

Towards a measure of joint verbal functional communication of a person with dementia and the communication partner: an exploratory study

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Abstract

Background and Objective: This study explored the feasibility and usefulness of a set of observer rated outcome measures for the joint verbal functional communication of people with dementia and their communication partners, in combination with a set of quantitative measures for the language ability of the person with dementia. We hypothesized that the joint verbal functional communication would at least remain stable, despite an expected progressive deterioration of language ability of the person with dementia.

Research Design and Methods: This was an exploratory study with audio and video recordings of 13 dyadic conversations before, directly after, and three and six months after a communication intervention. Four dyads of a home-dwelling person with dementia and their primary informal caregiver were included. Proportion of speaking time as well as occurrence and repair of communicative breakdowns were included as measures for joint verbal functional communication. Lexical diversity, propositionality and complexity of utterances were included as measures for language ability.

Results: We found evidence that lexical diversity of the persons with dementia decreased over time. By contrast, there was no evidence that the proportion of speaking time by the persons with dementia changed over time.

Discussion and Implications: Our combination of measures has primarily been proven feasible and useful for assessing joint verbal functional communication in persons with dementia and their communication partner, and seems to have potential for measuring the impact of a communication intervention. We recommend expanding our measures and investigating them in a larger sample.

Keywords: Alzheimer Disease, Speech and Language Therapy, Neurogenic Communication Disorders, Linguistic Measures

Background and Objective

Dementia is a degenerative cognitive syndrome, characterized by functional impairment in one or more cognitive domains (American Psychiatric Association, 2013). Decline in language functions is one of the symptoms that occurs during the course of any type of dementia (Kimbarow, 2019). Although communication has many modes, most people use spoken language for daily communication. A variety of problems in communication is likely to develop as a consequence of these spoken language problems, which worsen as the disease of people with dementia progresses (Schrauf & Müller, 2013). Breakdowns in communication limit people with dementia in everyday life, negatively affecting relationships with their significant other (Smith et al., 2011), and seriously impact their social participation (Schoenmakers et al., 2010; Small et al., 2000).

If the communication skills of the person with dementia are no longer sufficient for effortless and successful conversation, the conversation partner can mitigate occurring communication problems in order to retain meaningful conversations (Smith et al., 2011; for a systematic review, see Morris et al., 2018), also called 'joint effort'. Therefore, communication interventions that involve persons with dementia and their neurologically unimpaired conversation partner can be helpful in addressing communication problems (Morris et al., 2018; Olazarán et al., 2010). Interventions optimizing communication between people with dementia and their significant others focus on supporting positive interaction and facilitating the communication skills of both conversation partners. An example of such an intervention is the logopedic Com-mens intervention developed by Olthof-Nefkens et al. (2018). This intervention focusses on enhancing positive communication by education about the influence of dementia on communication and by training communication skills.

Although communication interventions aim to enhance joint effort in communication, the outcomes of these interventions are often measured by instruments that capture the communicative behavior of only one of the conversation partners, e.g., either the language ability of the person with dementia or the communication skills of the conversation partner. However, insights into the interaction between these aspects may give a more complete picture of the combined communication skill. When focusing on the outcome measures of only one of the conversation partners, one ignores the nature of naturalistic, real-world joint functional communication. Although the language ability of the person with dementia declines as a unavoidable result of the progressive disease, the conversation skills of the communication partner could remain stable or even improve as a result of a communication intervention. Measuring joint verbal functional communication can provide insight into how effectively and efficiently the persons with dementia and their partners communicate with each other.

In the aphasiology field, few instruments are currently used to quantify joint verbal functional communication (Doedens & Meteyard, 2020). In the field of dementia, even fewer instruments are available to assess joint verbal functional communication. The Verbal–Nonverbal Interaction Scale for Caregivers (Williams & Parker, 2012) and the Verbal and Nonverbal Interaction Scale for Care Receivers (Williams et al., 2017), for example, focus on rating a range of communication behaviors (facilitating and hindering behavior of the communication partner) in the interaction of the person with dementia and the communication partner as observed in a short conversation. Mok et al. (2021) modified two scales that were originally developed for people with aphasia: the Measure of Skill in Supported Conversation and the Measure of Participation in Conversation (Kagan et al., 2004). These modified scales include ratings of the communicative participation of the person with dementia and the support offered by the conversation partner. Another instrument that includes both parties in the conversation is the recently developed questionnaire for Experienced Communication in Dementia by Olthof-Nefkens et al. (2021), which measures the communication as experienced by both the person with dementia and the communication partner.

The aforementioned instruments give insight into different aspects of the communication between the two parties involved. However, these instruments are scales and questionnaires that have a qualitative nature, since there is a subjective judgement involved rather than a quantitative measurement of communication aspects. There is evidence that quantitative scoring methods of linguistic and functional communication measures, compared to qualitative ones, provide a useful alternative as they allow a more sensitive measure of change in communication skills over time (Grande et al., 2008; Ruiters et al., 2011). Therefore, a quantitative approach to measuring the joint functional communication between a person with dementia and the conversation partner could be useful. Language ability is expected to decline in people with dementia. As a result, their communicative abilities also diminish. But communication breakdowns might be prevented if the joint verbal functional communication is safeguarded by the extra joint efforts of a communication partner, especially if this communication partner is the significant other. To capture this interactive process, we developed a set of observer rated measures to assess the joint verbal functional communication of the person with dementia and the communication partner together with measures for the language ability of the person with dementia.

