

Differential diagnosis of seizure disorders: A conversation analytic approach

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Available online 7 May 2007

Abstract

“Taking the history” remains the most important diagnostic tool in the assessment of people who have lost consciousness. The distinction of epileptic and non-epileptic seizures (NES) is particularly difficult and relevant. Whereas epileptic seizures can usually be controlled with antiepileptic drugs, NES are considered an expression of psychosocial distress and may improve with psychotherapy. The recording of typical seizures with simultaneous video and electroencephalography (EEG) can produce almost complete certainty about the diagnosis but access to video-EEG is limited, the test is very expensive and often video-EEG fails to capture typical seizures. A German research group used conversation analysis (CA) to examine patients’ descriptions of seizures to their doctors. They found that certain linguistic and interactional features clustered together and that these clusters were usually concordant with particular medical diagnoses.

This study was undertaken to establish whether the observations made in German-speaking patients could be replicated in English speakers presenting to a less specialised epilepsy service. The findings presented here are based on transcripts of interviews with 11 patients admitted to a neurology ward in England because their consultant felt unable to make a clear diagnosis clinically. Transcripts were only analysed if the diagnosis of epilepsy or NES had been proven with video-EEG. The medical diagnosis was only disclosed to the linguist once a linguistic hypothesis of the diagnosis had been formulated to ensure that the linguist’s decision would not be influenced by factors not contained in the 30-min-interview between doctor and patient. The linguist predicted the correct diagnosis in all cases.

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Keywords: Conversation Analysis; Epilepsy; Non-epileptic seizures; Diagnosis; Dissociative seizures; Conversion disorder; Decision-making; UK

Introduction

In medical and health care settings, the micro-analytic approach of conversation analysis (CA) has a strong track record of delivering revealing insights for linguists, sociologists and health workers (e.g. Beach, 2001; Drew, Collins & Chatwin, 2001; Heritage & Maynard, 2006a, b; Maynard & Heritage, 2005). While early studies focused on the

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organisation of doctor–patient interaction (e.g. Heath, 1986; ten Have, 1991), or highlighted the influence of the institutional setting on participation rights (Frankel, 1990; Mishler, 1984), the analytical stance in recent years has increasingly turned the “spotlight on the patient” (Drew, 2001). Coinciding with this has been a trend towards interdisciplinary collaboration, aiming to improve the quality of health care by applying CA in clinical settings (Mangione-Smith, Elliot, Stivers, McDonald, & Heritage, 2006; Schwabe, 2004; Schwabe, 2006; Schwabe, Reuber, Schöndienst, & Gülich, 2007; Stivers, 2002; Stivers, Mangione-Smith, Elliot, McDonald, & Heritage, 2003). This paper is very much in line with these developments. We describe a novel use of CA methodology in the differential diagnosis of seizure disorders.

Neurologists regularly have to differentiate between epileptic and non-epileptic seizures (NES). One recent study found that 57.4% of patients presenting to medical services with a blackout had experienced an epileptic seizure, 18% a NES, and 22.3% had fainted (Kotsopoulos et al., 2003). Whereas there are a number of factors which make the history given by the patient a reliable tool in the diagnosis of faints (Alboni et al., 2001; Colman et al., 2004), the distinction of epilepsy and NES is more difficult: a recent study in over 300 patients with NES showed that it took a mean of seven years to make an accurate diagnosis. Almost all patients had been treated inappropriately with antiepileptic drugs (Reuber, Fernández, Bauer, Helmstaedter, & Elger, 2002).

Whilst epileptic seizures are caused by abnormal electrical activity in the brain, most NES are caused by a dissociative process. A range of predisposing, precipitating and perpetuating aetiological factors have been recognized. A history of significant trauma or an association with anxiety, other dissociative or somatoform symptoms are particularly common (Bowman & Markand, 1996; Reuber, Howlett, Khan & Grünwald, 2007). The accurate distinction between epilepsy and NES is particularly relevant because the treatment is very different. Whereas antiepileptic drugs can control seizures in the majority of patients with epilepsy, the treatment of choice for NES is psychotherapy (Reuber, Howlett, & Kemp, 2005).

The German and English projects were based on the methodology of CA, a well-established qualitative approach for the analysis of social interaction (Hutchby & Wooffitt, 1998; Sacks, 1992; ten Have,

2000). The project in England maintained the general methodological framework of the EpiLing project (Schwabe et al., 2007), a collaboration between the Department of Linguistics and Literature of the University of Bielefeld, Germany, and the Bethel Epilepsy Centre (Gülich, Schöndienst, & Surmann, 2002; Schöndienst & Gülich, 1999; Schwabe et al., 2007; Wolf, Schöndienst, & Gülich, 2000). Drawing on the analytic mentality and methods established in CA, the project focussed specifically on the patients' descriptions of their subjective seizure experience and treated patients as experts of their own experience and disorder. A number of studies based on the analysis of over 100 recorded consultations in the Bethel Epilepsy Centre in Bielefeld, Germany suggested that patients use a range of different communicative methods when describing their seizures, and that the use of these methods clusters in a non-random way. These communication styles seemed to concord with the medical diagnoses of epileptic or NES (Gülich et al., 2002; Schöndienst, 2002; Schwabe et al., 2007). Although differences were seen most clearly between patients with focal epilepsies and NES, they were also found in the comparison of patients with generalised epilepsy syndromes and NES (Surmann, 2005).

