much difference whether the adoptee comes from a

schizophrenic or a control mother in producing family disturbance. To be sure, we do not know what proportion of the schizophrenic biologic mothers actually transmitted genes bearing a predisposition to schizophrenia to their children.

The "direction of effects," that is, whether greater weight should be attributed to the role of genetic vulnerability or to family disturbance will need to be examined more definitely through a longitudinal combination of the adoptive family strategy and the risk research strategy for studying families prospectively, beginning prior to the onset of the illness in offspring. The present data collection paves the way for a prospective study of this kind. A major subsample of the adopted-away offspring has not yet passed the age of risk for schizophrenia. The "yield" of schizophrenic and borderline offspring has proven sufficiently high so that the prospective study may be a fruitful way to examine the knotty issues of direction of effects.

ACKNOWLEDGEMENT

The authors wish to thank Lyman Wynne, M.D., for the many helpful suggestions he made.

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