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Personality disorder traits in patients with epilepsy

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***Objective and methods*:** The Questionnaire on Personality Traits (VKP: Vragenlijst voor Kenmerken van de Persoonlijkheid) was used to investigate personality disorder (PD) traits in 203 patients with epilepsy and a control group of 332 subjects from the general population. Furthermore, the association of PD traits with epilepsy-related variables was studied, as well as the association between PD traits and level of psychopathology.

***Results*:** The results showed that, compared with the control group, patients with epilepsy had higher dimensional VKP scores for several Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and International Classification of Diseases (ICD-10) PDs. Associations were found between PD traits and age at onset of epilepsy, duration of epilepsy, seizure frequency and number of anti-epileptic drugs. Anxiety and depression were not associated with PD traits.

***Conclusion*:** It is likely that suffering from epileptic seizures negatively influences personality development and can result in the development of maladaptive PD traits. The results also support the idea that PD traits are not (completely) covered by axis I psychopathology and therefore should be separately investigated.

Key words: personality disorder traits; epilepsy; VKP.

INTRODUCTION

The relationship between epilepsy and personality disorders (PDs) is not often the subject of scientific investigation. Much research concentrates on psychiatric disorders, such as psychotic disorders, anxiety disorders and mood disorders, whereas PDs are less frequently studied in epilepsy. Most of the literature concerning psychopathology in epilepsy fails to make the distinction between psychiatric disorders and PDs. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)[1] an axis II PD is 'an enduring pattern of inner experience and behaviour that deviates markedly from the expectations of the individual's culture, is pervasive and inflexible, has an onset in adolescence or early adulthood, is stable over time, and leads to distress or impairment'. An axis I psychiatric disorder is an illness appearing any time in life, with its own characteristic features, course and prognosis, which usually can be treated successfully.

When psychopathology and personality in epilepsy is studied, the Minnesota Multiphasic Personality Inventory (MMPI) is frequently used[2–5]. The MMPI has been criticised by several authors as an inappropriate instrument for the detection of interictal behaviour and personality disturbances in epilepsy[6,7]. Bear and Fedio[8] who noted the shortcomings of the MMPI, developed the Bear-Fedio Inventory (BFI), a rating scale of 18 behavioural traits that previously had been associated in literature with temporal lobe epilepsy (TLE). They found an increased frequency of all 18 traits in patients with TLE, compared with normal and neurological controls, including obsessionality, dependency, emotionality, irritability, religiosity and philosophic interest. Other studies using the BFI showed mixed results, with generally increased behavioural traits in epilepsy patients (both TLE and primarily generalised epilepsy) compared with normal controls[9–11].

Some investigators use alternative methods like classification by a psychiatrist, to assess psychosis, depressive disorders, anxiety disorders and PDs. In a study by Schwartz and Cummings[12] the medical records of 21 epilepsy patients and 24 neurological control patients were reviewed. A psychiatrist classified

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PDs according to DSM-III in eight patients with epilepsy (38%) and one control patient (4%). Fiordelli *et al.*[13] studied psychiatric disturbances in 100 epilepsy patients and 100 matched control patients. After administration of a psychiatric interview (Clinical Interview Schedule: CIS), 19 epilepsy patients and 15 control patients were identified as having psychiatric disorders. Subsequently, a psychiatrist classified these patients following DSM-III-R criteria. PDs were found in four patients with epilepsy (21%) and in none of the control patients.

Only few studies exist assessing PDs by means of standardised diagnostic instruments based on objective diagnostic criteria. Lopez-Rodriguez *et al.*[14] used the Structured Clinical Interview for DSM-III-R PDs (SCID-II) for investigating PDs in 52 epilepsy patients. They found PDs in 11 patients (21%), especially cluster C disorders (15%). Avoidant and dependent PDs were the most common diagnoses. Also, Victoroff[15] found axis II PDs in 11 subjects out of 60 epilepsy patients by using the patient version of the SCID. Personality disorder Not Otherwise Specified (NOS) prevailed. Manchanda *et al.*[16] investigated both DSM-III-R axis I and II disorders in 300 epilepsy patients who where candidates for epilepsy surgery. They found PDs in 18% of the patients, especially dependent and avoidant PDs. Also, Arnold and Privitera[17] found axis II PDs in 18% of the epilepsy patients using the epilepsy version of the SCID. The most common diagnosis was the avoidant PD, which was present in all patients.

