Sequential Patterning of Emotional Interaction in Families with a Schizophrenic Son

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Summary. In 30 families with a schizophrenic son conjoint family discussions which had been generated by Strodtbeck's "Revealed Differences Technique" were analyzed on the strength of the "Relationship-Scale" developed by Riskin and Faunce. All three members of the family triad (two parents and son) proved to be more hostile and rejecting than their parallels in a control group of families whose sons had been admitted because of an acute surgical condition. However, no significant difference could be ascertained in the sequential patterning of interaction assessed by means of time-series analysis. In both family groups Bernoulli processes predominated, i.e. there was no dependence between the sequentially recorded speech units. A 2-year follow-up of the schizophrenic patients showed a contradictory pattern of results. In families with re-hospitalized sons there was only a slight and statistically insignificant tendency towards more negative relationships but the sub-groups of families containing a schizophrenic son differed clearly on the level of sequential data; more families with re-hospitalized sons showed autoregressive (morphogenetic) or moving average (morphostatic) processes.

Key words: Family interaction – Schizophrenia – Time-series analysis – Institutional career

Introduction

Although much of the theoretical interest in interaction in families containing a schizophrenic member is in the dynamics of the processes in the family group, only a handful of studies focus on the sequential patterning of interaction (Haley 1964, 1967; Mishler and Waxler 1975). There has been almost exclusive emphasis on summary or aggregate measures of behaviour, that is, on measures of

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behaviour totalled and averaged across an interval of time to provide overall indexes. Implicitly the assumption has been made in moving from empirical "static" data to the "dynamic" theory that scores totalled and averaged over some specified period of time provide an adequate and valid representation of family process—an assumption which has not yet been proved empirically (Mishler and Waxler 1975).

Strictly speaking, a study of the quality of relationships on the basis of aggregate data allows only a statement concerning the average situation, the 'climate' of the relationships, rather than a statement about the actual course of the dynamic processes. These can only be quantitatively grasped with the help of complicated statistical methods, such as the time-sampling method, and then only in segments. None the less, the possibility that families containing a schizophrenic patient distinguish themselves from other families on the level of aggregated data, but not on the level of sequential patterning of interaction (and vice versa) appears at least conceivable.

For this reason we decided in the study presented here to analyze the quality of intrafamilial relationships on both levels:
- on the aggregate level we calculated the mean values of the relationship quality as expressed in the communications emitted and received by individual members of the family;
- on the level of sequential patterning of interaction we tried to clarify what kind of systematic dependences existed between individual communications as far as the quality of relationship is concerned.

Following a model developed by Speer (1970) we differentiated between two types of process which govern the quality of intrafamilial relationships: morphostasis and morphogenesis. Morphostasis means that a family produces a homeostatic balance in the family system by establishing certain norms and attempts to maintain this balance by means of a negative feedback mechanism. Any deviation from the family norm is immediately corrected, and so every attempt to change the status quo in the intrafamilial relationships is prevented. Morphogenesis denotes a process by which deviations from the accepted family norms are amplified in the manner of a positive feedback mechanism. Here, there is a change in the quality of the relationships in whatever direction was indicated by the first deviation. This includes the opportunity for adaptation to a new situation but also the risk of an escalation into a possibly extreme condition. Thus, while in the case of morphostasis the intrafamilial relationships are set once and for all into an established mold, in the case of morphogenesis they are in movement.

These processes are analogous to two types of stochastic time-series models, in which observations made at consecutive moments in time are dependent on one another.

"The t-observation (z_t) is predictable to some degree from the previous observations, $z_{t-1}, z_{t-2}, \ldots$ or from previous random shocks, $a_{t-1}, a_{t-2}, \ldots$, which entered the system. These two types of dependence, i.e., upon previous observations or previous random shocks, correspond to the two basic types of time-series process: autoregressive and moving averages" ... "Models of the autoregressive type describe a process in which the observation of time t is predictable to a greater or lesser extent from previous observations" (Glass et al. 1975, p. 74).

"An alternative model for the dependence among the z's employs the concept of moving averages of the random shocks. For example, the observations z_t could be regarded as dependent upon the current shock to the series (a_t) and a portion of the previous random shock (a_{t-1})" (Glass et al. 1975, p. 75).

