British Journal of Psychiatry (1990), **156**, 357–362

Expressed Emotion and First-Admission Schizophrenia
Nine-Month Follow-up in a French Cultural Environment

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A study of 36 French-speaking families in Geneva identified 66% of high-EE household. At nine-month follow-up, the relapse rate for the high-EE group (33%) was significantly higher than for the low-EE group (0%). These results seem to confirm the relevance of EE as predictor of relapse. However, in our sample, it appears that one component of EE, critical comments, was principally responsible for the prognostic validity.

Schizophrenia is a chronic illness with a high relapse rate. A series of studies by the Medical Research Council's Social Psychiatry Unit at the Institute of Psychiatry in London (Brown *et al*, 1962; Brown & Rutter, 1966; Vaughn & Leff, 1976) has contributed to the development of the relatives' expressed emotion (EE) as a predictor of outcome in schizophrenia. This index has been reduced to two main factors, critical comments (CC) and emotional overinvolvement (EOI), as observed in a semi-standardised interview of family members, the Camberwell Family Interview (CFI; Vaughn & Leff, 1976). It is an empirical construct mainly developed on the basis of its predictive power, and it differentiates groups of schizophrenics with a higher or lower probability of relapse.

A more direct influence of high EE on outcome was shown through the second generation of EE studies. Their goal was to relate clinical course to modifications of EE levels obtained through various treatment settings. Tempting as it may be to adapt these programmes to different cultural environments, it is nevertheless important to answer the questions that have been raised about the intercultural validity of the EE concept (Koenigsberg & Handley, 1986). The study of a number of different cohorts of schizophrenics has made it possible to establish a close relationship between relapse and EE. The original findings have been replicated, but mainly in Anglo-Saxon countries (Vaughn *et al*, 1984). A cohort of Mexican-American schizophrenics (Jenkins *et al*, 1986) as well as the Chandigarh study (Leff *et al*, 1987) showed positive results, whereas a German study (Kottgen *et al*, 1984) as well as a further British study (MacMillan *et al*, 1986) and an Australian study (Parker *et al*, 1988) were not convincing.

Other workers have tried to confirm the hypothesis by studying external criteria: psychophysiological observations, such as skin conductance measurement of patients exposed to their high-EE relatives (Tarrier *et al*, 1979; Sturgeon *et al*, 1981, 1984; Valone *et al*, 1983); the observation of the behaviour of the relatives, for example parental attitudes (Vaughn & Leff, 1981); parental personality traits (Anderson *et al*, 1984); and intrafamilial characteristics (Kuipers *et al*, 1983; Miklowitz *et al*, 1984). Promising though it is, this direction has to be developed further.

The present study examines the application of the EE concept in a Swiss-French cultural setting. We set out to test the hypothesis that although the distribution of the different EE components, such as CC and EOI, may vary according to cultural setting, the variable as such remains a reliable predictor of outcome in schizophrenia.

Method

The catchment area (Jonction), with a population of about 140 000, is one of the three geographic sectors in Geneva, Switzerland. The public psychiatric facilities offer the only institutional services available in the area. Hence, virtually all psychotic patients needing admission are referred to these services, either to the in-patient unit (Clinique de Bel-Air) or to the Centre de Thérapies Brèves (CTB), a city crisis centre run as a day hospital. Such patients were considered for the present study, provided:

(a) they were admitted for the first time
(b) they presented with some psychotic symptoms
(c) they were between 17 and 45 years of age
(d) they resided in Geneva and had done so for the last year
(e) they spoke sufficient French to allow communication.

The final entry criterion was that the patient had a diagnosis of schizophrenia or paranoid psychosis (S+,S?, P+, P?, O+) confirmed by the CATEGO processing of the Present State Examination (PSE; Wing *et al*, 1974). The research design (Fig. 1) extends over 2 years and includes several tests over time and domains.