It would be a valuable addition to the scientific field to include quantitative measures of joint verbal functional communication for evaluating the communication of people with dementia, since these are currently lacking. Additionally, it would be useful as a clinical measure to the logopedic Com-mens intervention (Olthof-Nefkens et al., 2018). Therefore, the aim of this article is to report on our

exploration of the feasibility and usefulness of a set of observer rated measures that we developed, tapping into the joint verbal functional communication of the person with dementia and the communication partner while taking into account the language ability of the person with dementia.

Research Design and Methods

The Com-mens intervention program

Our exploratory study was part of a larger pilot study on the Com-mens intervention program (Olthof-Nefkens et al., 2022), which aims to stimulate positive and meaningful interactions between persons with dementia and their communication partners. This short (\pm 6 sessions) and practice-based intervention entails a highly personalized approach and is context-oriented. It provides education, advice on adaptations, and practical handles, all tailored to the needs and requests of the participating dyads. The intervention is mainly focused on compensation, if possible by the person with dementia but especially by the communication partner as external compensation. One of the important aspects of the intervention is to give the persons with dementia a bigger share in the conversation, either by better listening to the persons with dementia or giving them an opportunity to express their communicative intentions. The feasibility and impact of the intervention is evaluated with a mixed-methods approach (questionnaires and interviews) at five moments in time: baseline (T0), directly after the intervention (T1) and 3, 6 and 9 months follow ups (T2-T4; Olthof-Nefkens et al., 2022). Data collection for the Com-mens pilot study was approved by the regional medical ethical committee (file number 2017-3266). Recruitment was done with the help of health care professionals working in community care or institutions in the region of the Radboudumc, Nijmegen, the Netherlands. Before the study started, all participants received oral and written information about the purpose and content of the study. Written informed consent was obtained from all participants during the first meeting. Participation was voluntarily and participants had the right to withdraw at any point during the study.

Participants

The participants in the present exploratory study were recruited from the participants taking part in the study of the Com-mens intervention program. To participate as a dyad in the Com-mens study, the person with dementia had to live at home and had to show mild to moderate symptoms of dementia, indicated with a score of 0.5, 1 or 2 on the Clinical Dementia Rating scale (Hughes et al., 1982; Olde Rikkert et al., 2011). Inclusion in the Com-mens study also required a request for help with experienced communication problems resulting from the dementia and willingness to actively participate in the intervention. For more details of the recruitment procedure see Olthof-Nefkens et al. (2022). For the present exploratory study, we asked 30 dyads for their permission to video record their meetings with the researcher (MO) for the Com-mens study, which took place in the participants' homes. This

resulted in a sample of four dyads that gave their consent. Characteristics of these dyads are described in Table 1.

Table 1. Characteristics of the persons with dementia (PwD) and their communication partner. In all cases, the communication partner was the spouse of the person with dementia.

Dyad	Sex PwD	Age PwD	Diagnosis	Disease severity (CDR*)	Time since diagnosis	Education PwD	Sex partner	Age partner
1	Man	77	Unknown ("mild dementia")	1	1 month	Secondary vocational education	Woman	77
2	Man	58	Alzheimer's Disease	0.5	4 months	Practical training	Woman	61
3	Woman	75	Alzheimer's Disease	1	7 months	Practical training	Man	79
4	Woman	70	Alzheimer's Disease	1	1 month	Secondary vocational education	Man	70

* CDR = Clinical Dementia Rating scale, 0–5 point scale, (0 = absent; 0.5 = questionable; 1= present, but mild; 2 = moderate; 3 = severe; 4 = profound; 5 = terminal)

Dataset

The dataset for this exploratory study comprised the conversations of the person with dementia, the partner as direct communication partner, and the interviewer (MO). The interviewer asked standardized and predefined questions about the overall experiences with the Com-mens intervention and whether the dyads still used parts of the intervention in daily life. The dyads answered the questions together. The full video recordings per interview session lasted between 30 and 45 minutes.

We used only parts of the interview sessions as our dataset for this exploratory study, based on the topics of the conversation that were introduced by similar interview questions. The final dataset resulted in thirteen interview sessions (at least two recordings per dyad), including a minimum of 300 words spoken by the person with dementia (although the person with dementia in Dyad 2 and Dyad 4 never reached this minimum) and lasting approximately 6 minutes (see Table 2 for more details).

Table 2. Conversation details including total amount of words spoken by the person with dementia (PwD) and the duration of the conversation part per interview session.

