

## Identifying patterns of communication in patients attending memory clinics:

a systematic review of observations and signs with potential diagnostic utility

### Abstract

#### Background

Subjective cognitive complaints are commonly encountered in primary care and often result in memory clinic referral. However, meta-analyses have shown that such concerns do not consistently correspond to objective memory impairment or predict future dementia. Memory clinic referrals are increasing, with greater proportions of patients attending who do not have dementia. Studies of interaction during memory clinic assessments have identified conversational profiles that can differentiate between dementia and functional disorders of memory. To date, studies exploring communication patterns for the purpose of diagnosis have not been reviewed. Such profiles could reduce unnecessary investigations in patients without dementia.

#### Aim

To identify and collate signs and observable features of communication, which could clinically differentiate between dementia and functional disorders of memory.

#### Design and setting

This was a systematic review and synthesis of evidence from studies with heterogeneous methodologies.

#### Method

A qualitative, narrative description and typical memory clinic assessment were employed as a framework.

#### Results

Sixteen studies met the criteria for selection. Two overarching themes emerged: 1) observable clues to incapacity and cognitive impairment during routine assessment and interaction, and 2) strategies and accounts for loss of abilities in people with dementia.

#### Conclusion

Whether the patient attends with a companion, how they participate, give autobiographical history, demonstrate working memory, and make qualitative observations during routine cognitive testing are all useful in building a diagnostic picture. Future studies should explore these phenomena in larger populations, over longer periods, include dementia subtypes, and develop robust definitions of functional memory disorders to facilitate comparison.

#### Keywords

cognitive decline; functional memory disorder; memory clinic; memory disorders; mental status and dementia tests; subjective memory impairment.

### INTRODUCTION

Subjective cognitive complaints are seen frequently in primary care and commonly trigger referral to memory clinics.<sup>1</sup> These complaints are of potential clinical importance, might indicate cognitive decline and dementia, and are criteria for mild cognitive impairment (MCI).<sup>1</sup> However, recent literature has cast doubt on their validity as a marker of MCI due to the poor correlation between subjective and objective memory performance and the fact that subjective reports do not consistently predict future dementia.<sup>2,3</sup>

The National Dementia Strategy<sup>4</sup> and Prime Minister's Challenge<sup>5</sup> reflected a drive to increase dementia diagnoses. Accordingly, the average number of people attending memory services rose by 682% between 2008–2009 and 2014.<sup>6</sup> However, this increase appears to reflect a greater number of patients attending without neurodegenerative conditions.<sup>7</sup>

Although much of the recent dementia diagnostic research focuses on increasing use of technology and biomarkers, some authors are exploring clinical skills.<sup>8</sup> Creavin and colleagues are currently undertaking a Cochrane review of GP judgement in the diagnosis of dementia.<sup>8</sup> A previous meta-analysis found that GPs were able to identify 75% of people with dementia based on clinical impression.<sup>9</sup> Doctors are known to use various types

of reasoning to reach diagnoses including pattern recognition, which can not only have heuristic value but is also prone to particular types of error.<sup>10</sup> Objective assessment of diagnostic processes and identification of factors contributing to 'gut-feeling' may demonstrate significant utility in understanding and improving clinical judgement in both GPs and secondary care physicians.

Although depression and other psychiatric or medical disorders account for some non-dementia presentations to memory clinics, there remains a significant proportion of patients who lack a diagnosable condition.<sup>7–11</sup> Functional disorders of memory are attracting increased research interest, as are other such 'medically unexplained symptoms' (MUS).<sup>1</sup>

Schmidtke and Metternich proposed criteria for 'functional memory disorder' (FMD), a potentially reversible memory complaint thought to be secondary to psychological or emotional factors in the absence of major psychiatric disorder.<sup>12</sup> Aetiological factors include overwork, interpersonal conflict, somatic illness, adjustment disorder, dysthymia, and 'Alzheimer phobia'.<sup>13</sup> A longitudinal study of 46 patients with a diagnosis of FMD followed up for a mean of 20 months found that symptoms persisted in 39 patients, though only one was later diagnosed with dementia.<sup>13</sup>

**C Bailey**, MRCPsych, specialist registrar in old age and general adult psychiatry, East London Foundation Trust, Homerton Psychological Medicine. **N Poole**, MSc, MD, MRCPsych, consultant neuropsychiatrist, South West London and St George's Mental Health NHS Trust, Neuropsychiatry Service, St George's Hospital, London. **DJ Blackburn**, PhD, MRCP, senior lecturer and honorary consultant neurologist, Sheffield Institute for Translational Neuroscience (SITraN), University of Sheffield, Sheffield.

#### Address for correspondence

Cate Bailey, Specialist Registrar in Old Age and

General Adult Psychiatry, East London Foundation Trust, Homerton Psychological Medicine, Homerton Hospital, Homerton Row, London E9 6SR, UK.

**E-mail:** cate.bailey@nhs.net

**Submitted:** 19 June 2017; **Editor's response:** 25 July 2017; **final acceptance:** 4 September 2017.

©British Journal of General Practice

This is the full-length article (published online 16 Jan 2018) of an abridged version published in print. Cite this version as: **Br J Gen Pract 2018; DOI: <https://doi.org/10.3399/bjgp18X694601>**

### How this fits in

This review found that observations during interaction in cognitive assessments can help differentiate between dementia and functional disorders of memory. Whether the patient attends with a companion, how they participate, give autobiographical history, and make qualitative observations during cognitive testing are useful in building a diagnostic picture. For GPs the observations in this review may augment existing screening tools and maximise limited available time to inform decisions about onward referral.

It is increasingly understood that patients with MUS present frequently to both primary<sup>14</sup> and secondary care services,<sup>15</sup> and often receive unnecessary investigations resulting in significant costs to the health system.<sup>15</sup>

Although a recent review on 'functional cognitive disorder'<sup>16</sup> advised neuroimaging to exclude neurodegenerative causes, such investigations can intensify anxiety and cause iatrogenic harm.<sup>17,18</sup> Many patients report that memory clinic assessments are lengthy, distressing, and stigmatising.<sup>19</sup> Therefore, a rapid and inexpensive means of identifying such non-neurodegenerative conditions would benefit both patients and clinicians.

Conversation analysis in health care involves observation of clinical interaction occurring in real time.<sup>20</sup> There now exists a robust body of evidence demonstrating that looking at 'how' patients communicate, as well as 'what' they say can help to differentiate between epileptic and non-epileptic attacks during a single neurological assessment.<sup>21,22</sup>

Two recent studies identified divergent interactional profiles that could help differentiate between neurodegenerative and non-neurodegenerative disorders, that is, dementia and functional disorders of memory.<sup>23,24</sup> To date, studies exploring the diagnostic utility of communication during cognitive assessments in discriminating between FMD and dementia have not been reviewed.

### METHOD

This systematic review sought to undertake a narrative, clinically focused synthesis of existing evidence of features of communication, which could potentially discriminate between neurodegenerative and functional memory disorders. Narrative

reviews are recognised as tools for drawing together evidence where the review question necessitates the inclusion of a variety of research designs, including qualitative and quantitative data.<sup>25</sup>

The review questions were:

1. What is the current evidence for features of communication, interaction, or clinically observable signs that can help differentiate dementia from functional memory disorders in a memory clinic assessment?
2. What are the features of communication in dementia that could represent future points of comparison with functional disorders of memory?

A computer-assisted systematic literature search was undertaken to find published studies comparing observable signs and features of communication in FMD and dementia. Databases included: Books@Ovid, CINAHL, Embase, MEDLINE, London Health Libraries, PsycINFO, PubMed, Google Scholar, and the Cochrane Library. The initial search had a date range up to 2017. The terms for the functional memory disorder searches were developed through consensus with co-authors, and based on previous reviews.<sup>1,16,17,26,27</sup> These terms were also informed by a recent survey that explored how UK doctors describe functional memory symptoms.<sup>28</sup> Forward and back citation searching of any included articles was performed, as well as direct inquiry with specialists in the area.

Only a few studies directly comparing communication in these two diagnoses were found, so further searches were undertaken exploring communication in dementia in order to identify future areas for comparison.

