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Article title

Towards diagnostic conversational profiles of patients presenting with dementia or functional memory disorders to memory clinics

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Towards diagnostic conversational profiles of patients presenting with dementia or functional memory disorders to memory clinics

Keywords

Dementia; differential diagnosis; communication; functional memory disorders; Conversation Analysis

Structured Abstract

Objective

This study explores whether the profile of patients' interactional behaviour in memory clinic conversations with a doctor can contribute to the clinical differentiation between functional memory disorders (FMD) and memory problems related to neurodegenerative diseases.

Methods

Conversation Analysis of video recordings of neurologists' interactions with patients referred to a specialist memory clinic. "Gold standard" diagnoses independent of the CA findings were made by a specialist multi-disciplinary team based on clinical assessment, detailed neuropsychological testing and brain imaging.

Results

Two discrete conversational profiles for patients with memory complaints emerged, including i) who attends the clinic, and the role of any accompanying persons, and ii) patients' responses to neurologists' questions about memory problems, such as

difficulties in providing specific and elaborated examples, frequent "I don't know" responses and responding to compound questions.

Conclusion

The memory complaints presented by patients with neurodegenerative pathology are clearly observable in their communicative conduct during consultations. In contrast the memory dysfunction articulated by patients with FMD is not typically observable.

Practical implications

Our findings demonstrate that conversation profiles based on patients' contributions to memory clinic encounters have diagnostic potential to assist the screening and referral process from primary care, and the diagnostic service in secondary care.

1. Introduction/Background

The clinical differentiation of memory complaints attributable to progressive neurodegenerative disorders leading to dementia (ND) and that of similar complaints due to functional memory disorders (FMD, i.e. non-progressive memory deficits often linked to anxiety or mood disorders) [1] is a frequent challenge in specialist memory clinics. Recent observations in the United Kingdom (UK) suggest that up to 50% of patients referred to memory clinics receive a diagnosis of FMD rather than memory complaints secondary to ND [2]. Previous research shows that the distinction for ND from FMD is associated with high rates of diagnostic errors [1]. This is particularly true when diagnostic attempts are made at the earliest disease stage of possibly progressive memory disorders. However, an early differentiation of ND from FMD is highly desirable from a therapeutic point of view and has been declared a particular health service priority by the UK government [3, 4].

The assessment of a patient's memory concerns typically begins with a history from the patient and any accompanying persons (if available). The patient's history can be complemented by neuropsychological testing and brain scanning (Magnetic Resonance Imaging (MRI) or Computerised tomography (CT)); but it is widely recognised that reliance on tests alone or isolation is likely to increase the rate of erroneous diagnoses [1]. Although taking and interpreting the patient's history is a key to diagnosis and to choosing an appropriate treatment strategy, the interaction between doctor and patient, central to the diagnostic process of memory problems, has received relatively little research attention.

The purpose of this study was to explore patient interaction as a diagnostically relevant resource or indicator to differentiate between different courses of memory

complaints. Building on previous work exploring the use of Conversation Analysis (CA) as a diagnostic aid in the seizure clinic [5-7], and an initial analysis of a small subset of our corpus of recordings from the memory clinic [8], the present study pays particular close attention to patients' participation in initial (diagnostic) clinical encounters with neurologists, and aimed to explore the potential of using conversational differences to distinguish between functional memory complaints related to FMD from those caused by ND.

2. Methods

2.1 Study design

The study design parallels prior research that identified, described and tested profiles of interactional, linguistic and topical features as aids in the differential diagnosis of patients attending seizure clinics with epilepsy or psychogenic nonepileptic seizures [5-7]. Using similar analytic methods, we aimed to distinguish between conversational patterns observable in interactions with patients whose memory complaints are due either to ND (such as Alzheimer's disease) or FMD. FMD is a term used to describe memory problems thought to have emotional or attentional causes. Diagnostic criteria were suggested by Schmidtke et al 2008 [9]; a more extensive discussion of the nature of FMD, and the differences between FMD, Mild Cognitive Impairment (MCI) and Subjective Memory Complaints can be found elsewhere [1]. Participants in this study were screened for depression using the Patient Health Questionnaire 9 (PHQ9) [10] and by enquiries about symptoms of depression from the neurologist and neuropsychologist involved in assessing each patient. A past history of depression and current dysthymia were not exclusion criteria.