This study was intended to determine whether patients describing their seizures in English and in a somewhat less specialised clinical setting use the same or similar communicative methods. In other words, our initial aim was to establish to what extent the identified communicative methods are specific to one language (in this case German) or a more universal reflection of the way patients feel about and deal with their seizures regardless of their language.

Our first hypothesis was that English-speaking patients would use very similar communicative methods to describe their seizures compared to German-speaking patients, although there are a number of differences between the two languages on lexical and syntactical levels. Whilst English and German are part of one language family (Barber, 2000), English is a verb-orientated language whereas German uses a nominal style, which allows for the insertion of several sub-clauses and extended participial constructions. However, we did not expect such differences to interfere much with the features we were looking at, as the differentiating communicative features described in German patients with seizures essentially represent *interactive*

methods rather than specific lexico-semantic aspects of communication. Our second hypothesis was that patients describing their seizures in a less specialised secondary care setting would use similar communicative methods as the patients previously analysed in a tertiary reference centre (adding further weight to the generalisability of the findings).

Methodology

All patients admitted to a video-electroencephalography (EEG) unit, because a consultant neurologist remained uncertain about the nature of seizure disorder, were considered as potential participants for this study if their previous medical notes did not suggest the occurrence of different seizure types (none of the patients recruited were admitted for video-EEG in the context of epilepsy surgery evaluation or had reduced cognitive ability, for further clinical details see Table 1). Interviews were only subjected to linguistic analysis if a typical seizure had been recorded by video-EEG. This means that all medical diagnoses (of epilepsy or NES) were supported by the current diagnostic gold-standard test and not just based on a doctor's interpretation of seizure descriptions from patients and witnesses and tests such as interictal EEG and structural brain imaging.

All patients gave written informed consent before talking to the participating neurologist (MR) about their subjective seizure experiences. Their conversa-

tion with the doctor took place in the video-EEG room, and the pre-installed video and audio equipment in this room was used to record the patients' conversation with the doctor. The interviews lasted between 20 and 30 min. As these conversations about seizure experiences were not part of the standard treatment process during their inpatient stay the data collected have to be regarded as *interviews* rather than ("naturally occurring") *consultations*. This represents a significant difference from the previous study, which was largely based on routine consultations during inpatient stays or outpatient clinics.

The interviews were conducted using guidelines originally developed by the collaborators of the EpiLing project (Schöndienst, 2002; Schwabe et al., 2007; Surmann, 2005). Although from a CA point of view it could be argued that such guidelines could alter the nature of the consultation, it should be underlined that they were derived from the analysis of a number of consultations recorded in the pilot phase of the EpiLing project. By giving naturally occurring phases a specific order, the guidelines enhance the comparability of interviews, while ensuring that the discussion could still fulfil a clinical purpose (cf. Schwabe et al., 2007). In line with good communication practice (cf. Roter & Hall, 1992), the main aim of the guidelines is to allow patients to choose the topic of conversation. Hence doctors are asked to start with an open question, which does not even make direct mention

Table 1
Summary of clinical details

Pseudonym	Sex	Age	Duration of seizure disorder (years)	Monthly seizure frequency at the time of interview	Antiepileptic drug treatment at the time of interview	Medical diagnosis after video-EEG
Betty	F	24	6	12	Yes	NES
Carl	M	50	31	40	Yes	IGE with absences and GTCS
David	M	32	4	180	Yes	FE with SPS, CPS, GTCS
Jack	M	66	32	24	Yes	FE with SPS, CPS and GTCS
Ken	M	34	5	6	Yes	FE with CPS, GTCS
Laura	F	28	2	120	Yes	NES
Pat	F	33	14	5	No	NES
Patsy	F	37	8	10	Yes	NES
Sandra	F	41	38	300	Yes	FE with CPS
Sue	F	55	17	2	Yes	NES
Tallulah	F	25	10	15	Yes	NES

Abbreviations: NES, non-epileptic seizures; IGE, idiopathic generalised epilepsy; FE, focal (or cryptogenic) epilepsy; SPS, simple partial seizures; CPS, complex partial seizures; GTCS, generalised tonic clonic seizures.

of the patient's seizures (e.g. concerning the patients' expectations of the consultation or treatment plan). This form of opening to a conversation in a medical setting has previously been shown to create an unrestricted initial phase, in which the patient can set the agenda according to his relevancies and problems (Heritage & Robinson, 2006). This means that patients chose which aspects of their experiences they place particular emphasis on. In order to enhance the patients' contribution to the conversation, the doctor is asked to refrain from closed questions in this part of the interview. Next, patients are invited to describe single seizure episodes, in which subjective experiences are most likely to be reconstructed in detail (the first, last and worst seizure). In a third and final part the doctor can then ask further clinical questions if these have not been addressed in the open parts before (for further details see www.uni-bielefeld.de/lili/projekte/epiling).

