**Title:** Good reasons for non-standardisation in the administration of cognitive assessments

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1. **Introduction**

Cognitive assessment tools are a key component of the diagnostic process, and aim to facilitate identification of cognitive impairment, its severity, and the cognitive domains affected (Panegyres et al, 2016). The outcome of these tests is an important basis for early access to therapeutic care and management. Measuring cognitive function is, therefore, one of the most important assessments clinicians make (Alzheimer’s Society, 2015). A wide range of cognitive screening and assessment tools designed to test different aspects of cognitive functionality (e.g., recall, reasoning, abstract thinking, visuospatial and verbal skills) are available, e.g., Addenbrooke’s Cognitive examination (ACE-III), Montreal Cognitive assessment (MOCA), Six-item Cognitive Impairment test (6CIT) and Mini-Mental State Exam (MMSE).[[1]](#footnote-1) The ACE-III, examined in this paper, has reportedly good diagnostic specificity (Hsieh, 2013) that is sensitive to the early stages of dementia (Bruno and Schurmann Vignaga, 2019) and has been recommended in the UK by the Department of Health and the Alzheimer’s Society for use in specialist memory services (Alzheimer’s Society, 2015). However, a recent Cochrane Review (Beishon et al., 2019) raises questions about the quality of research that underpins estimates of the utility of the ACE-III. Significantly, Beishon et al. point to a lack of information about how the test was carried out in relevant studies.

Clinicians are aided in the administration of the ACE-III by a guide which helps to ensure standard procedures are followed. The implementation of tests matters because interpretation of outcomes relies on normative scores derived from the assumed standardization of the testing process.  If the correct administrative procedures are not followed the test is ‘not useful in indicating whether [a patient’s] score falls in the normal or pathological range’ (Venneri, 2005, p.97) and, therefore, could alter a clinician’s ability to make an accurate diagnosis. Despite the basic requirement for standardization of procedures, specialist clinicians anecdotally report having received no formal training on the administration of the ACE-III. Furthermore, the guidance document is not always clear; there are no instructions on how to introduce the test, and some questions have verbatim instruction, whilst other questions are *quasi*-scripted and do not require the practitioner to use the specific wording. These inconsistencies enable interactional variation in the administration of the test (Jones et al, 2020).

In common with most cognitive assessment tools, the ACE-III is implemented by means of talk-in-interaction (Drew, Raymond, Weinberg, 2006).  All talk is locally occasioned and contingent, hence unavoidably introducing non-standardised elements to the testing process. There is a body of CA research exploring standardization-in-interaction in a range of different settings: e.g., surveys (Houtkoop-Steenstra, 2000; Maynard et al. 2002); education (Marlaire and Maynard, 1990; Maynard and Turowetz, 2017); and healthcare (Jones et al, 2020). This research is predominantly interested in the ‘interactional substrate’ - the social organization of talk during standardized examinations and survey interviews. Much like in the delivery of standardized cognitive assessments, standardization in surveys focuses on reducing interviewer variability and thus on improving reliability, so that different interviewers act according to interviewing rules. However, such research has revealed that:

Standardization in survey research or any other realm is not guaranteed by its rules and procedures. Standardization has to be achieved according to the variegated circumstances that impinge on any attempt to follow those rules and procedures (Maynard and Schaeffer, 2006, p.27).

Maynard and Marlaire (1992) suggest that the interactional practices testers employ when administering psychoeducational standardized examinations can influence recipients’ responses, and their experience of ‘being tested’. Ultimately, they showed that test scores are collaborative products of the testing process rather than reflecting the (ostensibly) neutral qualities of the instrument.  Some interviewers/testers, for instance, opt for a more conversational approach by changing the scripted, ‘neutrally’ formulated, standardized questions (Houtkoop-Steenstra, 1997) because the rigidities of standardization can lead to contrived interactions. Similarly, in an ethnographic study of memory clinics, Swallow and Hillman (2018, p. 229) illustrate practitioners’ ‘tinkering’ practices to ‘carefully choreograph the consultation process’ (ibid. p. 234) in a number of practical ways. These include actively omitting test items and going off script to provide reassurance and encouragement. Swallow and Hillman suggest these practices are mechanisms for taking care of the vulnerabilities of the diagnostic encounter. That is, active *ad hoc* redesigning of test implementation, stepping away from standardization, occurs to prioritise recipiency and emotional labour.

The rigidities of standardized surveys/interviews are often overcome by interviewers revising the original questions to include more natural or *recipient-designed* formulations (Maynard & Schaeffer, 2006; Houtkoop-Steenstra, 1995: Houtkoop-Steenstra and Antaki, 1997). Recipient-design is a conversation analytic concept developed by Sacks (1992) to refer to the ways that speakers adapt talk for co-participants. This is a normative feature of interaction such that interlocutors hold each other accountable for failing to orient to what they know about each other and the particular circumstances of the interaction. Underpinned by Goffman’s (1967) work on *face*, Houtkoop-Steenstra and Antaki (1997, p.286) show how interviewers use recipient-design to encourage ‘face-protective responses in environments that are marked by interactional troubles’, i.e., they change the question to help the respondent to answer successfully. In medical assessments, where strict administrative procedure is required, there appears a tension between standardisation (underpinned by institutional constraints) and recipient design (and see Heritage, 2002).

The above findings suggest a need for fine-grained analysis of the situated implementation of cognitive assessments. In an earlier paper (Jones et al, 2020) we reported findings based on video recordings of clinicians and patients doing the ACE-III, showing a variety of ways that test implementation in practice is neither fixed nor standardized. For example, we demonstrated variation in the way clinicians introduce the test to patients as part of the ongoing activities in a consultation. To some extent, this variation might be expected as there is no administrative guidance for practitioners in how to prepare patients for the test. However, the different methods the practitioners used appeared to be consequential for how patients received and understood the testing activity. Our earlier work also demonstrated deviations from the standardised instructions that the ACE-III does provide. For example, practitioners might vary the design of questions and/or introduce elements of reassurance that are not present in the guidance.