2.1.1 Patient recruitment

Between October 2012 and October 2014, a total of 99 patients initially presenting to the memory clinic in the Department of Neurology at the Royal Hallamshire Hospital, Sheffield, United Kingdom, were video recorded. All patients - minimum age 18 years - had been referred to the specialist memory clinic for younger adults, a neurology-led service accepting referrals from the area covered by the South Yorkshire health authority. The majority of referrals were from primary care, but

referrals from neurologists not specialising in memory disorders and from psychiatrists were also accepted. Appointment letters to patients routinely encouraged them to bring along a family member, friend or carer to the clinic.

2.1.2 Diagnostic process

All patients enrolled received a provisional diagnosis following their assessment by a consultant neurologist with a special interest in memory disorders and completion of the Addenbrooke's Cognitive Examination (ACE-R, a 20 minute screening tool),. Final 'gold standard' clinical diagnosis was reached by interdisciplinary consensus based on history, extensive neuropsychological testing and magnetic resonance imaging (MRI) of the brain. Pathological confirmation of clinical diagnoses was not available within the timeframe of this study.

The neuropsychological battery included the Mini Mental State Examination [11], tests of long and short and long term memory (verbal and non-verbal) [12, 13], tests of abstract reasoning [13, 14] and tests of attention and executive function [15], tests of language comprehension [16], naming by confrontation, and category and letter fluency. A full description of these tests can be found elsewhere [17]. Patients were screened for anxiety using the Generalised Anxiety Disorder 7 questionnaire [18].

2.1.3 Structure of analysed interactions

For the purposes of this study the neurologists were encouraged to use a simple set of communicative instructions to allow for comparability of the history-taking phase across the consultations. This included the advice to begin the consultation with open questions to promote and encourage patients to provide more extended turns at talk. These questions covered such matters as general enquiries about patients'

memory experiences, who was most concerned about the patients' memory difficulties, and the patients' expectations of the visit (some of these questions are shown in our extracts below). Patients were also encouraged to try and give specific examples of when and how their memory had let them down.

2.1.4 Data corpus - Participant details

A total of 30 cases with clear medical diagnoses and their interactions transcribed in preparation for CA; 15 of these patients received an ultimate medical diagnosis of FMD, 15 were diagnosed with ND (11 with early dementias, 4 with amnesic MCI highly likely to develop into dementia) (see table 1 for more patient details). For the purpose of this study we focused only on the interaction involving patients with a clear diagnosis of dementia.

Table 1 - Patient details

		FMD group	ND group	Difference
Age	Median (range)	60 (47-80)	66 (51-78)	ns (p=.428) ¹
Education	Median (range)	15 (10-17)	14.5 (10-16)	ns (p=1.000) ¹
PHQ-9	Median (range)	6 (0-14)	2.5 (1-22)	ns (p=.688) ¹
GAD-7	Median (range)	4 (0-11)	3.5 (0-18)	ns (p=1.000) ¹
% accompanied	Percentage	40.0%	90.9%	P<0.008 ²
% female	Percentage	66.70%	45.50%	ns (p=.689) ²

¹Fischer Exact Significance; ²Chi-Square test

Non-parametric statistics were performed on demographic variables (age and education level) and on mood scales (PHQ-9 and GAD-7). There were no significance differences between the two groups on these variables. A chi-square test was performed on the amount of patients accompanied in both ND and FMD groups, and it was found that the ND group were significantly more likely to be

accompanied than the FMD group ($p < 0.008$). See **Table 1** for the descriptives of these results.

2.2 Conversation Analysis (CA)

The data (video recordings and transcripts) were analysed using the perspective and methods of CA. CA is a method for investigating patterns of communication in naturally-occurring interactions. Using a CA perspective we can document the temporal and sequential real-time progress of talk, and identify the systematic patterns and practices through which participants design their conduct and understand one another [e.g. 19, 20-22]. As will become clear, we include investigation of verbal and non-verbal conduct, and the interplay between them. CA has been to applied successfully to the investigation of doctor-patient interactions, focusing particularly on their interactional structure, dynamics and organisation. Increasingly CA has also been used to inform and direct medical practice and diagnosis [6, 23, 24].