Both of these models of inter-dependent data resemble the two family theoretical processes: the growth or positive feedback process (morphogenesis) is equivalent to the autoregressive model; the homeostatic or negative feedback process (morphostasis) is equivalent to a moving average process.

Aside from these two models of stochastic dependency in time-series data, a stochastic independence in such data may also occur. This would mean for families with a schizophrenic member that the qualities of the relationships which are evaluated at consecutive moments in time do not influence one another, i.e. are independent. Such a process is called a Bernoulli process, or 'white noise'.

Our study deals with an aspect of intrafamilial relationships which in the context of schizophrenic disorders appears highly relevant: the degree of friendliness vs. hostility as expressed in the communication between family members (Jacob 1975). As a first step we compared families with a schizophrenic son to families with a son who suffered from an acute somatic disease ("control families"). As a second step we investigated the association between the emotional quality of intrafamilial relationships and the institutional career of the schizophrenic patient.

In their review of the literature Hirsch and Leff (1975) came to the conclusion that "there is a consistent finding that parents of schizophrenics show more marital disharmony than normals as indicated by open or tacit conflict, expressed hostility, opposition of spontaneously expressed attitudes, and difficulty in reaching agreement. This emerges regardless of the experimental technique used" (p. 99). Less clear is the result of studies dealing with the relationship between parents and their schizophrenic child. Although generally the "schizophrenogenic mother" is characterized as hostile, an observation which is supported by Alanen (1958, 1966, 1968) and Delay et al. (1962), other studies which have been carried out on a larger scale show rather inconsistent results (Hirsch and Leff 1975). Statements on the relationship between father and son are almost completely missing.

Very cautiously the global hypothesis can be stated as follows:

(1) Relationships in families with a schizophrenic son are generally more hostile and rejecting than in control families.

In her criticism of Speer's concept of a continuum reaching from well functioning, morphogenetically organized family systems to disturbed, morphostatically organized systems, Wertheim (1973, 1975) comes to the conclusion that intact family systems should include morphostatic qualities, which stabilize the homeostatic balance, as well as morphogenetic qualities which permit change and development. In our context this leads to the following hypothesis:

(2) In control families the relationships between the family members are governed by morphostatic as well as morphogenetic processes, whereas in families containing a schizophrenic member either morphostatic or morphogenetic processes alternatively exist.

In a series of studies carried out at the Medical Research Council's Social Psychiatry Unit in London over the past 20 years a constant relationship has already been established between the outcome of schizophrenia and the emotional expression of the key relative towards the patient (Brown et al. 1962, 1972; Vaughn and Leff 1976; Leff and Vaughn 1980, 1981). In these studies the emotional atmosphere was assessed by means of individual interviews within about a week of the patient's admission into a psychiatric hospital. Beside the degree of emotional over-involvement the crucial measurements were the number of critical comments made and the extent of hostility shown by the key relative. These data were used to construct an index of Expressed Emotion. The consistent finding in all these studies was that patients returning to live with relatives with a high level of Expressed Emotion had a much greater risk of relapse than those returning to relatives with low Expressed Emotion.

From these results we derived the following hypothesis for the analysis of the interaction between parents and son:

(3) In families with a schizophrenic son, who had to be re-admitted during the time of follow-up, the relationship between parents and son is more negative/hostile than in families with sons, who did not have to be re-admitted.

As we could find no statements in the literature concerning a possible connection between morphostatic or morphogenetic processes and the course of schizophrenic illness, or the institutional career of a schizophrenic patient, no hypothesis is formulated.

Method

At the time that the patient was due to be discharged from hospital, we invited each family to a joint discussion about problems of daily family life. The son and both parents participated in the sessions which took place in the Hannover Medical School. The discussions were stimulated by means of Strodtbeck's revealed differences technique (Strodtbeck 1951). Each of the three family members was asked to fill out a questionnaire with 40 problem situations in daily family life. For each situation two possible solutions were given, one of which had to be chosen. The family members were then brought together and asked to discuss those problems for which they had suggested different solutions and to try to arrive at a consensus. The discussion lasted 30 min during which time the families were left on their own. The discussion was recorded on video and audiotape and verbatim transcripts of the latter were prepared.

