

Lexical access in a bilingual speaker with dementia: changes over time*

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Introduction

While decline in cognitive functions is a central feature in dementia, language problems are also recognized as a core clinical criterion in certain types of dementia, among them Alzheimer's disease (AD) (McKhann et al., 2011) and Primary Progressive Aphasia (PPA). In the latter case, language difficulty is the most prominent deficit at symptom onset (Gorno-Tempini et al., 2011). Word-finding problems, while also found in the healthy aging population (Burke & Shafto, 2004; 2008; Mortensen, Meyer, & Humphreys, 2006; Vogel-Eyny, Galletta, Gitterman, & Obler, 2016), seem to be among the earliest and most pervasive symptoms in these types of dementia, in AD both in earlier (Chen, Ratcliff, Belle, Cauley, DeKosky, & Ganguli, 2001; Mickes et al., 2007; Nicholas, Obler, Au, & Albert, 1996) and later stages (Locascio, Growdon, & Corkin, 1995; Salmon, Heindel, & Lange, 1999), and in all subtypes of PPA, but most prominently in the semantic and logopenic subtypes (Gorno-Tempini et al., 2011; Grossman & Ash, 2004; Hilger, Ramsberger, Gilley, Menn, & Kong, 2014; Kempler & Goral, 2008; Wilson et al., 2010). Two recent review articles, one on AD (Kavé & Goral, 2017) and one on several neurodegenerative disorders including AD and PPA (Boschi, Catricalà, Consonni, Chesi, Moro, & Cappa, 2017), show that word retrieval problems are evident both in single word production and in connected speech in these groups, and point to the importance of using different cognitive and linguistic tasks in the assessment of persons with dementia. In the present longitudinal study, we investigate lexical access and

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word finding difficulties in a bilingual speaker with PPA across three different contexts of language use: confrontation naming, semi-structured narrative production, and conversation.

Models of word production, whether serial (Levelt, 1999; 2001) or interactive (Dell, 1986; Dell & O'Seaghdha, 1992), agree that word retrieval implies two different processing levels: semantic processing (word meaning) and phonological processing (word form). In confrontation naming, the picture or object first activates the concept, then the lemma with its semantic and grammatical information, and the phonological form of the word with its articulatory encoding. The two models are based on different theoretical frameworks and thus differ in their assumptions about semantic representations as well as spreading of activation – whether it is unidirectional from meaning to form, or interactive between the levels.

Concerning lexical retrieval in healthy, elderly speakers, two main theories have been proposed. The Transmission Deficit Hypothesis (TDH) (Burke, MacKay, Worthley, & Wade, 1991) assumes that the retrieval problems reflect a weakening of the connections in the lexical network. Semantic processing is less affected by weakening since there are many connections between the semantic nodes, but phonological processing is vulnerable since there is only one connection between the semantic representation and the phonological form of the actual word. The Inhibitory Deficit Theory (IDT) (Zacks & Hasher, 1997), on the other hand, suggests that the word retrieval problems reflect a weakening in the inhibitory processes of working memory, resulting in a reduced ability to suppress competing lexical alternatives.

In dementia, difficulties in lexical retrieval have mainly been attributed to problems at the semantic level. In AD patients, errors in confrontation naming are typically semantically related to the target item (Balthazar, Cendes, & Pereira Damasceno, 2008; Bayles & Tomoeda, 1983; Martin & Fedio, 1983; Moreaud, David, Charnallet, & Pellat, 2001; Obler & Albert, 1981), but whether the errors are the result of an underlying semantic impairment, or rather a result of impaired access to semantic information is still under discussion (Balthazar et al., 2008; Kavé & Goral, 2017; Kempler & Goral, 2008; Nicholas et al., 1996). In speakers with PPA, the different subtypes may reflect different underlying problems: While the semantic variant of PPA seems to reflect an underlying deficit in semantic memory, retrieval problems in the logopenic and nonfluent/agrammatic variants may rather be attributed to a limitation in phonological access in word production (Grossman & Ash, 2004; Kempler & Goral, 2008; Rogers, Ivanoui, Patterson, & Hodges, 2006).

The study of language processing in bilingual¹ speakers is challenging. The list of confounding factors which may affect their linguistic performance is long and includes i.a. the age at which the second (third, fourth, etc.) language was acquired (simultaneous vs. sequential bilingualism), the manner in which it was acquired (e.g. by immersion or instruction), the usage patterns of the different languages (e.g. in which contexts the various languages are used), the proficiency in different modalities (speaking, reading, writing, etc.) in the two or more languages, structural similarities or differences between the languages, and societal attitudes towards the different languages. Adding a pathological condition affecting language and communication to the picture makes it even more complex. Finding homogeneous groups of bilingual speakers for research is thus at best challenging and often impossible. It may even not be desirable since bilingualism is governed by the complementarity principle, which means that the languages of a bilingual speaker are usually acquired and used for different purposes, with different people, and in different domains of life (Grosjean, 1998).

Despite the lack of a general, unified definition of bilingualism, it is acknowledged that a bilingual speaker is not the same as two monolingual speakers in one mind (Grosjean, 1998). Thus, using monolingual norms as a comparison may not give a correct picture. Instead, it has been argued that the use of ‘composite scoring’ may be more sensible, at least when investigating language processing in balanced bilinguals (Goral, 2013:192). ‘Composite scoring’ of a naming test means that semantically correct responses are scored as correct irrespective of the language in which they are produced. Such a scoring method has resulted in higher scores on naming tests in studies of younger bilingual adults (Kohnert, Hernandez, & Bates, 1998) as well as of older bilingual speakers (Gollan, Fennema-Notestine, Montoya, & Jernigan, 2007), than if the tests were scored for each language separately.

The few studies that have been conducted on naming in bilingual speakers with dementia so far have not yielded conclusive results. Several have found an earlier decline of naming performance in the L2 than in the L1 (e.g. Machado, Rodrigues, Simões, Santana, & Soares-Fernandes, 2010; Mendez, Saghafi, & Clark, 2004). However, there are also studies reporting comparable impairments across the languages (e.g. Filley, Ramsberger, Menn, Wu, Reid, & Reid, 2006; Hernández, Costa, Sebastián-Gallés, Juncadella, & Ramón, 2007; Veenstra, Huisman, & Miller, 2014) or greater impairment in the dominant language (not necessarily the L1 of the speakers) (Gollan, Salmon, Montoya, & da Pena, 2010).

¹ We use the term bilingual in the broad sense, referring to speakers of two or more languages.

Among the many factors that may influence naming performance, are grammatical class, frequency, cognate status, and communicative task. The effect of grammatical class on the speed and accuracy of language processing has been studied extensively, not least across child and adult populations with language impairments. Noun-verb dissociations are evident in a range of types of disorders (Kambanaros & Grohmann, 2015). Dissociations in both directions are found for many of the populations including speakers with dementia (cf. Druks, Masterson, Kopelman, Clare, Rose, and Rai (2006) for an overview). Frequency effects in naming in adults with language disorders are disputed, but when found, they occur more in nouns than in verbs (Bastiaanse, Wieling, & Wolthuis, 2016; Bird, Ralph, Patterson, & Hodges, 2000). In studies of bilinguals with and without language impairment, cognates (words that are similar in form and meaning in the two languages) are often found to be easier to retrieve than non-cognates (Costa, Santesteban, & Caño, 2005; Kohnert, 2004).