Comparing previous study results of interictal PDs in epilepsy patients is complicated, due to the use of different patient samples. Additionally, patient groups are usually small and frequently no control group is included. Even more important is the use of a variety of diagnostic instruments: many studies use instruments such as the MMPI and BFI which assess personality 'traits' underlying personality psychopathology, and not PDs as defined in widely accepted categorical systems such as the DSM and International Classification of Diseases (ICD).

This study investigates PDs in Dutch patients with epilepsy by means of a self-report questionnaire assessing PDs according to diagnostic criteria of the DSM-IV and ICD-10. Patients are assessed for each of the PDs but each separate disorder is conceptualised as a continuum. In this way the degree to which a patient exhibits the traits of a particular PD is determined. The results of the epilepsy patients are compared with a control group consisting of people from the general population. Because patients with epilepsy often experience mood and anxiety disturbances[18], we also investigated their level of general psychopathology. Furthermore, the association of PD traits with epilepsy-related variables was explored. Finally, the relationship between general psychopathology and PD traits was determined in order to investigate whether it is worthwhile to assess PD traits independent of and above assessing the level of psychopathology.

METHOD

Subjects

The study population included 203 epilepsy patients and 332 persons from the general population. The epilepsy patients were consecutively admitted to the observation department of the Stichting Epilepsie Instellingen Nederland (SEIN: a tertiary epilepsy centre). A minimum age of 18 years, sufficient knowledge of the Dutch language and a definite diagnosis of epileptic seizures (with no concomitant pseudo-epileptic seizures) were the inclusion criteria for this study. Their treating neurologist recruited all patients. The epilepsy patients can be divided into two subgroups: 110 patients suffering from seizures predominantly originating from localisations in the temporal lobes (TLE), and 84 patients with seizures originating from localisations outside the temporal lobes (extra-TLE). The classification of TLE and extra-TLE was made on the bases of all clinical information available (seizure history, clinical observation, EEG, MRI). Nine patients could not be assigned to either subgroup, because it was not clear whether the seizures were of temporal or extra-temporal origin. The demographic characteristics of patients with TLE and extra-TLE were not different, except for age. Compared with extra-TLE patients, patients with TLE were significantly older ($t(192) = 2,74$; $P < 0.01$).

The control group consisted of 332 persons. One hundred and forty-three subjects were approached 'door to door' at their home address, and 189 subjects were derived from family members, acquaintances and colleagues of the student researchers[19].

The characteristics of the epilepsy group and the control group are shown in Table 1. As for general psychopathology, the results of the epilepsy patients were compared with normative data of the general population and a psychiatric outpatient population as described in the Dutch manual of the Symptom Checklist-90 (SCL-90)[20].

Instruments

The Questionnaire on Personality Traits (VKP: Vragenlijst voor Kenmerken van de Persoonlijkheid)[19] was used to investigate PD traits. The VKP is a self-report questionnaire, based on the International

Table 1: Characteristics of the epilepsy group and control group.

Demographic variables	Epilepsy ($n = 203$)	Controls ($n = 332$)	*t*-test/Chi-square
Age (years)			
M	39.2	36.6	$t = -2.17^{*}$
SD	11.7	15.3	
Sex (%)			
Male	57.6	44.4	$\chi^2 = 8.83^{**}$
Female	42.4	55.6	
Education (%)			
Primary education	73.2	22.6	$\chi^2 = 129.31^{***}$
Secondary education	18.7	46.2	
Higher education	8.1	31.2	
Civil state (%)			
Married/living together	46.3	53.5	$\chi^2 = 2.59$
Single	53.7	46.5	
Age at onset epilepsy (years)			
M	16.7	–	
SD	13.7	–	
Duration epilepsy (years)			
M	22.4	–	
SD	14.0	–	
Seizure frequency (%)[a]			
No seizures	10.2	–	
Monthly	21.3	–	
Weekly	47.2	–	
Daily	21.3	–	
Localisation epileptogenic zone (%)			
TLE	56.7	–	
Extra-TLE	43.3	–	
Number of AEDs			
M	2.3	–	
SD	1.1	–	

M: mean; SD: standard deviation; TLE: temporal lobe epilepsy; AEDs: anti-epileptic drugs.
[a] Seizure frequency prior to hospitalisation.
$^{*}P < 0.05$; $^{**}P < 0.01$; $^{***}P < 0.001$.

