

FULL-LENGTH ORIGINAL RESEARCH

Seizure metaphors differ in patients' accounts of epileptic and psychogenic nonepileptic seizures

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SUMMARY

Purpose: To increase understanding of the subjective symptomatology of seizure experiences and improve differential diagnosis by studying the seizure metaphors used by patients with (psychogenic) nonepileptic seizures (NES) and epilepsy.

Methods: Twenty-one unselected patients taking part in this study were admitted for 48 h of video-EEG (electroencephalography) observation because of uncertainty about the diagnosis. Eight were proven to have epilepsy, 13 to have psychogenic nonepileptic seizures (PNES). During their admission, patients were interviewed by a neurologist. A linguist blinded to the medical diagnosis identified and categorized all seizure metaphors in verbatim transcripts. Between-group comparisons and logistic regression analysis were carried out.

Results: Of 382 metaphors identified, 80.8% conceptualized seizures as an agent/force, event/situation, or space/place. Most patients used metaphors from all categories, but patients with epi-

lepsy and PNES showed preferences for different metaphoric concepts (differences $p = 0.009$ to $p = 0.039$). Patients with epilepsy preferred metaphors depicting the seizure as an agent/force or event/situation. PNES patients more often used metaphors of space/place. Logistic regression analyses predicted the diagnosis of PNES or epilepsy correctly in 85.7% of cases (based on different metaphor types in the each category) or 81.0% (based on all metaphor tokens).

Discussion: Patients with epilepsy and PNES have different preferences in the metaphoric conceptualization of their seizures. Epileptic seizures are described as a more external, self-directed entity than PNES, which are depicted as a state or place patients go through. The differentiating value of metaphoric conceptualizations suggests that metaphor preference could form the basis of future diagnostic questionnaires or other diagnostic tools.

KEY WORDS: Epilepsy, Psychogenic nonepileptic seizures, Language, History-taking, Metaphors.

Epileptic seizures are caused by excessive and hypersynchronous electrical activity in the brain. Psychogenic nonepileptic seizures (PNES) resemble epileptic seizures but are unaccompanied by ictal electroencephalographic changes. PNES are a response to psychological or social distress, which occurs when alternative coping mechanisms are inadequate or have been exhausted. The label of PNES is sometimes applied to attacks with retained consciousness, but the diagnosis usually implies an ictal

reduction of reactivity and (at least partial) amnesia for some aspects of the seizure process (Lesser, 1996).

Although we have now acquired a fairly detailed knowledge about the origins and spread of epileptic seizures in the brain, many questions about the etiology, nosology, and treatment of PNES remain unanswered (Reuber, 2008). Several previous studies have demonstrated that it is possible to learn more about the nature of PNES and how PNESs differ from epileptic seizures by paying attention to subjective seizure symptoms (Vein et al., 1994; Goldstein & Mellers, 2006). In one, patients with PNES or epilepsy who were living in Seattle were asked how they had experienced an earthquake (Richter scale 6.8), which shook the city on 28 February 2001. Patients with epilepsy were more likely to report that

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they thought they were having a seizure when the earthquake started (Watson et al., 2002), implying that epileptic seizures are a more unusual or external experience and perhaps further removed from patients' own control than PNES. In keeping with this, patients' hypnotic recall of ictal events has been found to be more impaired after epileptic (complex partial) seizures than after PNES (Kuyk et al., 1999).

Here we study the use of seizure metaphors by patients with PNES and patients with epilepsy to learn more about their subjective seizure experience. In this approach we used the definition of metaphor proposed by Lakoff and Johnson (Lakoff & Johnson, 1980) in the field of Conceptual Metaphor Theory. They consider as an instance of metaphor any linguistic marker of a correspondence between distinct conceptual domains. As an example, "your claims are *indefensible*," "he *attacked* every weak point in my argument," and "I *demolished* his argument" are all metaphorical expressions based on a conceptual mapping between arguing and warfare—in short: "ARGUMENT IS WAR." Following this approach, we intended to identify the metaphors used by patients with PNES and patients with epilepsy in relation to their seizures, and group them into categories of the type "THE SEIZURE IS X." We carried out comparisons of the preferences for particular metaphoric conceptualizations exhibited by patients with PNES and epilepsy to gain new psychological and differential diagnostic insights.