This chapter continues and extends our earlier work. Following a description of our methods (Section 2), we return to the matter of variation in test introduction (Section 3.1) and extend our previous analysis by suggesting a possible association with practitioners’ working diagnoses. We then return to the evident non-standardisation of the delivery of test questions, including elements of recipient-design (Section 3.2). Finally, we introduce entirely new analyses of practitioner utterances that are positioned after a patient has answered (or attempted to answer) a question; that is, in the third-turn (Section 3.3). In this work we are not aiming to highlight particular issues with the ACE-III as a problematic assessment, nor the testers as incompetent; rather we’re pointing to more general issues about the social nature of tests of cognitive functioning, and the competing demands clinicians face in 1) trying to carry out the test in line with the instructions i.e., in a standardised way; and (2) doing so in manner which takes into account how the patients are responding or might respond. By exploring some of the ways in which the administration of the ACE-III differs from standard procedures in clinical guidance - including ways in which elements of the consultation are recipient-designed– we show there are often ‘appropriate’ interactional reasons for non-standard administration of cognitive examination.

**2. Methods**

The data are video recordings of 105 initial assessment consultations in a specialist neurology-led memory service in the UK. Patients have predominantly been referred by their GPs and these initial consultations typically comprise history-taking, followed by the ACE-III and sometimes a mood questionnaire, and then a brief physical examination. Further diagnostic testing, including a neuropsychology battery and Magnetic Resonance Imaging (MRI) are completed in a later appointment. The ACE-III is scored out of 100, with the higher score denoting better cognitive function and the cut-off for dementia being 82–88/100 (Crawford et al, 2012). Previous research has focused on the history-taking conversations before patients take the formal cognitive test(Elsey et al, 2015; Jones et al, 2016; Reuber et al, 2018). The current research focuses on the administration of the ACE-III. There were 92-recorded occurrences of the ACE-III being administered, from which a sample of 40 cases were randomly selected for detailed analysis. The administration of the test takes on average 15 minutes (the full initial consultation lasts on average approximately 35 minutes). In the sample consultations there are five different clinicians recorded - three neurologists and two neurology registrars. The interactions were transcribed in detail, according to the conventions used in Conversation Analysis (CA).

There is now an established body of CA research in medical settings (Heritage and Maynard, 2006; Stivers, 2007; Robinson and Heritage, 2014; Leydon and Barnes, 2020) which has identified patterns of language and interaction that inform practice (Heritage et al, 2007; Wilkinson, 2013), medical assessment (Heritage and Stivers, 1999; Reuber et al, 2009) and treatment recommendations (Stivers, 2002; Stivers and Barnes, 2018; Toerien, 2021). CA is also used to examine closely the various communicative formats used to ‘deliver’ medically relevant actions, such as diagnosis (Heath, 1992; Peräkylä, 1998; Maynard, 2017) – including dementia diagnoses (Dooley et al, 2018), as well as to explore linguistic and interactional patterns that can help clinicians to establish differential diagnosis (Elsey et al, 2015; Jones et al, 2016; Reuber et al 2018). In this study, we draw on conversation analytic methods to examine recordings of clinicians and patients completing the ACE-III.

1. **Analysis**

Our earlier work (Jones et al., 2020) revealed interactional *variations* in the administration of the ACE-III (e.g.,in the ways that clinicians introduce the test), and *deviations* from the (quasi) scripted guidance designed to ensure standardization. We showed that clinicians appear to design the questions in ways that reflect or account for patients’ perceived abilities. Here, as outlined above, we will start by further exploring interactional variation and deviation during the introduction to the test.

*3.1 Interactional variation: Introduction of the memory assessment*

There is *variation* in the manner clinicians’ transition from the history-taking phase of the consultation to administering the ACE-III (Jones et al, 2020). History-taking involves between 10-20 minutes of clinician-led questions in order to understand the person’s background and their current concerns. There is no guidance on how to introduce the test and each clinician completes this differently. Furthermore, as Jones et al, (2020) showed, variations in the introduction of the test appear to have implications for patients’ understanding, with some patients displaying uncertainty as evident within their embodied or verbal reactions. For example, some clinicians do not mention the test explicitly at all during the consultation itself, saying, for instance, “We’ll just run through a few quick questions then I’ll examine you” immediately before the test commences. Utterances of this kind, coming at the end of what is already a substantial period of questioning (during the history-taking), do not clearly convey that the upcoming questions are part of a discrete test, and hence can create difficulties for patients. Other patients appear to be fully aware of the expectations for the next phase of the consultation when the clinician adopts a different approach - explicitly naming the test, providing information about the questions within it and how the test was validated (see Jones et al., 2020, for full analysis).

Extract 1 shows another version of test introduction from a different clinician. In this version, the clinician introduces the upcoming test by both marking and naming a change of activity, characterising it as a ‘memory test’ but without furnishing details.

Extract 1

|  |  |  |
| --- | --- | --- |
| 01 | Neu1: | Erm:: So >I’m gonna> do:: (.) a |
| 02 |  | memory test on you now.=Is that okay:, |
| 03 | Pat: | Yeah. |
| 04 | Neu1: | Er: So what day: is it today:, |

In Extract 1, the clinician pronounces to the patient that they are going to be subject to a memory test (lines 1-2). The turn design conveys the clinician’s high deontic and epistemic authority (see Stevanovic and Peräkylä, 2012 or Muntigl, this edition) to decide about what happens next (‘I’m going to…’; notwithstanding the tag at the end of line 2) and expertise to conduct this test ‘on’ the patient (line 2). The test itself is characterised as a memory test but no further details are given. The patient confirms they are okay to continue - “Yeah” (line 3) – thus claiming (but not displaying) understanding of what is coming next.

Extract 2 (below) shows the moment of transition from history taking to testing involving the same clinician and another patient. Here, the hierarchical stance is more collaborative with the clinician’s proposal that “we’ll do a memory test now” (extract 2, line 1), which suggests more of a joint activity for the clinician and the patient.

Extract 2

|  |  |  |
| --- | --- | --- |
| 01 | Neu1: | OK. So we'll do a memory test now.=Okay:? |
| 02 | Pat: | Yeah. |
| 03 | Neu1: | So what day is it toda:y? |

It is interesting to note that this clinician (Neu1) is the only one (of the five clinicians recorded) to routinely seek consent or permission from the patient to begin the testing phase of the consultation - “Is that okay?” (extract 1, line 2) and “Okay?” (extract 2, line 1), thus introducing further variation. Notably though, in both these cases the clinician does not lift his gaze to the patient when seeking this consent. Instead, the clinician is engaged in gathering the test paperwork from a cupboard behind him and attaching the patient’s information to the test paper.