Personality Disorder Examination (IPDE)[21], assessing PDs according to DSM-IV and ICD-10 criteria. It consists of 197 questions scored on a 3-point scale (true (2); ? (1); false (0)). There are 12 questions with a fourth answer possibility, namely not applicable (0). The 197 questions can be assigned to seven domains: work, self-image, interpersonal relationship, affects, reality testing, impulse control, and behaviour prior to the age of 15. The VKP assesses 12 PDs according to the DSM-IV and 9 PDs according to the ICD-10 criteria. Intercorrelations between the VKP sub-scales vary from $r = 0.03$ to 0.57. The reliability and validity of the VKP proved to be adequate[22]. For each PD a dimensional score and a categorical diagnosis (negative, probable, and positive) are given. The dimensional score is calculated by counting the number of criteria met for each disorder, and thus contains more information than a diagnosis, which is only assigned when a minimum number of criteria have been met. In this study only the dimensional scores for PD traits are used to compare the epilepsy patients with the control group.

The SCL-90[20,23] was used to assess the level of psychopathology. It consists of 90 questions about recent physical and psychological complaints that can be scored on a 5-point scale. The 90 items can be assigned to eight dimensions: anxiety, agoraphobia, depression, somatic complaints, insufficiency, sensitivity, hostility and sleeping problems. On the basis of these eight sub-scale scores, a general psychoneuroticism score is given.

Data analysis

The *t*-tests and Chi-square tests were used to investigate differences in demographic characteristics between the epilepsy group and control group.

To investigate differences in PD traits between the epilepsy group and control group, analysis of covariance (ANCOVA) was performed correcting for age, sex and education. ANCOVA is a statistical technique, frequently used in the behavioural sciences and combines regression and ANOVA[24]. A *t*-test was used to

compare the results of the epilepsy patients on the SCL-90 with normative data of the general population and a psychiatric outpatient population as described in the Dutch manual[20]. Also, differences between TLE and extra-TLE patients on the SCL-90 sub-scales were analysed by means of *t*-tests.

Linear multiple regression analyses (with forced entry) was used to explore the association of VKP PD traits with epilepsy-related variables (age at onset, duration, localisation of the epileptogenic zone, seizure frequency, and number of anti-epileptic drugs).

In order to measure the association between VKP and SCL-90 sub-scales, Pearson's *r* correlations were calculated. In addition, a linear multiple regression analyses (with stepwise entry) was performed with the SCL-90 sub-scales as independent variables and the VKP PDs as dependent variables.

For statistical analysis SPSS for Windows release 10.0 was used.

RESULTS

As shown in Table 1, the epilepsy group significantly differed from the control group on the demographic variables age, sex and education: they were significantly older ($P < 0.05$), had a lower level of education ($P < 0.001$) and were predominantly male ($P < 0.01$). Because of these differences in demographic characteristics, a covariance-analysis was done correcting for age, sex, and education in order to investigate differences on PD traits between both groups. The results of this covariance-analysis are shown in Table 2. Compared with the control group, patients with epilepsy showed significantly higher dimensional scores on seven DSM-IV PDs, namely schizoid, antisocial, histrionic, avoidant, dependent, passive aggressive and depressive. Concerning ICD-10 PD traits, they scored significantly higher on the paranoid, schizoid, dyssocial, histrionic, anxious and dependent PD. For both DSM-IV and ICD-10 a significantly higher total dimensional score was found in the epilepsy patients. Besides these group-effects, also a certain number of significant age-, sex- and education effects were found.