The majority of the studies on word retrieval in healthy aging are based on single word production tasks, which have certain limitations. On the one hand, single word production does not require the speaker to retrieve and produce more than one lexical unit; no integration of the unit in a larger syntactic or discursive frame is required. On the other hand, the speaker is usually required to retrieve one very specific item without the support of an interlocutor. A recent review by Kavé and Goral (2016a) shows that word retrieval difficulties found on single word production tasks do not generally extend to connected speech in healthy aging subjects. In speakers with aphasia, on the other hand, word finding difficulties are clearly present in connected speech. Also in speakers with dementia, connected language production (both orally and in writing) is affected compared to normal controls (e.g. Ahmed, Haigh, de Jager, & Garrard, 2013; Kavé & Goral, 2016b; 2017; Pekkala et al., 2013; Wilson et al., 2010), evident for instance in fewer words overall and fewer content words in particular, and increased proportions of closed-class words, pronouns and verbs.² Most of the studies reported on here have investigated semi-spontaneous forms of connected language production in the form of picture description tasks. Such tasks are closer to ordinary language use than single word production tasks, and the speaker is somewhat freer to choose which lexical item to produce. However, the picture to be described also restricts the speaker's choices, and usually, the speaker cannot rely on the interlocutor to scaffold the production.

The most common context of language use is conversation. Spontaneous talk in conversation sets high demands on language processing by requiring extensive planning and

² None of these studies include bilingual participants.

production of sentences and longer coherent stretches of talk, such as narratives. On the other hand, word finding is facilitated by the fact that the lexical items occur in a natural context. Furthermore, the speaker can appeal to the interlocutor for help in word search sequences.

Aims

In this study, to address the abovementioned gap in previous research on lexical retrieval, we aim to investigate the naming skills and the strategies used to cope with naming problems in a bilingual (American-Norwegian) male with PPA across three different speech contexts (confrontation naming, semi-structured narrative, and conversation) which put different demands on the speaker in the language production process. In particular, we focus on naming of nouns and verbs across these contexts. We investigate the progression of his naming problems over time. We also aim to discuss the results in the light of the two different theories described above, TDH and IDT.

Methods

We used a test battery consisting of a naming test and various cognitive tests as well as a background questionnaire on communicative functions. Moreover, we elicited oral narratives and collected conversational data. The cognitive tests and the questionnaire function as background information.

Data were collected at two time points: at approximately 12 months post diagnosis (T1) and at approximately 30 months post diagnosis (T2). At both time points, data were collected in two sessions, once in Norwegian and once in English, with one week apart. For each session, we aimed for a monolingual environment, in the sense that the main test administrator used only one language in each session, and in the English session a researcher with no knowledge of Norwegian was present to assist with data collection.³ Ethical approval was obtained from the Norwegian Centre for Research Data (NSD).

The participant

The data were collected from a male bilingual speaker of American-English and Norwegian, here referred to as JJ. He was referred from his GP to a neurological examination at the age of

³ For practical purposes, we had to use the same test administrator for both sessions, and this is of course unfortunate with regard to creating a monolingual condition. However, it is well-known that a great majority of the adult population in Norway, particularly those with a higher, academic education, understands and speaks English reasonably well, so completely monolingual settings are generally less likely when the languages in question are Norwegian and English.

67 because of language problems, and after a brain scan (SPECT) ‘showing reduced perfusion in large areas of the brain on both sides’, he received a diagnosis of ‘a variant of Alzheimer’s disease, frontal lobe dementia, Primary Progressive Aphasia’. This is the wording (translated from Norwegian) from his medical journal, and when we first met JJ (at T1), he and his wife communicated to us that he had Alzheimer’s disease. Only later, at the second data collection point when we got access to his medical records, did we realize that his diagnosis was actually Primary Progressive Aphasia. It is unclear to us why the diagnosis was formulated like this. Apart from the brain scan results we do not have knowledge about any data on the underlying pathology. Possibly the neurologist himself did not distinguish clearly between these diseases, or he did not think that he had evidence to choose one over the other. There was no attempt in the medical journal to classify JJ’s condition into any subtype of PPA. However, it is clear that the sole initial symptom was a language deficit, in accordance with the basic clinical diagnostic criteria of PPA (Gorno-Tempini et al., 2011: 1008), and the description of the brain scan results indicates a diffuse rather than a focal brain damage, ruling out a diagnosis of aphasia.

From biographical interviews with JJ and his wife, we learned that JJ has a higher academic education from USA, where he met his Swedish wife. They moved to Norway when he was 31 and got a job in a Norwegian subsidiary of an international company. At work, he used both Norwegian and English; he had some formal training in Norwegian, but learned most of it through immersion. At home, he spoke English with his wife and children, but there was much Norwegian and code mixing in the family. He spoke Norwegian with friends and neighbours, read Norwegian newspapers and watched Norwegian news. His wife rated him as very proficient and fluent in Norwegian, but with an American accent, prior to the onset of dementia. JJ reported that since the onset of dementia he had not been using Norwegian a lot. However, at the times of data collection, JJ was living at home with his wife and regularly attended Norwegian conversation groups at a day care center for elderly people with dementia.

Background information on cognitive functioning

JJ was tested with a battery of cognitive tests consisting of *The Rowland Universal Dementia Assessment Scale* (RUDAS) (Storey, Rowland, Basic, Conforti, & Dickson, 2004) and a Flanker task (Eriksen & Eriksen, 1974). These cognitive tests were carried out twice, in his L1, at T1 and at T2, 12 and 30 months post diagnosis, respectively.

RUDAS is a screening test which can be administered in less than ten minutes. It is very similar to the *Mini-Mental State Examination* (MMSE) (Folstein, Folstein, & McHugh, 1975), but RUDAS is specifically designed to assess cognitive impairment in culturally and linguistically diverse populations. It covers the following domains: memory, spatial orientation, praxis, visuo-constructional drawing, judgment, and language. The maximum score is 30, and the cut-off score, indicating possible cognitive impairment, is <23 (Storey et al., 2004).⁴

The Flanker task (Eriksen & Eriksen, 1974) measures both attention and inhibitory control. In the version we used, the subject sees five arrows on the screen either pointing in the same direction (congruent condition) or with all but the middle one pointing in the same direction (incongruent condition). The participant is asked to focus on the middle arrow, ignoring the arrows flanking it, and indicate if the middle arrow is pointing left or right. JJ was tested on 40 sequences in randomized order, half in the congruent condition and half in the incongruent condition. The task was presented electronically on a laptop computer using the E-Prime 2.0 software.⁵

As part of his medical examinations, JJ was also tested with MMSE four times: 1) at the time of diagnosis, 2) 10 months, 3) 22 months, and 4) 32 months post diagnosis. The first two times he was also tested with *Trail Making Test A* (TMT-A) and *B* (TMT-B), a test for assessing focused and joint attention and psycho-motoric speed (Reitan & Wolfson, 1985). Finally, at the first two and the last medical examination sessions, he was also administered the *Clock Drawing Test* (Strobel, Johansen, Bekkhus-Wetterberg, & Engedal, 2012) assessing visuospatial abilities and semantic memory.

Table 1 gives an overview of the results of the cognitive testing at different points in time.

