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## Influence of Family Life on the Course of Schizophrenic Disorders: A Replication

By G. W. BROWN, J. L. T. BIRLEY and J. K. WING

In spite of the new methods of treatment and care introduced during the past fifteen years, schizophrenic patients are still liable to relapse with a recurrence of florid symptoms such as delusions, hallucinations and disturbed behaviour, and great suffering can be caused to all concerned (Brown *et al.*, 1966). It has been shown that the onset of florid symptoms is often preceded during the previous three weeks by a significant change in the patient's social environment (Brown and Birley, 1968; Birley and Brown, 1970). Other studies have focused on the influence of more persistent environmental factors, such as the emotion expressed towards the patients by relatives with whom they were living. In an exploratory survey of discharged long-stay men it was found that close emotional ties with parents or wives indicated a poor prognosis (Brown, Carstairs and Topping, 1958; Brown, 1959). In a further study, patients were seen in hospital just before discharge, and their relatives were interviewed at home at the same time, and both were seen together at a joint interview shortly after discharge. It was found that those patients who returned home to live with relatives who were highly emotionally involved with them (as judged by ratings of the relatives' behaviour) were more likely to suffer a relapse of florid symptoms, even when the severity of psychiatric disturbance at the time of discharge was taken into account (Brown *et al.*, 1962). Ratings of the patient's own expressed emotion showed much less involvement, and were much less highly associated with subsequent relapse. There was also a suggestion that short-term and long-term influences might have a cumulative effect; for example, that a raised level of tension in the home made relapse more likely in the event of a critical change in the patient's social environ-

ment (Brown and Birley, 1968). These facts, together with the contrasting but just as handicapping reaction of schizophrenic patients to an under-stimulating social milieu, were brought together in a more general theory of environmental influences on the course of schizophrenia (Wing and Brown, 1970). This also took account of the high physiological arousal which had been found in the most withdrawn schizophrenic patients (Venable, 1968; Venables and Wing, 1962). It was argued that in a socially intrusive environment acting upon a patient whose thought disorder was in any case liable to become manifest whenever circumstances became too complicated, a patient would tend to attempt to protect himself by social withdrawal; but this process might easily go too far, both in hospital and outside it, leading to complete social isolation and inability to care for himself. The optimum social environment, for those who remained handicapped, was seen as a structured and neutrally stimulating one with little necessity for complex decision making.

Many questions, however, were left unanswered by this work. What are the components of 'emotional involvement'? Is the patient's earlier disturbed behaviour the cause of the relative's emotional reaction *and* an indicator of future chances of symptomatic relapse? In other words, is the relative's emotional response without causal significance; simply a reflection of underlying processes in the patient? Alternatively, can a highly emotional reaction actually cause relapse, irrespective of the patient's previous degree of disturbance? How important are other factors such as sex, marital status, therapeutic medication, patient's attitudes, amount of contact between patient and relative or between

relative and other family members, the occurrence of environmental changes or crises, etc., in increasing or decreasing the chances of relapse?

A further study was therefore designed in which detailed attention was paid to techniques of measurement. The instruments used to measure expressed emotion and attitudes have been described elsewhere (Brown and Rutter, 1966; Rutter and Brown, 1966). The methods attempt to avoid the well-known difficulties of measuring the quality of interpersonal relationships by responses to standard questions. An experimental design, in which patients would be allocated at random to homes with high or low emotional tension, was clearly out of the question, and so a prospective follow-up design was used, in which the measurements of past behaviour, present emotional response and future relapse were made independently of each other. Alternative models were developed as a basis for the data analysis (Rosenberg, 1968). Since each patient in the series already had an established schizophrenic illness, the study was not intended to be concerned with the original causes of this condition but only with factors influencing its course.

The hypothesis under test is that a high degree of expressed emotion is an index of characteristics in the relatives which are likely to cause a florid relapse of symptoms, independently of other factors such as length of history, type of symptomatology or severity of previous behaviour disturbance.

#### DESIGN

The case records were screened of all patients aged 18-64, born in the United Kingdom and living with relatives at an address in Camberwell in S.E. London, who were beginning a new period of out-patient or in-patient care at any one of five hospitals serving the area. All those whose records indicated that they might be suffering from schizophrenia were interviewed, using a semi-standardized technique to rate and classify their clinical condition (Wing *et al.*, 1967; Cooper, 1970; Wing, 1970). If a diagnosis of possible or probable schizophrenia was made, the patient was included in the study and further social and clinical information was obtained. To obtain a larger number of patients with recent illnesses, all those with similar characteristics who were admitted

to Bexley Hospital and were within five years of their first admission were also included.

In this way, 118 patients were selected but 17 had to be excluded subsequently for the following reasons: 6 patients did not wish to participate (2 at admission, 4 at follow-up); 1 died in hospital; 5 remained in hospital for over one year and therefore could not be followed up at home; 5 did not return home after discharge from hospital. The 101 patients finally included in the series were distributed as follows:

	Camberwell area	Bexley Hospital
First episode . . . .	16	11
One or more episode during 5 years preceding key admission . . . .	17	22
First episode more than 5 years before key admission	35	—

The first patient was seen in February 1966, and the final follow-up interview was completed in August 1968.

The patients and their families were seen on several occasions by members of the research team (two psychiatrists and three sociologists). Eight types of interview were carried out for each patient and family, and ten if the patient was readmitted in the follow-up period. Two interviews to establish the current mental state of the patient and his social and clinical background were carried out by a research psychiatrist soon after the patient was admitted to hospital. The main family interview was carried out at home by a research sociologist while the patient was still in hospital. It usually took two separate visits to each informant to complete and lasted about three hours in all. A husband or wife was always seen; two parents (or married siblings or pairs of siblings) were interviewed separately by different workers.\*

Both the current mental state and the family interviews were repeated at the time of follow-up nine months after discharge, and comparable ratings were made. A 'joint interview' about two weeks after discharge was similar to that in the previous study

\* Twenty-seven parents were living together and 21 parents were living alone; 6 siblings were living either alone (3) or with someone else (3). For the purposes of this analysis siblings and parents have been placed together. For the 30 'pairs' of relatives we managed to arrange separate interviews in 25 cases; in the remaining 5 cases only one informant was seen. In the interview at readmission and follow-up only one relative was seen.

(Brown *et al.*, 1962). The patient and other members of the family were seen at home for no more than one hour. The interview was concerned with the family's and patient's recent contacts with medical or social services and designed to get everyone talking together on such topics. The scales concerning expressed emotion were completed at the main family interviews and at the joint interview. Patients and family were also seen at any readmission during the nine months after discharge.