Compared with normative data of the general population ($n = 1009$)[20], epilepsy patients scored significantly higher on the SCL-90 sub-scales for anxiety ($P < 0.001$), agoraphobia ($P < 0.02$), depression ($P < 0.001$), somatisation ($P < 0.02$), insufficiency

Table 2: Covariance analysis (ANCOVA) with group, sex and education as fixed factors, age as covariant and PD traits as dependent variable.

PD traits	Corrected means (SD)[a]		*F*-values			
	Epilepsy	Controls	Group	Age	Sex	Education
DSM-IV						
Paranoid	1.48 (1.70)	1.37 (1.49)	0.58	1.11	7.58**	1.54
Schizoid	1.14 (1.29)	0.68 (1.14)	15.51***	30.60***	6.60*	2.08
Schizotypical	1.31 (1.60)	1.04 (1.40)	3.69	8.06**	0.03	1.02
Antisocial	1.20 (2.18)	0.77 (1.90)	4.74*	9.38**	35.73***	0.37
Borderline	1.54 (1.77)	1.44 (1.54)	0.33	7.48**	1.56	3.28*
Histrionic	1.29 (1.35)	0.76 (1.19)	19.13***	0.80	0.44	1.32
Narcissistic	1.00 (1.53)	1.07 (1.35)	0.28	5.13*	9.54**	0.65
Avoidant	1.77 (2.08)	1.29 (1.81)	6.48*	0.12	17.14***	4.59*
Dependent	1.72 (1.74)	0.93 (1.53)	25.50***	0.59	6.39*	5.12**
Obsessive-compulsive	1.84 (1.76)	1.71 (1.54)	0.65	9.35**	1.22	0.82
Passive aggressive	0.99 (1.27)	0.71 (1.10)	5.99*	3.51	0.02	0.65
Depressive	1.67 (1.76)	0.97 (1.54)	19.46***	0.99	13.31***	0.28
NOS	15.76 (12.88)	12.73 (11.25)	6.88**	1.61	0.50	2.90
ICD-10						
Paranoid	1.75 (1.59)	1.45 (1.38)	4.63*	11.35***	10.20***	2.65
Schizoid	1.45 (1.58)	0.96 (1.37)	12.11***	19.98***	3.97*	0.92
Dyssocial	0.81 (0.98)	0.58 (0.85)	6.85**	6.33*	28.45***	0.44
Impulsive type	1.03 (1.31)	1.02 (1.15)	0.02	3.41	3.09	6.07**
Borderline	1.90 (1.90)	1.72 (1.77)	0.99	8.44**	5.50*	5.40**
Histrionic	1.03 (1.11)	0.59 (0.96)	19.42***	7.34**	3.64	0.79
Anankastic	1.67 (1.66)	1.62 (1.46)	0.09	7.00**	0.70	0.35
Anxious	1.36 (1.58)	0.78 (1.37)	17.16***	0.03	19.52***	4.59*
Dependent	1.60 (1.58)	1.05 (1.38)	15.08***	0.09	18.79***	4.91**
NOS	12.73 (8.98)	8.75 (7.84)	24.36***	0.29	4.37*	3.87*

SD: standard deviation.
[a] Mean dimensional scores for the PDs, corrected for age, sex and education.
* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

Table 3: Multiple regression (forced entry) with significant regression coefficients (Beta's) and squared multiple correlations (R^2) with the VKP PD traits as dependent variables and the epilepsy-related variables as independent variables.

PD traits	Epilepsy-related variables					
	Age at onset epilepsy	Duration epilepsy	Seizure frequency	Number of AEDs	Localisation epileptogenic zone	R^2
DSM-IV						
Paranoid						
Schizoid	0.31	0.41				0.10
Schizotypical						
Antisocial						
Borderline						
Histrionic						
Narcissistic						
Avoidant		0.25	0.18	0.20		0.10
Dependent						
OCD	0.21	0.24		0.17		0.09
Passive aggressive						
Depressive						
ICD-10						
Paranoid						
Schizoid	0.29	0.36				0.09
Dyssocial						
Impulsive type			0.18			0.06
Borderline			0.16			0.04
Histrionic						
Anankastic	0.24	0.24				0.10
Anxious		0.24	0.20	0.19		0.07
Dependent						

AEDs: anti-epileptic drugs, OCD: obsessive-compulsive disorder.