METHOD

Patients

Our findings are based on transcripts of first clinical encounters between 21 patients with seizures and one neurologist (MR). All patients had been admitted to the Royal Hallamshire Hospital in Sheffield, UK, for 48 h of continuous video-EEG monitoring because a fully trained neurologist was not certain whether they had epileptic or nonepileptic seizures. Patients were not included if they had been admitted for epilepsy surgery evaluation. All diagnoses were confirmed by the video-EEG recording of a spontaneous seizure considered typical of the habitual attacks by the patient and a seizure witness. Patients were included only if the recorded attack involved impairment of consciousness.

Interviews

The interviews were audio and video recorded and lasted 15–30 min. The one-to-one interviews were conducted following a previously described semistandardized interview procedure encouraging the doctor to adopt an unusually passive but very attentive role (Schwabe et al., 2008), minimizing the risk that patients' choices of metaphors would be influenced by the doctor's questions. A summary of the interview outline is presented in Table 1.

Note that the opening of the interview makes no reference to the patient's seizures and that the doctor is encouraged to not ask additional questions (other than for clarification) or introduce new topics into the conversation.

Linguistic analysis

Verbatim transcripts of the interviews were produced and analyzed by a linguist (LP) blinded to all additional clinical information and the result of the ictal video-EEG recording. The linguist searched the transcripts for all direct references to seizures and identified those that fulfilled the definition of metaphor proposed by Lakoff and Johnson (Lakoff & Johnson, 1980): a metaphor is an expression that is used in one semantic field while its core meaning, as defined in dictionaries of contemporary English, lies in another. For example, patients' expressions such as "the seizure *took place*," "I just let it *run its course*," and "then the seizure *started*" are metaphorical, since the core use of *take place*, *run its course*, and *start* is in the context of events, but here they are used by patients to formulate a particular part of their seizure experience. Likewise, "when I *came out of* the seizure" and "I thought the seizure was *trying to force itself out of me*" are metaphorical, since the core meaning of *coming out of something* entails the existence of a place or space as well as physical movement, and the core meaning of *trying to do something* entails a volitional agent. In all of these cases, patients are using their general vocabulary to formulate specific subjective experiences for which they know little or no specialized terminology.

In keeping with the method of Lakoff and Johnson (1980), and using contemporary dictionaries Anonymous (1987 & 2003), individual metaphors were grouped together according to the general semantic field with which the seizure was associated. In analogy to the example of "ARGUMENT IS WAR" given previously, "the seizure *took place*," "I just let it *run its course*," and "then the seizure *started*" can be grouped together as instances of the conceptual mapping "THE SEIZURE IS AN EVENT," whereas "when I *came out of* the seizure" and "I thought the seizure was *trying to force itself out of me*" are incompatible with this particular mapping: in the first case the seizure is treated as some kind of location, whereas in the second it appears to be personified. In fact, the linguist established three common conceptual mappings: "THE SEIZURE IS AN AGENT/FORCE," "THE SEIZURE IS AN EVENT/SITUATION," and "THE SEIZURE IS A PLACE/SPACE." The most frequent metaphorical expressions in these categories are given in Table 2. Metaphors that did not fit in the three categories were grouped together as "Other." Box 1 further illustrates the identification and categorization of metaphors by showing how patients use these metaphors in their interaction with the doctor.

Box 1: Illustrative interview fragments (metaphor tokens in italics; phonetic symbols have been removed from the transcription to improve readability)

Example 1:

David: I had to *contain it*, so that I was (...) within me- meself, and that's what (0.2) huh I thought *it were trying to do*; (1.0) and then *it came* and er and then *it did it again*; (0.8) and I did it again, (1.2) and then I think next thing is (1.0) thing I can remember is er (3.4) I can't (0.7) I can't remember whether me mum had got (0.3) got hold of me (1.2) in the car (0.2) taking me upstairs where I were just laid on the bed upstairs

Analysis: In the course of describing a particular seizure episode in some detail, David uses several metaphors that have the seizure as subject or object: he characterizes the seizure as something to be contained, and as something that came and tried to do things. All four metaphors suggest that David has conceptualized the seizure as an agent or force.

Example 2:

Ken: er (1.1) it's (-) you'd have to *handle each one* differently, (0.2) really; (0.3) depending on how it is, if it's a big one you you take an extra two minutes (1.0)

Doc: how do you try to handle them?