#### TECHNIQUES OF MEASUREMENT

##### *Family measures*

The techniques of measuring family variables have been described in detail elsewhere (Brown and Rutter, 1966; Rutter and Brown, 1966). The family interview deals not only with what happened at home during the three months before admission (such as who had carried out various household tasks or the circumstances surrounding admission) but with the *feelings* expressed during the interview towards particular people in the home or towards recent events. The interview was primarily designed to obtain an account of the patient's behaviour and the relative's feelings about him; but a somewhat shortened form was also designed to be used when the patient was seen. For the measurement of feeling most reliance is placed on vocal aspects of speech—tone, pitch and the like. Much of this material arises spontaneously during the detailed questioning about family activities and the development of the disorder.

Many different kinds of rating of family life were made during the course of the study, and we cannot do more than briefly describe those that are directly relevant for this paper. Considerable attention was given in the developmental work to inter-rater reliability. No measure used in this report falls below a product moment correlation (or comparable index of agreement) between raters present at the same interview of .80: most are in excess of this.

##### 1. *Ratings of emotional response*

(a) *Number of critical comments about someone else in the home.* Critical comments were judged either by tone of voice or by content of what was said. For a remark to be judged critical in content there had to be a clear and unambiguous statement of resentment, disapproval or dislike. Any remark could be rated critical on tone alone, and in making the ratings most emphasis was laid on the interviewer's judgement of tone of voice. The verbal unit of assessment was a statement terminated either by a change of topic or by a question from the interviewer. Only one comment could be counted per unit.

(b) *Hostility.* Hostility was rated as present or absent. It was defined as present if a remark was made indicating the rejection of someone as a person; for example, when someone was criticized for what he was rather than for what he did. Hostility was also regarded as present if critical comments tended to be generalized spontaneously; for example, when one criticism triggered off a string of further criticisms on unrelated topics (e.g. 'He's unhelpful, he's not tidy and in money he's the world's worst').

(c) *Dissatisfaction.* According to our definition, criticism and hostility are based on either negative emotion or a clear statement of resentment, disapproval, dislike or rejection. Another series of ratings took account of any expression of dissatisfaction, whether or not it warranted inclusion as criticism or hostility. Dissatisfaction was rated on 4-point scales describing eight areas of family life. An overall index was also calculated. Many subjects who were highly dissatisfied were rated low on hostility and criticism: it is possible to be markedly dissatisfied yet express little emotion or resentment.

(d) *Warmth.* This 6-point rating was based on the amount of warmth *demonstrated* by the respondent when talking about the particular person in the home. In general, stereotyped endearments were ignored, but positive comments, especially if made spontaneously, were regarded as important. Sympathy and concern, interest in the other as a person, and expressed enjoyment in mutual activities were all relevant. Particular attention was paid to warmth expressed in tone of voice. Negative feelings were deliberately ignored in making the rating, but failure to express warmth in what seemed a relevant situation (for example, when describing the patient's ailments) was taken into account. A judgement was based on the whole interview, but the expression of warmth was most likely to occur in certain sections dealing with leisure, marriage and communication, and with the patient's behaviour.

(e) *Emotional over-involvement.* This measure was designed to pick up unusually marked concern about the patient. It was rated on the basis either of feelings expressed in the interview itself or of behaviour reported outside it. For example, a top rating on the 6-point scale was given when a mother showed obvious and constant anxiety while describing such minor matters as her son's diet and the setting of his alarm clock so that he would wake in time for work. She also showed markedly protective attitudes about her son, who was not obviously handicapped; for example, she said, 'I could go out if I wanted to go out. I don't 'cause I'm looking after Johnny'. The rating was only made in the case of parents, as such over-involvement was very rarely found in

interviews with husbands and wives. Although conceptually it is the most complex of the scales, agreement on a specially interviewed series of 18 parents was .90.\*

The relationship between the scales is much what would be expected. Hostility and criticism are highly related, and warmth is negatively related to criticism and hostility. Emotional over-involvement is positively related to warmth, but only half of those rated as markedly warm also showed marked over-involvement. Finally, emotional over-involvement shows a curvilinear relationship to criticism and hostility: those rated high or low on emotional over-involvement show most criticism or hostility.

(f) *Overall index of relative's expressed emotion (EE)*. Since the total number of patients is small, it is necessary to limit the number of sub-groups produced by each variable. The individual scales were first related to relapse (e.g. Table III) and several methods of combining them into a high expressed emotion (EE) group were explored. All of them produced much the same result. The following indices, in hierarchical order, were finally used to allocate approximately half the families to a high expressed emotion group:

	N (Total N observed in brackets)	N added to high EE sub- group
<i>Interview with relative</i>		
7+ critical comments ..	35 (101)	35
Marked over-involvement of parents .. ..	13 (55)	5
Hostility .. ..	18 (101)	2
<i>Joint interview</i>		
2+ critical comments ..	9 (62)	1
Marked over-involvement of parents .. ..	9 (35)	2
Hostility .. ..	3 (62)	0
		45

The joint interview was considerably shorter than that with the relative alone, and rather less emotion was expressed, the relative presumably being more restrained in the presence of the patient. Only three additional cases were added to the group by using the data from the joint interview. Even this small number was only reached by considerably lowering the

\* The published reliability study was based on 30 married couples: a similar (unpublished) check with 18 parental families produced almost the same results concerning the reliability of ratings.

threshold of definition (to two critical comments, and a score of 2 on the scale of emotional over-involvement). Only one of the three additional patients relapsed.

## 2. Measures of behaviour before and at the time of admission

Many measures of the patient's behaviour before admission were employed in the study. Some of the most important are:

(i) *Work impairment*. Unemployment or, for housewives, marked handicap in carrying out domestic duties, for at least three months out of the preceding two years. Time in hospital was not taken into account.

(ii) *Disturbed behaviour*. Definite aggressive or delinquent behaviour in the 12 months before admission (40 patients) or very markedly disturbed behaviour at about the time of admission (this added 7 patients).

(iii) *Social withdrawal*. A score based on (a) contacts with friends; (b) casual contacts outside the home; (c) contacts within the home.

## 3. Psychiatric measures

All patients were interviewed using the semi-standardized 'Present State Examination', with the main object of describing fairly precisely the symptomatic condition of those included (Wing *et al.*, 1967). The CATEGO clinical classification procedure (Wing, Cooper and Sartorius, 1972) was then applied, and only patients in the three groups 'typical schizophrenia', 'delusional psychosis other than mania or psychotic depression' and 'other schizophrenia', were included. Clinical data from the psychiatric history were compatible with this grouping. Information on alcohol or amphetamine intake was also systematically recorded. Three groups of patients, with the following characteristics, were finally set up:

(i) Definite schizophrenia ( $N = 51$ ). The patient showed one or more symptoms as follows:

- (a) thought intrusion, broadcast, commentary or insertion;
- (b) delusions of control;
- (c) auditory hallucinations not based upon depressed or elated mood.

If patients with such a condition had been taking amphetamine or alcohol, and the diagnosis was in doubt for this reason, they were included in group (ii).