Relevant studies from a previous review of healthcare interactions in dementia were selected.<sup>29</sup> Studies considered applicable were those focusing on the assessment stage of memory clinic consultations. Furthermore, an updated search was conducted with the same search terms (limits 2014–2017) in order to identify any relevant papers published since the initial review. The search terms are described in Box 1.<sup>29</sup>

Included studies observed communication in patients attending a memory clinic or where cognition was assessed or discussed. Qualitative and easily observable aspects of behaviour during neuropsychological testing were included. Excluded studies were those focusing on population prevalence of subjective cognitive complaints, as these had been recently reviewed.<sup>30</sup> Also excluded were studies comparing quantitative results

## Box 1. Search terms

### Functional memory disorders (non-neurodegenerative) search (up to and including 2017)

Terms (Combined by OR):  
Subjective cognitive decline  
Subjective cognitive complaints  
Subjective memory complaints  
Subjective forgetfulness  
Functional memory disorder  
Functional memory symptoms  
Functional cognitive disorder  
Cogniform disorder  
Cogniform condition  
Fear of dementia  
Dementia worry  
Worried well

AND:  
Assess\*  
Diagnos\*  
Interact\*  
Communica\*  
Talk\*  
Discour\*  
Interview\*  
Dialog\*  
Conversation

### Dementia search (2014–2017): search terms from existing review of healthcare interactions in dementia<sup>29</sup>

Terms (Combined by OR):  
Alzheimer\*  
Dement\*  
Cognitive impair\*  
Memory  
Neurocogni\*  
Neuro-cogni\*  
Cogni\* disor\*  
Cogni\* func\*

AND:  
Assess\*  
Diagnos\*  
Interact\*  
Communica\*  
Talk\*  
Discour\*  
Interview\*  
Dialog\*  
Conversation

and patterns of neuropsychological testing as this is not part of initial memory clinic assessment. Studies requiring computerised analysis, or those including interactions with interpreters, were excluded. Communication in patients with formally diagnosed major mental illnesses were also excluded. Box 2 shows details of the exclusion criteria.

The main author performed all searches and screened titles and abstracts against criteria. For any papers where there was ambiguity, the full text was sourced. If the main author was unsure whether particular studies met criteria, the full text of this paper was shared between the authors and a consensus agreement was reached.

## Box 2. Exclusion criteria

- Studies focusing on community or population prevalence or longitudinal outcomes of subjective cognitive complaints will be excluded as these have already been reviewed.<sup>30</sup>
- Studies comparing neuropsychological patterns and comorbidities in patients presenting with subjective and objective cognitive impairment in a memory clinic population will also be excluded as these are the subject of a recent meta-analysis.<sup>2</sup>
- Studies that report solely on the results of specialist neuropsychological testing.
- Studies not published in English.
- Studies examining the cognitive assessment where interpreters are used.
- Studies that require computerised analysis of speech to differentiate between diagnoses.
- Studies examining the assessment of persons with formally diagnosed major mental illness such as depression, psychosis, or drug- and alcohol-related disorders. This population are excluded as those meeting the criteria for major disorders should be diagnosable based on clinical history, mental state examination, and existing diagnostic criteria.

A total of 17 931 papers were identified, and all titles assessed: 1209 abstracts were then screened; 92 full-text papers were identified for further assessment; and 10 papers from the combined searches were identified, which were then added to six papers identified from the previous systematic review<sup>29</sup> to reach 16 final papers for review.

Quality was assessed by the lead author using the Quality Assessment Tool for Studies with Diverse Designs (QATSDD).<sup>31</sup> Data extraction, data analysis, and interpretation were conducted based on the protocol for narrative synthesis<sup>25</sup> and completed by the lead author. The analysis employed techniques such as grouping, clustering, and thematic analysis.<sup>25</sup> The synthesis was then developed through a process of 'ideas webbing', 'reciprocal translation', and 'conceptual triangulation' to generate themes that explained or interpreted findings across studies.<sup>25</sup>

## RESULTS

Search results are shown in a PRISMA diagram (Figure 1). The characteristics of the 16 included studies, including citation, sample, and quality assessment score, can be found in Table 1. Characteristics of participants and further details of the studies are shown in Appendix 1. Following the narrative synthesis processes described above two overarching themes emerged.

### Narrative synthesis: Theme 1 — Clues to incapacity and cognitive impairment

Interactional features suggestive of cognitive impairment were further divided into subthemes.

*Presence of an accompanying person (n = 6).* Most memory clinics request that patients bring an accompanying person to their assessment.<sup>38,39,41</sup> Nevertheless, a number of patients attend alone. Over cohorts of consecutive referrals, Larner and colleagues assessed 'attending alone' (AA) as a diagnostic test of preserved cognitive function.<sup>38,39,41</sup> The sensitivity of AA to identify cognitively normal individuals ranged from 0.93–1.0,<sup>38,39,41</sup> but specificity was low: 0.35–0.41.<sup>38,39,41</sup>

A small study primarily focused on interaction reported that 90.9% of patients with either early dementia or amnesic MCI (neurodegenerative disorders [ND]) were accompanied, whereas 60% of patients with FMD attended alone ( $P < 0.0008$ ).<sup>24</sup>

Another study observed that all patients who later received a dementia diagnosis were accompanied, compared with only 5 out of 16 with FMD.<sup>23</sup> Saunders *et al*

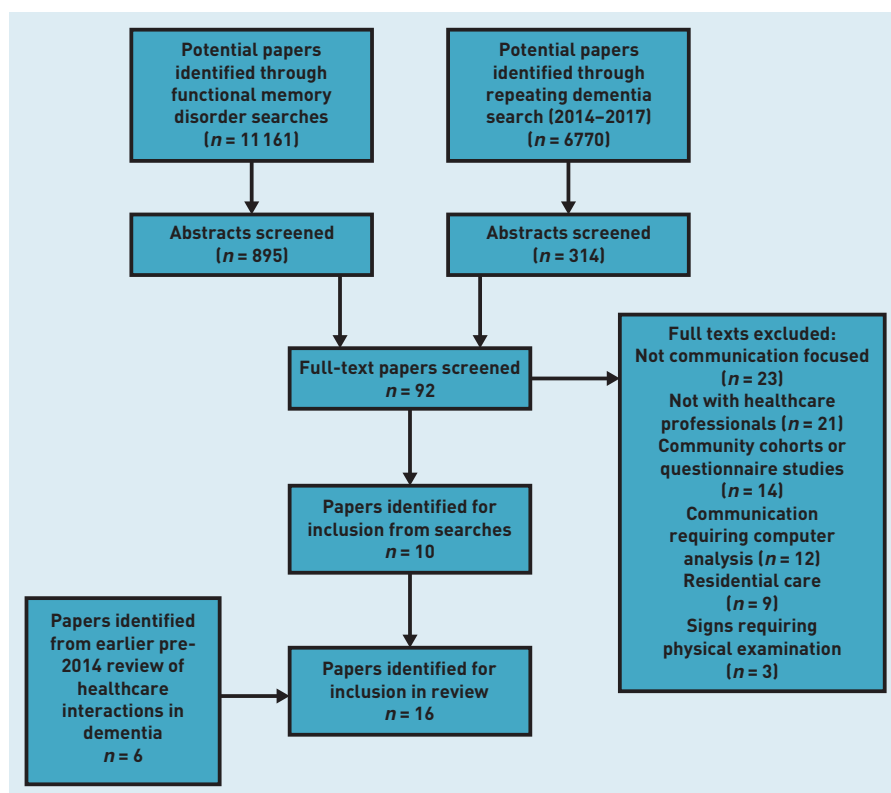


Figure 1. PRISMA flow diagram of search lines.

noted that in patients attending a general outpatient neurology clinic 96.7% with cognitive impairment attended with family or a carer, whereas only 34.4% of cognitively normal persons did.<sup>45</sup>

*Patient's ability to answer and participate in consultation (n = 3).* Two papers studied patients' ability to recall and describe memory concerns.<sup>23,24</sup> One compared patients with dementia to FMD.<sup>23</sup> Another included patients defined as having ND (described above).<sup>24</sup> Both noted that patients with dementia or ND had difficulty answering, sometimes giving no response or saying 'um' or 'er'.<sup>23,24</sup> Occasionally, persons with ND would provide a generic answer, for example, 'It happens all the time'; or sought assistance from their companion.<sup>24</sup> Patients with dementia were often unable to provide autobiographical information.<sup>23</sup>