⁴ The full test is available from <https://www.health.qld.gov.au/tpch/html/rudas>. In a systematic review and meta-analysis with data from 1236 participants, Naqvi, Haider, Tomlinson, and Alibhai (2015) found a pooled sensitivity of 77.2 % and a pooled specificity of 85.9 % for RUDAS. A pooled estimate of the correlation between RUDAS and MMSE was 0.77, and scores on RUDAS were less affected by language and education level than scores on MMSE. They concluded that RUDAS is an assessment tool that ‘has shown strong psychometric properties in several countries [and] shows particular advantage in culturally and linguistically diverse populations’ (Naqvi et al., 2015: E175). Our reason for using RUDAS was that this case study is a pilot for a larger study of bilinguals with dementia, including participants from different countries and with low levels of education.

⁵ Psychology Software Tools, Inc. [E-Prime 2.0]. (2012). Retrieved from <http://www.pstnet.com>

Table 1. Results of cognitive testing.

Time of testing	MMSE	RUDAS	Clock drawing	TMT-A (seconds)	TMT-A (z-score) ⁶	TMT-B (seconds)	TMT-B (z-score)	Flanker
At diagnosis	30/30		5/5	48	1.17	301 ⁷	8.05	
10 mths p.d.	28/30		5/5	69	2.91	197	2.15	
12 mths p.d. (=T1)		22/30						23/40
22 mths p.d.	17/30		1/5					
30 mths p.d. (=T2)		16/30						26/40
32 mths p.d.	13/30							

The MMSE scores do not give any indication of cognitive decline at the time of diagnosis, nor 10 months post diagnosis. However, the RUDAS results show that at 12 months post diagnosis the score is below cut-off. The MMSE and the RUDAS seem to correlate well, and indicate a steady decline over the next 20 months. The Clock Drawing Test indicates a similar trajectory, with a full score at the first the time of diagnosis as well as 10 months later, but a steep decline at 22 months post diagnosis. The TMT-A shows a performance below the 15th percentile (according to MOANS age-corrected scale scores (Ivnik, Malec, Smith, Tangalos, & Petersen, 1996)) at the time of diagnosis, and below the 5th percentile 10 months later; on the TMT-B he scores below the 10th percentile at the second test point. At the time of diagnosis, he was unable to complete the TMT-B, and was interrupted after making several errors. His time was then recorded as 301 seconds. We calculated z-scores for TMT-A and -B based on mean time ranges reported in Ivnik et al. (1996). These scores reflect a good estimate of JJ's performance relative to the normal population. As the norms in Ivnik et al. (1996) are reported as ranges rather than exact numbers, the z-scores in Table 1 are influenced by this. The low scores on the TMT tests indicate deterioration of attention and psychomotoric speed already at the time of diagnosis. On the Flanker task, even if the results at T1 (12 months post diagnosis) indicate reduced inhibitory control, this has not deteriorated to T2

⁶ Z-scores are calculated based on estimates of averages published in the MOANS age-corrected scaled scores (Ivnik et al., 1996).

⁷ JJ was unable to complete TMT-B at time of diagnosis, and following scoring criteria his time was recorded as 301 seconds.

(30 months post diagnosis). That JJ made a correct judgment to just over half of the trials at both T1 and T2, could be just by chance. A more thorough analysis of his responses shows that he answered all the congruent sequences and three of the incongruent sequences correctly at T1, and 19 of the congruent sequences and seven of the incongruent sequences correctly at T2, which indicates that he has understood the task, but has reduced inhibitory control.

Background information on functional communication

To get an impression of JJ's communicative abilities before and after the illness, his wife was asked to fill in the Norwegian version of the *Communicative Effectiveness Index* (CETI) (Lomas, Pickard, Bester, Erlbard, Finlayson, & Zoghaib, 2006).⁸ This questionnaire was developed to measure the functional communication skills of a person with aphasia, but it has also been used with speakers with dementia (Burgeois & Hickey, 2009). It consists of 16 descriptions of situations, referring to different aspects of functional communication. A significant other, for instance the spouse of the person with the speech or language impairment, rates to what extent the person with the impairment is able to do whatever the relevant description refers to, by marking on a ten cm long visual-analogue scale ranging from 'not able at all' (at zero cm) to 'as able as before the stroke', i.e. the onset of the disease (at ten cm). The rating for each situation is converted into a score by measuring where along the ten cm long scale the mark is made, and a total score is calculated by dividing the sum of the individual situation ratings by the total number of situations (maximum: 100). It is important to remember that with the CETI, the person is compared to him-/herself rather than to a given norm. The focus is not primarily on the absolute score, but on the change in score over time (Lomas, Pickard, Bester, Erlbard, Finlayson, & Zoghaib, 1989). A change in the total score of at least 12 points is regarded as clinically important (Lomas et al., 1989).

When JJ's wife completed the CETI at T1 (12 months after the diagnosis), the total score was 79.2, and at T2 (30 months post diagnosis) it was 63.1. This decline by 16.1 points indicates a clinically important deterioration in his functional communication skills as the disease progresses. Since a maximum score of 100 would have meant that there had been no change since the onset of dementia, we may also interpret the score of 79.2 at T1 as indicating a clinically important change (a change by >12 points) in his functional communication skills

⁸ JJ's wife was not instructed to evaluate his communication skills in just one of his languages exclusively, as the CETI is not linked to any specific language, but rather to functional, verbal communication in general. It is possible that the scores would have been different if she had been asked to evaluate his functional communication in his L1 separately from his L2 and vice versa.

already at the first measurement point. The items that received particularly low scores (55 or below) at T1, were items number 2 ('Getting involved in group conversations that are about him/her'), 4 ('Communicating his/her emotions'), and 14 ('Being part of a conversation when it is fast and there are a number of people involved'). Also, items number 6 ('Having coffee-time visits and conversations with friends and neighbors (around the bed or at home)'), 12 ('Starting a conversation with people who are not close family'), and 16 ('Describing or discussing something in depth') were rated lower than the rest of the items. At T2 the pattern is about the same, but in addition items number 3 ('Giving yes and no answers appropriately'), 13 ('Understanding writing') and 15 ('Participating in a conversation with strangers') are rated markedly lower than at T1. The results of the CETI thus indicate that cognitively and interactionally demanding speech contexts have become more problematic for JJ since the onset of dementia, and as the disease progresses comprehension also seems to have become more problematic.