Video recordings provide access to verbal and non-verbal features of the interactions, which can be vital when investigating and understanding embodied features of the encounters such as the 'head-turning sign' previously linked to Alzheimer's disease [25-27].

The qualitative video data management software Transana [28] was utilised to organise, compare and analyse cases across the entire video corpus. This software facilitated populating the analytic categories that were being identified across the corpus and within the different diagnostic classifications, which developed into the collections outlined in this paper.

The video recordings were transcribed in accordance with the conventions devised by Jefferson [29], capturing real-time features of the talk and widely used in CA research. In order to develop the conversational profiles the conversation analyst was necessarily aware of the clinical diagnosis of each patient inspected, as the diagnostic categories were applied after the interaction, tests and scans, and prior to analysis. As such it was assumed that the interactions exhibited the associated medical conditions attached retrospectively.

2.3 Ethics

The study was approved by NHS research ethics (NRES Committee Yorkshire & The Humber - South Yorkshire). The recruited patients received written information about the study at least 48 hours prior to their appointment date and were encouraged to discuss the information provided with anyone they wanted to bring along to the clinic visit. On the day of the visit, they had the opportunity to speak to a member of the research team prior to their initial appointment in the memory clinic. Participants gave written informed consent, having been told that they could withdraw from the study at any time. Patients lacking capacity to consent were excluded from the study. Confidentiality was assured and transcripts were by pseudoanonymised of participants in any subsequent outputs.

3.Results

We identified working conversational profiles that distinguished between the two patient groups, i.e. patients with memory complaints due to ND and patients with FMD. Broadly the profile is separated into two areas: who attends the memory clinic, and how patients respond to neurologists' questions during history-taking.

3.1 Is the patient accompanied, and if so what is the accompanying persons role?

Whilst patients were routinely encouraged to attend the clinic accompanied by a relative or friend, not all patients took up this option. An early (and therefore provisional) indication of a patient's eventual diagnosis is **whether or not they were accompanied** (typically by at least one family member). In the dementia subset 10 out of 11 (91%) were accompanied, whereas only 6 out of 15 (40%) of patients with FMD were joined in the consultation (see table 1). While not definitive on its own, this differentiating feature is consistent with the findings of previous research [30, 31].

We then considered not merely whether the patient was accompanied during the consultation but **what role the accompanying persons played during the interaction**. We focused particularly on the interactional input of the accompanying persons (APs) from the ND and FMD subsets during the history-taking phase of the consultation when they were present. A clear contrast in the interactional responsibilities of APs was evident. In ND cases, the APs were generally involved throughout history-taking, often acting as representatives or spokespeople for patients, for instance by providing important information about the difficulties the patient had experienced (see discussion of head-turning sign to seek AP input

below). Figure 1, taken from the opening exchanges of a patient with a ND, is a clear example of an APs contribution to his spouses' consultation.

Figure 1 - 048 (dementia, accompanied)		
1	Neu	Um- (5) Do you know the reasons why you've been referred to this clinic
2		and, and who's more concerned.
3		(0.7)
4	AP	((Coughs)) Right, well- ((coughs)) sorry (0.5) um I'll, I'll explain that er
5		when (.) ((Patient name)) had um, when she was um ((tuts)) (0.5) she left
6		work in 2011 about er- I got her to er- in February about 2011 to see the
7		GP because she was having (.) er problems at work.
8	Neu	Mm hmm,
9		((conversation between Neu and AP continues in similar pattern))

In example 1 the neurologist asks two direct questions. It is evident that the AP treats the delay in response (the silence in line 3) as indicating that the patient might have trouble in responding and therefore steps in to answer on the patient's behalf. Such interjections occurred only in the interviews of patient's with ND; there were no comparable instances in the FMD subset.

In the next example taken from a consultation with a patient with FMD, the contribution from the AP follows a rather different pattern. The AP only contributes (non-verbally) when requested to do so by the patient (again tacitly through turning towards her as a confirmation check in line 3).

Figure 2 - 034 (FMD, accompanied)		
1	Neu	And er meeting your wife?
2	Pat	Yes I can remember meeting my wife (.) bowling alley ((turns to
3		AP)) [yeah.
4	AP	[[((nods))
5	Neu	So, er and then: getting married?