(ii) Possible schizophrenia ( $N = 42$ ). There were two main groups:

- (a) Patients with definite schizophrenia as defined above, but who were also taking alcohol or amphetamine, so that there was a measure of doubt about the aetiology ( $N = 8$ ).

(b) Patients who did not show the symptoms listed above but who described other delusions or hallucinations (for example, persecutory, reference, religious, grandiose, somatic, sexual or fantastic delusions; visual or olfactory hallucinations). Symptoms such as elation, or depressive delusions or hallucinations, were not predominant (N = 34).

(iii) Doubtful schizophrenia (N = 8). Patients with no delusions or hallucinations who presented with stupor, excitement or muteness in the absence of depression or elation. These patients were all given hospital diagnoses of schizophrenia of non-paranoid type. One patient, for example, had recurrent attacks of retardation and stupor without affective changes from which she appeared to recover completely without treatment apart from admission to hospital. Another patient had two attacks in which she appeared disoriented, with markedly incoherent speech, and seemed to be hallucinated. She recovered on each occasion, but was unable to remember what had occurred.

#### 4. Relapse

The criteria used to assess relapse were the same as those used in our studies of the social precipitants of acute schizophrenia, which were based upon the same series of patients as the present one (Brown and Birley, 1968; Birley and Brown, 1970).

We distinguished between two types of relapse: Type I involved a change from a 'normal' or 'non-schizophrenic' state to a state of 'schizophrenia' as defined in the previous section. Type II involved a marked exacerbation of persistent schizophrenic symptoms. At our interviews at follow-up or readmission, we made a judgement, based on all available information, on two points: firstly, whether the patient had experienced schizophrenic symptoms at some time during the follow-up period; and, secondly, whether those patients who had been continuously ill had experienced a marked exacerbation of these symptoms.

Table I shows the relationship between relapse, symptoms and readmission of the 35 patients who had relapsed during the follow-up period. Twenty-nine of the 35 were readmitted. The remaining 6 all had schizophrenic symptoms at their follow-up interview; five of these patients had been well for some time after their key discharge, while the sixth had been continuously ill and had experienced a marked exacerbation of symptoms shortly before interview.

Three of the readmitted patients had not relapsed. One woman had been admitted to avoid possible friction with her son who was returning home from

TABLE I  
*Relapse, symptomatology and re-admission*

			Re- admitted	Not re- admitted	Total
Relapse (N = 35)					
Type I	..	..	18	5	23
Type II	..	..	11	1	12
No relapse (N = 66)					
No schizophrenic symptoms					
..	..	..	3	46	49
Schizophrenic symptoms +					
..	..	..	0	17	17
Total	..	..	32	69	101

prison. The two others were both women who had taken small overdoses of phenothiazines, apparently on impulse. One had been upset by her poor memory when asked questions about her baby in a welfare clinic. (She had originally been admitted with puerperal schizophrenia and had received an extensive course of ECT). The other said she was 'fed up with taking tablets' and had decided to take them all at once. All three patients remained well during the rest of the follow-up period.

Seventeen of the 'not relapsed' patients had experienced schizophrenic symptoms continuously during the follow-up period, but these symptoms had remained steady or showed only mild fluctuations.

#### 5. Time relationships between variables

The indices of work impairment and disturbed behaviour relate to events that are past by the time the patient is admitted to hospital. The scales of expressed emotion are rated while the patient is still in hospital or shortly after discharge. The index of symptomatic relapse relates to events during the year after discharge.

These indices measure conditions which are themselves changing over time. For example, at the time of follow-up, 9 months after discharge, 45 patients were rated as showing markedly improved behaviour compared with the time of key admission, while the other 45 showed moderate improvement or none. The number of criticisms made by relatives also decreased considerably. Thus, at the time of key admission 29 out of 90 relatives (32 per cent) made no criticisms, while 27 made seven or more (30 per cent). At the time of follow-up 43 made no criticisms (47 per cent) and only 13 made seven or more (14 per cent). The greatest reduction in number of relatives' critical comments occurred with respect to those patients who had markedly improved; on average

they received only one quarter of the original number of critical comments compared to the rest who still received about one half. The other indices of expressed emotion, such as warmth and over-involvement, showed less of a tendency towards decreased emotion at follow-up.

We are making the assumption, therefore, that a high degree of expressed emotion on one occasion is a measure of the relative's propensity to react in that way to that particular patient, even though other factors may be needed to precipitate this. The same relative would not necessarily respond to other people in the same way. For example, there is very little correlation between the amount of emotion expressed by a parent towards the patient and the amount of emotion expressed by the same parent towards his or her spouse. The measure reflects a quality of relationship with a particular person (the patient), not a general tendency to react to everyone in a similar way.

Thus the level of expressed emotion at the time of the patient's key admission will be taken to represent an enduring potential characteristic of the relative's behaviour towards the patient.

#### RESULTS

##### *Relationship between index of expressed emotion and relapse*

The proportions of patients with relatives in the high and low EE groups who relapsed are shown in Table II. There is a significant association between high EE and relapse ( $\gamma = .75$ , 1 df,  $p < .001$ )\*.

TABLE II  
*Relationship of relatives' emotion to relapse in the 9 months after discharge*

EE of relatives	No relapse	Relapse	% relapse
High .. ..	19	26	58
Low .. ..	47	9	16

This result is confirmed when various other indices of high expressed emotion are examined. For example, Table III shows the proportion of relapses when measures of critical comments, hostility or emotional over-involvement of the

\*  $\gamma$  is used as the measure of association. It is appropriate for ordinal material and provides an estimate of the proportional reduction in error (Goodman and Kruskal, 1954). A coefficient of 1.0 registers a one-way association, i.e. gamma is 1.0 if there is just one zero in a  $2 \times 2$  contingency table (Mueller and Schuessler, 1961).

parents are used, all based upon the interview with the relative alone. (Where more than one person in the family was seen, the higher rating was used). In each case there is a significant association with relapse.

TABLE III  
*Relationship of three measures of relative's emotion to relapse in the 9 months after discharge*

(i) Number critical comments						
				Relapse	No relapse	% relapse
0	..	..	..	6	26	19
1-6	..	..	..	9	25	26
7+	..	..	..	20	15	57
				$\gamma = .64$		
				(rows 1 and 2 combined)		
(ii) Hostility						
				Relapse	No relapse	% relapse
No	..	..	..	28	59	32
Yes	..	..	..	7	7	50
				$\gamma = .36$		
(iii) Emotional over-involvement of parents						
				Relapse	No relapse	% relapse
Low (0 to 3)	..	..	..	15	27	36
Marked (4 and 5)	..	..	..	8	5	62
				$\gamma = .48$		

Warmth expressed towards the patient was not used in the overall index. The scale shows a curvilinear association with relapse; patients in the middle range showing the lowest relapse rates. This was because relatives rated as showing little warmth tended to be highly critical, while those rated as showing considerable warmth tended also to be emotionally over-involved. Marked warmth free from these unfavourable factors was associated with a low rate of relapse. Only one patient relapsed out of 11 from families characterized by marked warmth in the absence of high EE (df. 1,  $p < .01$ ).