Patients with ND or dementia were unable to elaborate beyond the literal parameters of questions asked, took a long time to respond, and gave brief, undetailed answers even when prompted.<sup>23,24</sup>

In a quantitative analysis of 11 patients with ND there were 45 responses indicating 'I don't know' (29 verbal and 16 embodied in the form of head turning towards a companion). Conversely, patients with FMD provided quick, relevant, detailed, and even sometimes unsolicited accounts of memory

problems.<sup>23,24</sup> A significant difference was found between the number of verbal 'I don't know' responses between the ND and FMD groups.<sup>24</sup>

One study utilised the Lille Communication Test in 58 patients with dementia.<sup>36</sup> They found verbal and non-verbal communication scores correlated with the Dementia Rating Scale ( $P < 0.001$ ), suggesting ability to participate in conversation may have a relationship to dementia severity.<sup>42</sup>

*Head turning sign (n = 5).* A number of studies<sup>23,24,32,33,40</sup> assessed the head turning sign (HTS) in which patients turn towards their caregivers in the face of difficulties or inability to answer a question during cognitive testing.<sup>37</sup> Fukui and colleagues found the independent contributors to head turning frequency were Alzheimer's-related diseases (dementia or amnesic MCI), female sex, and increasing dementia severity.<sup>32</sup>

Larner observed HTS in response to requests for examples of memory 'failures' during history taking.<sup>40</sup> In later studies HTS proved specific (0.98, 95% CI = 0.95 to 1.0) but not sensitive (0.60, 95% CI = 0.49 to 0.70) for the presence of neurodegenerative disorder. Larner suggests HTS is an easily observed clinical sign that has a high positive predictive value for progressive cognitive impairment.<sup>33</sup> Although not meeting criteria for a screening observation due to low sensitivity, presence of HTS does suggest further investigation is required.<sup>33</sup>

In the two small conversation analysis studies, no statistically significant difference in HTS between cognitively impaired and normal individuals was found.<sup>23,24</sup> However, other verbal and non-verbal requests for assistance were observed.<sup>23,24</sup> Responses from people with dementia were often delayed and lacking detail, which may cause their companion to step in.<sup>23</sup>

*Companion involvement (n = 6).* In profiling the triadic (three-party) interaction in geriatric appointments, Hasselkus identified that consultations with persons with cognitive impairment had a disproportionate number of prolonged dyadic (two-party) interactions between companion and doctor.<sup>34</sup> It was noted that sometimes the physician shifts the conversation; sometimes the caregiver 'interrupts', answering a question initially directed at the patient.<sup>23,34</sup>

In a later paper Hasselkus noted patients with cognitive impairment often 'allow' companions to explain their impairments.<sup>35</sup> In cases of 'marked impairment', evidence for incapacity came from the patient's

**Table 1. Summary of studies and quality assessment scores**

Study	Measurements	Type of study	Gold standard or diagnostic comparison	Focus and analysis	QA score, %
Elsey <i>et al</i> , 2015 <sup>24</sup>	Video and audio	Observation, naturalistic, cohort	Clinical consensus: MDT discussion based on neurologist assessment, history, ACE III, MRI	Conversation analysis of communication to develop profiles to differentiate dementia and FMD. Verbal 'I don't know' responses and head turning subject to Fisher's exact test. Attending alone subject to $\chi^2$ test.	Mixed methods: 79.2
Fukui <i>et al</i> , 2011 <sup>32</sup>	Observation	Observation, naturalistic, cohort of consecutive outpatients	Diagnosis based on established diagnostic criteria: AD: NINCDS-ADRDA criteria aMCI: Petersen's criteria DLB: DLB Consortium criteria in 2005 VaD: NINDS-AIREN criteria	HTS during cognitive testing with Hasegawa Dementia Rating Scale, with caregiver seated 1 m behind patient. HTS positive if patient turned back to caregivers and asked for help implicitly or explicitly. HTS also scored in terms of severity. Comparison between subtypes of dementia	Quantitative: 71.4
Ghadri-Sani and Lerner, 2013 <sup>33</sup>	Observation	Observation, naturalistic, cohort of consecutive outpatients	Cognitive impairment (either dementia or mild cognitive impairment [MCI]) was defined according to clinical diagnostic criteria (respectively DSM-IV-TR and modified Petersen)	HTS during history taking as a sign of cognitive impairment. HTS judged to be present if patient turned their head away from interlocutor and towards accompanying person when first invited to describe symptoms (for example, 'Tell me about the problems you're having with your memory') HTS later in consultation (that is, during cognitive testing) was not considered	Quantitative: 57.4
Hasselkus, 1992 <sup>34</sup>	Audio	Observational, naturalistic, selection of patients likely to be attending with companions	Diagnostic process not described	Qualitative analysis of geriatric outpatient patient, doctor and caregiver interactions, quantitative analysis according to level of impairment	Mixed methods: 66.7
Hasselkus, 1994 <sup>35</sup>	Audio	Observational, naturalistic, selection of patients likely to be attending with companions	Diagnostic process not described	Discourse analysis for self-care behaviours as a marker of adult status in the older patient in geriatric outpatients. Data then categorised into degree of impairment	Qualitative: 61.9
Hesson and Pichler, 2016 <sup>36</sup>	Audio	Verilogue corpus, cohort of patients undergoing testing with MMSE	Clinician rating of mild, moderate, or severe impairment. Individual MMSE scores not reported	Conversation analysis with specific focus on 'I don't know' or other variations in speech during MMSE administration, analysis of surrounding talk, context, and meaning in mild, moderate, and severe cognitive impairment	Mixed methods: 66.7
Jones <i>et al</i> , 2016 <sup>23</sup>	Video and audio	Observational, naturalistic, cohort study	Gold standard diagnosis made by consultant neurologist, based on assessment, ACE R, detailed neuropsychological battery, and MRI	Conversation analysis with focus on history-taking part of assessment to identify interactional features that discriminate between neurodegenerative disorders and non-neurodegenerative disorders	Qualitative: 81.0
Karnieli-Miller <i>et al</i> , 2012 <sup>37</sup>	Video and audio	Observational, naturalistic, cohort study	Diagnostic process not described.	Discourse analysis focusing on triadic and dyadic exchanges during the process of memory assessment and diagnosis delivery	Mixed methods: 72.9
Lerner, 2005 <sup>38</sup>	Observation	Observational, naturalistic, cohort/audit study	Dementia diagnosed based on DSM-IV criteria, established by clinical interview, neuropsychological assessment, and neuroimaging. Subtype of dementia was also established. Patients had minimum follow-up of 6 months	All patients referred are sent a letter asking them to bring a relative, friend, or carer from whom additional information may be obtained. 95% CIs and Wilson methods of specificity and sensitivity used to calculate attending alone as a 'diagnostic test' for dementia	Quantitative: 54.8