Further to exploring variation between the individual clinicians’ styles of introducing the formal cognitive assessment, we found that clinicians would alter their own practice for different patients. The clinicians in the memory clinic informed us during informal discussions that they generally form an initial impression of the patients’ abilities during history–taking. They reported that within the first five minutes of talking to the patient they have generally formed a “working diagnosis”. Clinicians often use an initial “gut-feeling” as part of their clinical decision-making (Lindeberg et al, 2019) and the accuracy of this clinical impression on determining an correct diagnosis has been positively assessed (Pond et al, 2013). With this in mind, we suggest that clinicians may be adapting their administration of the cognitive assessment tool according to their working diagnosis. That is, in these interactions, clinicians can be seen to be (re)designing aspects of the test to suit the patient’s abilities or undertaking extra interactional work to prepare some patients for the potentially difficult nature of the test. This concept of recipient design (Sacks, 1992) relates to the relationship between the tester and recipient of the test. This was particularly evident during the introduction of the test.

The two patients in extracts 1 and 2 were given a working diagnosis of non-progressive memory problems (which may be summarized under the term ‘functional cognitive disorder’ (FCD)) after the initial consultation and received a formal diagnosis of FCD (Pennington, et al 2015). In contrast, the following patients (Extracts 3 and 4) both received a dementia diagnosis from the same clinician (Neu1). Prior to extract 3 the patient had been asked a series of questions requiring her to recall several details regarding her family’s medical history, which she was struggling to recall, informing the clinician that he was “asking difficult questions”.

Extract 3

|  |  |  |
| --- | --- | --- |
| 01 | Neu1: | So I’m gonna do a memory test on you now.=Okay, |
| 02 | Pat: | °Yeah°. .shih((*sniff*)) |
| 03 |  | (0.4) |
| 04 | Neu1: | So these are (.) designed to be a |
| 05 |  | bit tricky a[n::.st]retch your memory, |
| 06 | Pat: | [Yeah. ] |
| 07 | Neu1: | So it’d be ((similar to-)) (.) but even harder |
| 08 |  | questions unfortunately for you:, |
| 09 |  | (.) |
| 10 | Neu1: | Erm: so, (.) what day is it today? |

Extract 3 begins in a very similar manner to the previous two extracts, with the clinician informing the patient that a memory test will ensue (line 1), and (nominally) seeking consent, “Okay” (line 1). Although the patient confirms readiness/willingness to perform the test - “Yeah” (line 2) - this is said very quietly and is followed by an audible sniff. Sniﬃng can be interactionally relevant (Hepburn, 2004; Hoey, 2020) though, to our knowledge, systematic analysis has not been conducted in this sequential environment. Together with the quietly spoken agreement, we speculate that this sniﬀ is perhaps a display of unsureness or apprehension. Rather than commencing the test, as in the previous two examples, the clinician orients to the patient’s possible ‘unsureness”. “So” (line 4) in turn-initial position could be seen to be ‘other-attentive’ (Bolden, 2006). In stating that the test is “designed to be a bit tricky and stretch your memory” (line 4-5) the clinician could be both orienting to his perception of the patient’s cognitive difficulties, as well as to the patient’s lack of conviction in the confirmation to proceed with the test. The clinician is working here to absolve the patient should they find the test difficult by characterising the test as designedly difficult. The sense that the clinician is orienting to an already formed working diagnosis of more severe cognitive difficulties is supported further when he states that the questions would be “even harder questions unfortunately for you” (line 7 and 8). The questions may be designedly tricky, but here the clinician is expressing that the patient (with their particular cognitive deficits) would find them even harder to answer. The clinician here is engaging in additional interactional work to prepare the patient for the task ahead and, in expressing regret about the difficulty of the questions with “unfortunately” (line 8), he is working to build solidarity and set (perhaps low) expectations. This introduction is therefore designed for this particular patient. Extract (4), again with the same clinician (Neu1), shows very similar features.

Schiffrin (1987) argues that ‘‘so’’ has the

basic meaning of result

Extract 4

|  |  |  |
| --- | --- | --- |
| 01 | Neu1: | Okay. So I’m going to do a memory test with you |
| 02 |  | now.= if that’s oka:y, |
| 03 |  | (0.2) ((Dr looks at Patient)) |
| 04 | Pat: | .hhh HH[Hhhh ] |
| 05 | Neu1: | [I kno]w these aren’[t (.) particularl]y |
| 06 | Pat: | [((I’ve haven’t))] |
| 07 | Neu1: | nice:, |
| 08 | Pat: | °um hmm° |
| 09 | Neu1: | >But they’re okay,<.hh So what da:y is it today, |

Similar to the collaborative introduction to the test in extract 2 (“we’ll do a memory test now” (line 1)), here the clinician declaratively introduces the test by stating “So I’m going to do a memory test with you now” (line 1-2). He follows it up again with a tag question seeking consent to proceed, “if that’s okay” (line 2). Apart from the slight change in formation from doing a test “on you” (extract 1 and 3) to “with you” (extract 4), and the tag question being formulated with either “is that okay” (extract 1), “Okay” (extract 2 and 3) and “if that’s okay” (extract 4), these are all very similar introductions to the test. Unlike in the other extracts, however, here the patient does not confirm that it is okay to proceed. The tag question’s format invites a polar response from the patient, but her response is not type-conforming (Raymond, 2003), suggesting potential disaffiliation. Possible resistance on the part of the patient is first adumbrated by a gap (line 3) followed by an audible sigh (line 4). Hoey (2014) suggests that sighing has an indexical relationship with emotion – specifically, negative emotion. Here the patient could be hearably using the sigh to convey some level of distress. In both these extracts, the patients use non-lexical tokens (the sniff - extract 3, and the sigh - extract 4) to (possibly) display some problem with the proposed course of action. Again, the clinician orients to the patient’s negative stance by displaying his awareness of the disagreeable nature of the memory test, “I know these aren’t particularly nice” (lines 5-7), before reassuring the patient that “they’re ok” (line 9). Here the extra interactional work appears to arise more out of the contingencies of the patient’s response, rather than that clinician’s perception of their ability. However, it is worth noting the contrast between the ways the test is introduced for patients with likely FCD (extracts 1 and 2) and those with likely dementia (extracts 3 and 4). Furthermore, when the clinician has a working diagnosis of dementia (extracts 3 and 4) he gazes up at the patient when seeking consent to complete the memory test. He does not give this level of attention to the patients with FCD.

