

Emotions and Personality in Complex Partial Seizures

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Abstract. Using the emotion profile index (EPI) and the Bear and Fedio personality inventory (PI), we investigated the influence of hemispheric localization of epileptic foci on emotions and personality in 24 patients with complex partial seizure. On the EPI, left patients showed a paranoid and depressed personality and gave a negative image of themselves, whereas right patients rated themselves in a positive way. On the PI, left and right patients showed an epileptic behavioral syndrome. Left patients were more depressed, guilt-ridden and aggressive than right patients.

Previous studies on interictal behavioral changes in temporal lobe epileptics (TLE) mainly followed two different approaches. Many investigators studied the incidence of psychopathology in TLE as defined by clinical interviews and/or MMPI, and obtained controversial results [1–7]. On the other hand, Geschwind [8, 9], Waxman and Geschwind [10, 11], and Bear and Fedio [12] attempted to define a specific epileptic behavioral syndrome, not necessarily of psychiatric relevance, in TLE patients and to relate it to sensory-limbic hyperconnection [13].

In recent studies on psychopathology in TLE [7, 12–18] patients with complex partial seizures (CPS) were not considered as an uniform group. Subgrouping the patients on the basis of variables such as lateralization

[7, 12, 17, 18], age at onset [14], presence or absence of aura of fear [16] and presence or absence of neuropsychological deficits [19–21] seemed to be a more informative approach to this problem.

Studying personality changes in CPS means also approaching the problem of emotion and lateralization. Normal and damaged left and right hemispheres were reported to have different roles in the perception [22], integration [12, 13, 23–25], and expression [26] of emotional experience. Emotional experiences are thought to be at the basis of the development personality traits [27–30].

In the present study I decided to investigate both emotions and specific personality changes in a group of CPS patients with left

or right epileptogenic foci. In order to have a reliable localization of the epileptogenic foci, I restricted my study to patients with uncontrolled CPS, being evaluated for anterior temporal lobectomy. In this group localization was mainly based on side of onset of patient's habitual seizures during closed-circuit television EEG telemetry recording [31–33].

Materials and Methods

Materials

Subjects were selected from patients admitted at UCLA and Wadsworth VA Epilepsy Unit for surface or depth telemetry recording of their seizures. All patients had uncontrolled or poorly controlled seizures despite adequate anticonvulsant levels. Interviews, neurobehavioral assessment, and psychometric tests were performed on the first day of admission to the hospital for the inpatients. Patients with florid psychosis, as determined by clinical assessment, with pseudoseizures or primary generalized seizures only, as determined by EEG and clinical history, or with mental retardation ($IQ < 70$) were excluded.

Control subjects were obtained from health worker personnel and were matched for demographic variables. The diagnosis of CPS was made on the basis of clinical description of the ictus coupled with EEG abnormalities [32]. Lateralization of the epileptic focus was determined by the side of onset of patient's habitual seizures observed during closed-circuit television EEG telemetry recording [31–33].

Presence or absence of an aura and its type, age at onset of the seizures, and anticonvulsants utilized with dosages and blood levels at the time of evaluation were recorded. As part of their ongoing evaluation, most patients were screened for the presence of a structural lesion (angiogram, pneumoencephalogram, or CT scan), lateralizing psychometric abnormality (verbal or spatial memory, language disturbance) or lateralizing neurologic exam findings (hemispheric field cuts).

Eleven patients with left temporal epileptogenic foci and 13 patients with right temporal foci were included in our study. The two groups did not signif-

Table I. Seizure-related variables in left and right temporal patients

	Groups				p
	left (n = 11)		right (n = 13)		
	\bar{X}	SD	\bar{X}	SD	
Seizure frequency, n/year	78.8	57.33	228.23	338.59	NS ¹
Age at onset, years	12.09	12.36	14.00	8.35	NS ¹
Seizure type					
CPS	6		6		NS ²
CPS + GM	5		7		
Fear					
Present	2		5		NS ²
Absent	9		8		
Other kinds of aura					
Present	6		8		NS ²
Absent	5		5		

¹ t test.