... continued

**Table 1 continued. Summary of studies and quality assessment scores**

Larner, 2009 <sup>39</sup>	Observation	Observational, audit of consecutive referrals	Dementia was diagnosed by DSM-IV-TR criteria based on clinical interview, informant interview where possible, neuropsychological testing, and structural brain imaging (CT ± MRI), as in previous cohorts reported from this clinic	The attending alone sign was considered as a test for dementia. The STARD checklist for reporting diagnostic accuracy studies was observed and basic principles of evidence-based diagnosis were applied to calculate test sensitivity, specificity, positive and negative predictive values (PPV, NPV), diagnostic odds ratio (DOR), and positive and negative likelihood ratios (LR+, LR-) with 95% CI. Comparison made with previous cohorts from same clinic	Quantitative: 71.4
Larner, 2012 <sup>40</sup>	Observation	Observational, audit of consecutive referrals	The presence of cognitive impairment (either dementia or mild cognitive impairment (MCI)) was defined according to clinical diagnostic criteria (respectively DSM-IV-TR and modified Petersen)	HTS during history taking as a sign of cognitive impairment. HTS judged to be present if patient turned their head away from interlocutor and towards accompanying person when first invited to describe symptoms (for example, <i>'Tell me about the problems you're having with your memory'</i> ). HTS later in consultation (that is, during cognitive testing) was not considered	Quantitative: 66.7
Larner, 2014 <sup>41</sup>	Observation	Observational, audit of consecutive referrals	Assessment by semi-structured clinical interview, cognitive screening instruments, and structural neuroimaging, supplemented as necessary by additional investigations (for example, formal neuropsychological assessment, EEG, and neurogenetic testing). Standard diagnostic criteria for dementia (DSM-IV), dementia subtypes, and MCI were used	Analysis of attending alone (AA) sign used standard principles of evidence-based diagnosis and observed the STARD checklist for reporting diagnostic accuracy studies	Quantitative: 73.8
Rosseaux <i>et al</i> , 2010 <sup>42</sup>	Video and audio	Case-control study, observational	All patients were assessed with a comprehensive clinical examination by senior staff neurologist, psychiatrist, neuropsychologist, speech therapist, and nurse and imaging with CT or MRI. A consensual diagnosis was given for each patient according to existing diagnostic criteria	Lille Communication Test (LCT) comparison of controls and subtypes of dementia. LCT addresses three domains: participation in communication, verbal communication, and non-verbal communication	Quantitative: 73.8
Saunders, 1998 <sup>43</sup>	Audio	Observational, naturalistic, cohort	Memory clinic consists of MDT including geriatrician, psychologist, neurologist, and neuropsychologist. Actual diagnostic process not described but history taking and neuropsychological testing formed part of assessment	Neuropsychological assessment, qualitative, quantitative, and discourse analysis with particular focus on humour exchanges	Mixed: 77.1
Saunders, 1998 <sup>44</sup>	Audio	Observational, naturalistic, cohort	Memory clinic consists of MDT including geriatrician, psychologist, neurologist, and neuropsychologist. Actual diagnostic process not but history taking and neuropsychological testing formed part of assessment	Neuropsychological assessment, qualitative, quantitative, and sociolinguistic analysis with focus on accounts and ways people with dementia justify or explain their memory problems	Mixed: 90.5

... continued

own discourse: incoherence, non-responsiveness, or frequent need for the doctor to repeat questions.<sup>35</sup> Sometimes companions would overtly communicate that the patient was not going to contribute,

for example, *'She [the patient] is not going to understand'*, or correct, add to, prompt, or paraphrase the patient.<sup>35</sup>

Conversely, in consultations with patients without cognitive impairment,

**Table 1 continued. Summary of studies and quality assessment scores**

Saunders <i>et al</i> , 2011 <sup>45</sup>	Audio	Observational, naturalistic, cohort	Patients with cognitive impairment were those diagnosed by the neurologist or referring doctor with possible Alzheimer's disease, probable Alzheimer's disease, or mild cognitive impairment	Neuropsychological assessment with qualitative and quantitative analysis of health, memory accounts and humour and comparison of these in CI and non-CI groups	Mixed: 78.6
---	-------	--	---	--	-------------

*ACE III* = Addenbrooke's Cognitive Exam III. *ACE R* = Addenbrooke's Cognitive Examination Revised. *AD* = alzheimer's dementia. *aMCI* = amnesic mild cognitive impairment. *DLB* = dementia with Lewy bodies. *DSM-IV* = Diagnostic and Statistical Manual of Mental Disorders. *DSM-IV-TR* = Diagnostic and Statistical Manual of Mental Disorders (Text Revision). *EEG* = electroencephalogram. *FMD* = functional memory disorder. *HTS* = head turning sign. *MCI* = mild cognitive impairment. *MDT* = multidisciplinary team. *MMSE* = Mini-Mental State Examination. *MRI* = magnetic resonance imaging. *NINCDS-ADRDA Criteria* = National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association Criteria. *NINDS-AIREN* = National Institute of Neurological Disorders and Stroke (NINDS) and the Association Internationale pour la Recherche et l'Enseignement en Neurosciences (AIREN). *QA* = quality assessment. *STARD* = Standards for Reporting of Diagnostic Accuracy Studies. *VaD* = vascular dementia.

patients demonstrated self-responsibility and autonomy with some control over the appointment agenda.<sup>35</sup> However, the results are limited by the fact that patients with cognitive impairment and sensory deficits are analysed collectively.<sup>35</sup>

In outpatient neurology appointments companions contributed a greater number of comments in consultations where patients had cognitive impairment.<sup>45</sup> Karnieli-Miller and colleagues graphically represented the shifts in a triadic memory clinic interaction over the course of an initial assessment.<sup>37</sup> They noted too that the companion tended to interject when the patient gave 'incorrect' information or when the physician directed the conversation towards the companion.<sup>37</sup>

Patients with FMD were less likely to attend with companions.<sup>23,24,39</sup> When they did attend with companions they still answered questions on their own, and directly requested companion confirmation.<sup>23</sup>

*Anosognosia and who is more worried? (n = 3).* Anosognosia refers to loss of insight or awareness of impairments, which commonly occurs in dementia.<sup>46</sup> When asked who was more worried about the memory impairment, patients with FMD would express that they were the most concerned.<sup>24</sup> In four out of five consultations with patients with early dementia the patient would often not respond at all, and the companion expressed more concern.<sup>23</sup>

Saunders also noted that patients with cognitive impairment frequently made attempts to normalise, minimise, or account for their memory impairments, for example, '[I'm] just like my grandma. I can't remember anything, but who could?'<sup>44</sup>

*Assessment of cognition during natural interaction (n = 2).* One study looked at responses to compound questions, such

as, 'Could you tell me a little about your background? Where're you from and where did you go to school?'<sup>24</sup> Patients with ND or dementia responded to a single component of such questions, then required repetition or simplification of the question.<sup>24</sup> Conversely, those with FMD were able to address all parts of the question in a prolonged and detailed response.<sup>24</sup>

Jones and colleagues noted the effort and compensation that patients with FMD demonstrate in responding to compound questions. When asked a two-part question they were able to respond to both components in detail.<sup>23</sup> Any repetitions were acknowledged with phrases, for example, 'As I said earlier', which the authors argue demonstrate awareness of repetition, and preserved working memory.<sup>23</sup>

Patients with dementia, however, can be repetitive and do not preface their repetitions with acknowledgements.<sup>23</sup> Doctors are generally advised against the use of compound questions. However, the authors of the above studies argue selected use could reflect a method of assessing working memory within natural interaction, reducing the later need for more formal and confrontational testing.<sup>23,24</sup>

## **Narrative synthesis: Theme 2 — Strategies and accounts for loss of abilities in persons with dementia**

*Face-saving behaviour and accounts (n = 5).* 'Saving face' is a sociological construct often applied in analysing how persons with dementia manage situations where they are unable to provide an appropriate response.<sup>47</sup> Many studies focused on what is probably the most 'face-threatening' component of a memory clinic assessment: formal cognitive testing. Studies examined compensatory strategies including humour,<sup>43</sup> accounts and metaphor,<sup>44,45</sup> and the function and meaning

of particular types of 'I don't know' (IDK) responses.<sup>47</sup>

Saunders profiled humour during neuropsychological assessments, finding cognitively impaired patients initiated 3.7% of the total humour whereas clinicians initiated only 1.4%.<sup>43</sup> Patients with dementia tended to use more dominant and self-denigrating humour.<sup>43</sup> An example of dominant humour is the patient's statement to the psychologist *'You're out of your mind'*, when asked to copy a line drawing, where the author argues that the implicit communication is that the patient is unable to perform the task.<sup>43</sup>

Saunders also describes how patients excuse their difficulties in the form of cognitive, experiential, comparative, and emotional accounts and explanations of ability and attention.<sup>44</sup> Patients with cognitive impairment used 'object metaphors' such as images of tools or machinery (for example, *'My brain is off key'*) as the cause of their inability to recall the answer.<sup>44</sup> In accounting for the experience of memory loss, patients would sometimes assign blame to lack of knowledge, for example, when unable to name a paint palette the patient says, *'I don't know that because I worked with cars.'*<sup>44</sup> Patients with cognitive impairment would also use attention or ability when unable to complete tasks, for example, *'I didn't pay that much attention.'*<sup>44</sup> Saunders argues that metaphors serve to maintain a 'competent identity' and create distance from a 'forgetful identity'.<sup>44</sup>