($P < 0.001$) and psychoneuroticism ($P < 0.001$). Within the epilepsy group, patients with TLE scored significantly higher on the SCL-90 sub-scales for insufficiency ($P < 0.05$) and sensitivity ($P < 0.05$), compared with extra-TLE patients.

The results of the linear multiple regression analyses, in which the association of PD traits with epilepsy-related variables was explored, are shown in Table 3. Cluster C PD traits avoidant and obsessive-compulsive were positively associated with number of anti-epileptic drugs, duration of epilepsy, seizure frequency (avoidant only) and age at onset (obsessive-compulsive only). Age at onset and duration of epilepsy were also positively associated with the schizoid PD traits. Regarding ICD-10, schizoid and anankastic PD traits were positively associated with age at onset and duration of epilepsy. Impulsive type, borderline and anxious PD traits were positively associated with seizure frequency, whereas anxious was also positively associated with duration of epilepsy and number of anti-epileptic drugs.

For the epilepsy group, we also computed Pearson correlations between the VKP and SCL-90 sub-scales. Significant positive correlations were found between most scales for PD traits and SCL-90 sub-scales. In particular, the SCL-90 sub-scale sensitivity correlated high with most of the VKP sub-scales. Highest correlations were found between avoidant and sensitivity ($r = 0.62$, $P < 0.001$), anxious and sensitivity ($r = 0.59$, $P < 0.001$) and schizotypical and sensitivity ($r = 0.57$, $P < 0.001$). Multiple stepwise regression was carried out with the VKP sub-scales for PD traits as dependent variables and the SCL-90 sub-scales as independent variables (Table 4). Regarding DSM-IV PD traits, the avoidant PD is the best represented by the SCL-90 sub-scales ($R^2 = 0.45$). For the ICD-10 PD traits, highest R^2s were found for the impulsive type ($R^2 = 0.35$) borderline ($R^2 = 0.36$) and anxious ($R^2 = 0.38$) PD. Furthermore, the results showed that the SCL-90 sub-scale sensitivity is a strong predictor for all VKP sub-scales. The sub-scales agoraphobia, anxiety, depression, sleeping problems and somatisation had minimal predictive value.

DISCUSSION

The relationship between psychopathology and epilepsy has been extensively studied. Patients with epilepsy suffer from a high degree of mood and anxiety disorders[18]. The results of this study show that patients with epilepsy also exhibit more PD traits compared with a control group from the general population. The degree to which a patient exhibits the traits of a PD was determined by conceptualising each PD as a continuum. Most other studies use categorical diagnoses, which are only assigned when a minimum number of criteria have been met. These

Table 4: Multiple regression (stepwise) with significant regression coefficients (Beta's) and squared multiple correlations (R^2) with the VKP PD traits as dependent variables and the SCL-90 sub-scales as independent variables.

Personality disorder traits	SCL-90 sub-scales								
	ANG	AGO	DEP	SOM	IN	SEN	HOS	SLA	R^2
DSM-IV									
Paranoid						0.49			0.24
Schizoid						0.36			0.13
Schizotypical						0.57			0.32
Antisocial							0.22		0.05
Borderline						0.29	0.28		0.25
Histrionic						0.24	0.20		0.15
Narcissistic	−0.20				−0.19	0.47	0.29		0.24
Avoidant		0.14	0.25			0.56	−0.24	−0.15	0.45
Dependent					0.20	0.38			0.28
OCD					0.25	0.21			0.17
Passive aggressive					−0.18	0.33	0.41		0.31
Depressive			0.40	−0.25		0.32			0.32
ICD-10									
Paranoid						0.38			0.14
Schizoid						0.42			0.18
Dyssocial					−0.35	0.32	0.28		0.15
Impulsive type			0.30				0.37		0.35
Borderline			0.22			0.26	0.22		0.36
Histrionic						0.33	0.20		0.22
Anankastic					0.32	0.23			0.25
Anxious		0.20				0.49			0.38
Dependent						0.45			0.21

ANG: anxiety; AGO: agoraphobia; DEP: depression; SOM: somatisation; IN: insufficiency; SEN: sensitivity; HOS: hostility; SLA: sleeping problems; R^2: squared multiple correlation. OCD: obsessive-compulsive disorder.

different approaches limit the comparison of the study results.