Data on naming abilities and strategies – collection and analysis

Data on naming abilities were collected in three different settings: a) a confrontation naming task, b) a cartoon description task, and c) interview and small talk between the participant and the test administrator. The confrontation naming task consists of 60 items selected from the Norwegian versions of two test batteries developed primarily for the assessment of aphasia: *The Psycholinguistic Assessments of Language Processing in Aphasia* (PALPA) (Kay, Lesser, & Coltheart, 2009) and the *Verb and Sentence Test* (VAST) (Bastiaanse, Lind, Moen, & Simonsen, 2006). 30 drawings depicting objects were selected from subtest 53 of PALPA (oral picture naming), and 30 drawings depicting actions were selected from subtest 4 of VAST (naming of actions).⁹ The aim of the task was to elicit single nouns and verbs. The same set of pictures was used for this task in English and Norwegian. The words were not matched for any underlying variables, but post hoc analyses show that 16/30 of the nouns and 15/30 of the verbs are cognates, for example Norwegian *katt*, *buss*, (*å*) *danse*, (*å*) *filme* vs. English *cat*, *bus*, (*to*) *dance*, (*to*) *film*. A Wilcoxon rank sum test show that there is no significant difference in the frequencies of the words across the languages ($W=2122.5$, $p=0.091$). We should note, however, that the selection of words is slightly skewed, with few very high frequency items. The responses in the confrontation naming task were coded as

⁹ Both of these tests originally comprise 40 items, and norms based on healthy, monolingual speakers for the full versions of the tests show high average scores (98 % on both tests).

correct or incorrect in the target language. Incorrect responses were further analysed as code switches (CS) and/or as related to the target item (semantically, phonologically) or not. A chi-square test was used to investigate the difference in scores between the two languages at both time points. Frequency scores were logarithmically transformed and differences were checked with a Wilcoxon rank sum test for nouns and verbs in both languages at both time points. Finally, a Fisher's exact test was used to investigate if there was a cognate effect between word classes in both languages.

The cartoon description task (a sequence of six pictures) is taken from the *Bilingual Aphasia Test* (Paradis & Libben, 1987). The descriptions were audiotaped and subsequently transcribed orthographically, including all words and attempts at words (neologisms, false starts, and so on) and dysfluencies, such as repetitions. For the analysis, we counted the number of words in each text. Only words in the target language were included, as were repetitions, truncated words, and lexical paraphasias. Incomprehensible words (transcribed with an X or X=) and hesitations (*eh*) were excluded. We also calculated the lexical density by dividing the number of lexical word tokens (nouns, adjectives, and verbs (excluding auxiliary verbs and semantically light verbs such as *be, have, come, go, give, take, make, do, get, put* (Gordon, 2008)) by the total number of words.¹⁰ Furthermore, we defined ten key content components of the cartoon's plot for the purpose of coding and analysis. As there is no previously established set of key components for performing a concept analysis of the cartoon in the BAT, pre-analysis, we decided on ten key content components (Table 2). We analyzed the extent to which the ten components are accurately and completely presented (Nicholas & Brookshire, 1995), which in essence means that they should be presented in such a way that the gist of the story can be understood by a listener who does not necessarily have access to the pictures. For this, a certain number of content words has to be present; for instance, a bare pronoun (*he*) does not suffice as an accurate and complete presentation of the first key component.

Table 2. Key conceptual components of the BAT cartoon.

1	introduction of the man (main participant in the story)
2	introduction of the woman (main participant in the story)

¹⁰ Auxiliaries and semantically light verbs were not included in the calculation of lexical density since they are best regarded as function words and not content words (Malvern, Richards, Chipere, & Durán, 2004).

3	introduction of the birds in the nest (main participants in the story)
4	the man climbs the tree
5	the branch breaks
6	the man falls down
7	the man's leg is broken
8	the ambulance arrives
9	the man is in hospital
10	the bird is crying over her dead chicks outside the hospital

A well-produced narrative does not necessarily have to include each and every one of the components, and they do not necessarily have to appear in the order listed. However, for the complete story to be conveyed, most of these components will have to be represented. Since the narrative is based on pictures that could be seen both by the participant and the test administrator, the explicitness of the narratives may vary; implicitly, they could co-construct the narratives. However, in this task it was made clear to JJ that he was supposed to be the narrator.

The conversational data were gathered from an autobiographical interview with JJ in his L1 (English) at T1 and from small talk sequences before and in between the test sessions in both English and Norwegian at both test times. The informal autobiographical interview dealt with his life history and especially his use of different languages in various situations. All the test sessions were audiotaped, and the conversational data were subsequently transcribed in a detailed manner, using conversation analytic conventions (Jefferson, 2004) and including such features as pauses, speech overlap, prosody, and intonation (for transcription key, see Appendix A). Instances of word search sequences were excerpted and analysed qualitatively, using a conversation analytic methodology (Sidnell, 2011). Word search sequences are defined in this tradition as sequences where the speaker a) interrupts a turn-in-progress, b) initiates a searching activity, indexed by pauses, vocal features (filled pauses, sound stretches), meta comments, and/or non-verbal behaviour¹¹ (gestures, averted eye gaze, 'thinking face' etc.), and c) finds a solution to the problem (finds the word, finds another way of saying the same thing, or abandons the utterance) (Goodwin & Goodwin, 1986). Word searches may also become interactive by the speaker appealing to the

¹¹ Since we only had audiotaped data, non-verbal behaviour was obviously not taken into account.

interlocutor for help (seeking eye contact, asking questions, producing inviting gestures), and the latter may provide suggestions for the speaker to accept or decline. During the conversations, no specific guidelines were given to the conversation partners on how to handle word-finding problems; the most important thing was to keep the conversation going as naturally as possible.

Results

The results of the three tasks are presented consecutively below. For all three tasks, it is interesting to note that JJ showed no phonological distortions or paraphasias in either language (apart from the fact that he had an American accent in his Norwegian, a feature noted by his wife from before the onset of the disease).

The confrontation naming tasks

Figures 1 and 2 summarize the results of the confrontation naming tasks.

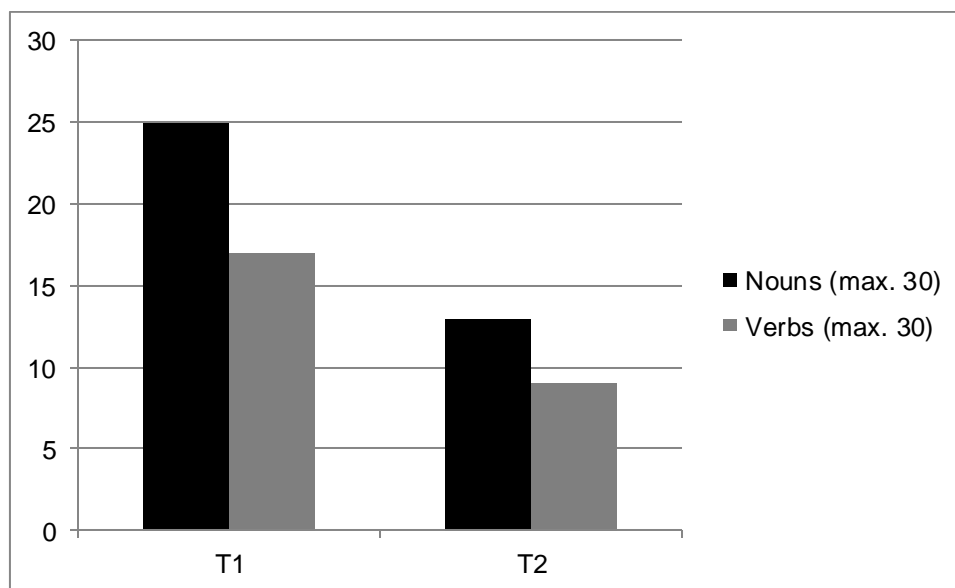


Figure 1. Results of the confrontation naming tasks in English (L1) at T1 and T2.