Ken: erm (1.8) there's li- if ye if you haven't if I (1.1) if I if I'm *experiencing one*, (0.6) erm (1.3) i tend to (1.1) sit and (1.7) not *block it out*, I try to concentrate

Analysis: Ken describes how he reacts to seizures of different degrees of severity. He uses three metaphors with the seizure as object: for Ken, seizures are handled, experienced, and blocked out. The latter metaphor was classified under "other," but the first two suggest a conceptualization of the seizure as an event or situation.

Example 3:

Sue: he was talking to me (0.2) cause he always speaks to me while I'm having a seizure or (1.1) whatever; he talks to me *all the way through it*, cause (0.8) s- he's hoping that it *brings me out of it* quicker (0.4) cause I have had (0.3) erm repeated fits

Doc: mmm

Sue: so erm, he don't li- he don't like that

Doc: mmm

Sue: so he tries to talk to me, to stop me *going back into another one*

Analysis: In the course of describing her husband's reaction to her seizures, Sue uses three metaphors that suggest a conceptualization of the seizure as a space.

Glossary:

- (...) shortening of the original transcript
- (-) short pause (approximately 0.25 s)
- (-) medium pause (approximately 0.50 s)
- (—) longer pause (approximately 0.75 s)
- (2.0) long pause, measured in seconds.

Table 1. Interview procedure

Interview phase	Inquiries	Approximate duration (min)
"Open" phase	<i>What were your expectations when you came to hospital?</i>	10
Elicited seizure episode accounts	<i>Can you tell me about the first seizure you can remember?</i> <i>Can you tell me about the last seizure you can remember?</i> <i>Can you tell me about the worst seizure you can remember?</i>	10
"Challenge" phase	Inquiry or inquiries challenging the patient's description	5
Topic shift	<i>The seizures are obviously quite distressing for you, but can you tell me about things which you enjoy doing?</i>	5
Doctor's instructions	Avoid introducing new topics Tolerate silence Use continuers (<i>mmm, right, etc.</i>) to indicate continued attention Repeat what the patient has said to encourage elaboration	

Statistical analysis

Between-group comparisons were based on counts of the number of metaphor "types" and "tokens" used by each patient in each conceptual mapping or category of metaphor. A metaphor "token" is defined as each use of a metaphoric expression fulfilling the definition of metaphor given previously. A metaphor type is defined as one

particular kind of metaphorical expression. For instance a patient may use the expressions "the seizure *comes over me*" and "the seizure *takes hold*." These are two different metaphor types that can be placed in the conceptualization "THE SEIZURE IS AN AGENT/FORCE." If this patient used each of these two types three times he would have used six metaphor tokens. The type count indicates the richness of

patients' metaphoric language, whereas the number of individual metaphor tokens expresses the frequency of patients' use of metaphorical expressions in the interview. Demographic and clinical variables were compared by two-tailed *t*-tests for independent samples or Fisher's exact test as appropriate. Statistical analyses of differences in type and token counts between the two patient groups (epilepsy/PNES) were conducted by two-tailed *t*-tests for independent samples after passing Levene's test for equality of variance. In view of the relatively small sample size, two separate forward stepwise conditional logistic regression (LR) analyses were carried out to determine whether type and token counts could contribute to the discrimination between patients with epilepsy and PNES.

Statutory approval

This study was approved by the South Sheffield Research Ethics Committee. All participants gave their written informed consent prior to the interview with the physician.