While the differences listed so far only concern the *design* of the study, there are some differences to the EpiLing project which also have *analytical* impact. In view of the local research ethics regulations, patients had to be given detailed information about the aims of the study before the interview could take place. It is likely that this information would have influenced the interviews. Another important difference between the EpiLing and English projects concerned the analytical stance. Whereas (at least in the initial phase) the German project approached the data by “unmotivated looking”, the English study was intended to replicate the previous findings in English speakers and therefore “hypothesis-driven”. To this end, individual communication profiles were generated for each patient after a first broad CA analysis based on those linguistic features which had been found to distinguish between seizure descriptions from patients with epilepsy and NES in the German data (Schwabe et al., 2007).

Perhaps the most significant change made to the methodology of the EpiLing project to maximise the impact of this validity study was that the linguist in England was fully “blinded” to (that is, kept unaware of) all medical and diagnostic information including the results of the video-EEG recording throughout the analytical process. The method of “blinding” patients and doctors is typically used in medical research to reduce the influence of selection or observation bias and placebo effects. In this study the linguist was “blinded” to ensure that the

detection of the linguistic features described in this study was not influenced by the medical diagnosis. The linguistic results were only compared to the medical diagnosis reached with the help of video-EEG once a ‘linguistic hypothesis’ had been established.

Results and examples

Formulation effort

One of the most striking observations in the German data was that seizure descriptions by epileptic and non-epileptic patients differ markedly in terms of patients' formulation effort. The description of seizures seems to pose an ongoing challenge—although most patients interviewed had seizures for several years and must have talked about them many times before. Patients seem to realise that their seizure symptoms are not like any experience they share with their doctor. Although the communicative challenge is similar for patients with epilepsy and patients with NES, the German data show that the two groups deal with this difficult task in different ways.

Patients with epilepsy typically exhibit an ongoing effort to get their own experience and perceptions across. They volunteer subjective seizure symptoms or possible strategies for interrupting or preventing seizures, and there is evidence of extensive formulation work including repairs, reformulations, hesitations, changes in grammatical construction and restarts. Often extensive seizure descriptions are preceded by metadiscursive commentaries which highlight the “indescrivability” of the subjective seizure experience (e.g. such as “I really don't know how to describe it”) (Gülich, 2005).

Patients with NES usually provide very little information about subjective seizure symptoms. Instead of talking about seizure manifestations from their own perspective, they focus on the circumstances in which seizures occurred. Seizure “descriptions” may be limited to statements of what patients did *not* experience or restricted to absolute (“holistic”) negations, with patients denying any knowledge or memory of their seizures. Unlike patients with epilepsy, patients with NES seem to resist the interviewer's attempts to focus on one particular seizure.

The extract from the interview with David (pseudonym) is a good example for the extensive

formulation effort typically exhibited by patients with epilepsy. It is taken from the initial open phase, where—asked about his expectations—David volunteers an attempt to differentiate two types of seizures which he experiences (see Appendix A for a glossary of transcription symbols).

Example 1. David (ll. 45–68).

45 D: (-) an OTHER times,
 46 (0.9) it WILL be a (-) bigger FIT,
 47 (-) and i can (.) FEEL meself (-)
 like
 48 (-) it might be two (.) to FIVE
 minutes
 49 that i = m fittin about, ((sniffs))
 (-)
 50 ((lipsmack)) and there = s like a
 (0.6)
 51 well (-) i don = t know i SHAKE a
 little bit
 52 (-) but i = ll still be in con-
 53 (.) i still know what i = m doing;
 54 D: [i STILL be in control o what i = m
 doing;
 55 I: [mhmh
 56 D: (0.6) er: (.) i just (2.0) but (-)
 57 i said i = m in control (i we-)
 58 (-) i = m kind = e IN control
 59 but not in control at the SAME time;
 60 (-) i know what i = m DOing
 61 (-) i c- i couldn = t stop it (if I
 wanted to)
 62 I: (-) mhmh
 63 D: but then again i c- ()
 64 it = s not gonna go (any worse)
 65 i know that er that = s bad as it = s
 gonna get
 66 kind of thing;
 67 i can FEEL (-) what (1.2) what (it)
 IS doing
 68 and that = s about IT;