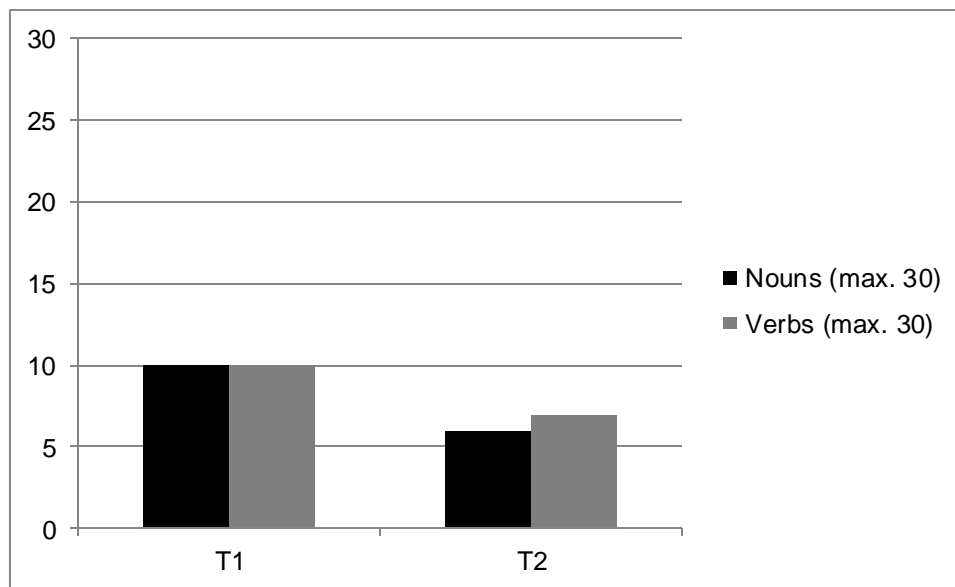


Figure 2. Results of the confrontation naming tasks in Norwegian (L2) at T1 and T2.

Figure 1 shows that at T1, JJ performs relatively well on the nouns in his L1 (English), but he has more problems with the verbs. It is clear, however, that in most cases he understands the depicted verbal concept, but that he is unable to retrieve the correct lexical item from his mental lexicon. Instead, he responds with a lexical verb semantically related to the target verb, usually a synonym, such as *sweeping the floor* for the target *vacuum* or a description of the target action. Interestingly, while there is a frequency effect on the L1 nouns – he performs better on high frequency nouns ($W=12$, $p=0.002$) – there is no such effect on his L1 verbs ($W=66$, $p=0.064$). He has no instances of code switching to Norwegian when naming objects and actions in his L1 at the first measurement point.

At T1, his scores in the L2 (Norwegian) (Figure 2) are significantly lower ($\chi^2=14.72$, $df=1$, $p=0.0001$). For both objects and actions, he manages to produce the correct noun or verb in the target language in only one third of the test items. In the object naming task we see a clear cognate effect in the correct responses; 9 of the 10 correct responses are cognates, such as *bok/book*, *fisk/fish* and *buss/bus* ($p=0.006$). In the action naming task, the cognate effect is not significant ($p=1$), although half of the correct verb responses are cognates. Unsurprisingly, as English is his strongest language, there is no cognate effect in the L1 at T1. We may also note that among the correct responses (both for objects and actions) in his L2 there are almost no low frequency items. For both nouns and verbs, there is a significant frequency effect: nouns ($W=53$, $p=0.039$); verbs ($W=35$, $p=0.003$).

The error patterns in the object and action naming tasks in Norwegian at T1 differ somewhat. When failing to come up with the correct target verb in the action naming task, JJ's main strategy is to produce a semantically bleached, all-purpose verb such as *bruke* (use), *ta* (take) or *gå* (go), often in combination with a noun. Some examples are *bruke en saw* (CS) (use a saw) instead of *sage* ((to) saw), and *ta opp* (take up) instead of *plukke* (pick (flowers)). In the object naming task JJ has another strategy. When failing to come up with the correct target noun, he often code switches to English. For ten items, he produces the correct English equivalent of the target noun, e.g. *pig* for *gris*, *train* for *tog* and *dart* for *pil*.

As in the L1 action naming task, his production of correct English equivalents for the Norwegian target nouns indicates that he understands the depicted concept, but that he is unable to retrieve the correct lexical item in the target language from his mental lexicon. If we add the ten 'correct' English nouns to the ten correct Norwegian (target) nouns, using a composite scoring method, we see that JJ has a better grasp of nouns than of verbs – at least at a conceptual level – not only in his L1, but also in his L2 at T1. For Norwegian, his composite score for nouns is 20/30, while the composite score for verbs remains low at 12/30. His very low score and the dominant error pattern in the Norwegian action naming task (an overuse of highly frequent, semantically light verbs) may indicate more severe difficulties with verbs as concepts in his L2 (Norwegian) than in his L1 (English) at T1.

Over time, we see a clear deterioration on all scores in both languages. At T2, there is no longer any difference in the performance between L1 and L2 ($\chi^2=2.58$, $df=1$, $p=0.108$). His score on nouns in the L1 has fallen to 13/30 (Figure 1), 9 of which are cognates; however, there is no effect of either cognates ($p=0.07$) or frequency ($W=66$, $p=0.064$). A closer look at his error pattern still reveals a better retained understanding of the depicted nominal concepts as 9 of the 17 errors are descriptions or synonyms. His L1 score on verbs is even lower (9/30), and only three cognates are correct. For half of the items he is unable to provide any response, and for the remaining six he gives a description of or a synonym for the target action. There is no effect of frequency ($W=57$, $p=0.094$). There are no instances of code switching to Norwegian on object and action naming in the L1 at T2.

In the L2 (Figure 2), the scores on nouns and verbs are equally low, and the cognate effect is only found for nouns ($p=0.01$), where all the six correct answers are cognates; only 3/7 correct verbs are cognates, which is not statistically significant ($p=1$). For the nouns, but not for the verbs, there is also a statistically significant frequency effect ($W=26$, $p=0.015$). In the object naming test, the composite score reaches 12/30; in addition, there are seven descriptions, indicating a still reasonably well-preserved grasp of the nouns in his L2 at a

conceptual level. In the action naming test, a composite score only adds one item to the original 7/30 correct responses. For 18 verbs, he is unable to provide a response.

In sum, his results on the confrontation naming tasks indicate greater impairment of his L2 than his L1 at T1, a difference that decreases as his dementia progresses (T2); more severe difficulties with verbs than nouns; and a better retained understanding of concepts, in particular nominal ones, than words in both languages as indicated by his use of synonyms, descriptions, and code switching when he cannot access the target word.

Naming in semi-spontaneous elicited narratives

JJ's descriptions of the cartoon from the BAT are longer at T2 than at T1, both in English and in Norwegian, but the lexical density diminishes in both languages as time passes and the disease progresses (cf. Table 3). Given the low and decreasing lexical density in the narratives, we may expect them to convey little information. An analysis of the number of key component units that are accurately and completely presented in the texts, indeed shows that very few of the ten pre-defined components are present in each of the narratives in a sufficiently accurate and complete way (cf. Table 3 and Appendix B).

Table 3. Results of the narrative tasks.

Test time	Language	Number of words (target language)	Lexical density	Number of key component units
T1	English	61	0.30	3/10
	Norwegian	92	0.23	3/10
T2	English	204	0.20	3/10
	Norwegian	138	0.14	1/10

Naming in interaction

Despite the fact that JJ has challenges of naming in the experimental task and of conveying substantial information in the narrative task, the interactional data show that he manages to communicate rather successfully in conversation, at least in his L1, English, and most clearly at the first data collection point. However, the difference in performance in his L1 and L2 as

observed in the tests is also observable in his conversational contributions. We will here describe some of the strategies he uses when facing a word retrieval problem.