We rated the quality of relationship observable during the family discussions on a bi-polar 5-point scale developed by Riskin and Faunce (1970) ("Relationship scale"). According to the authors this scale measures the amount of friendliness or hostility that occurs between family members. Thorough rating instructions are to be found in an unpublished manual that the authors kindly made available to us.

Because of the enormous amount of time involved, we restricted ourselves to the evaluation of two interaction sequences each comprising 75 basic units. The basic unit rated was the speech sequence, defined as all the sounds one person uttered until someone else made a sound. The first speech sequence began with the 6th min of the discussion, the second with the 16th min.

In the first stage of evaluation, video recordings were studied in order to determine who spoke to whom. Working from the audio tapes and transcripts, the ratings of the relationship quality were then made. All families were rated by two persons who knew nothing about the identity of the families. A random sample of 20 families was rated by both assessors independently. The Pearson correlation coefficients computed as a measure of interrater reliabil-
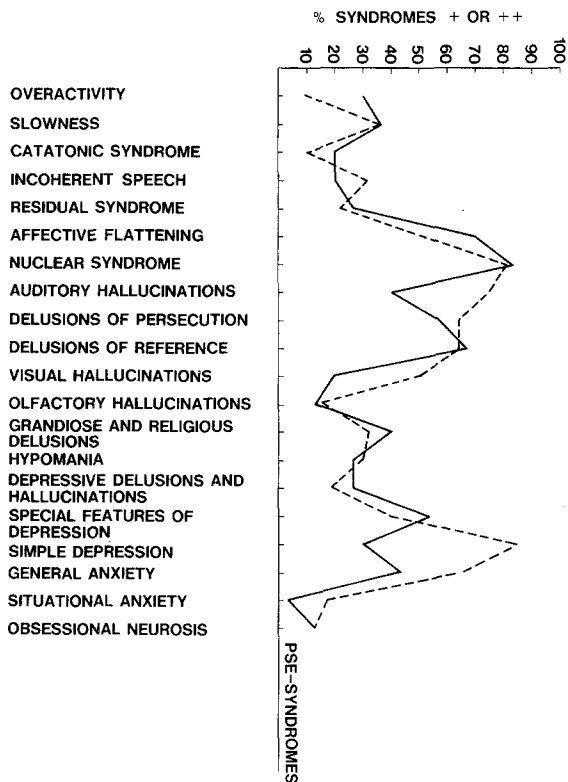
Fig. 1. Syndrome profile of schizophrenic patients. Solid line, patients in this study; broken line, International pilot study of schizophrenia (for comparison data of the International Pilot Study of Schizophrenia; from Wing et al. 1974)

ity varied between 0.61 and 0.92 for the different combinations of communicators and communicants; the mean value reached 0.86 (Fisher's z-transformation).

In order to analyze the two interactional sequences which were generated for each family, we proceeded according to a classificatory system for time-sequences devised by Box and Jenkins (1970) and Glass et al. (1975). These might have shown that the time-sequences would be sufficiently well-described by means of the so-called Arima-models ("autoregressive integrated moving average") on the basis of three parameters (p, d, q). Stochastic independence vs. dependence as well as autoregressive and moving average processes can be differentiated by means of the Arima-model (Revenstorf and Keeser 1979).

Which model should be used to describe the interactional sequences can be decided on the basis of the autocorrelogram and the partial-autocorrelogram of the time-sequences (Dahme 1976). A significance test by Bartlett was referred to for testing the autocorrelation, and one by Quenouille (see Glass et al. 1975, pp. 97, 98) for the partial autocorrelation.

Separate model estimates were made for the two interactional sequences of a family. It was not known whether a family containing a schizophrenic member or a control family was being dealt with. This evaluation was made for the quality of the relationship and was repeated for all families.

We used two Fortran programs for the analysis of time series experiments (CORREL and TSX) edited by Bower et al. (1974). The data processing was done at the DESY in Hamburg.