Saunders and colleagues later found that justifications for memory lapses were more likely to happen in consultations involving persons with cognitive impairment and most occurred during the testing stage of the examination.<sup>45</sup>

Hesson and Pichler specifically explored the function of 'I don't know' (IDK) responses during MMSE (Mini-Mental State Examination) administration.<sup>36</sup> Responses that the authors describe as 'knowledge reinforcing tokens', such as, *'My brain is going to hell. I can't remember everything'*, appear very similar to Saunders's accounts and metaphors.<sup>36,44</sup>

*Qualitative aspects of cognitive testing (n=1).* Closely related to face saving and accounts are considerations of the qualitative aspects of cognitive testing. Many clinicians recognise the clinical value of qualitative observations during formal cognitive screening including the patient's approach and effort.<sup>48</sup>

Hesson and Pichler examined all IDK responses during cognitive testing to explore what this phrase communicates beyond a

lack of knowledge.<sup>36</sup> They interpreted that immediate IDK responses, or those following a pause, signified lack of knowledge.<sup>36</sup> 'Face-saving' IDK (described above) and 'knowledge reinforcing tokens' were perceived to demonstrate inability to answer due to lack of knowledge. 'Turn final' IDK tokens, such as, 'Chicago, cadillac, *I dunno*' (when asked to recall three objects), were also interpreted as a desire to terminate the sequence due to trouble remembering.<sup>36</sup>

'Non-lack of knowledge IDKs' included hedging responses, such as 'Oh *I don't know*, but I guess we're still in \_\_\_ city', and bridging responses, which were felt to buy time.<sup>36</sup> Resistance responses were also included under the 'non-lack of knowledge IDK' responses as though the authors reported the surrounding talk as whole communicated inability to answer questions; the '*I don't know*' itself did not communicate this.<sup>36</sup> From a practical point of view such a division may not demonstrate clinical utility, although the authors found that severity of cognitive impairment was statistically predictive of the use of IDK lack of knowledge phrases.<sup>47</sup> However, the grading of cognitive impairment was based solely on clinician report rather than objective measures, so the application of statistical measures may not be appropriate.<sup>36</sup>

Taken as a cohort the studies exploring qualitative aspects of cognitive testing generate evidence that the talk occurring around formal testing, and the approaches, responses, and accounts that patients with dementia provide can be illuminating. However, this area of inquiry is limited by the lack of comparison to cognitively normal individuals.

### **Synthesis of evidence within clinical framework of memory assessment**

As described, the final aspect of the synthesis draws together existing evidence in the order of a naturalistic memory clinic from start to finish. A summary of the features, levels of evidence, and gaps in current knowledge are described in Table 2.

## **DISCUSSION**

### **Summary**

This review collated and synthesised evidence from 16 studies with heterogeneous methodologies using a narrative and clinical framework. The review found relatively firm conclusions in specific populations, and promising areas for future consideration. In relatively small and select samples there was robust and replicated evidence for the sensitivity of the HTS in identifying cognitive impairment, and for the AA sign in identifying

**Table 2. Summary of observable features over the course of a memory clinic assessment**

Observations during assessment	Functional disorders of memory	Dementia or neurodegenerative condition	Level of evidence
Attendance at the memory clinic	More likely to attend alone (AA sign). (AA sign sensitive but not specific for 'cognitive normality')	Likely to attend with companion	Robust and repeated studies in single neurology-led memory clinic, more evidence needed in other sites and for older adults
Ability to answer questions about memory impairment	Unproblematic, detailed responses of 'memory failures'	May not be able to answer, or if does answer likely to give generic/stock-phrase responses, such as, <i>'It happens all the time'</i>	Two small studies, replication needed in larger population
Ability to answer questions about biographical information	Detailed responses, sometimes more information than is required, even if closed questions are asked	May not be able to recall personal information, or will give account for why <i>'not able to recall offhand'</i>	Two small studies, replication needed in larger population
Ability to answer compound/multi-part questions	Able to address all parts of multi-part question, with generous detail	Unable to respond to multi-part question. Likely to require prompting to answer second or third parts	Two small studies, replication needed in larger population
Time taken to answer questions	Answers quickly and unproblematically	Responses may take so long that companion may step in to answer question	Two small studies, replication needed in larger population
Working memory in interaction	Aware of repetition and will preface these with <i>'As I said earlier'</i>	Unaware of repetition or 'second time tellings' or other's responses to them. Will not preface repetition with acknowledgement of this	Two small studies, replication needed in larger population
Head turn during history taking	No evidence of head turning to companion	May turn head to companion or recruit assistance from companion in other way (see below). (Head turning sign specific but not sensitive for cognitive impairment)	Robust and repeated studies in single neurology-led memory clinic, more evidence needed in other sites and for older adults
Interaction with companion (if present)	Likely to directly request companion (if present) to confirm what they have already said	May not be able to answer and companion will step in. Or may directly request companion assistance verbally. May give incorrect or very limited information that companion will add to or correct	Two small studies, and discourse and conversation analysis studies in geriatric outpatient clinics. Replication needed in larger population with robust measures of cognitive impairment compared with behaviour
Companion turns at talk and participation in assessment	No direct comparison studies, but likely to be minimal companion contributions	Companion likely to talk more if person has cognitive impairment	Lack of comparison studies with those who have functional memory disorders, or studies of persons with dementia in memory clinic assessments. Further studies needed
Who is more worried about the cognitive impairment?	Patient more worried about cognitive problems	Companion more worried about cognitive problems. Patient may not be aware of any issues	Limited directly observed evidence for particular behaviour in functional memory disorder but longstanding, robust evidence of anosognosia seen in dementia
Humour, accounts, and face saving during history taking	Not studied specifically in formally functional memory disorder but cognitively normal individuals do not provide explanations or accounts for cognitive difficulties	Some very limited evidence, but more analysis needed	Multiple studies of varying quality. Further robust studies needed comparing degree of cognitive impairment and performance on unbiased measures with qualitative observation of behaviour
Head turn during cognitive testing	Not studied	More likely to turn head in Alzheimer's disease, and with more severe dementia	One study with no comparison with persons without cognitive impairment, or with FMD. Direct comparisons needed
Humour, accounts, and face saving during formal cognitive testing	Not studied	Likely to provide various accounts and use 'face-saving' strategies including humour when confronted with difficulties in cognitive testing	Multiple studies of varying quality. Further robust studies comparing degree of cognitive impairment and performance on unbiased measures with qualitative observation of behaviour
'I don't know' responses during cognitive testing	Not studied	'I don't know' responses signifying lack of knowledge likely to be more common as cognitive impairment is more severe	One study, with limitations in the practical applications of findings. Further, more clinically applicable studies would be helpful

cognitive 'normality'. Other less replicated and more difficult to operationalise signs of interaction and communication could, collectively, provide the foundations of conversational profiles to differentiate between dementia and functional disorders of memory.

### Strengths and limitations

A strength of this review is the comprehensive search strategy and ability to draw together findings in a clinically relevant framework. Limitations include the use of a single author to extract and assess the quality of data. The author attempted to minimise the risk of study selection and extraction bias by discussion with co-authors.

Both patients with neurodegenerative conditions and functional memory disorders are heterogeneous groups. Patients with functional memory disorders remain poorly understood. Additionally, the heterogeneity of terms clinicians use to describe similar but not necessarily interchangeable concepts is also problematic in drawing comparisons.<sup>28</sup>

In addition, the heterogeneity of use of formal cognitive assessments or rating scales and variations in how diagnoses were reached mean results must be analysed with caution. The vagueness in reporting 'cognitive impairment' casts potential doubt on the rigour of clinical diagnosis.

The cross-sectional nature of the studies included, and lack of biomarkers or novel neuroimaging, are also limitations. Cross-sectional methodologies cannot provide iron-clad evidence that cognitively normal individuals who are presenting to a memory

clinic now will not develop dementia in the future. It should also be noted that the participants in the study were attending secondary care services and may not be directly representative of all patients seen in general practice with memory concerns.