In the English conversation at T1, the main naming problem seems to be retrieving low-frequency nouns. A very common strategy used by JJ is to replace a word he does not find with an explanation of the meaning of that word. This is what we find in excerpt (1),¹² where he is talking about changing jobs, and seems to be searching for the word *application*:

Excerpt (1)

1 JJ [And] then (0.5) and then at that time I sent eh: (1.0) (tsk) eh:
2 (1.5) sent out er (0.5) ((thump)) er you know (.) t- trying to
3 get a job (0.5) eh: (1.0) in (.) in places in Sweden.
4 HGS Mhm.

The utterance initiated in line 1 projects a complement in the form of a noun phrase. However, instead of a noun phrase there is a series of filled and silent pauses, displaying the activity of searching for a word. There is also a recycling of the finite verb (*sent – sent out*) and a potential appeal to the interlocutor to search for the intended referent (*you know*). When the search is still unsuccessful and the interlocutor does not provide any sign of understanding, he produces an explanation of the meaning of the word instead of the word itself. After this he continues the turn, and the interlocutor provides an acknowledgement token, claiming understanding of the turn so far. This strategy of circumlocution (Tarone, 1980) or paraphrase (Kurhila, 2006) is well documented in second language speakers lacking a word in the target language. Here we can relate it to JJs problems with retrieving low frequency words, and more specifically, with phonological access, since he is able to provide a semantically equivalent description.

Sometimes the interlocutor may help in the search for a word by providing suggestions. In excerpt (2), we have an instance of this.

Excerpt (2)

1 JJ And (1.5) and then from (.) from there I went to eh Johnston
2 University, (0.5) [in] eh Wyoming,
3 HGS [mm]
4 AS Yeah,

¹² In the excerpts, HGS refers to the test administrator/main interlocutor. A research assistant (AS) was also present, but she contributed mainly with minimal responses.

5 JJ and that's (.) where I (0.5) eh: got my (2.0) s- whatever I got
6 [he he he]
7 HGS [The degree?]
8 AS [mm] Mhm
9 JJ A degree yeah,
10 HGS Yeah, [what] eh what eh: in what field?

A word search occurs in line 5, where JJ suspends an utterance after a possessive pronoun (*my*), projecting an NP head, and leaves a long silence of two seconds. This time he seems to abandon the search and give up finding the referring expression (Tarone, 1980). The laughter accompanying this abandonment may seem oriented to compensating for the embarrassment created by this communicative failure (Lindholm, 2008; Wilkinson, 2007). However, at this point the interviewer comes in with a candidate solution to the retrieval problem by suggesting *the degree* with rising intonation. This suggestion is accepted by JJ in that he produces an echo answer – a repeat with an affirmative response token (Svennevig, 2003).

In the Norwegian conversation at T1, the problems seem to be of a more fundamental character and occur at points when it is not just a single noun that is projectable, but a main verb, and thus the complete sentence structure. An example can be seen in the next excerpt. JJ has excused himself for the low test scores, and the interlocutor (HGS) responds by saying that he has been using English much more during his life time and in addition that he was ‘born with it’. After a minimal response, JJ continues:

Excerpt (3)

1 JJ Jeg har altså vært ((KREMT)) (1.3) at (1.2) e:h (3.0) når jeg s-
I have (PART) been ((COUGH)) (1.3) that (1.2) e:h (3.0) when I s-
2 (sa) det var (.) problem,
(said) it was (.) problem,
3 AS [Mhm]
4 HGS [Mhm]=
5 JJ =e:h (0.7) eller (sånn) (0.5) eh gikk (.) som f- f- funnet hva det
=e:h (0.7) or (like) (0.5) eh went (.) that f- f- found what it
6 JJ var [og så] videre .hh eh ((KREMT)) (1.0) (tsk) (1.0) o:g (2.0)
was and so on .hh eh ((COUGH)) (1.0) (tsk) (1.0) a:nd (2.0)
7 HGS [ja .hhja]
Yeah yeah
8 HGS [mm]
9 JJ det er ehm (0.7) (det er eh) (0.9) (hårdt) nok
It's ehm (0.7) (it's eh) (0.9) (hard) enough
10 HGS Mhm=
11 JJ =til å eh (.) bruke: en.

=to eh (.) use one.
 12 AS Mm=
 13 JJ =heheheh
 14 HGS hehhehhhh ja (nemlig) [ja]
 hehhehhhh yeah (exactly) yeah

In this extract, there are several instances of disfluencies and pauses at points where there is no specific noun projected. In line 1 the search activity starts after a semantically light verb, *å være* (to be), which does not provide many clues about what sort of item he is searching for. The search continues after a subordinate clause in lines 1–2 ('when I said it was problem'), before the main verb of the main clause is presented. The same seems to be the case in the next round of searching in line 5. Here he produces what may be a self-repair of the previous subordinate clause, as indicated by the self-repair marker *eller* ('or'). Finally, in line 9 he pauses and restarts after a semantically empty introductory construction, *det er* ('it is').

What is common to these instances of apparent production problems in his L2 is that they occur before a clear structure may be assigned to the utterance as a whole. Thus, they are not just related to retrieving a specific lexical item, but rather to constructing a whole propositional utterance. A consequence of this is that in the Norwegian interaction the interlocutors do not have any basis for guessing what JJ is searching for and thus for assisting him by providing suggestions. As can be seen, they do not provide any candidate solutions in the long pauses that occur while JJ is searching.¹³

The picture that emerges from analysing the spontaneous conversations at T1 is that in the English data, the problem concerns retrieval of low-frequency nouns. JJ and his interlocutors manage to overcome JJ's lexical limitations to a large extent. JJ himself uses semantic strategies such as circumlocution and approximation (for instance using a hyponym) as alternative paths to the identification of the referent. The interlocutors participate actively by providing candidate suggestions in cases where JJ does not find a solution himself. In the Norwegian data, by contrast, the problem seems to concern the planning of the sentence structure as a whole. The problems often occur at an early point before the main verb has been produced. This severely limits the opportunities for the interlocutors to scaffold the speaker in his speech production.

At T2, JJ's conversational performance had deteriorated in both his L1 and his L2. While testing him in Norwegian, the interviewers tried to initiate some small talk in between

¹³ For a more thorough analysis of this extract, see Svennevig and Lind (2016).

the tests. However, JJ either answered in English or had such large problems in trying to formulate an answer in Norwegian that the interviewers rather quickly abandoned the attempt. In his English conversation, however, JJ managed to keep a conversation going, but had more word finding problems, and more importantly, more difficulties in using compensatory strategies to remedy the problems. The next excerpt is an example of this. JJ is telling about his daughter, but encounters a word finding problem when he tries to tell what her profession is:

Excerpt (4)

1 JJ: [Yeah] and eh: (1.0) so she's been (1.2) been working with
 2 ehm (.) ts °e::h° ne:w (1.1) un- (.) (when) (.) people get the
 3 (.)°eh (.) e:hm e:h e:h with the (.) if they get a ca-
 4 eh you know° hh hh [hh]
 5 HGS: [he] he
 6 JJ: a- how how how you go get (.) e:h you know the the first first
 7 when they first they get- and especially .hh a::h if they're
 8 (.) if they're from outside of of Norway.
 9 HGS: Oh i:mmigrants?
 10 JJ: [Yeah it's] it's it is [is sort] of [yeah] so:me of them are.
 11 AS: [Mhm yeah] [yeah]
 12 HGS: [wha-]
 13 HGS: [Yeah] oka:y
 14 AS: [Mhm]
 15 JJ: .hh (.) but but e:h (.) but to any of the: (.) the: (0.8)
 16 young people when they=
 17 AS: =Mhm
 18 JJ: the the f- first get eh: eh: (.) a chi:ld.
 19 HGS: Ok↑a::y.