In summary, we have explored variation between clinicians in the way they introduce the formal cognitive examination. We have further shown through analysing cases from a single clinician (Neu1) with different patients, how the introduction to the test is often recipient-designed, with the clinician adapting interactional practices when patients have more severe cognitive difficulties. This alteration may be either contingent on the patient’s negative response to the course of action proposed by the clinician, or orients to the clinician’s perception of the patient’s ability. In the consultations where the clinician has formed a working diagnosis of dementia during history taking, they often amended their introduction to include more attention (in their gaze patterns) and convey some of the difficulty the test may pose for the patient. These alterations suggest that there may be good reasons for variation in the introduction to the test.

*3.2 Interactional non-standardization and recipient question design*

There are other elements of the test that show evidence of recipient-design. Different clinicians deviate from the parameters of the test to design questions in ways that function to ‘help’ the patient establish the correct answer. This is evident for both questions that have verbatim instruction, as well as for *quasi*-scripted questions. Jones et al, (2020, p. 465-466) showed how clinicians help the patient with the more basic questions, like identifying the season of the year (extracts represented here). Extract 5 demonstrates how the question ordinarily runs off.

**Extract 5**

|  |  |  |
| --- | --- | --- |
| 01 | Neu2: | And what season of the year is it,= |
| 02 | Pat: | =Autumn. |
| 03 |  | (0.4) |
| 04 | Neu2: | .hhh Where are we,=What’s the name of this place, |

This extract shows an unproblematic question-answer sequence which follows the standard administrative procedure for the test, continuing with the next question (line 4). This extract is taken from someone who reported subjective cognitive complaints. In contrast, in extract 6 the clinician engages in extra interactional work, orienting to the patient’s difficulty in responding to the question and helping the patient establish the correct answer.

**Extract 6**

|  |  |  |
| --- | --- | --- |
| 01 | Neu3: | Erm, what erm, what season of the year are |
| 02 |  | we in? Is it spring, summer, autumn, winter? |
| 03 |  | What season is it? |
| 04 | Pat: | Erm. (0.4) |
| 05 | Neu3: | £I know it’s hard to tell at the |
| 06 |  | moment. Huh huh huh huh |
| 07 | Pat: | Yeah.= |
| 08 | Neu3: | =What would you say? |
| 09 | Pat: | Erm, (0.4) Autumn. |
| 10 | Neu3: | Oh Okay. That’s great. |

The patient in extract 6 displayed extreme levels of cognitive decline during history-taking (he did not know his age or why he was at the clinic). He subsequently scored only 31 out of 100 on the ACE-III, which is highly indicative of dementia. In the test immediately before this question about the season the patient said the wrong day, didn’t know the date, replied with “Monday” when asked the month, and replied with the name of the country when asked what year it was. Here the clinician is again asking, “what season of the year are we in” (lines 1 and 2), and then proceeds to produce candidate options for the patient (line 2). Given the patient had just prior responded with the name of the country when asked the year the clinician is here mobilising recipient-design by restricting the category of responses the patient can produce. This kind of anticipatory work – anticipating trouble and explicating possible answers for the patient deviates from the guidance. Trouble in responding is confirmed when the patient utters a marker of hesitation and pauses (line 4). Instead of moving on or reasserting the same question (which is a more typical course of action when a patient delays a response), the clinician states, “I know it’s hard to tell at the moment” (lines 5-6). This implies that the current weather condition, which is visible from the window, is atypical for the season they are in, thus assisting the patient to determine the correct answer (e.g., if it was snowing, and the weather was atypical, one might deduce that it was perhaps spring or summer). It could also work to excuse the patient for his displayed lack of knowledge – placing the blame for his inability to respond on the atypical weather rather than the patient’s failing cognition. The clinician further prompts for a reply, “what would you say” (line 8) – this implies that a guess based on this information may be acceptable. Despite this extra interactional work, the patient incorrectly responds with “autumn” (line 9) (when in fact it is spring). The clinician receipts the incorrect response with ‘Oh okay’ (line 10), a turn in which the oh-prefacing is the only indicator that the response was in some way unexpected (Heritage, 1998).

Jones, et al (2020) also showed how clinicians deviate from the administrative guide during the ‘attention-subtraction’ task, which states, “Ask the participant to subtract seven from 100, record the answer, and then ask the participant to keep subtracting seven from each new number until you ask them to stop”. This ordinarily runs off as follows:

**Extract 7**

|  |  |  |
| --- | --- | --- |
| 01 | Neu4: | Can you subtract seven from one hundred, |
| 02 | Pat: | Ninety-three. |
| 03 | Neu4: | And then keep taking seven from the |
| 04 |  | number that you get. |
| 05 |  | (0.4) |
| 06 | Pat: | Eigh::ty-four::,(0.6)s:: seventy-s:even, (0.2) |
| 07 |  | seventy,(0.6) s:ixty-three:, |
| 08 | Neu4: | Good. |

In Extract 7, the clinician does not offer any further guidance to the patient and does not attempt to support the patient’s handling of the calculations. However, Jones et al, (2020) showed that some clinicians alter this sequence by repeating the patient’s response after each subtraction within the design of the next sum, meaning the number of origin is repeated back to the patient, for example, “and seven away from ninety-three” (Jones et al, 2020, p. 465). We suggested that this showed evidence of co-construction, where the clinician appears to be helping the patients by adding information into the question and thus placing less of a burden on the patient’s attention skills to independently remember the numbers. These different designs demonstrate a divergence from the standardized test requirements given in the guidance but also places differential ‘cognitive load’ (Chandler and Sweller, 1991; Majlesi and Plejert, 2018) on patients.

We have also found occasions when the same question is amended, or as in the next case (extract 8), abandoned by the clinicians when it is clear that the patient is unable to complete it accurately. The patient in Extract 8 scored 65 out of 100 on the ACE-III and was diagnosed with dementia. Again, the patient has displayed interactional signs of dementia during history-taking (Jones et al, 2015; Reuber et al, 2018) and was given a working diagnosis of dementia by the clinician after the initial consultation. The scoring guide states that clinicians should “not stop the participant if they make a mistake. Allow them to carry on and check subsequent answers for scoring”, as the patients can score up to 5 points on this question, one for each correct subtraction. For example, in Extract 7, the patient got the first subtraction correct (line 2) but all the subsequent subtractions wrong (lines 6-7) so would have scored 1 for this question (although notably the error arises from the first incorrect answer because the remaining answers are correct in terms of subtracting seven each time). Despite getting the second subtraction wrong the clinician allowed the patient to continue with the course of the question. The clinician in the following extract administers this question quite differently:

Extract 8

|  |  |  |
| --- | --- | --- |
| 01 | Neu4: | Can you subtract seven from a hundred, |
| 02 |  | (1.2) |
| 03 | Pat: | .hh Er:::(0.2) ninety-two:. |
| 04 |  | (0.6) |
| 05 | Neu4: | Okay what we’ll do is- er: can you spell me the |
| 06 |  | word ‘world’, |

The patient projects trouble in answering, with a long gap (line 2) and the turn initial delay, “er” (line 3) before producing the wrong answer, “Ninety-two” (line 3) (albeit only incorrect by one number). The clinician then starts to narrate the next course of action he is going to take, which departs from pursuing further answers from the patient (“Okay what we’ll do is”, line 05). Instead of completing this with something like, “move to the next question”, the clinician proceeds to actually produce the next question, “can you spell me the word world” (lines 5-6). The clinician is here orienting to the patient’s troubles, and perhaps his own working diagnosis of the patient’s abilities and is choosing not to follow the administrative and scoring guidance by abandoning the question. This is another way in which the clinicians design and administer the assessment for particular patients.

We have shown how clinicians vary the administration of the ACE-III, both in the manner in which it is introduced within the initial consultation, and within the design of certain questions, deviating from the scripted or quasi-scripted guidance meant to ensure standard administrative procedures are followed. There is evidence of recipient-design, which is often locally occasioned in the interaction itself, for example when patients display some troubles with the course of action or in responding to a particular question. These troubles may also be predicted by the clinicians based on their perception of ‘how the patient is doing’ in the consultation more generally and the working diagnosis they have formed. The clinicians do extra interactional work to orient to these troubles and work to help the patients with the questions. We now move to show how this ‘special attention’ appears in different sequential locations within the administration of the ACE-III, notably in the clinician’s third-turn responses (Sacks, 1992; Schegloff, 1995; Schegloff, 2007).

*3.3 Recipient design in third turn - FCD*

Another place where clinicians demonstrate some additional interactional attention to the patient is in the third turn. Elaborations after a potentially completed sequence of talk has been widely discussed in CA literature (Schegloff, 2007), identifying different purposes for third-turn utterances in different interactional environments, such as in everyday interaction (Beach, 1993), in courtrooms (Atkinson and Drew, 1979), job interviews (Button, 1987), news interviews (Clayman, 1988; Clayman & Heritage, 2002; Clayman et al, 2020), classrooms (McHoul, 1978; Koole, 2010) and survey interviews (Maynard and Schaeffer, 2005; Houtkoop-Steenstra, 2000). Expansion in the third turn might be designed to be either minimal or non-minimal (Schegloff, 2007). Non-minimal post expansions project further talk, such as repair. Minimal expansions represent one further turn at talk following the second pair part and do not project further talk; hence they are also known as “sequence-closing thirds” (Schegloff, 2007, p.118). Minimal post-expansions accomplish a range of actions, including receipts of information using tokens such as “okay” (Beach, 1993), minimal confirmatory/assessing responses such as “good” (Maynard and Marlaire, 1992), and what survey methodologists characterise as feedback (Houtkoop-Steenstra, 1997; Maynard and Schaeffer, 2005). Interviewers can use this third-turn position, not only to acknowledge a response, but also to convey evaluations of it for the purpose of providing reassurance and motivation (Swallow and Hillman, 2018). However, interviewing protocols often advise administrators to produce “neutral” acknowledgements only, thus refraining from indicating whether a response is correct or incorrect (Mehan, Hertweck, and Meihls, 1986). Maynard and Marlaire (1992) demonstrated how acknowledgments (such as smiling and nodding following a correct response) do not necessarily affect an individual answer but may have a cumulative influence on performance.

Importantly, the ACE-III administrative guide has no advice on how clinicians should respond to answers. In our dataset, there appear to be different approaches adopted by different clinicians and for different patients and their abilities. That is, we see a distinction in the interactional uses of third-turns depending on whether the patient has FCD or dementia. The first three examples below (extracts 9-11) exemplify routine practice when a patient has a working diagnosis of FCD and the subsequent four (extracts 12-15, Section 3.4) feature patients with dementia. We found that when there is a working diagnosis of FCD the clinicians generally do not produce third-turn responses or, if they are produced, they are typically minimal, either “okay” or “good”, and appear at the end of a task sequence rather than between individual question-answer sequences. The focal sequence within extracts 9-14 is taken from an ‘attention-orientation’ task on the ACE-III, which is scored out of 5 (extract 15 deals with a different question). On the test paper clinicians are told, “Ask: which – No./Floor, Street/Hospital, Town, County, Country”. The test then moves to an ‘attention-registration’ task where the participants are asked to repeat and remember three words.

In our first example (extract 9), the clinician uses no post-expansion in third-turn position.

Extract 9

|  |  |  |
| --- | --- | --- |
| 01 | Neu4: | An- Where are we,=What’s the name of this place, |
| 02 | Pat: | (City name). |
| 03 |  | (0.8) |
| 04 | Neu4: | Um- th- the name of this specific building, |
| 05 | Pat: | Er (Hospital name). |
| 06 | Neu4: | And >do you know what< floor we’re on, |
| 07 | Pat: | (Floor letter) |
| 08 | Neu4: | And what county is (City name) in, |
| 09 | Pat: | (County name). |
| 10 | Neu4: | And what country is, n- do we live in, |
| 11 | Pat: | England. |
| 12 | Neu4: | .hh I’m going to give you the name of three things |
| 13 |  | I want you to remember, |

After each response the clinician moves to the next question in the sequence, even when the task is changing (line 12). Looking across the dataset, this lack of minimal post-expansion is typical when the patient has FCD. However, there is often some ambiguity in the initial question in this section “what’s the name of this place?” (line 1). As Schegloff (1972) shows, a range of possibly correct answers are relevant in response to such a question (e.g., the specific room, the building, city and so on). In this case the patient responds with the name of the city (line 2) (other patients provide alternative place terms including more generic responses such as “a hospital”). The test is here seeking the name of the specific hospital as the ‘correct’ response and therefore, in the third-turn (line 4), the clinician repairs her question to be more specific, “the name of the specific building”. Although this is not prefaced by an explicit marker of repair, for example “I mean” (see Schegloff, 1992), following a gap (line 3) and turn-initial delay the clinician partially repeats her prior turn (“the name of the”) before replacing the ambiguous term, “place” with the more particular locational formulation, “this building”. This attends to the lack of specificity inherent in the initial question as required by the question on the test papers. That is, in order to gain a point on the test the patient needs to produce the name of the building in response to this question. Following the reformulated question, the patient does produce the required response (line 5) and the clinician moves on with no further elaboration or acknowledgment. The next extract is very similar, in that the initial question requires some revision. However, in this extract (10), the clinician acknowledges the end of the task sequence before moving to a new activity (“Good” – line 13).