The other major affective variable measured was dissatisfaction. There was an overall

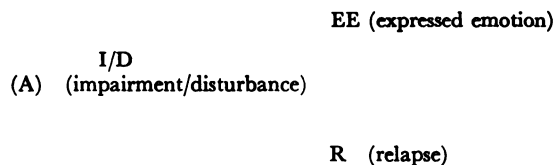
association between dissatisfaction on the part of relatives and the patient's relapse, but only within the high EE group. This suggests that dissatisfaction as such did not cause relapse.

Ratings of expressed emotion in the patients showed far less than in relatives (only 10 per cent of patients were markedly critical about relatives at home compared with 34 per cent of relatives about patients) and there was no relationship to relapse.

*The effect of previous behavioural and work impairment*

Work impairment during the two years before key admission was related to relapse ( $\gamma = .40$ ), as was disturbed behaviour ( $\gamma = .32$ ). An index combining these two factors did not much increase the association ( $\gamma = .47$ ). Both were closely related to EE (work impairment,  $\gamma = .73$ ; behavioural disturbance,  $\gamma = .82$ ). Two-thirds of patients who had been disturbed or had had work difficulties lived with a relative with a high level of EE, but only 14 per cent without such behaviour did so.

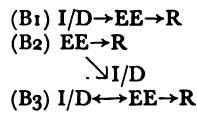
There are two alternative ways of explaining this set of correlations. The first and most straightforward hypothesis is that past impairments and disturbances are predictive of future behaviour such as relapse because some underlying 'process' links them together. At the same time, the more disturbed the patient's behaviour, the more likely are the relatives to respond with criticism, hostility and emotional over-concern. Thus the correlation between expressed emotion and relapse is spurious in so far as it is mediated by the patient's own behaviour, as shown in diagram (A):



The second hypothesis is that the relatives' expressed emotion contributes to relapse independently of the patient's past behaviour. In other words the patient would be unlikely to relapse, however disturbed or impaired his past behaviour, if there were no 'emotional'

tension in the home. The relatives' expressed emotion may be caused by the patient's past behaviour, the emotional expression may have caused the behaviour, or each may have influenced the other; it is impossible to say what is primary in a study of this kind.

The three possibilities may be expressed graphically as follows:



In each of the cases B<sub>1</sub>, B<sub>2</sub> and B<sub>3</sub>, it is the relationship between EE and R which can be differentiated from that in case (A).

It is possible to discriminate between these two hypotheses, since if relatives' EE independently contributes to relapse various conditions should hold. (The relevant associations are given in Fig. 1 and in Appendix I which shows the associations between the main variables used in this paper.)

(i) In the first place, when previous work impairment and behavioural disturbance are controlled by standardization\* the association between EE and relapse should not be much reduced. This is the case (gamma becomes .63 instead of .75), and these two background factors cannot be producing a spurious effect (Blalock, 1960).

(ii) In the second place, since in the three alternatives EE is either an intervening variable (B<sub>1</sub> and B<sub>3</sub>) or a common cause of the other factors (B<sub>2</sub>), the association between impairment/disturbance and relapse should be greatly decreased when EE is controlled (Blalock, 1964). In fact it almost disappears (.47 to .08).

(iii) Finally, it follows from these same considerations that the association between impairment/disturbance and relapse (.47) should be weaker than that between impairment/disturbance and EE (.84) or between EE and relapse (.75). These conditions also hold.

Table IV shows why this is so. Three-quarters of the patients in the series fall into one of two categories; either they have been dis-

\* Standardization has been used to control for the effect of apparently important variables (Rosenberg, 1962; Atchley, 1970). The raw data used to standardize the associations may be obtained from the senior author.



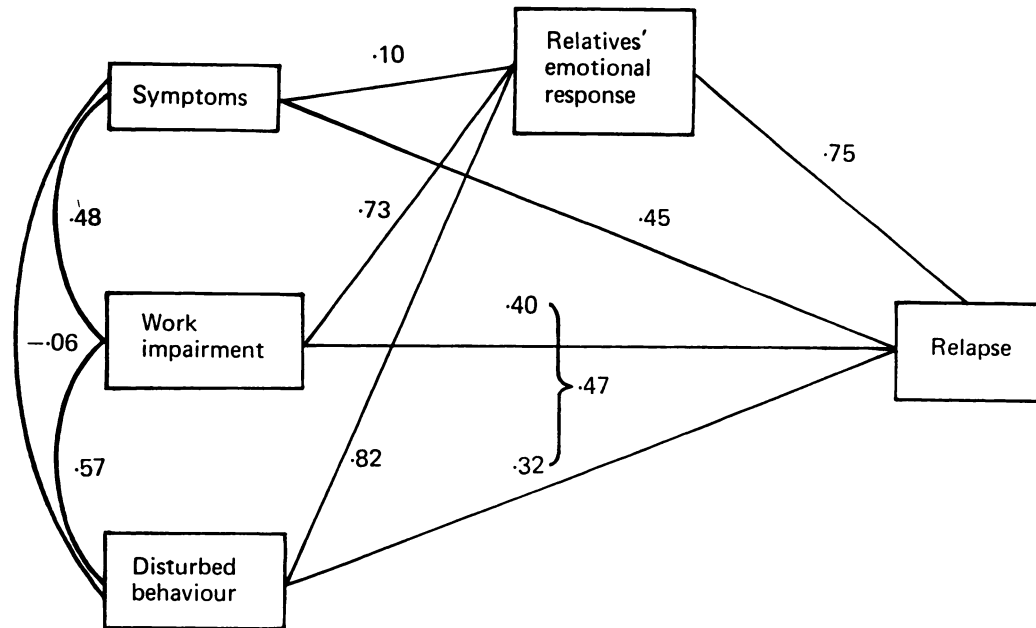


FIG. 1.—Relationship of the main variables to each other and to relapse

TABLE IV  
Relationship between behavioural disturbance, work impairment, expressed emotional and relapse

Past behavioural disturbance	Expressed emotion	No relapse	Relapse	Total
+	+	15	19	34
+	o	15	1	16
o	+	4	7	11
o	o	32	8	40
Total		66	35	101

Past work Impairment	Expressed emotion	No relapse	Relapse	Total
+	+	12	14	26
+	o	7	3	10
o	+	7	12	19
o	o	40	6	46
Total		66	35	101

turbed in behaviour in the past and are living with relatives with a high degree of expressed emotion, or they were not disturbed in the

past and are living with relatives with a low degree of expressed emotion. Only one-quarter of the patients are non-congruent for the two factors; but here, it is plain, the degree of expressed emotion is related to relapse, and the degree of past disturbance is irrelevant ( $\chi^2 = 10.28$ ,  $df\ 1$ ,  $p < .001$ ). Precisely the same is true of past work impairment.