RESULTS

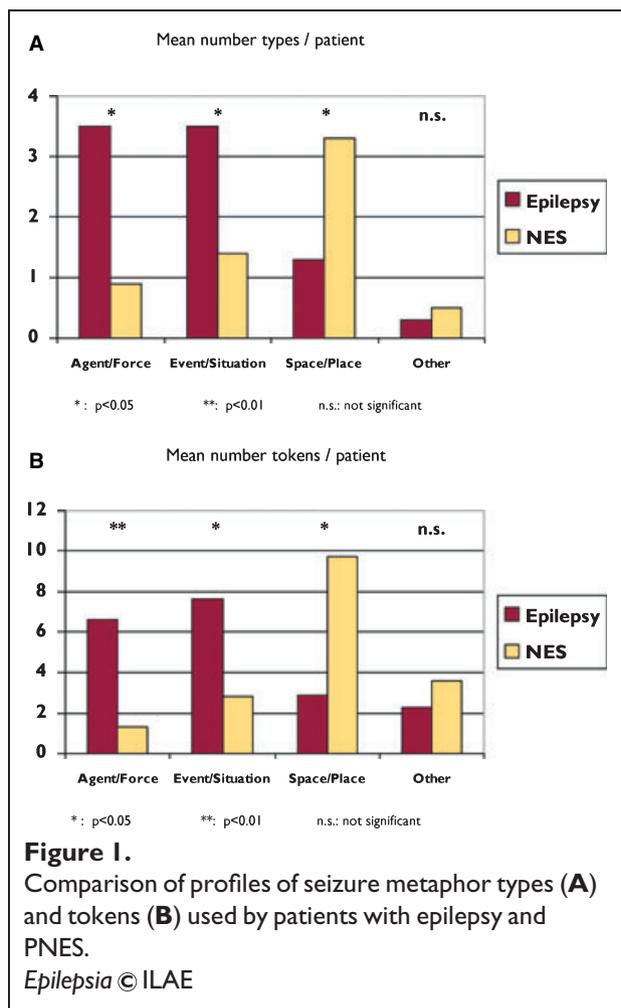
After video-EEG, 8 patients were found to have epilepsy and 13 were found to have PNES (see Table 3 for clinical and demographic details). The video-EEG results showed that the working diagnosis was incorrect in 37.5% of cases in the epilepsy group and 69.2% of cases in the PNES group. At the time of admission, 100% of the patients found to have epilepsy and 84.6%

Table 2. Examples of metaphor types in the three most common conceptual categories

Category	Seizure as an agent/force	Seizure as an event/situation	Seizure as a space/place	Other
Grammatical subject	Seizure	Seizure	Patient	Variable
Semantic agency	With the seizure	Variable	With the patient	Variable
Examples	Seizures come, go, come in, come on, come up, creep up on you, get you, try to do things, set off, are sent in, are straight there, are fought, counteracted, contained, are let pass, wear off	Seizures happen, occur, take place, are due, start, finish, go on, carry on, develop, are experienced, witnessed, handled, controlled, stopped, avoided/put off, are brought on, run their course	Drifting off, being off somewhere else, going, going off, being gone, coming back, coming round, coming to, going down, being down, not being there, being out into seizures, in seizures, out of seizures, within seizures, through seizures	Seizures are started up, are fixed, like an electrical charge, like the lights are on but nobody's at home, like something going off, like shutting a computer off, like cold or hot water on the top of your head, are as if your head carries on without you

Table 3. Clinical and demographic details

Pseudonym	Sex	Age	Duration of seizure disorder (years)	Monthly seizure frequency at time of interview	Working diagnosis before video-EEG	Medical diagnosis after video-EEG
Carl	M	50	31	30	Epilepsy	IGE with absences and GTCS
David	M	32	1	180	PNES	FE with SPS, CPS, GTCS
Jack	M	67	32	24	PNES	FE with SPS, CPS, GTCS
Ken	M	34	5	6	Epilepsy	FE with CPS, GTCS
Peter	M	30	20	200	Epilepsy	FE with CPS, GTCS
Samantha	F	45	27	1	Epilepsy	FE with SPS, CPS, GTCS
Sandra	F	41	38	300	PNES	FE with CPS
Zack	M	20	2	60	Epilepsy	FE with CPS
Alastair	M	26	23	30	PNES	PNES
Barbara	F	36	13	60	PNES	PNES
Betty	F	24	8	12	Epilepsy	PNES
Chris	M	34	15	4	PNES	PNES
Laura	F	28	2	120	Epilepsy	PNES
Pat	F	32	12	5	Epilepsy	PNES
Patsy	F	37	8	10	Epilepsy	PNES
Steve	M	54	17	2	Epilepsy	PNES
Sue	F	22	0.5	30	Epilepsy	PNES
Tammy	F	24	10	15	PNES	PNES
Tallulah	F	24	0.1	75	Epilepsy	PNES
Trudie	F	55	39	14	Epilepsy	PNES
Vera	F	51	0.3	20	Epilepsy	PNES



was a higher proportion of women in the PNES group (25% vs. 76.9%, $p = 0.032$).