Extract 10

|  |  |  |
| --- | --- | --- |
| 01 | Neu1: | What building are we in, |
| 02 | Pat: | Hospital. |
| 03 | Neu1: | What’s the na:me of the hospital, |
| 04 | Pat: | (Hospital name) |
| 05 | Neu1: | And what floor are we on, |
| 06 | Pat: | (Floor letter). |
| 07 | Neu1: | And what town, |
| 08 | Pat: | (City name) |
| 09 | Neu1: | And the county, |
| 10 | Pat: | (County name). |
| 11 | Neu1: | And the country, |
| 12 | Pat: | England. |
| 13 | Neu1: | Good. |
| 14 |  | (0.2) |
| 15 | Neu1: | >Now I’m g-< I’m going to ask you to repeat three words… |

The clinician’s initial question here is a little more constrained than in extract 9, asking, “what building are we in?” (extract 10, line 1). Despite needing to identify a “building” (extract 10) instead of a “place” (extract 9), the patient does not respond with the name of the hospital but labels the type of building, i.e., a “hospital” (line 2). Again, the clinician attends to the test requirements for a more specific locational formulation by asking the patient “What’s the name of the hospital” (line 3). Although this may not be interactionally salient to the patient, analysing the data in relation to the external requirements of a standardised test reveals the clinician’s orientation to be more specific. Reformulating the question enables the patient to produce the ‘correct’ locational formulation to gain a point on the test. As noted, this question appears to be a source of troubles in many of the interactions we have examined, suggesting a need for further advice to clinicians regarding the specificities of this question. In this case, the patient continues to produce the required response (line 4) and the clinician moves forward, notably using and-prefaced questions (Heritage and Sorjonen, 1994), which was not a feature of the revised question at line 3. This further suggests that the question at line 3 was not the next in a sequence of questions, but rather, a clarification of the earlier question. There is no overt acknowledgment of the patient’s responses until the end of the task sequence - “Good” (line 13). This minimal post-expansion is designed to close the prior sequence, before initiating the next (Beach, 1993; Schegloff, 2007). It could also be hearably assessing the prior responses as being accurate, hence, providing the patient with reassurance (Swallow and Hillman, 2018).

We see something similar in Extract 11, where “Okay” (line 12) is used to receipt the answer and to close the sequence before moving to the next task.

Extract 11

|  |  |  |
| --- | --- | --- |
| 01 | Neu2: | A::nd can you tell me the name of the |
| 02 |  | building we’re in, |
| 03 | Pat: | .tch .hh (Hospital name) |
| 04 | Neu2: | And the floor that we’re on, |
| 05 | Pat: | Er:(letter) floor. |
| 06 | Neu2: | And the:: city, |
| 07 | Pat: | (City name)= |
| 08 | Neu2: | =The county, |
| 09 | Pat: | (City name) is (county) isn’t [it,] |
| 10 | Neu2: | [And] country, |
| 11 | Pat: | UK. Huh hh |
| 12 | Neu2: | Okay.= And just repeat these three words… |

Merritt (1980, p. 144) suggests that ‘Okay’ acts as a “bridge, a linking device between two stages or phases of the [service] encounter”. Furthermore, Maynard and Schaeffer (2005) suggest, “okay” signifies the boundaries of related questions in that interviewers withhold third-turn acknowledgment when a subsequent question links to the topic of its predecessor and produce acknowledgments when the next question shifts topic. In extract 11, “Okay” (line 12) bridges topics and shifts between two discrete tasks on the ACE-III. Clinicians also do not appear to confirm the responses of patients with FCD, even if they seek confirmation. For example, the patient in extract 11 is uncertain of the county but nevertheless gives the correct response, followed by a confirmation check “isn’t it” (line 9). The clinician does not confirm that the patient has given the correct response and instead continues with the next question.

In sum, when there is a working diagnosis of FCD the clinicians generally do not produce third-turn responses or, if they are produced, they are typically minimal, either “okay” or “good”, and appear at the end of a task sequence rather than between individual question-answer sequences. The third-turn can also be used to address a lack of specificity within the design of the initial question as required by the test. The clinicians use this turn to restrict the range of place terms to a specific locational formulation to enable to patient to score a point on the test. Third-turn utterances often look different when clinicians interact with people with a working diagnosis of dementia.

*3.4 Recipient design in third-turn - Dementia*

When clinicians have established a working diagnosis of dementia based on a patient’s ‘performance’ during history-taking, they often conduct the ACE-III differently. Some clinicians do not require these patients to be as specific in their responses (as compared with examples above - extracts 9 and 10). Also, they do not use the third-turn to seek a more specific, and thus, correct response. For example, in the extract below (12), the patient responds to the question about the “name of the building you’re in” (line 1) with “Hospital” (line 2). As we have seen above (extract 10) this locational formulation is not accurate and requires further revision to receive a point on the test. Here, the patient has a diagnosis of dementia and the clinician does not alter the question in the third-turn and instead appears to accept this more general locational formulation and moves to the next question (although it is not clear if the patient received a point on the test paper).

Extract 12

|  |  |  |
| --- | --- | --- |
| 01 | Neu4: | Okay.= Can you tell me the name of the building you’re in, |
| 02 |  | (0.2) |
| 03 | Pat: | Hospital. |
| 04 | Neu4: | A:nd the floor that you’re on, |

The next extract (13) also demonstrates the clinician’s lack of orientation to eliciting a full and correct response to this question. For the purpose of the transcript below we have used the pseudonym ‘Sandington’ for the hospital name.