This example illustrates the different shape that characterised triadic encounters involving patients with FMD; the AP's role was to act as a resource available to the

patients when they wanted to check the accuracy of their responses (referred to here as confirmation checks), as well as when seeking a second opinion.

3.2 Responding to neurologists' questions about memory problems

As outlined previously, the neurologists involved were encouraged to use a flexible communicative template to organise their history-taking activity. Part of this process involved replicating particular questions. We focus here on two of these questions.

First, in just over half the cases (n=14, out of 26 consultations) neurologists' asked the patient **"Who is most concerned about the memory problems?"** (or some variation). Examining the responses to this question, a very clear distinction between the patient groupings emerged. In all 9 of the FMD cases in which the question was asked, the patient stated that they were the one most concerned ("[It's] me"). Note that attending alone might also be related to this. In the most transparent case, an FMD patient expands his utterance, saying "My partner dun't even know I'm `ere. (2.0) I've not even discussed it with him...((continues discussing his anxieties))".

In contrast, the same question yielded a very different response from the patients with dementia; in 4 of the 5 cases the AP said they were both more aware of and concerned about the memory problems (e.g. "I got her to see the GP..." in case 048). Furthermore, there was evidence to suggest that the patients themselves were not aware of any problems or could not answer the question, sometimes failing to reply to the question altogether (e.g., "I don't know" in case 033, which the AP responded to by saying "Well I am certainly worried about it" registering her position).

3.3 "Can you give me an example of the last time your memory let you down?"

Second, in 17 of the 26 cases analysed the neurologist asked the patient to give an example of the most recent time their memory let them down ("**Can you give me an example of the last time your memory let you down?**", or some variant thereof).

In 11 of the 12 occasions from the FMD category when asked this question, the patient successfully provided a relevant and detailed example of a particular recent event, as illustrated in Figure 3.

Figure 3 - 040 (FMD, unaccompanied)		
1	Neu	Yeah (2) Um, and can you (.) tell me the last time it happened to you?
2	Pat	Er, yesterday, yesterday, yeah=
3	Neu	=And what happened?
4	Pat	Um, I- I was um, we were out walking with, with friends and um we were
5		having a conversation (.) and er- we were talking about the economy,
6		a:nd um (1.3) I- I was having the conversation (.) I was talking about
7		Italy, I remember it exactly, talking about Italy, and I got to the- to the
8		word economy and I couldn't remember it, <I couldn't remember the word
9		economy>, and my sentence, everything just stopped, it was like phew
10		((hands motion hitting a wall)) (1.6) and everybody went (1) "And?" (0.9)
11		And I- I just- well I just stood there, what- what- I just couldn't get
12		anything out, couldn't (.) <I couldn't think of the word> economy
13		((continues))

In contrast the patients with memory problems caused by ND had difficulty answering this question and giving such an example. Most either made no response, or only the beginnings of a response (e.g., "um" or "er"), or declared they were unable to remember a specific occasion. In 2 cases the patient sought the assistance of the AP ("can you?"). In the few cases when patients from this group responded, the 'example' offered was a routine or common problem, rather than a specific incident (e.g., "happens all the time" or "it's daily").

3.4 Responding to compound questions

The majority of neurologists' questions were mono-topical (e.g. "can you tell me the last time it happened to you?" in Figure 3 above). However, sometimes the neurologists asked questions in a compound construction in which two or three questions were actually asked in speaker turn[8]. An example occurs in Figure 1 above, when the neurologist asks "Do you know the reasons why you've been referred to this clinic and, and who's more concerned?". The two patient groups responded differently to **multi-component, compound questions**.

FMD patients were able to attend to multiple parts of a question (e.g. "can you tell me a little bit about your background, where you're from originally and where did you go to college") in their responses and could return to other elements of the initial question after providing detailed answers to aspects of it [see also 8]. In contrast, ND patients experienced difficulties, frequently replying to single components of the compound questions, and were unable to recall and respond to other aspects of the original question, so that the neurologist was required to repeat the omitted parts of the question. This feature is exhibited in Figure 4.