² χ^2 test.

icantly differ for seizure-related variables such as seizure frequency, age of onset, or type of aura (table I). Informed consent was obtained from each subject involved in this study, following a full explanation of the procedures.

Methods

The emotion profile index (EPI) [34] was used to measure eight personality traits based on eight emotional dimensions (table II). The EPI is a forced choice test developed directly on the basis of the psychoevolutionary theory of emotions of Plutchik [27–30]. The theory postulates the existence of eight primary emotions whose combination produces all the mixed emotions and personality profiles that are commonly encountered. The theory also notes that emotions vary in several ways: two of them are similarity and polarity, and these two implicit relations can be represented simultaneously by means of a cir-

Table II. The eight primary emotions and personality traits in the EPI [34]

Emotions	Personality trait	High score (> 60th percentile)	Low score (< 40th percentile)
Acceptance	trustful	accepting obedient suggestible	unaccepting distrustful
Surprise	discontrolled	impulsive curious	unadventurous not impulsive
Fear	timid	cautious careful fearful	not fearful take risks
Sadness	depressed	sad gloomy pessimistic	satisfied with his style of life
Disgust	distrustful	resentful hostile rejecting	uncritical not rejecting
Expectancy	controlled	well organized need for order	disorganized not planning
Anger	aggressive	quarrelsome expressing anger	unaggressive little anger
Joy	gregarious	sociable extroverted	unsociable introverted

cle. The EPI provides a quantifiable measure of the relative importance of these eight emotions in a person's life, and also a measure of the tendency to describe one's self in a socially desirable or undesirable way (bias scale). The 9 scales have been shown to have an internal reliability over 0.90 and their validities have also been demonstrated in a series of studies [35–38]. This test has been used on psychiatric patients [36], medical patients [38], and violent individuals [37].

In order to assess specific behavioral changes, we used the personal inventory (PI) developed by Bear and Fedio [12], that measures 18 personality traits putatively associated with TLE. A one-way analysis of variance (ANOVA) was performed where indicated. Whenever the differences were significant ($p < 0.05$ or less), the Newman-Keuls procedure was performed, in order to indicate how the three groups differed from each other.

Results

With a one-way ANOVA, the three groups showed significant differences on 3 out of the 9 scales of EPI: on EPI-4 (depressed) ($p < 0.05$), EPI-5 (distrustful) ($p < 0.01$) and EPI-9 (bias) ($p < 0.05$) (table III). The Newman-Keuls procedure followed the ANOVA and indicated that on EPI-4 (depressed) left-sided patients scored significantly higher than controls but not higher than right-sided patients; on EPI-5 (distrustful) left-sided patients scored significantly higher than both right-sided ones and controls. On EPI-9 (bias) left temporals scored significantly lower than both groups. Left-

Table III. EPI mean scores in left temporal and right temporal CPS patients matched for seizure-related variables and matched healthy controls

EPI scales	Left (n = 11)		Right (n = 13)		Controls (n = 19)		ANOVA F prob- ability ¹	Newman-Keuls test ²		
	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD		L/R	L/C	R/C
Trustful	39.36	32.75	56.08	26.56	56.84	28.24	0.249	NS	NS	NS
Discontrolled	35.55	32.75	45.92	31.83	50.37	31.41	0.474	NS	NS	NS
Timid	63.27	25.80	68.46	22.46	63.63	27.42	0.843	NS	NS	NS
Depressed	68.27	25.02	50.77	26.34	43.37	24.55	0.043	NS	p < 0.05	NS
Distrustful	59.91	27.06	30.15	20.33	33.79	28.79	0.010	p < 0.05	p < 0.05	NS
Controlled	57.84	35.84	63.23	26.60	67.47	23.90	0.664	NS	NS	NS
Aggressive	49.73	31.85	32.38	22.13	33.00	30.14	0.244	NS	NS	NS
Gregarious	38.91	35.44	53.15	27.20	59.26	30.66	0.185	NS	NS	NS
Bias	39.45	32.97	68.00	23.84	68.73	23.89	0.024	p < 0.05	p < 0.05	NS

L = Left temporal patients; R = right temporal patients; C = controls; NS = not significant.