After a short account of the estimated duration of a seizure David starts to work on the quality of the attack (50 onwards). His description incorporates several signs of formulation work: David begins with a definition of what the feeling consists of, including the vagueness marker “like”. However, after two short pauses—interrupted by the reformulation marker ‘well’—he initiates a restart in which he also changes the grammatical construc-

tion, now introducing two separate pieces of information (shaking; remaining in control) about his seizures, and adding a metadiscursive marker of uncertainty “I don’t know” (please note: the expression “reformulation” is used here descriptively to signify a particular manifestation of formulation effort, not in the more narrow CA sense of a metacommunicative act intended to construct an explicit sense of something which has just been talked about (cf. Garfinkel & Sacks, 1970; Heritage & Watson, 1979). The mention of “being in control” sparks off a chain of reformulations, in which David works on an extensive description of his state of consciousness. In lines 52–54 his formulation work mainly concerns the phrases “being in control” and “knowing what he is doing”, whereas his first attempt projects “being in control”, this is suspended and replaced by “I still know what i = m doing” (53), which is immediately reformulated again in a third step to his initial statement of being “in control of what he = s doing”. The reformulative chain does therefore not only highlight the relevance of this aspect of his seizure experience but also maintains a (semantic) difference between two levels of consciousness, which he denotes as “being in control” and “knowing what one is doing”. One differentiating feature between both is the agency the speaker claims in the events: whereas “being in control” forfeits a strong, active agency, “knowing what one is doing” merely alludes to a cognitive awareness, while control over the events is assigned to another—here unnamed—agent.

David continues to work on his description: after some filled and unfilled pauses he projects some restrictions to his claim of being in control with the conjunction “but” (56). However, this is cut off. Instead he offers a further assertion of being in control (“as i said i = m in control” (57)). This claim is immediately rephrased. While at first a subtle alteration in his wording only downgrades the scope of being in control by the vagueness-marker “kind = e”, David then produces an adversative construction displaying the paradoxical feeling of being in control and not in control at the same time. Interactively he treats the phrase “being in control” as a shared concept between both participants and therefore as a linguistic resource to overcome the indescribability of his feelings. However, by pointing out how the feeling he experiences does not quite resemble this shared concept, David displays that his perception is part

of a different, alien reality to everyday life (cf. Gülich, 2005). From line 60 onwards he goes on to explain this adversative experience further by stating that he knows what he is doing without being able to control or stop it. Thus, David's extensive formulation work in this extract is employed to depict his particular level of consciousness during a seizure. Despite his obvious difficulties he tries extensively to give as clear an impression as possible of the altered state of consciousness he has experienced.

In contrast, patients with NES, focus on situational details rather than *subjective* seizure symptoms. In the following example Betty mostly equates her seizures with a complete loss of consciousness.

Example 2. Betty II. 214–242.

214 I: ((clears throat)) can you
remember the
215 FIRST seizure?
216 (-) <<p> can i take you BACK to
that?>
217 B: (6.7) think the FIRST one was in:
((sniff))
218 .h ((smacks lips)) (-) ACTually
in = erm
219 (1.2) a local CLUB of ours;
220 (-) jus = across the road from
MEself;
221 (-) and they ended up getting
AMBulance,
222 (1.8) and but by = e time the
ambulance men had
223 COME (-) i = d stopped fittin and
i = ve kind = a
224 come ROUND;
225 (-) so by the time i got took to
hospikal,
226 (2.0) i were jus-
227 (.) comin ROUND from it, i were jus
TIRed, an
228 i = d a HEADache, n
229 (-) that were IT: kind = o thing.

The doctor's question is followed by a long pause before Betty hesitantly delivers a broad description of the circumstances in which the seizure occurred: at "a local CLUB of ours" (219). Betty then goes on to provide information about the club before she directly switches to the reaction of others to the seizure. She does not describe the seizure itself,

leaving a blank concerning the topic highlighted in the doctor's question. Thus (unlike most patients with epilepsy) Betty treats the doctor's question about a particular seizure as a question about the *circumstances* of this event. In the following lines Betty continues to focus on the effects of this seizure: the only information she provides regarding her subjective seizure experience is that she had a headache and felt tired afterwards. In contrast to the formulation work employed by David to communicate his subjective experiences, Betty does not reformulate or detail the representation of her feelings at all. A shared understanding of the type of headaches or the precise meaning of her gloss for the seizure ("fittin" (223)) is taken for granted. Although Betty alludes to others being aware of the seizure and reacting to it, she also fails to give an account of the seizure itself from their perspective. The listener is left struggling to imagine what her seizure was like.

Although Example 2 shows some markers of formulation work such as pauses, reformulations and repetitions, these are not associated with the depiction of seizure symptoms. Interactively, the pauses at clause endings as well as the frequent use of the connectors "and" or "so" do not give the impression of a chronological narrative style but show that Betty only extends her "story" because the doctor does not take the floor at possible turn completion points. Compared to David's, Betty's "narrative" is thus characterised by less urgency to communicate her seizure experiences (this also becomes evident in Example 5).