### Comparison with existing literature

The concept of cognitive examination as a quantitative and qualitative exercise has been reported during focus groups with clinicians working in memory clinics.<sup>48</sup> This review adds weight to these reports and highlights that observations of the patient's approach, comments, and interaction during cognitive testing are valuable in diagnosis. The use of humour, 'face-saving' explanations and accounts for incorrect answers, and even the meaning of IDK responses can be informative. Historically IDK responses have been suggested as a sign of depressive pseudo-dementia.<sup>49</sup> However, this review highlights that such responses reflect nuanced and subtle communications, and further studies could be illuminating.

The use of conversation analytic (CA) interventions is well established in first seizure clinics<sup>20,50</sup> and can be taught relatively easily. A 1-day training course resulted in junior neurologists allowing more time before first interrupting patients during assessments and increased ability to differentiate between epileptic and non-epileptic event.<sup>20</sup> A CA-informed approach to cognitive assessments could facilitate both diagnostic clarity and formulation for patients presenting to memory clinics who do not have dementia (see teaching website link in Box 3 for video tutorials demonstrating how

### Box 3. What a busy clinician can look out for in patients presenting with cognitive problems<sup>a</sup>

#### Signs suggestive of functional disorder of memory

- More likely to attend clinic alone
- Worried about their memory
- Providing clear personal history and explicit, detailed examples of memory failures
- Demonstrates working memory within the interaction (refer to things they have said earlier)
- Able to answer multi-part questions

#### Signs suggestive of neurodegenerative disorder

- Attending with companion, and companion is more worried about memory than patient
- May turn head towards companion when unable to answer
- Unable to provide personal history, from recent past, such as, *detailed* information about what they did last weekend, or information on news items
- Provides examples of memory failures as '*all of the time*' or everyday but cannot provide specific examples
- Evidence of short-term memory problems within consultation (repetition)
- Struggles with multi-part questions
- May use humour or try to 'save face' during cognitive testing

<sup>a</sup>For training modules and examples of real-life cases showing the signs described in this study, visit the University of Sheffield website on conversation analysis in dementia and functional memory disorder at <http://sitran.blymi.com>.

to use interaction to aid diagnosis in memory clinics). Such methods would be aligned with the now favoured method where MUS are approached as positive diagnosis rather than one of exclusion.<sup>51</sup>

### **Implications for research and practice**

In routine memory clinic consultations whether the patient attends with a companion, how they interact, account for difficulties, give basic autobiographical details, demonstrate working memory, and approach formal cognitive testing are useful in building a diagnostic picture. No one sign is likely to prove diagnostic, nor would observation replace clinical examination or blood and imaging investigations where appropriate. However, equipping clinicians with an increased repertoire of observational tools could aid both those working in and referring to memory clinics. If qualitative aspects of routine assessments can be interpreted alongside brief screening tools such as the General Practitioner Assessment of Cognition,<sup>52</sup> GPs may be more able to confidently decide who is appropriate to refer for further assessment. For example, individuals with pre-morbidly high intelligence may perform well on conventional brief cognitive screening but the use of CA or interaction analysis as described in this article may help validate a gut feeling that something is wrong and result in referral for further testing. Observing responses to occasional multi-

part questions, and the interaction between patient and relative, could represent less confrontational ways for GPs to assess cognition in patients who might refuse to participate in formal cognitive testing. Conversely, identifying signs suggestive of functional disorders of memory might prompt GPs to explore the meaning of the cognitive concerns and provide reassurance or consider watchful waiting. This would be in keeping with recognised approaches to MUS. With the increased numbers of patients attending both primary and secondary care with cognitive concerns but no neurodegenerative disorder it is vital that clinicians develop evidence-based skills that empower them to avoid unnecessary neuropsychological testing and imaging investigations.

Future studies should explore these observations in larger populations and in primary care settings, for example, replicating HTS and AA in older groups and dementia subtypes. Direct comparison of qualitative and quantitative findings of cognitive testing will be helpful. Additionally, developing robust definitions of subjective memory complaints and functional memory disorders will allow more definite comparison between and within groups. The use of follow-up studies, biomarkers, and novel neuroimaging techniques represent opportunities for clinical signs to be compared with quantitative measures to add weight to existing observations.

---

### **Funding**

Cate Bailey was a National Institute for Health Research (NIHR) Academic Clinical Fellow (ref. 2349) at the time of conducting the review. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR, or the Department of Health.

### **Ethical approval**

None given.

### **Provenance**

Freely submitted; externally peer reviewed.

### **Competing interests**

The authors have declared no competing interests.

### **Discuss this article**

Contribute and read comments about this article: [bjgp.org/letters](https://bjgp.org/letters)