Subjects. Thirty families containing a son who had been hospitalized for the first time with a diagnosis of schizophrenia participated in the family discussions. This was an approximately complete sample of all patients from the greater Hannover region in the period from January

Table 1. Sociodemographic data of the schizophrenic families and the control families

	Father		Mother		Son	
	Schizo-phrenic	Control	Schizo-phrenic	Control	Schizo-phrenic	Control
Age (years)						
$\bar{x}$	55.1	52.1	51.8	48.1	21.6	19.8
s	9.4	9.3	9.2	7.6	3.9	3.2
Education (N)						
Primary school	15	12	17	16	14	11
Secondary school	6	6	12	9	7	10
Senior/profes-sional matric-ulation	9	10	1	3	9	7
Profession: social class *(N)* [a]						
Lower class	5	3	2	–	–	–
Upper lower class	8	6	3	5	4	1
Lower middle class	6	6	5	8	1	3
Middle class	6	7	–	–	–	1
Upper middle class	5	6	1	1	–	–
Without occupa-tion	–	–	19	14	25	23

[a] Self-assessment of social class (SSE)
(Kleining and Moore 1968)

1975 to June 1977, who fulfilled several psychiatric and demographic selection criteria (for details of the sampling procedure see Angermeyer and Schwoon 1982). Patients with the diagnosis borderline or schizoaffective psychosis, alcohol or narcotic-induced psychosis were excluded from the study. The diagnosis was based on a standardized clinical interview (Present State Examination, Wing et al. 1974). The syndrome profile of the patient group studied is shown in Fig. 1. Only those patients in whom the risk of false positive diagnoses did not exceed 4% (Carpenter et al. 1973) were taken into account. Four families refused to take part in the family study resulting in a response rate of 88.2%.

The control group consisted of 30 families with adolescents/young adults who had been admitted consecutively to two hospitals in Hannover because of an acute surgical condition. Neither the patients nor the parents were stated to have ever required psychiatric help. The response rate here reached 63.5%.

The same biographical/demographic selection criteria were applied to both groups: the sons were between 15 and 30 years old and single. The natural parents were married and still living together. The sons had grown up with their parents and had been in close contact with them up to the time of the study. The language of communication in the family was German.

The demographic data of the parents of the two groups are compiled in Table 1. Statistical analysis using the *t*-test (age) or χ^2-test (school education, social class) did not reveal any significant differences.

Follow-up Study. Of the 30 schizophrenic patients 13 had to be re-hospitalized within 2 years of discharge from the first inpatient psychiatric treatment. A comparison of psychiatric criteria between the two sub-groups (PSE syndrome profile, clinical subcategories of schizophrenia, premorbid social adjustment, place and duration of first psychiatric inpatient treatment), and

Table 2. Comparison of quality of relationships in schizophrenic and control families

	Schizophrenic families (N=30)		Control families (N=28)		$P_{(t)}$[a]
	$\bar{x}$	s	$\bar{x}$	s	
Father total	2.91	0.40	3.17	0.36	0.01
to mother	2.90	0.45	3.00	0.68	–
to son	2.89	0.55	3.27	0.38	0.01
to no one / to both	2.94	0.37	3.24	0.32	0.01
Mother total	2.77	0.48	3.21	0.39	0.001
to father	2.67	0.61	3.05	0.76	0.05
to son	2.80	0.55	3.33	0.35	0.001
to no one / to both	2.85	0.47	3.25	0.30	0.001
Son total	2.64	0.66	3.12	0.39	0.001
to father	2.56	1.12	3.07	0.68	0.05
to mother	2.52	1.12	3.06	0.73	0.05
to no one / to both	2.83	0.41	3.22	0.24	0.001

[a] t-test, one-tailed

also of sociodemographic criteria (age, education, profession, number of children), did not reveal any significant differences. (For details see Angermeyer and Schwoon 1982.)

Results

Hypothesis (1)

As hypothesized the figures of the relationship scale diverge in the families containing a schizophrenic son from the neutral point (score 3) to the negative pole (scores below 3) whereas in the control families the figures are at the neutral point or diverge towards the positive pole (scores above 3). With one exception, the differences between the two family groups are significant at the 0.01 level (Table 2).

Whereas in the control families communication between the parents as well as from son to parents was more or less emotionally neutral and communication from parents to son distinctly positive, communication between the three members of the families with a schizophrenic member was rather uniformly negative. The most hostile messages—also with the highest variance—were directed from the schizophrenic son to his parents. The mothers of the schizophrenic patients showed in all relationship constellations greater deviations from their parallels in the control group than the fathers.