Across both diagnostic groups, we identified a total of 382 metaphors tokens. The mean token count per patient was 18.2, the mean number of metaphor types was 8.7 (demonstrating that patients who used one particular type of metaphoric expression tended to repeat it once more during the course of the interview). A total of 77.6% of all types and 80.8% of all tokens used could be placed in one of three common conceptual mappings or categories of metaphor. There were no significant differences in mean type or token counts between the PNES or epilepsy groups.

Superficially, the nature of the metaphors used by the two patient groups was similar. Most patients used metaphors from all categories (AGENT/FORCE, 15 of 21 patients; EVENT/SITUATION, 16 of 21; and SPACE/PLACE, 18 of 21). However, closer analysis revealed significant differences in the metaphor profiles typically used by patients with epilepsy or PNES (see Fig. 1). Metaphors for epileptic seizures were more commonly derived from the AGENT/FORCE or EVENT/SITUATION categories. PNES metaphors more often belonged to the SPACE/PLACE category. For detailed figures and statistical comparisons see Table 4.

Only the categories AGENT/FORCE and SPACE/PLACE contributed to the most highly discriminating forward conditional stepwise logistic regression models based either on type or token counts (type counts model: $\chi^2 = 17.97$, $p = 0.0004$; 85.7% of patients correctly classified, sensitivity for PNES: 84.6%, specificity: 87.5%; token count model: $\chi^2 = 19.75$, $p = 0.0002$; 81.0% of patients correctly classified, sensitivity for PNES: 84.6%, specificity: 75.0%).

Patients with epilepsy were 5.0 times more likely to use metaphor types and 3.0 times more likely to use metaphor tokens from the AGENT/FORCE than the SPACE/PLACE category. In contrast, patients with PNES were 6.25 times more likely to use metaphor types and 5.26 times more likely to use metaphor tokens from the SPACE/PLACE than the AGENT/FORCE category.

of the patients in the PNES group were taking antiepileptic drugs. The median age was 37.5 years in the epilepsy group (median duration of the seizure disorder 23.5 years) and 32 years in the PNES group (median duration 10 years). The only significant demographic or clinical difference between the two diagnostic groups

Table 4. Overview of the mean counts of metaphor types and tokens in each category used by patients with epilepsy and patients with PNES

Metaphoric conceptualization	Type/token count	Patients with epilepsy (mean, SD)	Patients with PNES (mean, SD)	Comparison (p-value, t)
Agent/force	Type	3.5 (3.1)	0.9 (1.1)	$p = 0.013$ (2.745)
	Token	6.6 (6.4)	1.3 (1.5)	$p = 0.009$ (2.936)
Event/situation	Type	3.5 (2.4)	1.5 (1.3)	$p = 0.022$ (2.487)
	Token	7.6 (5.2)	2.8 (3.3)	$p = 0.018$ (2.585)
Space/place	Type	1.4 (1.4)	3.3 (2.6)	$p = 0.039$ (-2.217)
	Token	2.9 (5.4)	9.7 (6.8)	$p = 0.020$ (-2.406)
Other	Type	2.1 (3.4)	1.8 (1.7)	n.s.
	Token	2.3 (3.4)	3.6 (4.0)	n.s.

DISCUSSION

This study shows that patients with epilepsy and patients with PNES talk differently about their seizures. Although it is possible that the differences are explained by how patients chose to present their paroxysmal symptoms to the doctor, it is more likely that the metaphor profiles used by the two patient groups reflect differences in the subjective seizure experience. Patients may make a conscious decision about what they tell a doctor, but they are unlikely to have much premeditated control over how they are going to present their symptoms at a metaphoric conceptual level.

Our findings are broadly in line with a number of qualitative German studies, which reported that patients with epilepsy are more likely than patients with PNES to describe their seizures as an opponent acting under his own volition, or to use verbal imagery depicting the patient as fighting against the seizure (Surmann, 2002, 2005). In grammatical terms, the seizure is the subject in this type of metaphor and has semantic agency.

Our study adds to the German results in a number of ways. We have identified a new metaphoric category of seizures as an event or situation. This metaphoric conceptualization was also used more often by patients with epilepsy than by those with PNES. In these constructions, the seizure is usually still the subject, but it is not marked as having independent volition. The patient is an experiencer rather than the "victim" of the seizure. We identified another new category of metaphoric conceptualization, which was preferred by patients with PNES. This patient group was more likely to present their seizures as a space or place. Unlike in the conceptualizations more commonly used by patients with epilepsy, it is the patient who is the acting subject in most of these metaphoric constructions. The seizure is a sphere or location the patient goes into, travels through, or comes out of. The semantic agency in these constructions is with the patient rather than the seizure.