Figure 4 - 056 (dementia, accompanied)		
1	Neu	How's er: reading, writing, spelling?
2	Pat	Erm (.) <reading> (.) I read an awful lot (.) however, I have- and the only
3		way I've noticed it is, well we've got a three year old grandson and I=
4	AP	= Oh yeah.
5		((27 lines of talk lasting 51 seconds about the patient's difficulties reading
6		stories omitted))
7	Neu	OK. How's your spelling writing?
8	Pat	I think me- writing's deteriorated (.) Um (1.5) spelling?

The patient answers the first part of the question about reading, but after the 27 omitted lines, seems unable to recover the second and third items in the neurologist's original question - items that the neurologist therefore repeats (line 7).

3.5 "I don't know" responses

Previous research by Mikesell [32] into patients with frontotemporal dementia has highlighted the excessive and 'out of context' usage of "I don't know" utterances in their speech [33]. Our study develops these findings by identifying alternative practices and applications of **patient's responding "I don't know" in consultations**, including embodied practices that express similar responses.

FMD patients responded verbally with "I don't know" only rarely (four times in 15 cases) each in response to regard to elicitation of their "expectations" for the visit. There were a further 4 occasions in the FMD cases when patients indicated non-verbally that they didn't know, by turning to their AP for assistance. In both instances of verbal "I don't know" responses the patient exhibited uncertainty, displaying that they had not previously considered the matter and were unsure of the answer. In short the problem was not suggestive of a recall issue.

However, the patients in the ND group displayed different communication behaviour indicating a diagnostic potential of this observation. There were a total of 45 "I don't know" or equivalent responses from the 11 patients with dementia, whether verbal (29 cases) or embodied in the form of 'head turning' signs (16 cases, illustrated below). The results of non-parametric tests (Fischer's exact) show that there is a significant difference in the number of verbal 'I don't know' responses ($p < 0.004$) but not for head turning or other non-verbal forms ($p = 0.103$).

The patient's problem remembering or recalling information is exemplified by the following sequence (Figure 5).

Figure 5 - 048 (dementia, accompanied)		
1	Neu	Where's your favourite place that you've been in the world?
2		(2.4)
3	Pat	Oh it's hard to say isn't it? ((laughter))
4	Neu	If you had to have maybe your top five then?
5		(1.8)
6	Pat	Top five? ((turns to AP and back))
7	Neu	Which of your journeys or travels sort of stands out most?
8	Pat	Latin America.
9	Neu	And whereabouts in Latin America did you go?
10	Pat	All over.
11		(2.6)
12	Neu	Can you tell me which- which of those countries, which ones did you
13		visit?
14		(3.6)
15	Neu	And were you travelling on your own or, were you in a group, or,
16	Pat	With my husband most of the [time.
17	Neu	[Right. And how many years ago was that?
18		(2.0)
19	Pat	Two three, ((turn to AP)) more?
20	AP	A bit more than that, yeah.
21	Neu	OK. Can you remember any, the names of any places you went to or
22		what you saw?
23	Pat	Not offhand. (2.0) Went all over, you see. ((laughter))

Previous studies have noted a high incidence of head-turns in patients with dementia [25-27]. The prevalence of head-turning indicates recall difficulties and conversational problems in general. In these sequences the neurologist asks the patient a question. Instead of offering a reply, the patient 'withholds' (notice the pauses in excerpt 5) or fails to answer (implying "I don't know") and turns to face the AP, thereby transferring the question to them with the expectation that the AP will answer on their behalf. Thus patients with ND display conversational dependence on their companions to fill in the gaps in the exchanges when memory failures occur [34-36].

A typical example is provided in Figure 6 below.

Figure 6 - 033 (dementia, accompanied)		
1	Neu	And could you, give me an example of the last time your memory, let you
2		down?
3		(1.5)
4	Pat	Um: ((turn to AP1))
5		(2.8)
6	AP1	In the car you've lost your sense of direction (.) does that count?
7	Pat	Right ((nods))
8		((Pat and AP1 laugh))

Notice the lengthy pauses in lines 3 and 5, in conjunction with the patient's turn to AP1 in line 4 display that he "didn't know how to answer".

3.6 Patients' elaborations and length of turns

FMD patients often elaborated their responses by volunteering unsolicited details when responding to relatively closed questions (example given in Figure 7).