In concordance with studies by Lopez-Rodriguez *et al.*[14], Manchanda *et al.*[16], and Arnold and Privitera[17], we found higher dimensional scores for the epilepsy patients on the cluster C PDs dependent and avoidant. This corresponds with the clinical impression that patients with epilepsy are frequently seen as unstable, introvert and anxious people, who avoid personal contact for reasons of uncertainty. We also found higher dimensional scores for a number of other PDs that are not previously described in literature. If we compare the results of the epilepsy patients with data of psychiatric patients[19], the mean dimensional scores for the epilepsy patients are low. On the other hand, when we compare our results with those found in asthma outpatients[25] (also a chronic medical condition) patients with epilepsy score much higher. These results suggest that the higher scores found in epilepsy patients are not the consequence of a chronic medical condition *per se*. The significance of this outcome is not quite clear. Probably, a relationship exists between PD traits and epilepsy-related variables.

We studied this hypothesis and we found that a modest part of the variance of several PD traits can be explained by epilepsy-related variables. As was expected, a relationship exists between PD traits and the severity of epilepsy. When patients have more severe epilepsy, they often have a high seizure frequency and they use more anti-epileptic medication. It is likely that in these patients the need for control is usually high (because seizures mean a loss of control). Therefore they are probably more prone to develop a behaviour pattern that corresponds with especially cluster C PD traits. Besides, it is well known that epilepsy is a disorder that can have substantial psychological and social consequences for everyday life. Many patients with epilepsy have problems with interpersonal relationships, have low self-esteem, have increased levels of anxiety and depression and are frequently described as persistent and rigid. These characteristics frequently seen in patients with especially severe epilepsy, again correspond with the cluster C traits.

Besides the severity, also a longer duration of epilepsy is supposed to have an influence upon the development of maladaptive personality traits. For some PD traits we found a positive association with both a longer duration and a later age at onset of epilepsy. We expected, however, to find a negative association between the age at onset and the PD traits, because we think that onset of epilepsy in the early phase of personality development will be crucial. The contribution of age at onset of epilepsy in PD traits should be further investigated.

Because previous studies showed a high degree of anxiety and mood disorders in patients with epilepsy, we also investigated the level of general

psychopathology. Higher scores were found for patients with epilepsy on several of the SCL-90 sub-scales compared with normative data of the general population, indicating more physical and psychological complaints in patients with epilepsy. This is possibly the result of having epilepsy or the distress of being hospitalised. On the other hand, when we make a comparison with normative data of a group of psychiatric outpatients ($n = 2118$)[20] the scores for the epilepsy patients were significantly lower on all SCL-90 sub-scales ($P < 0.001$). Within the epilepsy group, we found some differences in the level of general psychopathology depending on the localisation of the epileptogenic zone. Patients with seizures originating from the temporal lobes (TLE) scored higher on the SCL-90 sub-scales for insufficiency and sensitivity than patients with seizures originating from outside the temporal lobes (extra-TLE). We did expect more psychoneurotic complaints in patients with TLE because of the involvement of the temporolimbic system.

Correlations between the SCL-90 sub-scales and VKP PD traits showed high positive correlations between the SCL-90 sub-scale sensitivity and most of the VKP PD traits. Especially the sub-scale sensitivity, and to a lesser extent hostility, appeared to be strong predictors for all VKP PD traits. This can be due to the fact that the sub-scales sensitivity, hostility and insufficiency represent more or less underlying 'traits', whereas the other sub-scales represent more temporary 'states'[26].