JJ here initiates a search for a word to specify what his daughter had 'been working with' (line 1). After some time searching for the word without success, he initiates a new clause ('when people get the') that is not syntactically fitted to the point of suspension of his previous clause. Rather, it seems to be an attempt to explain the phenomenon in a paraphrase or a circumlocution. However, also this attempt fails, since he stops mid-course and starts to search for a new word to complete this clause (line 3). He tries to appeal to his interlocutors for help with the discourse marker 'you know' and displays his embarrassment of not finding words by starting to laugh (line 4). HGS joins in with the laughter, but does not contribute any suggestion, being without any contextual clues to guess what he might be searching for.

In lines 6–8 the search continues and some contextual clues are added. His specification of the numeral ‘first’ neither helps him or his interlocutors, but the second specification of a typical condition (‘being from abroad’) leads to a candidate suggestion from HGS (line 9). The suggestion is only partially accepted by JJ, who instead gives another contextual clue by adding that the people are ‘young’ (line 16). Finally, in line 18, he retrieves the word he had been searching for since line 2, the object of the verb ‘get’, namely ‘a child’. HGS responds by an emphatic claim of understanding.

Although this word search is very extended and complicated, it only solves a part of the problem, namely the formulation of an explanation about the daughter’s profession. What this profession is, still remains to be established. The excerpt shows the deterioration in JJ’s skills in compensating for his word finding problems by making use of alternative means such as explanations of meaning and circumlocution. It also shows how his linguistic deterioration limits the opportunities for the interlocutors to assist in solving his word finding problems, much like in his Norwegian conversations at T1.

Discussion

In this article, we have presented analyses of the naming skills of a bilingual speaker with PPA in each of his languages across three different speech contexts: confrontation naming, semi-spontaneous picture description, and conversation, at two points in time.

Our data show firstly that the dementia has clearly affected his language skills and his conversational performance, and thus corroborate the report by his wife in the CETI questionnaire that his abilities to communicate functionally have deteriorated since the onset of dementia and progressively so. Consistent with his premorbid use of and proficiency in the two languages, his performance in his L2 Norwegian is lower than in his L1 English, but this difference diminishes as the disease progresses. This is the case across the three speech contexts; however, the difference is smaller in the narrative task, where his performance is very low in both languages already at T1.

Secondly, in our data in the confrontation naming task, we find effects of word class, frequency, and cognateness. The test scores show a better performance on nouns than on verbs in the L1 only, at both T1 and T2. However, also in L2, the error patterns reveal that the two word classes are treated differently. If we use a composite score including correct L1 answers in the L2, he has a lower performance on verbs than on nouns also in his L2, at both time points. High frequency words are clearly easier to retrieve at T1 in both languages (except for verbs in L1), but this effect has nearly disappeared at T2 (except for nouns in L2).

In L2, his less dominant language, there is a clear cognate effect for nouns, but not for verbs, at both T1 and T2.

In conversation, JJ performs better than he does in the semi-spontaneous narrative. At T1, especially in his L1, English, he communicates quite well, and manages to convey a rich and detailed life story. His retrieval problems mainly concern specific low-frequency nouns, and they are generally remedied by compensatory strategies such as circumlocution or approximation. In his Norwegian (L2) conversation, by contrast, the naming problems are more frequent and severe, and concern more fundamental aspects of sentence construction. Consequently, the opportunities for scaffolding are much more limited. At T2, the compensatory strategies for word retrieval become more limited even in English, resulting in less opportunities for the conversation partner to bring the conversation forward.

Despite some variation across the tasks, the overall impression is that JJ performs best in his first language, in accordance with his premorbid proficiency and use. However, across both languages nouns are easier to retrieve than verbs, and in semi-spontaneous narratives his performance is very low in both L1 and L2. Thus, although it may look as if JJ's L1 is less affected by the dementia than his L2, in line with prior research by e.g. Machado et al. (2010) and Mendez et al. (2004), both his narrative performance and the dissociation between nouns and verbs indicate that there are parallel impairments across his two languages. As mentioned, in the literature the findings so far are mixed regarding the question of parallel or non-parallel impairment of the languages of bilingual speakers with dementia. Further research is obviously needed in this field.

In confrontation naming, his error strategies when word retrieval fails – descriptions, use of synonyms and code switching – all indicate that his concepts are better retained than his words. This suggests that his impairment is not related to semantic memory, but rather is a problem of phonological processing, of accessing the phonological form of the word. His extensive use of code switching when naming nouns in his L2 might be seen as more of a compensatory strategy than as lack of inhibition. As mentioned above, JJ could safely assume that the test administrator knew both his languages, so code switching was a feasible strategy. Thus, his performance seems to support the Transmission Deficit Hypothesis (Burke et al., 1991). However, his poorer performance on verbs than on nouns across all contexts – and worsening with the progression of the disease – indicates a deficit in semantic and syntactic processing in particular related to action naming. This finding supports the research pointing to a dissociation between nouns and verbs found in different types of disorders (Druks et al., 2006, Kambanaros & Grohmann, 2015).

The diagnosis based on JJ's medical examination and cognitive tests was Primary Progressive Aphasia, but also described as a variant of Alzheimer's disease. It seems clear to us that since his disease so clearly started with a language deficit with cognitive functioning intact, followed by a gradual, progressive impairment of both cognitive and linguistic functioning, this is a case of PPA (Gorno-Tempini et al., 2011: 1008). The discussion in the literature concerning the sub-classification of PPA (e.g. Gorno-Tempini et al., 2011; Wilson et al. 2010), shows that it is not always easy to distinguish clearly between the different subtypes in each case. Although we are not in a position to classify JJ's PPA definitely, our linguistic investigation can bring us closer to an answer. His performance across all speech contexts shows the following pattern: His speech is generally fluent with an acceptable speech rate, not agrammatic, and he has no phonological distortions or paraphasias; this should exclude the non-fluent variant of PPA. On the other hand, his word finding problems result in many hesitations, pauses and repairs in connected speech. He has clear problems with word retrieval in confrontation naming as well as in connected speech, but spared object knowledge; this seems to exclude the semantic variant of PPA, and rather indicates that he suffers from a logopenic subtype of PPA.¹⁴ The fact that in a large proportion of cases of this subtype of PPA, the underlying pathology is similar to that of AD (Gorno-Tempini et al., 2011), may support the 'double' diagnosis given by his neurologist.