Figure 7 - 004 (FMD, unaccompanied)		
1	Neu	So where are you from originally?
2	Pat	Um, I come from ((Country name)) (.) but I was, my father was a
3		missionary in India and I was there until I was fourteen=
4	Neu	Mm hmm.
5	Pat	=So I came back from India when I was fourteen in 1948 (0.6) um then I
6		went to university in ((City name)).

The patient's response in Figure 7 goes beyond the original question by explaining where she grew up and studied at university. This additional material is appropriate and relevant to the topic at hand. This kind of expansion or elaboration by the patient is very common in the FMD consultations, but was rarely seen in the ND group.

The fundamental difference between the patient groups was that the ND patients were generally unable to go beyond the (literal) parameters of the question as demonstrated in Figure 8.

Figure 8 - 048 (Dementia, accompanied)		
1	Neu	And what did you do first after leaving school?
2		(2.5)
3	Neu	Did you go onto college or: did you work or-
4	Pat	Yeah, I worked.
5	Neu	And what was your first job after leaving school?
6		(6.7)
7	Neu	Can you remember what your first job was?
8		(2.9)
9	Pat	Not offhand.
10	Neu	Okay.

Briefly, this example displays a number of features outlined above. First, the patient offers a delayed and short reply ("I worked") to the neurologist's question about their post-school activities. This question gives the patient the opportunity to expand on her answer (as seen in Figure 7 with the FMD patient) and the neurologist's follow-up questions indicate a similar orientation. However, the patient struggles to provide any further detail (notice the long gaps) and agrees that they cannot "remember".

4. Discussion/Conclusion

4.1 Discussion - Summary

The principal aim of this research was to develop conversational profiles, which could help to distinguish between the interactional behaviour of patients with FMD and that of patients with memory problems due to ND. We have identified and explored a range of conversational indicators that can aid in the diagnostic process. Patients with ND were more likely than those independently diagnosed with FMD to be accompanied during their visit to the memory clinic. The companions of patients with ND were more likely to be concerned about the patients' memory difficulties than patients themselves; by contrast FMD patients who were accompanied were, when asked, always more concerned than their companions. Even when accompanied to the clinic, patients with FMD only rarely sought their companions' assistance in answering questions; conversely, patients with dementia relied to a very large extent on their companions' assistance in answering. Patients with ND struggled to answer specific questions in much detail (if at all), had difficulties responding to compound questions, frequently responded "I don't know," and generally had difficulties sustaining the interaction - their memory failure impacting significantly on their ability to communicate with the neurologist during the outpatient clinic encounter. Patients with FMD on the other hand interacted much more confidently with the neurologists, could provide numerous extended and specific examples of memory difficulties, give detailed answers going beyond the parameters of the question and they could handle and recall all parts of compound questions. Future research has to confirm the diagnostic sensitivity and specificity of the different interactional features described here and that of the conversation profile as a whole.

4.2 Conclusion - Limitations of study

There are several limitations to our study: first and foremost, the conversational profile we report was based upon a relatively small sample size. Small datasets are common for conversation analytic research of this kind based on the detailed and extensive analysis of recorded data and associated transcripts [7]. Whilst the findings described were seen in the majority of cases in both diagnostic groups, they should be confirmed in larger future studies.

Our report is based on patients attending one memory clinic in Sheffield, UK. The clinic in which the recordings were conducted is called the working age memory clinic; however, the data collected here included patients up to age 80. It is not clear that the same findings could be replicated in older patient groups, in whom there is likely to be a higher incidence of ND, although FMD can also occur in older adults.

It would be advisable to confirm our findings in patients speaking other languages (who may communicate differently with health professionals), although our findings should not be particularly language-dependent and the differential diagnostic potential of CA-based observations in patients with seizures has not only been observed in English speaking patients but also in German [37] and Italian speakers [38]. In any case, the differentiating diagnostic value of our interactional and linguistic observations should be confirmed in a future prospective study in which the analyst is unaware of the clinical diagnosis at the time of analysis, before the observation of conversational observations such as those described above should be used for diagnostic purposes.

Whilst our approach using CA on memory clinic data has yielded a number of observations, which may help healthcare practitioners with the diagnostic process in

the memory clinic, our list of potentially differentiating features is unlikely to be complete. The more extensive research that has been carried out on seizure clinic encounters has revealed that other linguistic techniques (including metaphor analysis, focussed content analysis or phonological studies) and statistical methods can yield additional insights [6, 39, 40]. Additional diagnostic pointers may also be described using CA, for instance by focussing more on the contributions of accompanying persons.