These two examples show that formulation work in seizure descriptions of patients with epilepsy and NES does not only differ in terms of quantity but also categorically regarding the aspects which trigger enhanced communication efforts. Another important distinction is the extent to which patients self-initiate and volunteer seizure experiences. Although a reserved attitude to the description of seizure events is hard to demonstrate in a short extract, the following example taken from the interview with Tallulah serves as an illustration.

Example 3. Tallulah II. 174–188.

174 I: (-) so do you p- er (1.5) so what
about
175 the seizures HERE?
176 (-) do you think THEY were reLAted
177 to you feeling ANxious, or:

- 178 T: (1.3) no; because i = ve been
reLAXed when
179 I = ve been in here;
180 (-) so I DON = t know why they = ve
come (on);
181 I: (1.7) mhmh/
182 (4.7) so you don = t ALways
underSTAND;
183 T: (-) no; (13.2) everybody asks you
184 what you SEE when (-) you = re like
in = a fit;
185 (1.0) and you don = t see ANYthing;
186 (2.7) you can = t HEAR (anyfin);
187 I: (23.2) mh,
188 (16.7)

Here the doctor has to structure the interview much more with his questions than in the previous two examples. While Betty, after some shorter pauses, eventually extends her narration, Tallulah only makes highly condensed contributions. Her answers are short negations, produced with a falling intonation, indicating that a construction unit is complete. While in the first case Tallulah self-initiates a brief explanation of her answer, she treats the second turn as finished and sufficient by letting a longer pause ensue. She only takes the floor again in line 183 to elaborate her initial answer when the doctor expresses his expectation to receive more information by not taking the floor for 13.2s—a very long time in the course of an ordinary conversation. When Tallulah finally accepts the floor she offers some information on the quality of her seizures, but without any significant formulation effort. What is more, the information she offers is limited to describing what she does *not* experience. Responding to cited questions from others, she reports that neither visual nor auditory senses are working during seizures. Thus, the seizure is described in absolute negatives.

Such negations are a further linguistic feature identified in the German data as typical of non-epileptic seizure descriptions. *Absolute* negations, which refer to the seizure as a whole and suggest that the patient does not know anything about the seizures have to be differentiated from *contextualised* negations, which refer to a particular seizure manifestation and are embedded in a description of other seizure experiences the patient does realise (e.g. “I talk during my seizure, but what I say, I don’t know”).

Phase of reduced self-control

Seizure-related “phases of reduced self-control” were a focus of particular scrutiny in the German data (Furchner, 2002). Such phases occur in many but not all epileptic or NES. The term “phase of reduced self-control” was chosen with care to capture the idea of loss of control or consciousness as patients describe it. Patients distinguish carefully between different grades of (un-)consciousness. In the following we will also use the term “gap” as shorthand for this phase of a seizure. The description of such gaps can be regarded as a recurrent conversational task for seizure patients posing a significant communicative challenge as patients have to reconstruct a phase of which they often hardly have any recollection. The German studies showed that patients with epilepsy and those with NES deal with this challenge in different ways (Furchner, 2002).

Descriptions of this particular part of epileptic seizures are characterised by extensive formulation work. This includes attempts to contour the beginning and end of this phase and to embed it in the wider context of the seizure. Furthermore, patients with epilepsy are more likely to try to reconstruct what must have happened during this phase, either by referring to witnesses’ reports or by trying to reconstruct the “gap” from what they can still remember around this time. In contrast, patients with NES are more likely to treat the phase of reduced self-control as identical with the seizure. This tendency often correlates with the use of absolute negations in their seizure descriptions. In the German study, depictions of reduced self-control, in which the gap is presented as the only feature of a seizure, were termed ‘holistic’ (Furchner, 2002). Some patients with NES also refer to witnesses’ reports but—similar to their general seizure descriptions—these typically do not refer to actual seizure manifestations but to the circumstances of the seizure.

In the following example Carl recalls a seizure, which was characterised by such a phase of reduced self-control.

Example 4. Carl II. 511–537.

- 511 C: (-) but WHEN i was a CHILD, (-)
512 prior to eight- to being a
teenager,
513 i remember = em;

514 (0.9) and i remember me mother
telling me
515 what to DO, (or)
516 (-) asking me what i wanted for me
TEA
517 or WHAT = ve you been doing at
school,
518 (1.3) and i remember sort of
hearing the voice,
519 and then it just went .h (1.3)
nothing; (-)
520 and then picking the voice up
again,
521 I: mhmh
522 C: (0.9) and then (-) i was having to
sort of
523 GUESS what she was talking about,
524 I: mhmh
525 (2.5)
526 C: and she said to me
527 <<imitating, all> you = re not
listening to me,
528 are you?>

Carl vividly reconstructs how his ability to hear and follow the conversation is gradually reduced: starting with “sort of hearing the voice” (518), he describes how it fades away (“then it just going” 519). After a pause, the depiction culminates in “nothing” (519), characterising the climax of this phase of reduced self-control as a complete absence of sensual perception. Afterwards, Carl switches to the description of the phase following such a brief episode of a “blank” and again alludes to different steps: after regaining his ability to hear his mother’s voice, he has to (re)orientate himself before he can pick up the thread of conversation that was going on. Thus, he describes vividly how things close in around him until there is just “nothing” and how they gradually return to normal.