Hypothesis (2)

In contrast to the first hypothesis, we did not find our prediction of a clear distinction between families with a schizophrenic member and control families con-

Table 3. Time series analysis of quality of relationship: schizophrenic and control families

	Auto-regressive process	Moving average process	Combination of auto-regressive and moving average processes	Bernoulli process
Schizophrenic families (N=30)	5	4	1	20
Control families (N=28)	4	1	2	21

Table 4. Comparison of quality of relationships in families with re-hospitalized and with non re-hospitalized schizophrenics

	Families with re-hospitalized schizophrenics (N=13)		Families with non re-hospitalized schizophrenics (N=17)		$P_{(t)}$[a]
	$\overline{x}$	s	$\overline{x}$	s	
Father total	2.84	0.45	2.97	0.35	–
to mother	2.85	0.53	2.94	0.40	–
to son	2.73	0.64	3.02	0.44	0.10
to no one / to both	2.94	0.43	2.95	0.34	–
Mother total	2.69	0.57	2.83	0.40	–
to father	2.57	0.76	2.74	0.48	–
to son	2.71	0.57	2.86	0.54	–
to no one / to both	2.79	0.60	2.90	0.36	–
Son total	2.64	0.70	2.64	0.65	–
to father	2.70	0.90	2.46	1.29	–
to mother	2.39	1.15	2.61	1.12	–
to no one / to both	2.82	0.42	2.84	0.42	–

[a] *t*-test, one-tailed

firmed (Table 3). Even our premise that dependent processes would, in general, characterize the communications proved to be inaccurate for the majority of families. In $\frac{2}{3}$ of the families with a schizophrenic patient and in $\frac{3}{4}$ of the control families, none of the single communications stood in such a relationship to its predecessor as to obey either the principles of morphostasis or morphogenesis.

Table 5. Time series analysis of quality of relationship: families with non re-hospitalized and with re-hospitalized schizophrenics

	Auto-regressive process	Moving average process	Combina-tion of auto-regressive and moving average processes	Bernoulli process
	(1)	(2)	(3)	(4)
Families with non re-hospitalized schizophrenics ($N=17$)	1	–	1	15
Families with re-hospitalized schizophrenics ($N=13$)	4	4	–	5

Fisher test, $df = 1$ $(1+2+3, 4)$; $P<0.001$

Hypothesis (3)

Although the parents of the re-admitted schizophrenic patients generally showed more hostile and rejecting behaviour than the parents of the non re-admitted patients, the difference was statistically not significant (Table 4).

The analysis of dependences between the emotional quality of the individual communications revealed a clear difference between the two sub-groups of families with schizophrenic sons. As Table 5 shows, in the families with sons who were not re-admitted within the following 2 years, there were systematic dependences in only 2 out of 17 cases, whereas in families whose sons had again to be hospitalized for psychiatric treatment, they were present in 8 out of 13 families ($P<0.001$). In this context, autoregressive (i.e. morphogenetic) processes and moving average (i.e. morphostatic) processes were observed in 4 families each.

Discussion

Considering that the families containing a schizophrenic son have often been confronted with irritating, damaging, threatening and anxiety-producing behaviour, even before their schizophrenic son's first hospitalization and labelling process (Bleuler 1972; Dunham 1965; Serban and Woloshin 1974), and that the families have been exposed to objective and subjective stress after hospitalization because of the psychosocial consequences of the illness (Angermeyer and Döhner 1980), it is not surprising to find family relationships less "normal" than in families in which one member had to undergo surgery because of an acute illness. It might be more surprising to find "normal" relationships, with no evidence of burden or of having to cope with the illness in families with a schizophrenic member. The impact of the emotional distress, with its psycho-

logical and social consequences for the individual and the family system, cannot be ignored. (In our view, the literature on family dynamics far too often fails to take this impact into account when the "pathology" of "schizophrenic" families is described.)