4.3 Practice implications

Despite these limitations, our findings demonstrate that conversation profiles of patients' contributions to outpatient clinic encounters in the memory clinic have the potential to aid the diagnostic process. Whilst our study was conducted in a hospital-based specialist memory clinic, these profiles could be useful in both primary and secondary care settings. Attending to conversational cues could aid the screening and referral process from primary care, which would be important in facilitating earlier diagnosis of ND without overwhelming specialist services.

Beyond the issue of helping with the differential diagnosis, references to conversational observations in the explanation of the memory complaints given to the patient may make explanations more acceptable or effective. For instance, a doctor may want to reassure a patient with FMD that they are unlikely to be experiencing symptoms of dementia because they were able to provide a lot of detail when relating experiences of apparent memory failures. Patients presenting with memory failure complaints may also experience the initial open discussion as less stressful and anxiety-provoking than other diagnostic processes, such as cognitive screening tools [8].

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No conflicts of interest to declare.

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6. References

- [1] Blackburn DJ, Wakefield S, Shanks MF, Harkness K, Reuber M, Venneri A. Memory difficulties are not always a sign of incipient dementia: a review of the possible causes of loss of memory efficiency. *British Medical Bulletin*. 2014.
- [2] Blackburn DJ, Bell SM, Wakefield S, Harkness K, Rittman T, Rowe J, et al. The Changing Face of Memory clinics in the UK. *British Journal of General Practice*. In submission.
- [3] NHS England. Everyone Counts: Planning for Patients 2014/15 - 2018/19. In: England N, editor. Leeds: NHS England; 2013.
- [4] Older people and dementia team. Prime Minister's challenge on dementia: Delivering major improvements in dementia care and research by 2015. In: Health Do, editor. London: Department of Health; 2012.
- [5] Reuber M, Monzoni C, Sharrack B, Plug L. Using interactional and linguistic analysis to distinguish between epileptic and psychogenic nonepileptic seizures: A prospective, blinded multirater study. *Epilepsy & Behavior*. 2009;16:139-44.
- [6] Robson C, Drew P, Walker T, Reuber M. Catastrophising and normalising in patient's accounts of their seizure experiences. *Seizure*. 2012;21:795-801.
- [7] Schwabe M, Howell SJ, Reuber M. Differential diagnosis of seizure disorders: A conversation analytic approach. *Social Science & Medicine*. 2007;65:712-24.
- [8] Jones D, Drew P, Elsey C, Blackburn D, Reuber M. Conversational assessment in memory clinic encounters: interactional profiling for the differential diagnosis of dementia and functional memory disorder. *Aging & Mental Health*. In submission.
- [9] Schmidtke K, Pohlmann S, Metternich B. The syndrome of functional memory disorder: definition, etiology, and natural course. *Am J Geriatr Psychiatry*. 2008;16:981-8.
- [10] Kroenke K, Spitzer RL, Williams JB. Validity of a brief depression severity measure. *Journal of General Internal Medicine*. 2001;16:606-13.
- [11] Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*. 1975;12:189-98.
- [12] Rey A. *L'examen clinique en psychologie*. Paris: Presses Universitaires de France; 1964.
- [13] Wechsler D. *Wechsler Adult Intelligence Scale-III* San Antonio, TX: The Psychological Corporation; 1997.
- [14] Raven JC. *Coloured Progressive Matrices Sets A, Ab, B. Manual Sections 1 & 2*. Oxford: Oxford Psychologists Press; 1995.
- [15] Stroop JR. Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*. 1935;18:643-62.
- [16] De Renzi E, Faglioni P. Normative Data and Screening Power of a Shortened Version of Token Test. *Cortex*. 1978;14:41-9.
- [17] Lezak MD, Howieson DB, Bigler ED, Tranel D. *Neuropsychological Assessment (5th Edition)*. Oxford: Oxford University Press; 2012.
- [18] Spitzer RL, Kroenke K, Williams JBW. A brief measure for assessing generalised anxiety disorder: the GAD-7. *Archives of Internal Medicine*. 2006;166:1092-7.
- [19] Drew P, Chatwin J, Collins S. Conversation analysis: a method for research into interactions between patients and health-care. *Health Expectations*. 2001;4:58-70.
- [20] Heath C, Hindmarsh J, Luff P. *Video in qualitative research*. London: Sage; 2010.
- [21] Heritage J, Maynard DW. *Communication in Medical Care: Interaction Between Primary Care Physicians and Patients*. Cambridge: Cambridge University Press; 2006.
- [22] Maynard DW, Heritage J. Conversation analysis, doctor-patient interaction and medical communication. *Medical Education*. 2005;39:428-35.
- [23] Heritage J, Robinson J, Elliott M, Beckett M, Wilkes M. Reducing Patients' Unmet Concerns in Primary Care: the Difference One Word Can Make. *Journal of General Internal Medicine*. 2007;22:1429-33.