In this study, we used several tools to explore the naming skills and strategies of JJ, allowing us to examine the phenomenon from different perspectives, in our case, contexts with different demands on language processing. By combining different tools and methods of analysis we get a 'thicker' description and thus a more comprehensive picture of the impact of the dementia on JJ's languages from an intra-individual as well as an inter-individual perspective. For instance, the greater difficulties in the Norwegian interaction at T1, which seem to be linked to fundamental aspects of sentence construction, are more readily understandable in view of JJ's particularly low scores on Norwegian verbs in the confrontation naming task. On a more general level, this corroborates the crucial role of verbs in sentence construction and communication (e.g. de Diego Balaguer, Rodríguez-Fornells, Rotte, Bahlmann, Heinze, & Münte, 2006). Finally, our data show that it is necessary to assess a bilingual person in both his languages, to get a comprehensive view of strengths and weaknesses in language functioning.

¹⁴ Unfortunately, sentence repetition was not tested, so this important diagnostic feature remains unattested.

A combination of different tools and methods is also useful in clinical practice as it allows both a systematic exploration of possible effects of confounding factors such as grammatical class, cognate status and frequency, and an exploration of the phenomenon in speech contexts with different demands for language processing. By examining talk-in-interaction one also gets the opportunity to study the role of the interlocutor in managing the linguistic and communicative challenges of the person with dementia. The knowledge gained from studies of conversations, preferably combined with studies of language processing in more restricted contexts, provides a good basis for guiding significant others and professional caregivers. These interlocutors may need advice on how best to interact with the person with dementia in such a way that the person is able to make use of the linguistic and communicative resources she or he still has despite the impairments.

Limitations

Our study has several limitations. First, the medical diagnosis given at the outset was not entirely clear, and since we do not have access to the actual brain scan results, we cannot confidently evaluate the neurological basis for the disease. Second, this is a case study, and we have no control group to compare with. Although control groups for bilinguals are always problematic since it is near impossible to find groups of individuals with comparable language histories, a proper baseline control against which we could have evaluated JJ's performance, would have been preferable.

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Appendix A: Transcription conventions (conversation)

- (.) Micro pause
 (0.2) Timed pause
 [] Overlapping speech
 () Uncertain transcription
 (()) Non-verbal actions
Under Emphasis
 hh Breath or laughter
 .hh Inbreath
 = Latched speech, continuation of talk
 :: Elongated speech, a stretched sound

Appendix B: Semi-spontaneous narratives (concept analysis)*

<i>T1: English</i>	<i>T1: Norwegian</i>
she has asked him to get the ... the ... eh ... the the chicks ³ and the ... and the ... to get them down all of them and he agrees to do it and XX to do to do that and snaps and both <they> and the others are XX flat	en mann ¹ og ... kone ² og ... også det er en a man and ... wife and ... and there is a ...ja <sette rygg på > ... yes <put back on> og ... så en ... en kar han kommer opp og ... prøver til å ta vekk ... den ... som som var der and ...then a ...a guy he comes up and ... tries to take away ... that ... which which was there og så her så en en kom- ...

* The texts are segmented into AS-units (analysis of speech units) (Foster, Tonkyn, & Wigglesworth, 2000) divided by extra interlinear space in the transcription. The relevant key concept components (cf. Table 2) are marked by numbered boxes. Utterances in the non-target language are italicized, and translations of the Norwegian utterances are provided in a smaller font size. Three dots indicate pauses, unintelligible utterances are marked by X and X=, and uncertain interpretations are indicated by brackets.

<p>on the ...</p> <p>and then we have the ... taken to taken to the hospital⁸</p> <p>and then the hospita⁹</p>	<p>and then here then one one com- ...</p> <p>ja ... det ... gikk ikke så god ... yes... it ... didn't og so good</p> <p>og så så ... det det kom ned begge to and then then ... it it came down both of them</p> <p>og karen var tatt til ... til ... puh ... mm til til til ... er på er i ... and the guy was taken to ... to ... puh ...mm to to to ... is on is in...</p> <p><i>I know but I don't remember the names forget the names</i></p> <p>så <he was> kjørt til ... til ... so <he was> driven to ... to ...</p> <p>ja ... det var en som ... nettopp før før du kom yes ... there was one that ... just befor before you came</p> <p>babu babu babu ba-⁸ babu babu babu ba-</p> <p>og han ligger i ... i ... and he lies in ... in ...</p> <p><i>my wife spent fift- thirty years there bu</i></p>
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<i>T2: English</i>	<i>T2: Norwegian</i>
<p>there is a ... first there is a fine ... <X that X> chicken³ or the</p> <p>not chicken but eh</p> <p>... the- they're they're X getting they're they're getting ... to to have a child</p> <p>and they're ... putting him in a place to be</p> <p>and these ... people are ... they're trying to fix</p> <p>... waf- they should watch what they do ... this</p> <p>... right</p> <p>... and then then ... the man decides that he he will go up⁴ ...and ... bring him bring this down</p> <p>and the X ... this is persos wants</p> <p>... the... the woman wasn't much ... didn't much care one way or the other</p> <p>eh but he ...he's heavy and snaps eh ... so that the the ... the the <X others X> have to</p>	<p>det er ...to ...to ... there are ... two ... two ...</p> <p>eh ja de som er X som hjelper der eh yes those who are X who are helping there</p> <p>det de er de er har sannsynligvis at de har vært X it they are they are have probably that they have been X</p> <p>... og så så er det også sånn ... and then then it is also such</p> <p>... det de det de sitter oppi i topp oppi topp X= ... it they it they are sitting up in the top up in the top X=</p> <p>... ja og og sitter der oppe ... yes and and are sitting there up</p> <p>og så ... og de tenkt hva skal vi gjøre hva and then ... and they thouht what shall we do what</p> <p>og så ... de sitter ... de bruker å ... sitte ... eh sånne ... sitter and then ... they sit ... they use to ... sit ... eh such ... sit</p> <p>... og og kaster den ned ... and and throw it down</p>

<p>get some- somewhere else</p> <p>and this is ... four children ... standing outside</p> <p>there is a ...</p> <p>oh the man fell down⁶ ... and</p> <p>... I am not quite sure but I think that the woman is helping that person maybe because X eh eh because of of the <X chicks X></p> <p>eh this person has been ... this is called fallen down on</p> <p>and has to ... eh get the ... car <X now X> to</p> <p>the truck</p> <p>to take him to the ... to to the ...closed closed place... which is ... here</p> <p>and they get they do get</p> <p>eh eh break a a leg and then have this X</p>	<p>... det X en annen X ut til den ... åh ... X= ... it X another X out to that ... oh ... X=</p> <p>og det har X eller X= and it has X or X=</p> <p>og så ... det er han X nedover <X for langt X> and then ... it is him X downwards <X too long X></p> <p>og han falt ned fra⁶ ... X= and he fell down from ... X=</p> <p>falt til til ... til fell to to ... to</p> <p>... og ... så det... de folk X og så under X= ... and ... so it ... those people X and then under X=</p> <p>... X= det er ... X= it is</p> <p>... sist- ... las-</p> <p>... hvert fall de har sitter og venter til ... hjelp ... anyway they have sit and wait to ... help</p> <p>og det var X= and it was X=</p> <p>til til når de er i till till when they are in</p> <p>... åh ... oh</p> <p>... de er i ... they are in</p> <p>... X= ... X=</p> <p>... men i hvert fall ... de kommer ... ser ... but anyway ... they come ... see</p>
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