Interestingly, most of the associations of VKP PD traits with the SCL-90 sub-scales for anxiety and depression were not significant. These results suggest that the elevated scores for PD traits in epilepsy patients cannot be attributed to the high prevalence of anxiety and mood disorders as generally found in epilepsy patients. Apparently, scores for PD traits on the VKP were not critically confounded by SCL-90 scores for anxiety and depression. These results are consistent with the idea that most of the sub-scales of the SCL-90 investigate levels of psychopathology as found in axis I disorders. However, high scores on the sub-scales for sensitivity and hostility may reflect elevated PD traits on axis II and should be further investigated. The constructs of psychopathology and PD traits although interrelated are distinct enough to warrant independent scientific and clinical attention.

Critical remarks and conclusion

There are some limitations of this study that need to be addressed.

First, all patients were admitted to our epilepsy inpatient clinic at the time of assessment. Presumably, they would have had more severe illness, so we cannot generalise these findings to the total epilepsy population. Therefore, in future studies a more representative sample of epilepsy patients should be used, consisting of patients originating from outpatient clinics, general hospitals, as well as inpatient clinics. Also the control group should be a more representative sample from the general population. The control group in this study consisted of a relatively high proportion of subjects with a higher education.

A second remark concerns the questionnaire we used to screen for PD traits. The VKP is a valid instrument, but does not give accurate diagnoses (it overestimates) of PDs. However, the aim of this study was to compare patients with epilepsy with a control group on the number of traits for each PD and not to determine real PDs. For that, it is recommended to use a questionnaire to screen for the possible presence of PDs. When PDs are present, a standardised interview (such as the IPDE) should be used to further investigate the PDs.

Finally, we did not find any association between the localisation of the epileptogenic zone and PD traits. However, the diagnoses TLE and extra-TLE were made retrospectively by several neurologists on the basis of all diagnostic data available and not by means of firm and objective diagnostic criteria established beforehand. Besides, the extra-TLE group was a mixed group consisting of patients with seizures originating from localisations other than the temporal lobes. Therefore, in future studies the classification of epilepsy should be made more accurately, according to strict criteria, based on EEG and anatomical diagnoses and clinical information. Additionally, only patients with a localisation related epilepsy of temporal or extra-temporal origin should be included.

It can be concluded that patients with epilepsy have raised scores for a number of PD traits. It is likely that suffering from epileptic seizures can result in disturbances in the development of personality characteristics. The results of this study also indicate that a relationship exists between the development of PD traits with the severity and duration of the epilepsy.

From a clinical point of view it is important that we are aware of these personality features, which can occur in addition to axis I disturbances. However, we must not treat patients with epilepsy as if they are personality disordered. After all, the mean dimensional scores for PD traits range between 0.81 and 1.90 (especially cluster C traits), so we cannot speak of real PDs. Also, compared with psychiatric patients, patients with epilepsy have considerably less PD traits. The personality characteristics in epilepsy patients are generally common manifestations of the chronic epileptic condition, which should be bear in mind when treating these patients.