## REFERENCES

- Blackburn DJ, Wakefield S, Shanks MF, *et al*. Memory difficulties are not always a sign of incipient dementia: a review of the possible causes of loss of memory efficiency. *Br Med Bull* 2014; **112(1)**: 71–81.
- Burmester B, Leatham J, Merrick P. Assessing subjective memory complaints: a comparison of spontaneous reports and structured questionnaire methods. *Int Psychogeriatr* 2015; **27(1)**: 61–77.
- Silva D, Guerreiro M, Faria C, *et al*. Significance of subjective memory complaints in the clinical setting. *J Geriatr Psychiatry Neurol* 2014; **27(4)**: 259–265.
- Department of Health. *Living well with dementia: a National Dementia Strategy*. 2009. <https://www.gov.uk/government/publications/living-well-with-dementia-a-national-dementia-strategy> (accessed 3 Jan 2018).
- Department of Health. *Prime Minister's challenge on dementia 2020*. London: <https://www.gov.uk/government/publications/prime-ministers-challenge-on-dementia-2020> (accessed 3 Jan 2018).
- Hodge S, Hailey S. *Second English national memory clinics audit report*. London: Department of Health, Royal College of Psychiatrists, 2015.
- Larner A. Impact of the National Dementia Strategy in a neurology-led memory clinic: 5 year data. *Clin Med (Lond)* 2014; **14(2)**: 216.
- Creavin S, Noel-Storr A, Richard E, *et al*. Clinical judgement by primary care physicians for the diagnosis of all-cause dementia or cognitive impairment in symptomatic people [protocol]. *Cochrane Database Syst Rev* 2017; **(2)**: CD012558.
- Mitchell AJ, Meader N, Pentzek M. Clinical recognition of dementia and cognitive impairment in primary care: a meta-analysis of physician accuracy. *Acta Psychiatr Scand* 2011; **124(3)**: 165–183.
- Elstein AS. Thinking about diagnostic thinking: a 30-year perspective. *Adv Health Sci Educ Theory Pract* 2009; **14(Suppl 1)**: 7–18.
- Høgh P, Waldemar G, Knudsen GM, *et al*. A multidisciplinary memory clinic in a neurological setting: diagnostic evaluation of 400 consecutive patients. *Eur J Neurol* 1999; **6(3)**: 279–288.
- Schmidtke K, Metternich B. Validation of two inventories for the diagnosis and monitoring of functional memory disorder. *J Psychosom Res* 2009; **67(3)**: 245–251.
- Schmidtke K, Pohlmann S, Metternich B. The syndrome of functional memory disorder: definition, etiology, and natural course. *Am J Geriatr Psychiatry* 2008; **16(12)**: 981–988.
- Rosendal M, Carlsen A, Rask M, Moth G. Symptoms as the main problem in primary care: a cross-sectional study of frequency and characteristics. *Scand J Prim Health Care* 2015; **2015(33)**: 91–99.
- Burton C, McGorm K, Richardson G, *et al*. Healthcare costs incurred by patients repeatedly referred to secondary medical care with medically unexplained symptoms: a cost of illness study. *J Psychosom Res* 2012; **72(3)**: 242–247.
- Pennington C, Newson M, Hayre A, Coulthard E. Functional cognitive disorder: what is it and what to do about it? *Pract Neurol* 2015; **15(6)**: 436–444.
- Stone J, Pal S, Blackburn D, *et al*. Functional (psychogenic) cognitive disorders: a perspective from the neurology clinic. *J Alzheimers Dis* 2015; **49(S1)**: S5–S17.
- Coebergh J, Stanton B, Isaacs J. Re: Pennington *et al*. Functional cognitive disorder: what is it and what to do about it? *Pract Neurol* 2016; **15(6)**.
- Manthorpe J, Samsi K, Campbell S, *et al*. From forgetfulness to dementia: clinical and commissioning implications of diagnostic experiences. *Br J Gen Pract* 2013; DOI: <https://doi.org/10.3399/bjgp13X660805>.
- Jenkins L, Cosgrove J, Ekberg K, *et al*. A brief conversation analytic communication intervention can change history-taking in the seizure clinic. *Epilepsy Behav* 2015; **52(Pt A)**: 62–67.
- Plug L, Sharrack B, Reuber M. Conversation analysis can help to distinguish between epilepsy and non-epileptic seizure disorders: a case comparison. *Seizure* 2009; **18(1)**: 43–50.
- Robson C, Drew P, Walker T, Reuber M. Catastrophising and normalising in patient's accounts of their seizure experiences. *Seizure* 2012; **21(10)**: 795–801.
- Jones D, Drew P, Blackburn D, *et al*. Conversational assessment in memory clinic encounters: interactional profiling for differentiating dementia from functional memory disorders. *Aging Ment Health* 2016; **20(5)**: 500–509.
- Elsej C, Drew P, Jones D, *et al*. Towards diagnostic conversational profiles of patients presenting with dementia or functional memory disorders to memory clinics. *Patient Educ Couns* 2015; **98(9)**: 1071–1077.
- Popay J, Roberts H, Sowden A, *et al*. *Guidance on the conduct of narrative synthesis in systematic reviews*. ESRC, 2006.
- Griem J, Stone J, Carson A, Kopelman MD. Psychologic/functional forms of memory disorder. *Handb Clin Neurol* 2017; **139**: 407–417.
- Kessler E-M, Bowen CE, Baer M, *et al*. Dementia worry: a psychological examination of an unexplored phenomenon. *Eur J Ageing* 2012; **9(4)**: 275–284.
- Bailey C, Bell SM, Blackburn DM. How the UK describes functional memory symptoms. *Psychogeriatrics* 2017; **17(5)**: 336–337.
- Dooley J, Bailey C, McCabe R. Communication in healthcare interactions in dementia: a systematic review of observational studies. *Int Psychogeriatr* 2015; **27(8)**: 1277–1300.
- Mitchell AJ, Beaumont H, Ferguson D, *et al*. Risk of dementia and mild cognitive impairment in older people with subjective memory complaints: meta-analysis. *Acta Psychiatr Scand* 2014; **130(6)**: 439–451.
- Sirriyeh R, Lawton R, Gardner P, Armitage G. Reviewing studies with diverse designs: the development and evaluation of a new tool. *J Eval Clin Pract* 2012; **18(4)**: 746–752.
- Fukui T, Yamazaki T, Kinno R. Can the 'head-turning sign' be a clinical marker of Alzheimer's disease? *Dement Geriatr Cogn Dis Extra* 2011; **1(1)**: 310–317.
- Ghadiri-Sani M, Larner A. Head turning sign for diagnosis of dementia and mild cognitive impairment: a revalidation. *J Neurol Neurosurg Psychiatry* 2013; **84**: e2.
- Hasselkus B. The family caregiver as interpreter in the geriatric medical interview. *Med Anthropol Q* 1992; **6(3)**: 288–304.
- Hasselkus B. Three-track care: older patient, family member and physician in the medical visit. *J Aging Studies* 1994; **8(3)**: 291–307.
- Hesson AM, Pichler H. Interpreting 'I don't know' use by persons living with dementia in Mini-Mental State Examinations. *Patient Educ Couns* 2016; **99(9)**: 1534–1541.
- Karnieli-Miller O, Werner P, Neufeld-Kroszynski G, Eidelman S. Are you talking to me?! An exploration of the triadic physician–patient–companion communication within memory clinics encounters. *Patient Educ Couns* 2012; **88(3)**: 381–390.
- Larner A. 'Who came with you?' A diagnostic observation in patients with memory problems? *J Neurol Neurosurg Psychiatry* 2005; **76(12)**: 1739.
- Larner A. 'Attended alone' sign: validity and utility for the exclusion of dementia. *Age Ageing* 2009; **38(4)**: 476–478.
- Larner A. Head turning sign: pragmatic utility in clinical diagnosis of cognitive impairment. *J Neurol Neurosurg Psychiatry* 2012; **83(8)**: 852–853.
- Larner A. Screening utility of the 'attended alone' sign for subjective memory impairment. *Alzheimer Dis Assoc Disord* 2014; **28(4)**: 364–365.
- Rousseaux M, Seve A, Vallet M, *et al*. An analysis of communication in conversation in patients with dementia. *Neuropsychologia* 2010; **48(13)**: 3884–3890.
- Saunders P. 'You're out of your mind!': humor as a face-saving strategy during neuropsychological examinations. *Health Commun* 1998; **10(4)**: 357–372.
- Saunders P. 'My brain's on strike': the construction of identity through memory accounts by dementia patients. *Res Aging* 1998; **20(1)**: 65–90.
- Saunders P, de Medeiros K, Bartell A. 'Oh he was forgettable': construction of self identity through the use of communicative coping behaviours in the discourse of persons with cognitive impairment. *Dementia* 2011; **10(3)**: 341–359.
- Vogel A, Mortensen EL, Hasselbalch SG, *et al*. Patient versus informant reported quality of life in the earliest phases of Alzheimer's disease. *Int J Geriatr Psychiatry* 2006; **21(12)**: 1132–1138.
- Perkins L, Whitworth A, Lesser R. Conversing in dementia: a conversation analytic approach. *J Neurolinguistics* 1998; **11(1–2)**: 33–53.
- Bailey C, Dooley J, McCabe R. 'How do they want to know?' Doctors' perspectives on making and communicating a diagnosis of dementia. *Dementia* 2017; in press.
- Kang H, Zhao F, You L, *et al*. Pseudo-dementia: a neuropsychological review. *Ann Indian Acad Neurol* 2014; **17(2)**: 147–154.
- Jenkins L, Cosgrove J, Chappell P, *et al*. Neurologists can identify diagnostic linguistic features during routine seizure clinic interactions: results of a one-day teaching intervention. *Epilepsy Behav* 2016; **64(Pt A)**: 257–261.
- Evens A, Vendetta L, Krebs K, Herath P. Medically unexplained neurologic symptoms: a primer for physicians who make the initial encounter. *Am J Med* 2015; **128(10)**: 1059–1064.
- Brodsky H, Pond D, Kemp N, *et al*. The GPCOG: a new screening test for dementia designed for general practice. *J Am Geriatrics Soc* 2002; **50(3)**: 530–534.

## Appendix 1. Study setting and participants

Study and country of origin	Total number of patients	Sampling	Diagnoses	Average or range of cognitive testing scores	Age, years	Sex	Companions present or considered in analysis	Ethnicity	Setting
Elsley <i>et al.</i> , 2015 [UK] <sup>24</sup>	30	Consecutive referrals to memory clinic October 2012 to October 2014 agreeing to participate in video recording, 30/99 videos analysed. Refusal data not provided	Neurodegenerative (ND), functional memory disorder (FMD)	Not described	ND: Median 60 (47–80), FMD: 66 (51–78)	ND: 45.5% F FMD: 66.7% F	Yes	Not described	Neurology-led memory clinic
Fukui <i>et al.</i> , 2011 (Japan) <sup>32</sup>	181	Consecutive referrals attending clinic run by lead author during the period September 2010 to March 2011. Refusal data not provided	Alzheimer's dementia (AD), amnesic mild cognitive impairment (aMCI), dementia with Lewy bodies (DLB), progressive supranuclear palsy (PSP), vascular dementia (VaD)	HDSR (Hasegawa Dementia Rating Scale) — short cognitive test AD: 14.5 (± 6.6) aMCI: 24.8 (± 3.9) DLB: 15.1 (± 6.9) PSP: 14.5 (± 8.0) VaD: 20.5 (± 4.2)	AD: 79.1 (± 8.7 years), aMCI: 79.3 (± 4 years), DLB: 77.9 (± 6.3 years), PSP: 78.4 (± 5.2 years), VaD: 73.8 (± 3.2 years)	AD: 65% F, aMCI: 63% F, DLB: 47% F, PSP: 38% F, VaD: 33% F	Yes	Not described	Neurology department
Ghadi-Sani and Lamer, 2013 [UK] <sup>33</sup>	191	Over a 10-month period (February to December 2012), 191 consecutive new referrals were observed for the presence of HTS	Dementia, mild cognitive impairment (MCI), cognitively normal	85/191 judged to have cognitive impairment. Cognitive scores not provided	Median: 60 (20–89)	45% F	Yes	Not described	Neurology-led memory clinic
Hasselkus, 1992 [US] <sup>34</sup>	27	Purposive sampling approach to patients on clinic roster likely to be accompanied by a family member. Number approached and refusals not described	'Continuing health problems', 'dementing illnesses', hearing impairment, and expressive dysphasia	Although participants are described as 'cognitively impaired' or 'not cognitively impaired' the cutoff point for cognitive impairment not described	Mean 77.3 (64–91)	Not described	Yes	100% white	General internal medicine clinic
Hasselkus, 1994 [US] <sup>35</sup>	27	Purposive sampling approach to patients on clinic roster likely to be accompanied by a family member. Number approached and refusals not described	'Continuing health problems', 'dementing illnesses', hearing impairment, and expressive dysphasia	Although participants are described as 'cognitively impaired' or 'not cognitively impaired' the cutoff point for cognitive impairment not described	Mean 77.3 (64–91)	Not described	Yes	100% white	General internal medicine clinic