- [24] Stivers T. Prescribing under pressure: Parent-physician conversations and antibiotics. Oxford: Oxford University Press; 2007.
- [25] Bouchard RW, Rossor MN. Typical clinical features. In: Gauthier S, editor. *Clinical Diagnosis and Management of Alzheimer's Disease (Third Edition)*. Abingdon: Informa Healthcare; 2006. p. 39-52.
- [26] Fukui T, Yamazaki T, Kinno R. Can the 'Head-Turning Sign' Be a Clinical Marker of Alzheimer's Disease. *Dementia and Geriatric Cognitive Disorders Extra*. 2011;1:310-7.
- [27] Lerner AJ. Head turning sign: pragmatic utility in clinical diagnosis of cognitive impairment. *Journal of Neurology, Neurosurgery & Psychiatry*. 2012;83:852-3.
- [28] Woods DK, Dempster PG. Tales From the Bleeding Edge: The Qualitative Analysis of Complex Video Data Using Transana. *Forum Qualitative Sozialforschung/ Forum: Qualitative Social Research* 2011.
- [29] Jefferson G. Glossary of transcript Symbols with an Introduction. In: Lerner G, editor. *Conversation Analysis: Studies from the First Generation*. Amsterdam and Philadelphia, PA: John Benjamins; 2004. p. 13-31.
- [30] Lerner AJ. "Who came with you?" A diagnostic observation in patients with memory problems? *Journal of Neurology, Neurosurgery and Psychiatry*. 2005;76:1739.
- [31] Starkstein SE, Sabe L, Chemerinski E, Jason L, Leiguarda R. Two domains of anosognosia in Alzheimer's disease. *Journal of Neurology, Neurosurgery & Psychiatry*. 1996;61:485-90.
- [32] Mikesell L. Conversational Practices of a Frontotemporal Dementia Patient and His Interlocutors. *Research on Language and Social Interaction*. 2009;42:135-62.
- [33] Robillard A. *Meaning of a Disability: The Lived Experience of Paralysis*. Philadelphia, PA: Temple University Press; 1999.
- [34] Hamilton HE. *Conversations with an Alzheimer's patient: An interactional sociolinguistic study*. Cambridge: Cambridge University Press; 1994.
- [35] Jones D. A family living with Alzheimer's disease: The communicative challenges. *Dementia*. 2013.
- [36] Perkins L, Whitworth A, Lesser R. Conversing in dementia: A conversation analytic approach. *Journal of Neurolinguistics*. 1998;11:33-53.
- [37] Schwabe M, Reuber M, Schoendienst M, Guelich E. Listening to people with seizures: how can Conversation Analysis help in the differential diagnosis of seizure disorders. *Communication and Medicine*. 2008;5:59-72.
- [38] Cornaggia CM, Gugliotta SC, Magaudda A, Alfa R, Beghi M, Polita M. Conversation analysis in the differential diagnosis of Italian patients with epileptic or psychogenic non-epileptic seizures: A blind prospective study. *Epilepsy & Behavior*. 2012;25:598-604.
- [39] Plug L, Sharrack B, Reuber M. Seizure metaphors differ in patients' accounts of epileptic and psychogenic non-epileptic seizures. *Epilepsia*. 2009;50:994-1000.
- [40] Plug L, Sharrack B, Reuber M. Seizure, fit or attack? The use of diagnostic labels by patients with epileptic and non-epileptic seizures. *Applied Linguistics*. 2009;31:94-114.