Extract 13

|  |  |  |
| --- | --- | --- |
| 01 | Neu1: | What building are we in at the moment, |
| 02 | Pat: | Pardon, |
| 03 | Neu1: | What's the name of this building, |
| 04 | Pat: | Oh it's er a- Sa- Sa- Sa- (0.4) hhh it's |
| 05 |  | got S (0.6) um::, (0.4) tch I've been |
| 06 |  | here (.) many times. Sadn- Sandi- Sandi- |
| 07 |  | (0.4)HHH Sa- Sadding- or something like that. |
| 08 | Neu1: | That's right.= Yeah. The Sandington.= |
| 09 | Pat: | SANDington. Yeah. |
| 10 | Neu1: | >°Good°. And wha-< do you know what floor we're on, |
| 11 | Pat: | Yes:. |
| 12 | Neu1: | What floor is it, |
| 13 |  | (0.2) |
| 14 | Pat: | (Floor letter) |
| 15 | Neu1: | Very good. What's the name of the town we're in, |
| 16 | Pat: | ^Well it’s (City name)^. |
| 17 | Neu1: | And the county, |
| 18 | Pat: | Er:: (County name). |
| 19 | Neu1: | And the: country, |
| 20 |  | (0.2) |
| 21 | Pat: | And the country, (0.2) erm::: ye- the whole |
| 22 |  | of it, erm: ^I don't know^, |
| 23 |  | (0.4) |
| 24 | Com: | .hhhhh hhhh |
| 25 |  | (0.6) |
| 26 | Pat: | No, it goes, you see, |
| 27 | Neu1: | Okay. Can you repeat after me these three words: |

Despite the patient only partially and somewhat incorrectly establishing the first sounds of the hospital name, “Sandi-” and “Sadding” (lines 6-7), the clinician confirms this as being correct, “that’s right. Yeah” (line 8) and provides the correct name for the patient, “The Sandington” (line 8). Clinicians, thus, seem to permit more leeway in what counts as accurate responses when a person has dementia; here the clinician can be seen to be ticking the box on the sheet following this response.

Clinicians also appear to ‘help’ and reassure the patients by using the third-turn to explicitly confirm responses as being correct, e.g., “that’s right” (extract 13, line 8), or to offer a reassuring assessment of their performance when they get a question right, e.g. “very good” (extract 13, line 15). The extract ends with the clinician closing the task sequence with “okay” (extract 13, line 27). Maynard and Marlaire (1992) demonstrate that administrators typically use "good" when an answer is correct and “okay” when it is incorrect. In extract 13, “good” (line 10) and “very good” (line 15) are used when the individual question is (accepted as) correct and “okay” (line 27) following an incorrect response. Although further systematic research is required, it appears to be the case, certainly with people with dementia, that “good” is often used when a response is correct and “okay” when it is incorrect (also see extract 14 below).

The next extract (14) demonstrates this pattern of clinicians using “okay” more frequently throughout each task sequence following incorrect answers. On these occasions’ clinicians are more likely to excuse the patient’s inability and reassure them, for example “Okay. Not to worry” (extract 14, line 11).

Extract 14

|  |  |  |
| --- | --- | --- |
| 01 | Neu3: | Um:: a few quick questions about where |
| 02 |  | we are:, right now,=Do you know what this |
| 03 |  | building is,= What’s this place that we’re in, |
| 04 |  | (0.2) |
| 05 | Pat: | Um: (0.2) your, your job. Huh [huh huh ] |
| 06 | Neu3: | [Yeah, W-]What’s this |
| 07 |  | building,= whe- what is it, Er, (0.2) do you |
| 08 |  | know what it’s called, (.) ^this building that we’re |
| 09 |  | in at the moment,^ |
| 10 | Pat: | No:, not at the moment. |
| 11 | Neu3: | Okay,= Not to worry. .hh Um ((coughs)) >excuse me,< |
| 12 |  | Do you know what floor we’re on,= What floor of |
| 13 |  | the building we’re on, |
| 14 | Pat: | Third I think. |
| 15 | Neu3: | Okay, no worries. Oka:y:., Do you know what town |
| 16 |  | we’re in? |
| 17 | Pat: | Pard[on.] |
| 18 | Neu3: | [Whi]ch- which to:wn: or which city are we in |
| 19 |  | at the moment, |
| 20 |  | (0.2) |
| 21 | Pat: | Um:: (0.2) tch (1.2) No. |
| 22 | Neu3: | O:kay:, don’t wor[ry.] |
| 23 | Pat: | [Sho]uld be- I should be- |
| 24 | Neu3: | ^No it’s alrig[ht^,] |
| 25 | Pat: | [Bu- ] |
| 26 | Neu3: | You’ve been moving around a bit. That’s okay, Um: |
| 27 |  | do you know what county we’re in, |
| 28 | Pat: | (County name). |
| 29 | Neu3: | Yes:, ABSolutely. [= Good.] |
| 30 | Pat: | [huh huh] huh |
| 31 | Neu3: | That’s good. And do you know what country we’re in? |
| 32 | Pat: | England. |
| 33 | Neu3: | Yeah,=I know it sounds daft doesn’t it.=Bu[t er ]we have |
| 34 | Pat: | [Yeah.] |
| 35 | Neu3: | to check these things.=Okay, now I’m just going to |
| 36 |  | mention three objects… |

Interestingly in this extract the clinician does reformulate the first question about the name of the building. The patient’s response “your job” (line 05) is not ‘close enough’ to being correct to enable the clinician to accept it as an adequate response and therefore he re-issues it, “what’s this building” (lines 6-7), then reformulates it, “do you know what it’s called this building” (lines 7-8). The patient then answers, “no” (line 10) and continues to suggest that not knowing is temporary, “not at the moment” (line 10). The clinician expands this sequence with “Okay” (line 11) and then offers the patient some reassurance that he should not worry about not knowing, “Not to worry” (line 11). The third-turn utterances across this extract - including “okay” + reassurance, for example “not to worry” (line 11), “no worries” (line 15), “don’t worry” (line 22) occur after all three of the incorrect responses in the task sequence. Following the patient’s two correct responses in this task sequence, when correctly identifying the county (line 28) and country (line 32), the clinician uses the third turn to confirm the response and positively and emphatically assess it, “Yes. ABSolutely. Good” (line 29) and “Yeah” (line 33). This illustrates how clinicians are far more likely to use the third-turn in these question-answer sequences when the patient has dementia.

Furthermore, clinicians sometimes use post-expansion sequences to do extra interactional work to account for a patient’s inability to answer correctly. The patient in extract 14 is unable to identify the town or city, and further hearably implies that he should be able to so, “I should be-” (line 23) (although he stops before completing this, which could be heading for “I should be able to…”). The clinician again offers a reassuring response, “No it’s alright” (line 24), and then continues with a reasonable account for why the patient legitimately cannot respond, “You’ve been moving around a bit. That’s okay” (line 27). In extract 15 below, this extra interactional work is also evident when the patient is unable to name the president of America who was assassinated in the 1960s.