Another manifestation of the formulation work invested here is Carl’s delineation of the gap with contextual contours: his description of the gradual onset and his efforts to guess what was said afterwards denote the beginning and end of the episode and embed the gap in the wider context of his other seizure symptoms. He provides implicit information about the (presumably short) duration of the gap, when he says that he tried to follow the conversation again afterwards.

Whereas the description of the phase of reduced self-control in Example 4 enables the listener to relieve the situation from Carl’s point of view, the description contained in the next example offers only little information.

Example 5. Betty II. 249–260.

249 I: (2.9) mh:, (1.8) ((smacks lips))
250 what about the (-) LAST seizure?
251 B: (1.5) well; (1.5) YESTerday:
252 (-) i woke up on = d FLOOR,
253 (-) I seemed to come round on = d
floor,
254 (-) i don = t know how i GOT there,
255 (-) that happens quite a lot,
256 (1.2) so ALL i can do is (-) presume
i DID
257 have a seizure, but i t-
258 i don = t know if I don = t
remember; (.)
259 i were ON me own,
260 (-) and i ain = t got a CLUE;
261 (2.5) i really (.) i JUS don = t
know.
262 (5.0)

Betty’s description of her last seizure begins with the end of the episode, when she found herself lying on the floor. While her way of presenting the seizure makes a gap apparent, Betty does not focus on this phase of reduced self-control. She only marks the end of this gap without contouring it as a phase that is embedded in a wider seizure context. Nor does she attempt to fill the gap with any information about what might have happened during that time. On the contrary, there is considerable formulation effort highlighting the fact that she does not know or remember anything about this phase. She even emphasises that she was alone at the time. While this may make sense superficially, as it explains why she cannot give any extra information, it also underlines the absolute character of her gap indicating to the doctor that her lack of recollections cannot be challenged. In effect, Betty treats the gap as equivalent with a seizure in general and she regards it as evidence that a seizure must have occurred.

The following example taken from the interview with Sue illustrates even more clearly the extent to which a seizure can be equated with a phase of reduced self-control. This extract is taken from a

very long description of a seizure which happened when Sue attended the outpatient clinic of a former neurologist.

Example 6. Sue II. 1088–1098.

1088 S: (-) i was actually just walking
through and
1089 must be (-) and .h I put THEM down
to
1090 wurrying aGAIN;
1091 (-) cause i were worried what (.)
you know;
1092 (1.4) ((smacks lips)) but i were
WALking
1093 through into his: ((smacks
lips)) study,
1094 S: into his [room];
1095 I: [mhmh/
1096 S: (-) when (-) i jus: (-) just WENT;
1097 I: mhmh
1098 S: (-) THAT was the FIRST time;

Here the seizure is characterised as a phase of complete absence without any effort to detailing or embed the gap (i jus: (—) just WENT; 1096). Furthermore, this seizure description is a good example for how much emphasis patients with NES may place on seizure circumstances compared to their subjective experiences. This becomes particularly apparent when taking the larger context of this example into account. Sue's exposition (paying minute attention to the details of the situation and surroundings for this particular seizure, including the design of the curtains in the clinic) stretches over 54 lines of the transcript; the seizure itself is captured in a single line.

Metaphors

Seizure descriptions contain many comparisons, similes and metaphors. As metaphors form a part of the lexicon of each language, which often reflect cultural influences, this area of our analysis had to be regarded as the one most likely to show differences between English and German seizure descriptions. However, some of the features described regarding the use of metaphorical expressions in the German data (Surmann, 2005) can also be found in the English interviews. To a large extent this is due to the fact that Surmann adopted the cognitive linguistic theory of metaphors by Lakoff

and Johnson (1980), which does not focus on the metaphors themselves, but on the *concepts* they allude to (Lakoff & Johnson, 1980).

Using this approach, Surmann was able to show that patients with epilepsy tend to use specific and coherent metaphorical concepts throughout their conversation with the doctor. These concepts typically encompass a number of elements: firstly seizures are depicted as an enemy or threat. Secondly, this threat is characterised as an entity that acts independently of the patient's will. Finally, this entity approaches from the outside. While all three elements are not necessarily contained in each metaphor, these concepts proved typical for the use of metaphorical expressions by all patients with epileptic seizures.

No equivalent concept could be identified in descriptions of patients with NES. On the contrary, their seizure descriptions were often characterised by contradictory or incoherent metaphorical conceptualisations.

A good example of the use of metaphorical expressions can be found in the following self-initiated description from the initial open phase of the interview with Carl.

Example 7. Carl II. 63–84.