¹ ANOVA: p < 0.05.

² The Newman-Keuls test identifies subsets of groups whose means do or do not differ significantly.

sided patients were identified by the EPI as being depressed, distrustful, and giving a negative evaluation of themselves.

On the Bear and Fedio PI, the three groups differed significantly on 12 out of 19 scales and on the total score (fig. 1). Left temporal patients rated themselves significantly higher for the trait 'aggression' 'depression', and 'guilt' than the other two groups. They also scored significantly higher than controls on 'emotionality' and 'obsessionalism'. Right temporals reported a significant higher score on the lie scale, as compared with left temporals and controls. This indicates a tendency for this group to give a socially acceptable image of themselves, the 'polishing' attitude reported by Bear and Fedio [12] in their right temporals. Both left and right patients scored significantly higher than controls on circumstantiality, hypergra-

phia (altered language output), dependence, humorlessness, hyperreligiosity, personal destiny and total score (fig. 1).

Discussion

When the emotional profiles of left, and right patients as well as controls, as assessed by the EPI, were compared, patients with left temporal foci seemed to be much more distrustful and tended to give less socially desirable images of themselves than both right temporal patients and controls. A high score on the 'distrustful' dimension describes individuals who are resentful, guarded, overcritical, rejecting of people, and hostile [34], all characteristics of a paranoid personality [39, 40]. Patients with left foci also differ significantly in the 'depression' dimension