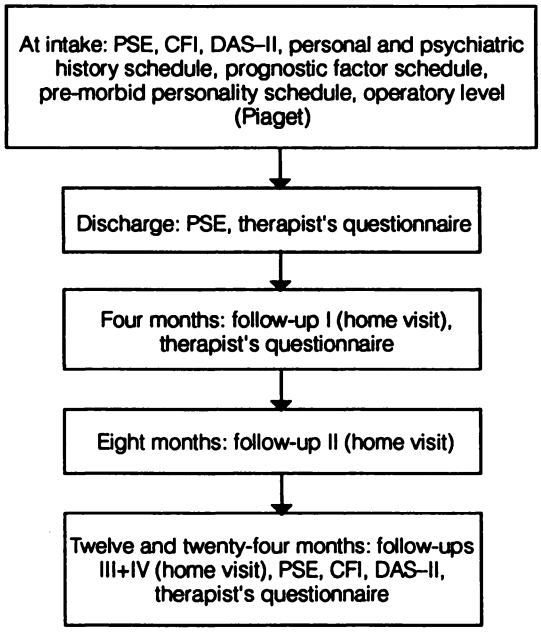

FIG. 1 Study design: this report examines results at nine-month follow-up only (PSE, Present State Examination; CFI, Camberwell Family Interview; DAS-II, Disability Assessment Schedule).

The CFI is conducted with the family members living in the area who either live in the same residence or are in frequent contact with the patient. The CFI was conducted with both parents in two-parent households. As can be seen from Table I, the present project also undertakes to study variations in EE over time. We therefore felt it necessary to control for the chronicity factor and its possible impact on relatives' attitudes. The CFI is rated on several scales according to the criteria of Vaughn & Leff (1976), to determine an EE index. A French translation had previously been developed and used in a retrospective study (Barrelet *et al*, 1988); Two raters successfully completed the training with Dr C. Vaughn in London. On a randomly selected set of intake tapes, they showed high inter-rater reliability (Pearson correlation coefficients: 1.00 for overall EE categorisation, 0.96 for critical comments, 1.00 for emotional overinvolvement, 1.00 for hostility). It can thus be assumed that the rating criteria are being correctly applied in the present cultural context. One of the raters (LS) rated all the CFI conducted at intake.

Figure 1 shows the introduction of several additional variables measured at intake, the most important of which is the Disability Assessment Schedule (DAS–II; World Health Organization, 1985), a social functioning scale. The DAS–II global scores are rated on a six-point scale. Patients with below average intelligence (as measured by operatory level according to Piaget) were not included in the sample. At intake, three additional schedules were filled in. The personal and psychiatric history schedule is a modification of a WHO schedule, the prognostic factor schedule and the pre-morbid personality schedule were built to collect additional information on the patient's past. If the patient had been readmitted, the discharge PSE and the therapist's questionnaire were reapplied at the second discharge.

Initially we had planned to use the PSE to determine relapses. Unfortunately a possible relapse could sometimes only be determined weeks after the event, at which time the PSE was unreliable and was often refused by the patient. Therefore we used two criteria to determine relapse: readmission, or duration of symptoms for at least two weeks. Two weeks was chosen to avoid inclusion of patients with ambiguous symptoms of short duration and prodromal symptoms rapidly controlled by an increase in medication. Relapse was defined as a recurrence (type I) or an exacerbation of symptoms (type II) occurring at least one month after discharge. When patients had an exacerbation or a recurrence of symptoms the PSE was done only to decide if the relapse was psychotic or not. In the three cases where a PSE could not be performed, the clinicians' judgement was used. Only relapses with psychotic symptoms are considered in this report.

The present paper is limited to the report of the nine months post-discharge follow-up and to the analysis of several predictive variables: age, sex, household status (living in the family residence or maintaining regular contact with the family), EE index, number of critical comments (CC), emotional overinvolvement (EOI), and presence of hostility (H). Other results will be presented in further reports.

The two-tailed significance level is used for the Mann-Whitney *U* tests and the Fisher's exact probability tests.