63 C: er:m (1.5) i DID have
64 a couple of attacks this week,
65 that i = ve remembered, (0.9)
66 but (-) as you KNOW (they = re a-)
67 they = re very mb- (-) QUICK;
68 I: (-) mhmh/
69 C: and = er: (1.0) (the- the-) no
WARNING of them
70 they just OCCUR:
71 I: mhmh
72 C: (-) and i = ve ALways likened them
to: erm (0.8)
73 you know somebody having the finger
on an
74 electric socket,
75 and turning it OFF and on;
76 I: mhmh
77 C: so you = ve got the POver on the
RADio and then
78 it de- (-) cha- (-) cha- and it just
keeps coming off,
79 (they = re a-) .hh cause
somebody = s doing it (h)ere
80 and you CAN = t see than;
81 I: mh,

82 C: i = ve always envisaged that
 THAT = s
 83 what = s (-) happening inside me
 head

After giving a first qualitative description of his seizures as being “quick”, Carl goes on to volunteer details about this characteristic, even after the interviewer has acknowledged this interactively in line 68. While the qualification as ‘quick’ could refer to the duration of a seizure or its onset, Carl especially highlights the sudden onset, as he points out that there is “no warning” (69) and that they “just occur” (70). After the doctor acknowledges this again in line 71, Carl extends his qualification of the seizures by comparing them to somebody switching an electric socket on and off. This comparison points towards the concept that an external entity is doing something to him. Using deictic expressions such as “here” and gestures pointing behind him, he shows that this entity is operating behind his back. While this takes up the idea of a sudden onset without warning it also alludes to the element of the seizure as entity acting outside the patient.

Carl’s metaphorical concept is consistent. There are no contradictions in his metaphorical comparison of a seizure to switching a socket on or off nor does the metaphor fail to link to other qualifications of the seizures during the rest of the interview.

Techniques of seizure suppression

Another distinguishing feature between epileptic and non-epileptic seizure descriptions identified in the EpiLing project was that patients with epileptic seizures tend to give explicit and self-initiated hints at strategies they have devised to interrupt or prevent seizures, such as focussing on a particular thought. Such strategies were also volunteered by English patients with epilepsy, but not by patients with NES.

The following example is from the interview with David.

Example 8. David II. 69–79.

69 D: i kind = e stop these (0.4)
 70 (it = ll) like (set off) (0.6)
 71 and i = d be able te (1.2)
 72 really fra- (-) REALLY calm meself
 down;

73 (0.6) and like (.) CONcentrate;
 74 and then i have te look up in = d
 AIR: = nd
 75 .h (-) jus FOCUS and jus STOP;
 76 (1.3) <<pp> (it = ll go away); >
 77 (0.4) (and i = ll) just carry on as
 normal,
 78 as if (-) nothing happened at all;
 79 (0.4) and just (.) carry on;

Conclusion and future perspectives

Our results suggest that the interactive features previously identified in consultations in which German patients describe their epileptic or NES can also be identified in interviews with English speakers. What is more, these features occur in analogous clusters. Like the German-speaking patients investigated in the EpiLing project (Schwabe et al., 2007), their English counterparts use two distinct communicative styles which are associated with a diagnosis of epilepsy on the one hand or NES on the other (for an overview see Table 2).

In this study the diagnostic hypotheses based on the identification of these clusters predicted the correct diagnosis of epilepsy or NES in all of the 11 cases analysed. This is all the more remarkable because the linguistic method was applied to conversations with patients admitted to hospital because a consultant neurologist was unsure about the diagnosis. Given that the linguist was kept unaware of all medical information about patients until the linguistic hypothesis had been formulated, this finding offers strong support for the validity of the observations discussed here.

At this time we cannot say why patients chose these particular communicative methods or why patients with epilepsy focus formulation effort on the seizure experience itself and patients with NES on the circumstances in which a seizure occurred. Future research will have to establish whether the use of certain features can be attributed to particular psychological or psychodynamic dispositions, coping styles or organic abnormalities associated with different seizure disorders. Further studies may also identify additional communicative features that can help to distinguish patients with epilepsy and NES, including non-verbal features and gestures. Furthermore, future studies could extend this approach to patients who lose

Table 2

Overview of linguistic criteria found useful in the differentiation of interactions with patients with epileptic and non-epileptic seizures (with alterations from Schwabe et al., 2007)