Extract 15

|  |  |  |
| --- | --- | --- |
| 01 | Neu3: | Can you tell me, who was the:: um the |
| 02 |  | president of t- of America that was assassinated |
| 03 |  | back in the nineteen-sixties, |
| 04 |  | (0.6) |
| 05 | Neu3: | He was the President of th- of the United States |
| 06 |  | that was assassinated in the sixties,=Can you |
| 07 |  | remember who that was, |
| 08 | Pat: | No.=I didn’t even know. (( )) huhuhu |
| 09 | Neu3: | °No°, it was a long time ago, |

In the third-turn the clinician accounts for the patient’s inability to answer, mitigating the ‘fault’ or inability from the patient and instead suggesting it is legitimate to not *know* the answer given the time period since the indexed event’s occurrence, i.e. “it was a long time ago” (line 09). Interesting to note here the clinician asks the patient if he can *remember* the event(line 07). The patient resists the implication that non-answering is because of his cognitive inability to remember, but instead imbues an epistemic dimension asserting that he didn’t possess the knowledge in the first place – “I didn’t even know” (line 08). Nevertheless, the clinicians can work to account for an incorrect response and reassure the patient in more-than-minimal expansion of the sequence. This type of expansion and inability account it not generally seen in relation to people with FCD.

**4. Discussion and Conclusion**

We have continued our earlier work (Jones et al, 2020), further demonstrating variation and non-standard administration of the ACE-III in clinical practice. We have shown, for example, that clinicians actively redesign test implementation, stepping away from standardization, to prioritise recipiency and emotional labour (Swallow and Hillman, 2018) i.e., they incorporate elements of recipient design within the questions they ask (e.g., extract 6). While this variation in administration may undermine standard assessment procedures, it could be seen to be an important component for enhancing patient experience. Furthermore, we have drawn an important distinction within the clinicians’ conduct when testing patients with a ‘working diagnosis’ of FCD as compared to those with a dementia diagnosis. Clinicians appear to orient to the patients’ needs and abilities when introducing the test and seeking consent, working harder to set expectations, provide reassurance and to prepare the patients with dementia for the task ahead. Clinicians often deviate from the parameters of the test to design questions in ways that function to ‘help’ the patients with dementia.

We have also demonstrated variation in clinical practice when administering the ACE-III in how clinicians respond to patients’ answers and how they expand question-answer sequences. When patients have FCD the clinicians either do not use the third-turn at all, or do so only minimally to close the task sequence. Third-turns are also used to orient to the need for the patient to produce a more specific response to achieve a mark on the test. However, when a patient has dementia, clinicians often use the third-turn more frequently within each task sequence either to confirm and assess a correct response, with “good” or even “very good”, to reassure a patient following an incorrect response (for example, “don’t worry”), or to provide a legitimate account for why the patient may not be able to provide the correct answer, thus absolving them of ‘fault’ in the inability to correctly answer a question. Clinicians are also less likely to pursue specific responses from people with dementia, for example a specific locational formulation, accepting a wider range of formulations as being correct. Some clinicians do not always appear to hold patients with dementia to the same standards to acquire a point on the test. These tests shine a light on people’s cognitive difficulties, exposing them in the consultation, which can create a significant emotional burden on people undertaking them (Cheston, 2000; Cahill et al, 2008). Akin to the work of Houtkoop-Steenstra and Antaki (1997:) we show how clinicians use recipient-design to help patient’s *save face* in environments that are marked by both interactional and (perceived) cognitive troubles. Clinicians work harder in their interaction to provide support and reassurance during the administration of the tests with patients they suspect have dementia.

This raises the question of why patients with FCD receive a more ‘standard’ approach to testing. The ACE-III in this context follows history-taking, during which the patient’s social and interactional competence (or incompetence) has begun to be exposed (Elsey et al, 2015; Jones et al, 2016). Clinicians report forming a working diagnosis during these interactions, and perhaps respond to this clinical expertise by choosing to follow standard procedure for patients they perceive to be cognitively competent. In turn, for those patients who have struggled to respond to basic questions in history-taking, clinicians adapt their delivery of the ACE-III. Aside from the larger structure of the consultation, these adaptations are also, in part, generated within the sequential unfolding of the interaction itself. For example, the clinicians reacting with reassurance when a patient displays some distress at the introduction to the test. This raises the inherent tension between the demands for the clinician to follow the standard administrative procedures on one hand and the demands of recipient design on the other. It can be suggested therefore that there are often good interactional reasons for non-standard administration of cognitive assessments.

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**Appendix**

*Transcription convention*

Neu/Pat Speakers labels (Neu= Clinician/Neurologist; PAT= Patient)

Com (Com= companion)

[overlap] Brackets: Onset and oﬀset of overlapping talk.

= Equals Sign: Utterances are latched or ran together, with no gap of silence.

- Hyphen: Preceding sound is cut oﬀ/self-interrupted.

(0.0) Time pause: Silence measured in seconds and tenths of seconds.

(.) Parentheses with a period: A micropause of less than 0:2 s:

: Colon(s): Preceding sound is extended or stretched; the more the longer.

. Period: Falling or terminal intonation.

, Comma: Continuing or slightly rising intonation.

? Question mark: Rising intonation.

underline Underlining: Increased volume relative to surrounding talk.

°soft° Degree signs: Talk with decreased volume relative to surrounding talk.

>fast< Greater-than/less-than signs: Talk with increased pace relative to surrounding talk.

<slow> Less-than/greater-than signs: Talk with decreased pace relative to

surrounding talk.

.h Superscripted periods preceding h’s: Inbreaths; the more the longer.

h H’s: Outbreaths (sometimes indicating laughter); the more the longer.

hah/heh Laugh token: Relative open or closed position of laughter.

(that)/(hat) Filled single parentheses: Transcriptionist doubt about talk. Alternative hearings.

( ) Empty single parentheses: Transcriptionist can’t identify talk.

((Cough)) Filled double parentheses: Additional details, or an event/sound not easily transcribed.

1. It is also notable that the ACE-III, in common with the other tests listed, is designed for speakers of English. For people with a diverse linguistic and cultural background, the Cross-cultural Neuropsychological Test Battery (CNTB) and Rowland Universal Dementia Assessment (RUDAS) have proven more useful than the above-mentioned tests for major populations (e.g. Nielsen et al., 2019). [↑](#footnote-ref-1)