*Clinical picture*

Patients who showed 'typical' schizophrenic symptoms (thought intrusion, delusions of control, etc.) at the time of present state examination were more likely to relapse than those in the second group ( $\gamma = .45$ ). The third (non-paranoid) group is too small for separate analysis and is included with the second.

This association between type of clinical condition and relapse is not mediated by a higher degree of past work impairment or behavioural disturbance ( $\gamma$  for the association between clinical condition and impairment/disturbance is only .18; with relapse controlled it is reduced to .10). Moreover, the association between EE and relapse remains strong ( $\gamma = .79$ )

when type of clinical condition is controlled, and the association between type of clinical condition and relapse is increased slightly ( $\gamma = .49$ ) when EE is controlled.

Thus, type of clinical condition is not associated with any particular degree of emotional expression ( $\gamma = .10$ ) and seems to be independently related to relapse ( $\gamma = .49$ ).

*Marital and parental homes*

When this analysis is repeated separately for patients living with parents and patients living with marital partners, the main results are repeated in every particular. Fewer married patients are rated as having been disturbed or impaired in the past, but this does not affect the hypothesis under test.

*Other factors related to outcome*

(a) *Background factors.* Table V lists other background variables that show some relationship to relapse. The three indices of previous occupation are all highly correlated with the index of work impairment and are best seen as

alternative indicators of it. Since they add nothing to the ability of the index to predict relapse they can be ignored. Whether a patient has been previously admitted or not relates somewhat to the impairment/disturbance index ( $\gamma = .32$ ). When it is controlled, the association between EE and relapse is not reduced and so it can be ignored. Length of time since first onset and duration of present episode appear to have little significance.

The living group and sex differences are more difficult to explain. The relapse rate for men is double that for women, and the rates for the unmarried are somewhat greater than for the married:

Married:

men 44%; women 17%; total 26%

Unmarried:

men 53%; women 26%; total 42%

The difference between the unmarried and the married is a consequence of the fact that if either of both parents live with no one other than the patient a greater amount of emotion

TABLE V  
*The relationship of additional 'background' factors to relapse*

				N	% relapse	gamma
(a) Best occupational level (men; N = 47)	Skilled or better	..	..	14	43	.17
	Semi or unskilled	..	..	33	52	
(b) Decline occupation level (men; N = 47)	None	..	..	23	35	.56*
	Decline	..	..	23	65	
(c) Most recent occupation level (men; N = 47)	Skilled or better	..	..	10	20	.68*
	Semi or unskilled	..	..	37	56	
(d) Time since first onset	< 1 year	..	..	17	29	.17
	1-5 years	..	..	52	38	
	5 years +	..	..	26	35	
(e) Whether previously admitted	No	..	..	59	22	.61*
	Yes	..	..	41	54	
(f) Living group at discharge	Marital	..	..	46	26	.34
	Parental/sibling	..	..	55	42	
(g) Sex of patient	Female	..	..	53	21	.59*
	Male	..	..	48	50	
(h) Age of admission	45 plus	..	..	25	20	.45*
	-45	..	..	76	39	
(i) Peak of heterosexual performance	Prolonged relationship	..	..	30	29	.33
	No prolonged relationship	..	..	62	47	
(j) Decline in peak heterosexual performance	Decline	..	..	29	24	.28
	No decline	..	..	52	39	
	Never sexual contact	..	..	14	36	
					38	

Note: Variation in totals due to cases not known.

\*  $p < .05$ .

is expressed. The reason will be discussed later; it should be noted, however, that it is not a measurement artefact. The difference remains when allowance is made for the fact that the highest rating of either parent is used to arrive at the EE index.

The large difference between men and women is puzzling. The rate of relapse in men is double that in women and this difference remains when marital status and level of EE are controlled. Extensive analysis failed to suggest any reason for it. It does not, however, affect the main association between EE and relapse, which is high in both sexes ( $\gamma = .85$  for women and  $.70$  for men).

Age at admission and peak heterosexual performance are related very highly to sex and marital status, due to the fact that women in the series are older than men and more likely to be married.

Decline from peak sexual performance is, if anything, related to a *lower* rate of relapse. As will be seen later, there is a general suggestion from a number of results that 'social withdrawal' can protect a patient from relapse.

Social class measures based on the occupation of the male patients, the father's occupation for women living with parents, or the husband's occupation for married female patients, showed no consistent relationship with relapse; nor did length of time since first onset or length of current episode.

(b) *Factors after discharge.* Two-thirds of the patients took one of the major tranquillizing drugs for a large part of the follow-up period or until their relapse. A larger proportion of patients failed to take drugs in high EE homes (idf,  $p < .01$ ). Drug taking does relate to

outcome, but only modestly, and just fails to reach statistical significance ( $\gamma = -.41$ ). However, the results are not straightforward. Table VI shows that drugs appear to have no effect on patients living with relatives rated low on EE, suggesting that medication might serve mainly to protect patients who live with relatives showing a high EE. The numbers are small, however, and the difference in outcome between patients in the high EE group who were taking and those who were not taking drugs regularly is not statistically significant. So far as the patients in the low EE homes are concerned, however, there is no trend at all.

Previous research suggested another variable of importance: that the patient who returned to a high EE home could to some degree improve his chance of avoiding relapse by seeing less of his relatives. More than 35 hours per week of face to face contact with adults in the home seemed to be the critical amount of time; less contact than this seemed to provide some protection when the patient returned to a high EE home (Brown *et al.*, 1962). In the present study we made a similar estimate, at the time of the follow-up interview, of the amount of face to face contact between relatives and patients living at home before relapse.

Table VII shows that the previous result was repeated: the amount of contact makes no difference for those living with low EE families, but a very large one for those living in high EE homes. These results hold for both drug and non-drug groups, and both factors are probably of importance in determining the conditions under which the home environment may have a deleterious effect.

It is possible that a general coping style is

TABLE VI  
*Relationship of relatives' EE, drug taking after discharge and relapse*

Relatives' EE	No drugs			Drugs		
	No relapse	Relapse	% relapse	No relapse	Relapse	% relapse
High ..	6	12	66	13	11	46
Low ..	11	2	15	36	6	14
Total ..	17	14	45	49	17	26

TABLE VII  
Relationship of relatives' EE, time spent in face to face contact per week after discharge and relapse

Relatives' EE			Time in face to face contact with relatives		
			Less than 35 hours		
			No relapse	Relapse	% relapse
High	..	..	15	6	29
Low	..	..	15	5	25
$\gamma = .09$					

Relatives' EE			More than 35 hours		
			No relapse		
			No relapse	Relapse	% relapse
High	..	..	4	15	79
Low	..	..	29	4	12
$\gamma = .92$					

(Hours of contact not known in 8 cases)

involved; a tendency for some patients when in difficulty to withdraw from close social contacts. There is some support for this view. Several indices of level of contact with others in the home in the three months before admission were associated with subsequent outcome, particularly in patients living with parents or siblings. Patients who had been most involved in family life relapsed more often after discharge. For example, the following factors were associated with a higher relapse rate (all but the first two measures are based on the relative's reports): patient's report of a dominating parent ( $\gamma = .59$ ), patient's report of un-reduced communication with parents (.50), one day or more per week leisure activity with parents (.47), a moderate or high level of communication with parents (.42), un-reduced joint leisure activities (.31), holiday with parents in year (.29), joint contact with patient outside home (.28), 6 or more evenings spent at home per week (.27). Only two interactional measures failed to show such a trend. The result did not, not, however, hold for married patients.