Subjects

During the first 24 months of intake to study, 51 patients were diagnosed as suffering from schizophrenic or paranoid psychosis. A further 14 patients were excluded because the psychotic symptoms they presented with were transient or not part of a schizophrenic syndrome. The nine-month follow-up has been completed for 46 of these 51 schizophrenic patients (two patients left the country, one committed suicide, two refused further contact). There were 24 women and 22 men, median age 24.5 years (range 17–42).

The CFI was conducted within 36 households; 30 patients were living with their relatives, and six were in frequent contact with their families. In the low-EE group, one relative refused the CFI, leaving a possibility of false classification of one of the low-EE households. The ten other patients had no family members assessed with the CFI, six because they lived alone and had no family ties in Geneva, one because the relative refused, two because the relatives were unavailable (husband in prison, mother in hospital), and one for technical reasons.

Results

Eleven of the 46 patients (24%) relapsed during the nine-month follow-up. Nine of these relapses were psychotic. They were all readmitted.

TABLE I
Descriptive results of 46 schizophrenic patients with and without CFI assessment of relatives

	Men n *(%)*	*Women* n *(%)*	*Age: years median (range)*	*Patients living in family household* n *(%)*	*Psychotic relapse* n *(%)*
Without CFI ($n=10$)	4 (40)	6 (60)	32.0 (23–41)	4 (40)	1 (10)
With CFI ($n=36$)	18 (50)	18 (50)	23.0 (17–42)	30 (83)	8 (22)

TABLE II
Descriptive results of the relapsed and the non-relapsed patients with the assessment of relatives

	Men n *(%)*	*Women* n *(%)*	*Age: years median (range)*	*Patients living in family household* n *(%)*	*CC median (range)*	*EOI median (range)*	*Hostility* n *(%)*	*DAS–II median range*
Relapsers ($n=8$)	4 (50)	4 (50)	23.5 (18–34)	6 (75)	15.0 (8–50)	2.0 (0–3)	3 (38)	4.0 (2–5)
Non-relapsers ($n=28$)	14 (50)	14 (50)	23.0 (17–42)	24 (86)	4.5 (0–48)	1.0 (0–4)	2 (7)	3.0 (1–6)

The 36 patients whose family environment had been assessed with the CFI were younger (median age 23.0 years) than those not assessed (median age 32.0 years) ($U=70.5$, $P=0.003$), but differed neither in sex (Fisher, $P=0.725$) nor in relapse rates (Fisher, $P=0.659$). Results are presented in Table I.

Further description of results was limited to the 36 patients with complete follow-up and with CFI assessment. The median number of CC was 8.0 (range 0–50), the EOI median score was 1.5 (range 0–4), relatively few relatives were hostile (5/36) (14%), and the DAS–II median score was 3.5 (range 0–6). The relapse rate for the 36 patients was 22% (8/36). All were psychotic relapses. One was a psychotic recurrence while the patient was living with his family but still attending the day programme of the CTB after remission for more than a month.

The difference between relapsers and non-relapsers with respect to prognostic variables

Univariate analysis shows that the only prognostic variable which distinguished the relapsers (8 patients) from the non-relapsers (28 patients) was the number of CC ($U=26.5$, $P<0.001$); the relapsers had more CC (median 15.0) than non-relapsers (median 4.5) (Table II).

There was no significant difference in sex (Fisher, $P=1.0$), household status (Fisher, $P=0.596$) age ($U=106.0$, $P=0.838$), EOI ($U=106.5$, $P=0.838$), presence of hostility (Fisher, $P=0.067$), or DAS–II scores ($U=84.0$, $P=0.302$). If we consider only the 30 patients living with their family, the results of the same statistical analysis are similar, with only CC providing a significant difference between groups ($U=20.0$, $P=0.005$).