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REFERENCES

1. American Psychiatric Association, Committee on Nomenclature and Statistics. *Diagnostic and Statistical Manual of Mental Disorders*, revised 4th edn. Washington, DC, American Psychiatric Press, 1994.
2. Provinciali, L., Franciolini, B., Del Pesce, M., Signorino, M. and Ceravolo, G. Influence of neurological factors on the personality profile of patients with temporal lobe epilepsy. *Journal of Epilepsy* 1989; **2**: 239–244.
3. Hermann, B. P., Dikmen, S. and Wilensky, A. J. Increased psychopathology associated with multiple seizure types: fact or artifact? *Epilepsia* 1982; **23**: 587–596.
4. Hermann, H. P., Dikmen, S., Schwartz, M. S. and Karnes, W. E. Interictal psychopathology in patients with ictal fear: a quantitative investigation. *Neurology* 1982; **32**: 7–11.
5. Silberman, E. K., Sussman, N., Skillings, G. and Callanan, M. Aura phenomena and psychopathology: a pilot investigation. *Epilepsia* 1994; **35** (4): 778–784.
6. Trimble, M. R. Personality disturbances in epilepsy. *Neurology* 1983; **33**: 1332–1334.
7. Perini, G. I., Tosin, C., Carraro, C. *et al.* Interictal mood and personality disorders in temporal lobe epilepsy and juvenile myoclonic epilepsy. *Journal of Neurology, Neurosurgery, and Psychiatry* 1996; **61**: 601–605.
8. Bear, D. M. and Fedio, P. Quantitative analysis of interictal behavior in temporal lobe epilepsy. *Archives of Neurology* 1977; **34**: 454–467.
9. Brandt, J., Seidman, L. J. and Kohl, D. Personality characteristics of epileptic patients: a controlled study of generalised and temporal lobe cases. *Journal of Clinical and Experimental Neuropsychology* 1985; **7**: 25–38.
10. Rodin, E. and Schmaltz, S. The Bear-Fedio personality inventory and temporal lobe epilepsy. *Neurology* 1984; **34**: 591–596.
11. Sorensen, A. S., Hansen, H., Andersen, R., Hogenhaven, H., Allerup, P. and Bolwig, T. G. Personality characteristics and epilepsy. *Acta Psychiatrica Scandinavica* 1989; **80**: 620–631.
12. Schwartz, J. and Cummings, J. L. Psychopathology and epilepsy: an outpatient consultation-liaison experience. *Psychosomatics* 1988; **29** (3): 295–300.
13. Fiordelli, E., Beghi, E., Bogliun, G. and Crespi, V. Epilepsy and psychiatric disturbance. A cross-sectional study. *British Journal of Psychiatry* 1993; **173**: 446–450.
14. Lopez-Rodriguez, F., Altshuler, L., Kay, J., Delarhim, S., Mendez, M. and Engel, J. Personality disorders among medically refractory epileptic patients. *Journal of Neuropsychiatry and Clinical Neuroscience* 1999; **11**: 464–469.
15. Victoroff, J. DSM-III-R psychiatric diagnoses in candidates for epilepsy surgery: lifetime prevalence. *Neuropsychiatry, Neuropsychology, and Behavioral Neurology* 1994; **7** (2): 87–97.
16. Manchanda, R., Schaefer, B., McLachlan, R. S. *et al.* Psychiatric disorders in candidates for surgery for epilepsy. *Journal of Neurology, Neurosurgery, and Psychiatry* 1996; **61**: 82–89.
17. Arnold, L. M. and Privitera, M. D. Psychopathology and trauma in epileptic and psychogenic seizure patients. *Psychosomatics* 1996; **37**: 438–443.
18. Swinkels, W. A. M., Kuyk, J., de Graaf, E. H., van Dyck, R. and Spinhoven, Ph. Prevalence of psychopathology in Dutch epilepsy inpatients a comparative study. *Epilepsy and Behavior* 2001; **2**: 441–447.
19. Duijsens, I. J., Haringsma, R. and Eurelings-Bontekoe, E. H. M. *De VKP handleiding, DSM-IV & ICD-10*. Leiderdorp, Datec, 1999.
20. Arrindell, W. A. and Ettema, J. H. M. *Handleiding SCL-90*. Lisse, Swets & Zeitlinger, 1986.
21. World Health Organisation. In: *International Personality Disorder Examination (IPDE) DSM-IV Module: Dutch Adaptation* (Eds I. J. Duijsens, E. H. M. Eurelings-Bontekoe and R. F. W. Diekstra). Leiderdorp, Datec, 1995.
22. Duijsens, I. J. *Assessment of Personality Disorders: Construction, Reliability and Validity of the VKP Self-Report*. Lisse, Swets & Zeitlinger, 1996.
23. Derogatis, L. R. *SCL-90: Administration, Scoring and Procedures Manual-I for the Revised Version*. Baltimore, John Hopkins University School of Medicine, Clinical Psychometrics Research Unit, 1977.
24. Cox, D. R. and McCullagh, P. Some aspects of analysis of covariance. *Biometrics* 1982; **38**: 541–561.
25. Bauer, H. and Duijsens, I. J. Personality disorders in pulmonary patients. *British Journal of Medical Psychology* 1998; **71**: 165–173.
26. Karterud, S., Friis, S., Irion, R., Mehlum, L., Vaglum, P. and Vaglum, S. A SCL-90-R derived index of the severity of personality disorders. *Journal of Personality Disorders* 1995; **9** (2): 112–123.