(c) Patient's attitude towards admission. Whether a patient accepted admission or resisted it in

some way was related to the likelihood of relapse after discharge. Patients who objected were less likely to relapse (Table VIII). There are no obvious reasons for this result, which is made more curious by the fact that resistance to admission is itself related to a series of factors which otherwise appear to make relapse more likely. Rejection of admission, for example, is associated with number of critical comments (.44), over-involvement (.55), work impairment (.44) and disturbed behaviour (.63). Those who had shown most impairment and disturbed behaviour and who had provoked relatives into the most marked emotional expression were also most likely to have resisted admission, but they had a lower chance of relapse. Extensive analysis revealed only two clues to this paradox. In the first place, patients who had resisted admission did better when they took drugs after discharge (Table IX). Out of 25 patients who had resisted admission, living in high EE homes, most of whom would have been expected to relapse, only 8 did so, and 6 of these were not taking medication regularly, whereas 13 of the 17 patients who remained well took regular medication. In the second place, they were much more likely to have been markedly socially withdrawn either at home or in their

TABLE VIII  
Patients' attitude to admission and relapse

		No relapse	Relapse	% relapse
Accepting	.. ..	32	25	44
Rejecting	.. ..	34	10	23
$\gamma = .41, p < .05, 1 \text{ df}$				

TABLE IX  
Patients' attitude to key admission and relapse by whether drugs were taken after discharge

Attitude to admission	EE	Drugs		No drugs	
		No relapse	Relapse	No relapse	Relapse
Rejecting	High	13	2	4	6
Rejecting	Low	13	0	3	1
Accepting	High	4	7	1	5
Accepting	Low	20	6	5	1

leisure activities in the two years before admission—often in both ( $\gamma = .49, p < .05$ ). Although this particular measure of social withdrawal was unrelated to relapse ( $\gamma = -.06$ ) various results have suggested that 'social withdrawal' can lessen chances of relapse of schizophrenic patients.

Rejecting admission, taking drugs regularly, and low face to face contact with relatives after discharge were all associated with a favourable outcome. Of patients who were characterized by all three factors none relapsed; of those characterized by two, 23 per cent relapsed, and of those characterized by only one, 46 per cent relapsed.

(d) *Summary of other factors relating to relapse.* Thus, typical schizophrenic symptoms, male sex, acceptance of admission, lack of regular medication and high contact in the home are associated with a higher chance of relapse. Table X provides a check that the relationship between EE and relapse is not reduced when these factors are controlled. The presence of any such factor scored one point, giving an overall score from 0 to 5. Relapse is more likely the higher the score, but the association between EE and relapse holds within each score, confirming that it is independent of these factors.

#### *Determinants of the relatives' emotional responses*

Not all relatives who had lived with patients characterized by long-term work impairment or behaviour disturbance had a high EE score; as many as 20 of the 59 who did so showed a low score (in contrast to 36 of the 42 remaining relatives). It is possible that situational as well

as 'personality' factors played some part in determining their response. It is important to investigate this possibility, since if expressed emotion is strongly related to some other variable that acts independently of the patient it would be even less likely that the relationship between EE and relapse could be explained by some enduring clinical characteristic. One possibility is that the reaction of relatives is related to the amount they see of people other than the patient. It seemed possible that there was a relationship between the amount of contact that relatives had with others, their dependence on the patient, and their tolerance of the patient's behaviour; in short, that the more isolated relatives would show the least tolerance because they were the most dependent on the patient for practical and emotional support. It was therefore predicted that a high rate of contact with relatives outside the home, or the presence of others in the home, would reduce dependence on the patient, and lead to less expressed emotion.

For patients living with parents these ideas were confirmed: a parent living alone, except for the patient, or living only with a spouse, expressed more emotion than those who had others living in the house, apart from the patient. More emotion was also expressed by those with low rates of contact with friends and relatives. The 20 per cent who were most isolated were almost all rated as expressing a high degree of emotion (Table XI).

However, for married patients this result was reversed. The isolated relatives expressed the lowest emotion, and it was the 40 per cent who

TABLE X

*Association between emotional response and relapse controlling for the presence of five factors: type of clinical condition, sex, acceptance or rejection of admission, time in face-to-face contact and medication*

	Overall score on five factors									
	5* and 4		3		2		1 and 0*			
	No relapse	Relapse	No relapse	Relapse	No relapse	Relapse	No relapse	Relapse	No relapse	Relapse
High EE .. ..	1	5	4	16	3	4	10	3		
Low EE .. ..	3	4	14	2	18	1	11	1		
$\gamma$ .. ..	.58		.93		.92		.53			
Overall relapse rate as %	69		50		19		16			

\* One patient scored 5, and four scored 0.

TABLE XI  
*Relationship of social contacts of relatives inside and outside the home to expressed emotion*

	'Isolation'		Expressed emotion index			
	Home	Out-side	Low	High	% high	
(a) Parents and siblings	Yes*	Yes**	Marked	1	10	90
	Yes	No	Medium	9	5	
	No	Yes			8	5
	No	No	Low	11	4	27
(b) Married	Yes	Yes	Marked	8	1	11
	Yes	No	Medium	6	0	12
	No	Yes			9	
	No	No	Low	8	11	58

\* Yes = Relative living alone except for spouse.

\*\* Yes = With an average rate of fewer than 3 contacts per week in the 3 months before admission.

were least isolated who most often expressed high emotion (Table XI).

Thus there is some suggestion that the relatives' social life plays some role in determining their reaction to the patient, but the theory as stated applies only to parents. In their case the presence of others in the home makes them less dependent on the patient, but when the patient is a husband or wife the presence of others in the home (who will most often be children) may make the patient's spouse *more* dependent on the patient. Furthermore, a spouse may depend more upon the patient fulfilling a parental, breadwinning or house-keeping role and upon a 'joint' front before guests and when others are contacted outside the home. It is possible that such 'structural' features could be influenced by the patient's disorder and therefore produce a spurious result. It is not difficult to imagine brothers and sisters leaving home more often when the patient had been badly disturbed, and this kind of selective process could have brought about the results. Some estimate could be made of such contamination. We knew the number of potential kin who might be contacted and

where they lived, the frequency of contacts with kin and friends one year later when the patient was often a good deal improved, and we also asked whether the patient's illness had changed the amount of contact with relatives and friends. These data did not suggest that the severity of the patient's disorder could explain the results.