Whether several factors might combine to predict relapse was tested by means of a multivariate analysis. We performed a discriminant analysis with sex, age, household status, CC, EOI, hostility, and DAS–II score as predictors, and relapse as a grouping variable. The predictive variables were selected with a stepwise method which minimises Wilks'lambda. Only CC was included in the final discriminant function which provided a significant distinction between the groups ($\chi^2=10.40$, d.f. $=1$, $P=0.001$) and which correctly classified 83% of the patients (27/28 non-relapsers and 3/8 relapsers).

Expressed emotion index and relapse

Using the classic cut-off points described by Leff & Vaughn (1976*b*), based on CC and EOI scores, 24 households were categorised as high EE and 12 as low EE. The respective relapse rates were 33% (8/24) for the high-EE group and 0% (0/12) for the low-EE group and were significantly different (Fisher's exact $P=0.033$). If we consider only the patients living with their family members ($n=30$), the relapse rate is 32% (6/19) for the high-EE group and 0% (0/11) for the low-EE group, a difference which just fails to be significant (Fisher's exact $P=0.061$).

Changing the cultural environment might modify the sensitivity of the EE ratings. Usually the EE index is rated, as above, on the basis of the number of CC and the EOI score. However, only the number of CC was related

https://doi.org/10.1192/bjp.156.3.357 Published online by Cambridge University Press

TABLE III
Percentages of misclassified patients in the group of schizophrenics (n = 36)

	Cut-off point on CC										
	5	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
High-CC non-relapsers	46	43	39	39	25	18	14	14	14	14	14
Low-CC relapsers	0	0	0	0	13	13	13	13	13	25	38

to relapse in our cohort. Therefore only this variable had a critical cut-off point. The difference in relapse rates between low and high CC was significant ($P<0.05$) with cut-off points on CC from 5 to 15; the highest statistical difference between the two groups was obtained with a cut-off point between 11 to 13 CC, which gave relapse rates of 4% (1/25) in the low-CC group and 64% (7/11) in the high-CC group (Fisher's exact $P=0.0003$). The decision to lower or raise the cut-off point is not only related to statistical significance but also to the proportion of relapsers and non-relapsers in high-CC and low-CC categories. Indeed, changing the cut-off point modifies the sensitivity of the detection of patients who will relapse. Table III gives the proportion of relapsers classified in the low-CC group (false negatives) and of non-relapsers classified in the high-CC group (false positives) for cut-off points. The lowest cut-off points maximise the detection of patients who will relapse but include more non-relapsers. On the other hand, the highest cut-off points reduce the number of false positives but miss some relapsers.

Discussion

The relapse rates in our cohort of first-admitted schizophrenic patients are similar to those of the first-admitted patients in the pooled data of the 1972 and 1976 British studies (Leff & Brown, 1977): 38% in the high-EE group and 13% in the low-EE group. In the studies that include readmitted patients, the relapse rates in the high-EE group are generally higher: 69% (Leff & Brown, 1977), 48% (Vaughn & Leff, 1976), 56% (Vaughn *et al*, 1984), 44% (Falloon *et al*, 1982), and 50% (Leff *et al*, 1985). These differences may result from the fact that in these studies first-admission patients are reported together with readmitted patients in various proportions, i.e. 54% for the combined 1972 and 1976 British studies, 17% for the California replication (Vaughn *et al*, 1984).

An English study from Northwick Park (MacMillan *et al*, 1986) and an Australian study (Parker *et al*, 1988) showed an insignificant or no relation between EE and outcome. In the Australian cohort, of the patients living in low-EE surroundings, 60% relapsed during a nine-month follow-up. This is remarkable considering that in all previous studies the relapse rates of the low-EE groups had been much lower: during a nine-month follow-up, 13% for the British studies (Leff & Brown, 1977) and 17% for the California replication (Vaughn *et al*, 1984), and during a variable follow-up period (between a few months and two years), 38% for the Northwick Park study (MacMillan *et al*, 1986). Therefore, the high relapse rate in the low-EE group in the Australian cohort must be part of the explanation why the EE index or its subscales failed to be of any prognostic value.