The finding that fathers of schizophrenic patients show smaller deviations from the contrast group than mothers may result from the different stress patterns and coping strategies. Because of their role in the daily family routine mothers are generally more intensively and directly confronted with the patient's problem behaviour than fathers, who by their professional and leisure time activities are more outwardly oriented. It is also mainly the mother who maintains the contact between family and patient. Apart from the different stress factors resulting from the demands of their specific roles, different coping styles also play a part. The analysis of personal perception shows that fathers tend to use a forced normality to cope with the "family life event" of their son becoming schizophrenic (Angermeyer et al. 1979) and cling to their familiar modes of perception and behaviour in a rather rigid way. Contrary to their emotionally more detached and distant attitude the mothers are much more involved, become more engaged in the new situation, seem more open and flexible, at the same time risking to suffer from emotional hurt. Studies by Balck (1982) suggest that the norm-oriented attitude of the fathers and the situation-oriented attitude of the mothers are general patterns originating from the sex role.

The conclusion that dependent processes—in families with schizophrenic sons as well as in control families—are rather the exception than the rule, may indicate that in general the individuals involved in family conversations, at least with regard to the relational dimensions studied by us, do not react immediately to each other, but rather that the interaction takes place in a more detached manner than had been assumed generally. This does not exclude the possibility that dependencies of a somewhat higher order do exist between larger units of interaction. Perhaps situational effects also played a role: in the strange surroundings and under the artificial conditions under which the family conversations took place, the participants behaved perhaps with less involvement for each other, the individual communications were therefore not so closely interconnected with each other.

Contrary to our expectations, the emotional atmosphere was similar in families with re-hospitalized and with non re-hospitalized schizophrenic sons. This may be due to the small number of cases. A further methodological consideration may be of importance here. According to the studies of the English researchers which were quoted earlier, in addition to the degree of rejection and hostility with which we were concerned, there is over-protective behaviour with regard to near relations which serves as an important predictor for the course of schizophrenic disease. This behaviour might possibly have led to a distortion in the direction of the positive pole on the relationship scale which we employed. There is thus a possibility that both tendencies at least partially neutralize each other on a bi-polar scale. A separate measurement of both dimensions on two separate scales could be of use here.

The second conclusion of the follow-up appears to us to be of the greatest interest: a distinct association between a frequent occurrence of dependent proc-

esses and an increased risk of re-hospitalization. Surprisingly enough, not only were morphostatic processes represented here—as one might have expected—but morphogenetic processes were equally well represented. It appears that in the families of the re-hospitalized, changes in the emotional behaviour of one member leads immediately to an affective reaction in the others, whether it be to maintain the old norms or to adapt as quickly as possible to the new situation. The individual actors are emotionally very closely involved with each other; even minor affective deviations in the one or the other direction are answered immediately, without latency. Perhaps one facet of the emotional over-involvement described by the English researchers could be understood as a dynamic process.

The especially high degree of attention to the behaviour of others, especially the behaviour of the mentally ill son, could lead to a point where even the smallest deviation in behaviour or changes in mood are registered and do not remain undiscovered. This could contribute to an increased risk of re-admission to hospital. If the attention of the individual family members, however, is less fixed on the behaviour of the others, then this could lead to the absence of an immediate emotional reaction, such as we have empirically established.

Our observations are only preliminary but it may be permissible to speculate on some possible practical implications for work with families containing a schizophrenic member. One goal of the work with relatives, and also with patients, could be to weaken close mutual fixations of attention and to break emotional strangle-holds. Both relatives and patients should learn not to react too promptly to the behaviour of others but rather to behave calmly and with greater patience. Family groups might present a suitable training field (compare Döhner and Angermeyer 1981; Kuipers et al. 1981).

Finally some *limitations* of the method used in this study should be mentioned:

The families we examined represented a group which was highly selected with regard to sex and position of the patient in the family as well as regards to the type of family (complete vs. uncomplete) and the stage of the illness. This means that it is possible that families with a schizophrenic daughter, for example, might present a completely different picture. Our results should not, therefore, be taken as valid for all families containing a schizophrenic member.

A feature of our investigation which makes generalization even less justifiable is that the family interaction was observed in unnatural laboratory conditions. These observations do not allow us to draw direct conclusions about the pattern of interaction in the family at home (Bronfenbrenner 1977; Moustakes et al. 1956; O'Rourke 1963).

A further problem concerns the validity of the "relationship-scale" used in this study. Although Riskin and Faunce (1970) presented data which indicate a satisfactory validity of the scale, as far as we know, a similar study has never been conducted again either by the authors or by other researchers and there is a complete lack of validation studies for the German version.

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