#### DISCUSSION

The main results of the previous family study of discharged schizophrenic patients have been replicated and in certain important respects extended.

In the first place, the 'emotional involvement' of relatives with patients has been more precisely specified and the term 'expressed emotion' substituted. The most measurable component of expressed emotion is the number of critical comments made by the key relative about the patient. The whole analysis could have been undertaken using this measure alone. However, the other components are important in interpreting the nature of 'expressed emotion'. These are 'emotional over-involvement' and 'hostility'. 'Warmth', which was formerly considered to be a component, is now seen to be a complex variable. A high rating of warmth is often accompanied by a high rating on emotional over-involvement, while a low rating on warmth usually implies a high level of critical comments. Patients whose relatives showed marked warmth without also expressing criticism or over-involvement had a significantly better outcome. Warmth was consequently not included in the index of expressed emotion. 'Expressed emotion', therefore, has a mainly negative connotation.

Using this index, a high degree of emotion expressed by relatives at the time of key admission was found to be strongly associated with symptomatic relapse during the nine months following discharge. This replicates our principal previous finding. The question arises how far this relationship can be explained by the fact that patients with the most severe behavioural disturbance and work impairment before the time of key admission had the greatest liability to relapse. In our previous study, both factors were independently related to outcome. The

present results are unequivocal, however, in suggesting that expressed emotion is independently associated with relapse, while previous work impairment and behavioural disturbance are only associated with relapse because of their association with level of expressed emotion. Moreover, the ability of the index of expressed emotion to predict symptomatic relapse is not explained away by the action of any other factor that we have investigated (such as age, sex, previous occupational record, length of clinical history, type of illness, etc.). It will therefore be assumed, during the remaining discussion, that the level of relatives' expressed emotion must be taken into account as one of the factors that cause relapse.

It is worth mentioning that dissatisfaction on the part of relatives was only associated with relapse if criticism was also present. Dissatisfaction need not necessarily be critical.

The action of this factor can be mitigated to some extent by two other important environmental variables which might help to give the clinician some control over events. The first of these is regular phenothiazine medication, which shows a close to significant relationship with a favourable outcome. In view of the results obtained in a recent controlled trial of preventive phenothiazine medication (Leff and Wing, 1971) this finding must be taken seriously. It is the more significant since, as Leff and Wing found, preventive medication is only effective for certain groups of schizophrenic patients. Our present results suggest that patients living with relatives who expressed high emotion at the time of key admission (and who are therefore most vulnerable to relapse) are also most susceptible to protective drug effects. There is one other clue to the sort of patients most responsive to phenothiazines; those who resisted admission were particularly like to be living with relatives who expressed high emotion, and they were particularly helped by drugs.

The second mitigating factor is the extent to which the patient can avoid a too close contact with a highly emotional relative. The most clear-cut measure of this is the number of hours per week that the patient spends in actual face-to-face contact with the relatives. In our previous study we found that 35 hours per week was

the critical period; above this, the chances of relapse were greatly increased. The same held true in the present analysis. Several other findings contributed towards a strong impression that social withdrawal could be a protective factor, particularly for unmarried patients.

Other factors were independently linked to chances of relapse, such as age (under 45), sex (male), admission status (not first admission), recent occupational level (unskilled manual), decline in occupational level and failure ever to achieve a satisfactory sexual adjustment.

One other factor deserves special mention; schizophrenic subtype. The patients were divided into three groups, as described on pages 244-45, of which the first was composed of patients with clear-cut and typical schizophrenic illnesses (Class S in the CATEGO system; Wing, Cooper and Sartorius, 1972). The other two groups of patients could have been diagnosed in various ways (paranoid state, alcoholic hallucinosis, recurrent atypical psychosis, oneirophrenia, etc.) although they were in fact, all labelled schizophrenia. The relationships between expressed emotion, relapse, and other factors were identical within the first compared with the second and third groups. The first (most typical) group had a worse prognosis than the other two, but this was not due to a higher degree of expressed emotion in the patients' relatives. It seems that type of clinical condition is an independent variable, and this raises the question whether the factors we have been considering are in any way specific for schizophrenia at all. This is not, however, a question we can answer from our present material. So far, we have been discussing the relationship between expressed emotion and outcome, in the light of other factors which exercise an independent, mitigating or deleterious effect upon it. The results may be expressed in the same terms as those of our previous article, i.e. that three types of factor independently predict outcome; previous history (age, sex, decline in occupational level etc.), clinical condition (schizophrenic subgroup, severity of symptoms at discharge—not measured in the present study), and factors following discharge (relatives' expressed emotion, medication, amount of face-to-face contact).

Now we shall turn our attention to the determinants of the relatives' degree of expressed emotion. We have shown that there is a considerable association with the patient's behaviour and employment record. We cannot specify the direction of cause and effect, but the fact that a decrease in expressed emotion at follow-up accompanies an improvement in the patient's behaviour strongly suggests that there is a two-way relationship, each depending on the other. Striking examples of such an interaction of factors can be found in our material. For example, one married patient had been disturbed in behaviour for about six years, following a surgical operation. She experienced auditory hallucinations and had periodic outbursts of shouting. She was suspicious of everything and accused and threatened her husband. The patient sat behind closed curtains most of the time, smoking cigarettes, and she cooked a meal only once a week. There was 'a terrible atmosphere' in the home. Her husband often threatened to leave her unless she accepted treatment, but did not actually do so. ('I felt sorry for her' . . . 'although love has gone I think there is some goodness there'). His degree of expressed emotion was high. She was finally admitted to hospital. At the time of follow-up she was reported to be quite well apart from a tendency to grumble and 'to go on and on talking'. She was taking no drugs, was coping well with housework and cooked each day. There was much less tension (low expressed emotion) and the couple now spent most of their spare time together, chatting and watching television. We would argue that in such a case the effect of hospital treatment was to mitigate the severity of the patient's symptoms; this lowered the level of tension in the home and the expressed emotion of the relative, which in turn reduced the chances of relapse, of work impairment, behavioural disturbance and symptomatic exacerbation in the patient. This is model B<sub>3</sub> (Low I/D ← → Low EE → No Relapse). There was no preventive medication in this case, but we would suggest that it was probably unnecessary. If the relative had continued to express a high degree of emotion, however, preventive medication and a reduction in amount of face-to-face contact would have been useful.

It is difficult to reconcile this example with model B<sub>2</sub>, in which the degree of expressed emotion is held to be primary. A circular effect (which may be vicious or benign) seems much more probable. Another point is also worth emphasizing, since our previous results have sometimes been misinterpreted. We do not wish to suggest that the behaviour of the relatives was *in general* abnormal or excessive. We have found a high degree of expressed emotion in a substantial proportion of relative-patient pairs, but not in relative-relative pairs. We have the impression that the relatives of other kinds of handicapped individuals might also tend to develop such relationships, though whether the tendency would be as strong as with schizophrenia deserves investigation. It would seem to be a reasonable assumption that it would depend upon the degree of behavioural disturbance involved.