In the Northwick Park study, the definition of relapse included cases with "active antipsychotic medication considered by the responsible clinician to have become essential because of features of imminent relapse" (Crow *et al*, 1986, p. 122). With such a definition, the authors might have added cases with prodromal signs of relapse to cases of full relapse and thereby decreased some of the differences between their low-CC and high-CC groups of patients. In our sample of first-admission patients, we had a more clear-cut difference, with a definition of relapse excluding patients who showed only the prodromal signs of relapse. From this, one may hypothesise that high-CC and low-CC patients differ in the severity of their relapse and possibly in the reaction to prodromal signs. Further, in the Northwick Park study, EE was in some ways associated with outcome but the treatment status interfered; this was probably due to the group of placebo-treated patients, inasmuch as in this group, the relapse rates at one year after discharge were 67% for the high-EE group and 62% for the low-EE group (MacMillan *et al*, 1987). From these data it can be hypothesised that EE status is not a predictor of relapse in every possible situation. Indeed, even in the California study (Vaughn *et al*, 1984), it was of no predictive value for female patients: the relapse rates were 19% in the high-EE women and 17% in the low-EE women. A possible conclusion is that for women patients with a well established pattern of chronicity and relapses and for first-admitted patients treated with placebo, EE has no prognostic

value. It may be that for women with a well established pattern of relapses, the pattern of evolution might be too stable, and for placebo-treated relapsers too labile, for a low-EE environment to show any favourable effect.

In our Swiss-French cultural environment, which is a mix of several south-European cultures, a relation between some characteristics of family EE as measured by the CFI and the short-term clinical course of schizophrenic patients has been observed. In this general sense it is a replication of previous English and American studies. The classic EE index predicts, as in previous works, higher relapse rates for patients who have frequent contacts with a high-EE than with a low-EE family. The predictive power of the EE index is no more significant when the analysis is limited to the patients who are living with their relatives. There are at least two possible explanations for this finding. The first is that conservative, two-tailed statistical tests were used; one-tailed tests would have produced significant differences in relapse rates. The second reason, probably the most important one, is that the use of CC plus EOI in our population introduced 'noise' in the EE ratings. In fact, our results clearly show that relapse rates are better predicted by CC alone. Other studies have demonstrated that only CC was informative (Moline *et al*, 1985; MacMillan *et al*, 1986). That CC was a more powerful predictor than EE as a whole is perhaps the most intriguing result of our study. It will be interesting to see whether this result is confirmed over time in our sample. The fact that some other studies also produced this result suggests that CC may deserve more detailed consideration in future EE research. However, it is premature to place too much emphasis on this finding, and we resist the temptation of attempting to explain this preliminary result.

An even better index for our population was obtained with a cut-off point at 11 to 13 CC. A similar effect was observed in the study urban American schizophrenic patients of lower socio-economic class (Moline *et al*, 1985).

Our study seems to confirm the continuing epidemiological interest of EE. In our environment, 70% of the schizophrenic patients were in frequent contact with their family. This percentage is quite high in comparison with that observed in the Northwick Park study of first-admission schizophrenic patients, and it is much higher in comparison with the prevalence rates (13%) observed by McCreadie & Robinson (1987), who accounted for all schizophrenic patients living in the Nithsdale area of Scotland. Previous work (Goldstein & Strachan, 1986; Leff *et al*, 1986) has shown that high-EE and low-EE families benefit from and require different therapeutic strategies.

In conclusion, the preliminary findings of the present study confirm the hypothesis that EE in families has an intercultural application. Our first results support its value as a prognostic factor for the clinical course of schizophrenia.

Acknowledgements

The authors wish to thank the patients and their relatives for their participation; administrative staff and the clinical teams of the IUPG for their help; Dr C. E. Vaughn for constructive criticism. This study was supported by the Fonds National Suisse de la Recherche Scientifique (FNRS) grant no. 3.931.0.85

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