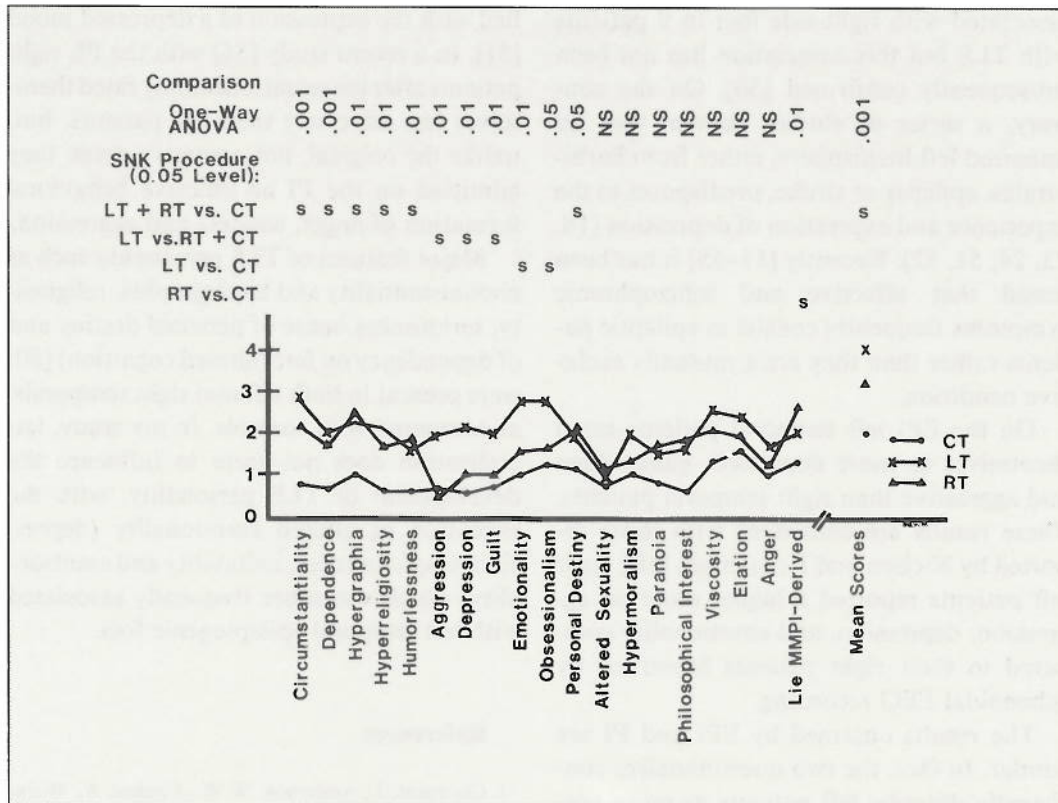


Fig. 1. PI profiles. LT = Left temporal profiles; RT = right temporal profiles; CT = control group. A multiple range test (Student-Newman-Keuls [SNK] procedure) follows the ANOVA.

from the controls but not from the right temporal group. Epileptic patients with paranoid or schizophrenia-like psychosis are reported by Flor-Henry [41], Taylor [42], Ounsted and Lindsay [43], and Sherwin [44, 45] to have more frequently left foci rather than right ones. Serafetinides and Falconer [46], in their sample of patients who underwent temporal lobectomy for uncontrolled seizures, reported that 5 out of 7 patients with paranoid psychosis with affective symptoms were operated on the left side. Conversely, left hemisphere dysfunction is

reported to be characteristic of schizophrenia [47], and overactivation of the left hemisphere seems to be more pronounced among paranoid than among nonparanoid schizophrenics [48, 49]. In my sample it seems that, even in the absence of florid psychosis, an epileptic foci in the left hemisphere predisposes the patients to develop a paranoid personality, characterized by a heightened suspiciousness and sensitivity.

Depression as an emotion coexists, in my sample, with paranoid traits. Flor-Henry [41] reported that clinical depression was

associated with right-side foci in 9 patients with TLE but this association has not been subsequently confirmed [50]. On the contrary, a series of studies showed that an impaired left hemisphere, either from barbiturates, epilepsy or stroke, predisposes to the experience and expression of depression [18, 23, 24, 51, 52]. Recently [53–55] it has been found that affective and schizophrenic symptoms frequently coexist in epileptic patients rather than they are a mutually exclusive condition.

On the EPI left temporal patients rated themselves as more depressed, guilt-ridden and aggressive than right temporal patients. These results are consistent with those reported by Nielsen and Kristiansen [18]; their left patients reported a higher score on aggression, depression, and emotionality compared to their right patients identified by sphenoidal EEG recording.

The results obtained by EPI and PI are similar. In fact, the two questionnaires consistently describe left patients as more hostile ('distrustful', 'aggression'), more brooding ('depressed', 'sadness') and 'tarnishing' their images when compared with right temporals. Right-sided patients seemed less prone to behavioral and emotional changes. They also showed a 'polishing' attitude on the lie scale of the PI, similar to that found by Bear and Fedio [12] in their sample of right temporals. It is not known whether this reflects a true lack of psychopathology or a less accurate perception and expression of their emotions. However, some results do support the latter hypothesis. In fact, patients with right nonepileptic lesions tend to minimize their disabilities [23], to express their emotions in an aprosodic, monotonous way [53] and to have neuroendocrine and vegetative signs of depression not closely al-

lied with the expression of a depressed mood [51]. In a recent study [56] with the PI, right patients after temporal lobectomy rated themselves less adversely than left patients, but, unlike the original, not operative cases, they admitted on the PI an emotive behavioral formation of anger, sadness and aggression.

Major features of TLE personality such as circumstantiality and hypergraphia, religiosity, seriousness, sense of personal destiny and of dependency on fate (altered cognition) [50] were present in both left and right temporals, as compared with controls. In my study, lateralization does not seem to influence the development of TLE personality, with the exception of altered emotionality (depression, suspiciousness, irritability and emotionality) which was more frequently associated with left temporal epileptogenic foci.

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