We are unable to comment on claims that factors in the relatives' personality and handling of the patient as a child cause the first onset of the illness, except to say that the fact that expressed emotion acts as strongly in marital partners as in parents argues for a reactive rather than a causal model.

The only substantial body of work which attempts to show a measurable abnormality in parents (which would, however, be compatible with a genetic or an environmental explanation, or a mixture of both) is that of Wynne and his colleague (Wynne, 1968). However, their results have not been replicated in recent work by Hirsch and Leff (1971). This discrepancy could perhaps be explained by the very different diagnostic practices which have been shown to exist in the U.S. and the U.K. (Kendell *et al.*, 1972) in which case Wynne and Singer's work is also of less relevance to our own. The patients in the present study, as in Hirsch and Leff's investigation, were diagnosed according to a standardized clinical examination and classification procedure (Wing *et al.*, 1967; Wing, 1970). Such a group of patients would also be recognized as schizophrenic in the U.S. but would probably form only a minority of any group diagnosed there, the majority suffering from mania, depression or personality disorders according to British practice.



Our own theory (Brown and Birley, 1968; Wing and Brown, 1970) is that many schizophrenic patients remain very highly sensitive to their social environment, even when there are no apparent symptoms. The optimum 'arousal' level (Venables, 1964) may very easily be upset if the patient finds himself in overstimulating or understimulating social conditions. In the presence of a socially intrusive relative, for example, he is unable to withdraw, and any residual or latent thought disorder will become manifest as expressed delusions or odd behaviour. This condition will be accompanied by a high level of 'arousal'.

Epstein and Coleman (1970) suggest that this arousal 'is broader than fear and anxiety in the usual sense of these terms, as it involves a reaction to the combined stimulation from all sources, including positive and negative emotions and impulses, as well as external stimuli'. We have demonstrated that schizophrenic patients are susceptible to both positive and negative emotional stimuli (Brown and Birley, 1968). Life changes and crises are most often unpleasant and lead to negative emotion, but by no means always. We may assume that patients living with relatives who express a great deal of emotion are likely to have heightened arousal levels over long periods of time. The occurrence of a critical event during such a period is particularly likely to precipitate a relapse, although either factor acting alone may occasionally do so. Social environments other than the home may also provide conditions for long-term over-arousal but they have not been systematically studied. However, too enthusiastic attempts at reactivating unprepared long-stay patients have been shown to lead to sudden relapse of symptoms that had not been present for years (Wing, Bennett and Denham, 1964). On the other hand, if the patient is allowed to withdraw, for example in the understimulating social environment of an old-fashioned mental hospital (or even in an attic at home), what might in other circumstances have been a protective withdrawal may go too far, and the picture of the typical 'back ward' patient develops (Wing and Freudenberg, 1961; Wing and Brown, 1970). Such a patient too, shows a high level of 'arousal'. The optimum

social environment would be structured, with clear-cut roles, only as much complexity as any given individual can cope with, and with neutral but active supervision to keep up standards of appearance, work and behaviour. Thus we postulate interactions between biological and social factors which will have predictably different results in different social environments.

Finally, we should like to make some tentative suggestions as to the ways in which our findings might be of practical interest to clinicians who are trying to help schizophrenic patients and their families.

(1) Certain factors which can potentially lead to relapse are to some extent under the patient's control; whether he takes medication, whether he remains in face-to-face contact with a socially intrusive relative and, in other ways, whether he withdraws from socially complicated situations (disturbing sexual relationships, for example).

(2) Reducing the degree of disturbance of a patient's behaviour or of his work impairment may act to reduce the level of emotion expressed by a key relative.

(3) Long-term medication may be particularly effective with patients who have resisted the idea of entering hospital for treatment and who return to live with highly emotional relatives.

(4) Applying techniques of reducing the number of hours spent in face-to-face contact with highly emotional relatives may make the difference between stability and relapse.

(5) Therapy with relatives should take account of their liability to develop highly emotional responses to the patient. In the light of present knowledge, it should not be too readily assumed that the parents' handling of the patient when a child has caused schizophrenia to develop; such an assumption may be wrong, in which case harm may be done both to relative and patient.

(6) The best coping patterns may differ for single patients living with parents and for married patients living with their partners. Extra social contacts on the part of the parents may be helpful if their friends and relations accept the patient as handicapped. The friends and relations of a patient's husband or wife, on

the other hand, may have different expectations of the patient, which can cause considerable embarrassment and concern to the non-schizophrenic spouse. It may be possible to anticipate and deal with such problems.

(7) If likely 'precipitating' events can be anticipated it may be possible to prevent an unwanted reaction, by adjusting the dose of medication, or by preparing patient and relatives, or even by avoiding the situation altogether in some cases.

These are fallible rules. The clinician will, in all cases, need to decide what is best in the light of all the circumstances. Moreover, we have not here discussed the important rules of management which can be derived from a study of the processes leading to secondary handicaps (Wing and Brown, 1970). However, we would suggest that work like that described in this paper has important practical, as well as theoretical, aspects.

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## APPENDIX I

*Interrelation of various variables ( $\gamma$ )*

	1	2	3	4	5	6	7	8	9	10	11	12
1. Relapse .. ..	—											
2. Exp. emotion ..	75	—										
3. Work impair. ..	40	73	—									
4. Disturbed beh. ..	32	82	57	—								
5. Symptoms .. ..	45	10	48	-06	—							
6. Accept. admiss. ..	41	-40	-44	-63	18	—						
7. Type hsehold. ..	34	43	21	-05	-06	17	—					
8. Amount contact ..	29	-33	-17	-17	14	16	-38	—				
9. Drugs .. ..	-41	-42	12	-36	25	30	06	21	—			
10. Sex .. ..	59	28	01	05	37	12	45	08	04	—		
11. Prev. admiss. ..	61	51	58	02	12	-20	44	-17	33	19	—	
12. Age at admiss. ..	45	-20	-43	28	28	43	17	-11	00	59	21	—
13. Impairment or disturbance ..	47	84	—	—	18	-57	15	-11	-11	16	32	17

*Italic numbers* = Statistically significant ( $\cdot 05$  level).

## Key

- |                  |                         |                      |
|------------------|-------------------------|----------------------|
| 1. 1 Yes; 2 No   | 5. 1 Typical; 2 other   | 9. 1 Yes; 2 No       |
| 2. 1 High; 2 Low | 6. 1 Accept; 2 Reject   | 10. 1 Male; 2 Female |
| 3. 1 Yes; 2 No   | 7. 1 Par/sib; 2 Marital | 11. 1 Yes; 2 No      |
| 4. 1 Yes; 2 No   | 8. 1 High; 2 Low        | 12. 1-45; 2-45+      |

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