Feature	Epileptic seizures	Non-epileptic seizures
Subjective seizure symptoms	Typically volunteered, discussed in detail (Examples 1, 4, 7)	Avoided; discussed sparingly (Examples 2, 3, 5, 6)
Formulation work related to seizures	Extensive, large amount of detail. (Example 1, 7, 8)	Practically absent, very little detailing efforts (Examples 2, 5, 6)
Seizures as a topic	Self-initiated (Example 7)	Initiated by interviewer
Focus on seizure description	Easy	Difficult or impossible (“focusing resistance”)
Seizure description by negation	Rarely (negation usually explained and contextualised)	Common (Example 3, 5)
Description of periods of reduced consciousness or self control	Intensive formulation work	“Holistic” description of unconsciousness”.
	Aiming at a precise, detailed description.	Naming of unconsciousness without further description.
	Attempts to fill gap.	Pointing out inability to remember anything.
	Precise placement of period of lost consciousness in seizure context.	No self-initiated detailed description.
Metaphors, conceptualisation of seizures	Display of willingness to know what happened during periods of unconsciousness.	Presentation of gaps in consciousness as most dominant element of the disorder.
	Degree of unconsciousness can be challenged in interaction with interviewer (Example 4)	Completeness of unconsciousness cannot be questioned in interaction. (Example 3, 5, 6)
	Seizures as external independent agent	No coherent concept
Spontaneous reference to attempted seizure suppression	Active fight against seizure-threat (Example 7) Often made (Example 8)	Rarely made

consciousness for reasons other than epilepsy or NES (especially patients with cardiac or neurovasogenic/vasovagal syncope) and the use of specific features by patients with particular types of focal or generalised epilepsy (cf. Wolf, 2002). To date, patients with generalised epilepsy syndromes (who typically experience no warning of their seizures and may therefore have less to say about subjective seizure symptoms) have been relatively underrepresented in the research carried out in Bielefeld and in this study.

It should be pointed out that this study focussed on similarities between English and German-speaking patients. So far, no attempt has been made to examine whether the two data sets reveal significant cultural and social differences between patients and patient roles in the two countries. Bearing this in mind, our study has shown that the obvious lexical and structural differences between English and German do not influence the identified differentiating features. One important reason for this may be that these features represent universal communica-

tive *methods*, which patients use when they face the task of explaining subjective perceptions and experiences to other people. Given the interactive nature of this challenge, CA is a particularly appropriate research tool which is likely to be superior to linguistic approaches with a purely content-orientated focus. Having said that, our examples show how carefully the context of a particular linguistic or interactive feature have to be considered before it can be used to inform a CA-derived diagnostic hypothesis. What is more, it is rare for all features of a communication profile to be ‘typical’ of epileptic or non-epileptic seizure descriptions. A mixture of features may be particularly common in patients with generalised epilepsies (such as Carl, Examples 4 and 7) (Surmann, 2005). When communication profiles contain some features more in keeping with a diagnosis of epilepsy and others more in keeping with NES, the relative importance and degree of expression of the features has to be considered in the “diagnostic” process. This means that (at least at this point) the linguistic

features described here cannot be translated into a diagnostic checklist or a system suitable for “coding and counting”. However, our findings justify further research to establish the predictive and discriminatory power of a linguistic analysis based on the described features.

One reason why it is of great importance to communicate the findings of this study successfully to clinicians is that they demonstrate the practical usefulness of allowing patients time to develop their agenda and to detail their subjective symptomatology in clinical encounters. Research based on consultations shows that doctors typically interrupt patients after 18 s and that only a quarter of patients are able to complete their own opening statement (Beckmann and Frankel, 1984). Our results indicate that a change to a more passive interviewing style does not only give patients the impression that their doctor listens to them but also can improve diagnostic accuracy (Schöndienst, 2002; see also Heritage & Robinson, 2006).

Although our results are based on the transcription and careful analysis of interviews, the personal experience of the epileptologists involved in the German and English research projects suggests that experts in the assessment of patients with seizures can learn to listen out for some of the described features during a consultation.

From a methodological point of view, this study illustrates a new application of CA in institutional settings: whereas previous CA research has focussed on the interactional process of consultations or the function and outcome of specific communicative styles in medical interactions, this study demonstrates the potential of CA as a diagnostic tool in a multidimensional clinical decision process.

Acknowledgements

This study was undertaken with financial support from the Frank Moody Bequest administered by the University of Sheffield and by Steven Howell. We are grateful for the advice on earlier version of this manuscript from Elisabeth Güllich, Paul Drew, Leendest Plug and Fabienne Chevalier.

Appendix A. Glossary of most important transcription symbols

[]	overlap and simultaneous speech
=	direct tying of two words
(.)	micropause

(-)	pause (– ≈ 0.25 s; – ≈ 0.5 s; — ≈ 0.75 s)
(2.0)	longer pause in seconds
:: ::; ...;	lengthening, depending on duration
’	cut off with glottal stop
beLIEVE	emphasis
be!LIEVE!	strong emphasis
!	emphatic exclamation
?	high rising intonation, questioning intonation
,	medium rising intonation
;	medium falling intonation
.	Falling intonation
-	level intonation
/	rising–falling intonation
()/ (there)	falling–rising intonation
(there/where)	inaudible/suspected wording
< <laughing>	possible alternatives
oh well>	interpretative commentaries, with given scope
((wheezing))	para- and non-linguistic acts/ events
.h; .hh; .hhh	audible inhale, depending on duration
h, hh, hhh	Audible exhale, depending on duration

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