Notably, the metaphoric conceptualizations that discriminated most clearly between the epilepsy and PNES groups were placed at the extremes of an "agency continuum": in metaphors most clearly preferred by patients with epilepsy the seizures acted on the patient, in metaphors most frequently used in the PNES group, the seizure was a passive backdrop to the patient's actions.

Having said this, the metaphoric conceptualization of the seizure as a space/place does not imply that the patient moves through this space at will. Even a patient who "goes into a seizure" may not be doing so "deliberately." For instance, a train passenger might warn a person he was talking to on the telephone that he was "going into a tunnel," although he would not actually be driving the train.

The results of the logistic regression analyses and the different ratios of AGENT/FORCE and SPACE/PLACE metaphors

used by patients with PNES and epilepsy suggest that the metaphoric conceptualizations could help physicians with the task of distinguishing between epileptic and non-epileptic seizure disorders. The clinical data in our sample confirm how difficult this task is: although all patients in our study had been referred by fully trained neurologists and the mean duration of seizures in the epilepsy or PNES groups were 23.5 and 10 years respectively, approximately one-third of patients found to have epilepsy and two-thirds of patients diagnosed as having PNES by video-EEG were found to have carried an incorrect working diagnoses prior to admission. There is no suggestion that the delay in the diagnosis of PNES at our center was exceptionally long. Similar delays have been demonstrated in two previous studies (Reuber et al., 2002; de Timary et al., 2002). Of course, rapid and accurate differentiation is of great clinical importance, because the most appropriate treatments for epilepsy and PNES are very different. Unfortunately, neurologists cannot rely on tests for this. Even when attacks are frequent and video-EEG accessible, 23–47% of patients fail to have seizures during prolonged in-patient monitoring (Mohan et al., 1996; Benbadis et al., 2004). What is more, 10–30% of patients have both epileptic and nonepileptic seizures (Reuber et al., 2003a). For these reasons the act of taking the patient's history remains the diagnostic "gold standard" in this setting (Wolf, 2005).

So far, we are unable to demonstrate that listening out for the metaphoric conceptualizations can be a reliable diagnostic pointer in this setting. However, the marked difference in the ratios of AGENT/FORCE and SPACE/PLACE metaphors observed here may be something clinicians could listen out for. It is also conceivable that our findings could be incorporated into a self-report questionnaire, generating a probability of epileptic seizures or PNES. This approach is perhaps more likely to work than inquiries about factual details such as tongue biting, ictal injuries, sleep seizures, or ictal incontinence, which (at least in isolation) have been shown not to distinguish reliably between epileptic and nonepileptic seizures (Geyer et al., 2000; Reuber et al., 2003b; Duncan et al., 2004). Notably the specificity and sensitivity of a diagnostic categorization based on metaphoric concepts was more encouraging than an approach based on factual analysis of seizure descriptions: one study in which two experienced epileptologists (who were unaware of any other clinical information) were asked to rate detailed written seizure descriptions from patients with temporal lobe epilepsy or nonepileptic seizures found that the sensitivity of this approach for the detection of epileptic seizures was 96%, although the specificity was only 50% (Deacon et al., 2003).

This study has a number of limitations. Foremost, the relatively small sample size restricted our ability to do more ambitious statistical analyses (such as a logistic

regression analysis including all possible factors). It should also be pointed out that our results depend on the relatively nondirective interview technique involving a minimum of questions from the doctor. It is possible that more directive questioning would encourage patients to align their own way of talking about their seizures to the physician's choice of expression. Even in our study it is possible that some of the metaphors used by patients were influenced by the doctor's contribution to the encounter. We can also not be certain that the same results would be found if the speakers spoke American rather than British English, although it is encouraging that our findings are in broad agreement with the results of a previous study of German speakers.

Despite these drawbacks we conclude that patients with epilepsy and PNES have different preferences in the metaphorical conceptualization of their seizures, which are likely to reflect differences in subjective seizure experience. Our results suggest that epileptic seizures are experienced as a more external, self-directed entity than PNES, which are a state or place patients go through. These linguistic findings offer fascinating psychological insights that may be useful in the differential diagnosis of epilepsy and PNES.

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We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines. The authors do not have to report any conflict of interest in relation to this study.

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