... continued

## Appendix 1 continued. Study setting and participants

Hesson and Pichler, 2016 [UK and US] <sup>16</sup>	72	Outpatient consultations from the Verilogue corpus where physicians identified 'dementia' as one of the primary conditions being assessed during the visit	Mild cognitive impairment, moderate cognitive impairment, severe cognitive impairment	Although MMSE performed during consultation, scores were not extracted. Severity was assessed by the consulting physician as follows. mild cognitive impairment: 18 (25%), moderate cognitive impairment: 39 (54.2%), severe cognitive impairment: 15 (20.8%)	55–74 years: 20 (27.8%), ≥75 years: 52 (72.2%)	65.3% F	No	Not described	Ambulatory care clinics with neurologists or primary care physicians
Jones <i>et al</i> , 2016 [UK] <sup>23</sup>	25	Consecutive referrals to memory clinic October 2012 to October 2014 agreeing to participate in video recording. 25 videos recorded. Refusals not described	Neurodegenerative (ND), functional memory disorder (FMD)	Neurodegenerative: average ACE R score: 56/100 (range: 28–80), non-neurodegenerative (FMD): average ACE R: 93/100 (range: 85–99)	ND: Median 61, FMD: 60, overall range: 47–77	64% F	No	Not described	Neurology-led memory clinic
Karnieli-Miller <i>et al</i> , 2012 [Israel] <sup>37</sup>	25	Described as 'convenience sampling': 25 first-time assessments at diagnostic memory clinic recruited for participation. Refusals not described	Not described, but dementia diagnosis delivered in at least some participants	MMSE range 12–27	All >65	68% F	Yes	Not described	Outpatient memory clinics: mix of psychiatry, geriatrician, and neurology led
Lamer, 2005 [UK] <sup>38</sup>	183	All consecutive referrals over 2-year period (September 2002 to August 2004)	Dementia, MCI, not dementia	Range of cognitive scores not described.	Not described	Not described	Yes	Not described	Neurology-led memory clinic
Lamer, 2009 [UK] <sup>39</sup>	Sep 2004 to Aug 2008: 552, Sep 2002 to Aug 2004: 183	All consecutive patients seen by one neurologist over 4-year period. (September 2004 to August 2008)	Dementia, not dementia	Range of cognitive scores not described	Sep 2004 to Aug 2008: Mean 61.4 (range: 20–90), Sep 2002 to Aug 2004: Mean 59.2 (range: 25–82)	Sep 2004 to Aug 2008: 49% F, Sep 2002 to Aug 2004: 43% F	Yes	Not described	Neurology-led memory clinic

... continued

## Appendix 1 continued. Study setting and participants

Larner, 2012 (UK) <sup>40</sup>	207	Over a 10-month period (January to October 2011), consecutive new referrals were observed for the presence of HTS	AD and mixed AD/cerebrovascular disease, amnesic MCI, frontotemporal lobar degenerations, dementia with Lewy bodies, subcortical ischaemic vascular dementia, and miscellaneous others. Depression and depression with cognitive impairment	82/207 (39%) judged to have cognitive impairment. Cognitive scores not described	Median: 60 (18–91)	53% F	Yes	Not described	Neurology-led memory clinic
Larner, 2014 (UK) <sup>41</sup>	726 (years 2008–2011), 735 (years 2002–2008)	Consecutive new patient referrals to a cognitive clinic seen over a 3-year period (September 2008 to August 2011)	Dementia, MCI, 'cognitively healthy'	Range of cognitive scores not described	Median: 61 (16–92)	47.2 F	Yes	Not described	Neurology-led memory clinic
Rosseau <i>et al</i> , 2010 (France) <sup>42</sup>	105	Cases recruited from memory clinic: suffering from mild to moderately severe dementia using standard criteria for respective disease. Controls: recruited from community matched to patients in sex, age, and educational level. Refusals not described	Alzheimer's dementia (AD), frontotemporal dementia (FTD), dementia with Lewy bodies (DLB), controls (C)	MMSE: AD: MMSE: 22 (14–28) FTD: MMSE: 27 (14–30) DLB: MMSE: 24 (13–28) C: MMSE: 29 (25–30)	AD: 74 (50–79), FTD: 61 (51–78), DLB: 71 (57–78), C: 68 (50–79)	AD: 65% F, FTD: 52% F, DLB: 36% F, C: 47% F	No	Not described	Memory Clinic
Saunders, 1998 (US) <sup>43</sup>	17	Patients recruited from MDT memory clinic. Approach to sampling and refusals not described	Alzheimer's disease: <i>n</i> = 7, vascular dementia: <i>n</i> = 2, alcohol-related dementia: <i>n</i> = 1, non-impaired: <i>n</i> = 1, mixed dementia: <i>n</i> = 1, other cognitive impairment (folate deficiency, endocrine): <i>n</i> = 4, undetermined dementia aetiology: <i>n</i> = 1	Range of cognitive scores not described	54–86	70% F	Yes	Not described	MDT memory and Alzheimer's clinic
Saunders, 1998 (US) <sup>44</sup>	17	Patients recruited from MDT memory clinic. Approach to sampling and refusals not described	Alzheimer's disease: <i>n</i> = 7, vascular dementia: <i>n</i> = 2, alcohol-related dementia: 1, non-impaired: <i>n</i> = 1, mixed dementia: <i>n</i> = 1, other cognitive impairment (folate deficiency, endocrine): <i>n</i> = 4, undetermined dementia aetiology: <i>n</i> = 1	Range of cognitive scores not described	54–86	70% F	Yes	Not described	MDT memory and Alzheimer's clinic

... continued

## Appendix 1 continued. Study setting and participants

Saunders <i>et al</i> , 2011 (US) <sup>45</sup>	60	Patients recruited through referral from neurology clinic and then later divided into cases or controls depending on presence of cognitive impairment. Sampling strategy and refusals not described	Cognitively impaired (CI): <i>n</i> = 31, not cognitively impaired: <i>n</i> = 29	MMSE: CI group: 5–28 (mean: 18; SD: 6.6). Not routinely administered to non-CI group.	Mean: 73.1 (range: 63–92 years)	CI group: 58% F, non-CI: 48% F	Yes	CI: white, <i>n</i> = 24, black, <i>n</i> = 6, Asian, <i>n</i> = 0, Cuban American, <i>n</i> = 1, referral (tertiary centre) Non-CI: white: 22, black, <i>n</i> = 6, Asian, <i>n</i> = 1, Cuban American, <i>n</i> = 0
---	----	---	---	---	---------------------------------	--------------------------------	-----	---

ACE R = Addenbrooke's Cognitive Examination Revised. AD = Alzheimer's dementia. CI = cognitive impairment. F = female. HTS = head turning sign. MCI = mild cognitive impairment. MDT = multidisciplinary team. MMSE = Mini-Mental State Examination. SD = standard deviation.