Dyad		T0	T1	T2	T3
1	PwD words	337	309	338	442
	Duration of conversation	6 min 2 s	5 min 53 s	6 min 29 s	8 min 26 s
2	PwD words	120	197	123	NA
	Duration of conversation	5 min 25 s	8 min 46 s	4 min 54 s	NA
3	PwD words	494	320	407	792
	Duration of conversation	6 min 45 s	7 min 40 s	5 min 31 s	5 min 32 s
4	PwD words	119	122	NA	NA
	Duration of conversation	6 min 13 s	8 min 3 s	NA	NA

Data analyses

The conversations in the interview sessions were orthographically transcribed based on transcription guidelines by Saffran et al. (1989). We derived measures for the joint verbal functional communication of the dyads and measures for the language ability of the person with dementia. Below we explain how we operationalized these concepts. We made a codebook to remain consistent with the decisions we made (available on request).

Joint verbal functional communication measures

To indicate the joint verbal functional communication of the dyads, we included a measure for the proportion of speaking time per speaker, the number of communicative breakdowns and the type of repair of the breakdowns. The contribution of the person with dementia to the conversation is an important aspect of the communication intervention (Olthof-Nefkens et al., 2018), which can be measured by the proportion of speaking time. We used components of the Partners of Aphasia patient Conversation Training 'Problem and Repair' (*Partners van Afasiepatiënten Conversatietraining*; PACT; Wielaert & Wilkinson, 2012) for the analysis of the breakdown detection and repair: PACT 1 "Self-repair at the initiative of the patient", PACT 2 "Other recovery at the initiative of the patient", PACT 3 "Self-help at the initiative of the conversation partner", PACT 4 "Other recovery at the initiative of the partner" and PACT 6 "Incomplete recovery sequences". A communicative breakdown was defined as a hitch in the conversation, as interpreted by the rater. Both word finding and grammatical disorder could lead to miscommunications. After the detection of a communicative breakdown, the manner of resolving that communicative breakdown was analyzed by coding who signaled the conversational problem (i.e., initiation of repair) and who provided the solution.

Language ability measures

To determine the language ability of the person with dementia, we included measures for lexical diversity, propositionality of an utterance and the complexity of an utterance. For determining the lexical diversity, the Type Token Ratio (TTR) was used, provided that a minimum of at least 300 words was uttered (Wright et al., 2003). We note that in two cases, this minimum requirement was not achieved, see Results below.

The guidelines from the Analysis for Spontaneous Speech in Aphasia (*Analyse voor Spontane Taal bij Afasie*; ASTA; van der Scheer et al., 2011) were used for marking the utterance boundaries as “A contiguous set of words in spontaneous speech that forms a grammatical unit”. Propositional utterances were distinguished from non-propositional utterances (Van Lancker Sidtis, 2004). Propositional utterances enfold novel and grammatical language following the language rules, are generated and provide new information in the context of the conversation. Non-propositional utterances on the other hand are formulaic, prefabricated and fixed expressions, that are stored and retrieved as complete forms from memory (Wray, 2002). To calculate propositionality, we determined how many of the utterances could be classified as propositional utterances versus non-propositional utterances.

Within the propositional utterances, we distinguished two levels of grammatical complexity of the utterances on the basis of finiteness (Kolk, 2006; Ruiter et al., 2013): sentences (containing finite verbs) and ellipses (containing infinitives or past particles, e.g., *Tom eating pizza*). According to the non-sentential approach (Progovac, 2006), ellipses are grammatically well-formed but incomplete utterances. We did not count non-finite utterances that answered a direct question as an ellipsis, as questions in general elicit more ellipses (Merchant, 2004) and the focus of our study was to differentiate between the complexity of utterances (sentences vs. ellipses) that convey a propositional communicative intention. To calculate utterance complexity, we determined how many of the propositional utterances could be classified as sentences versus ellipses.

Cross-modality interrater reliability

It turned out that only four out of the 30 dyads wanted to participate in this exploratory study, because most of the Com-mens participants stated that video recordings were too confrontational. Therefore, after data collection was finished we included an additional analysis to investigate whether the measures we devised could be derived from audio recordings instead of video recordings. We calculated the cross-modality interrater reliability between two different raters, one using the video recordings (researcher RW), and the other (an independent speech and language therapist) using only audio recordings. Researcher RW wrote the codebook, which the speech and language therapist used.

The raters independently rated the 13 conversations using the measures for the occurrence of communicative breakdowns and for propositionality of utterances. Cohen's Kappa, calculated over the complete dataset, was used for determining the cross-modality interrater reliability of the measures. A kappa over 0.80 was characterized as strong, a kappa over the 0.60 as sustainable, and a kappa between 0.20 and 0.60 as fair to moderate (Landis & Koch, 1977).

Statistical analysis

For the analysis on the group level, we used RStudio version 4.1.2 4.1.2 (R Core Team, 2021) with the tidyverse (Wickham, 2019) and ggplot2 (Wickham, 2016) packages. We used simple linear regression models. The proportion of speaking time, the TTR, and the proportion of propositional utterances entered three separate models as depended variables and interview session entered as the predictor variable in all three models. We included the available interview sessions of the dyads in the models, which resulted in four data points for dyad 1, three data points for dyad 2, four data points for dyad 3, and two data points for dyad 1. We also described these patterns on the outcome measures in more detail per dyad.

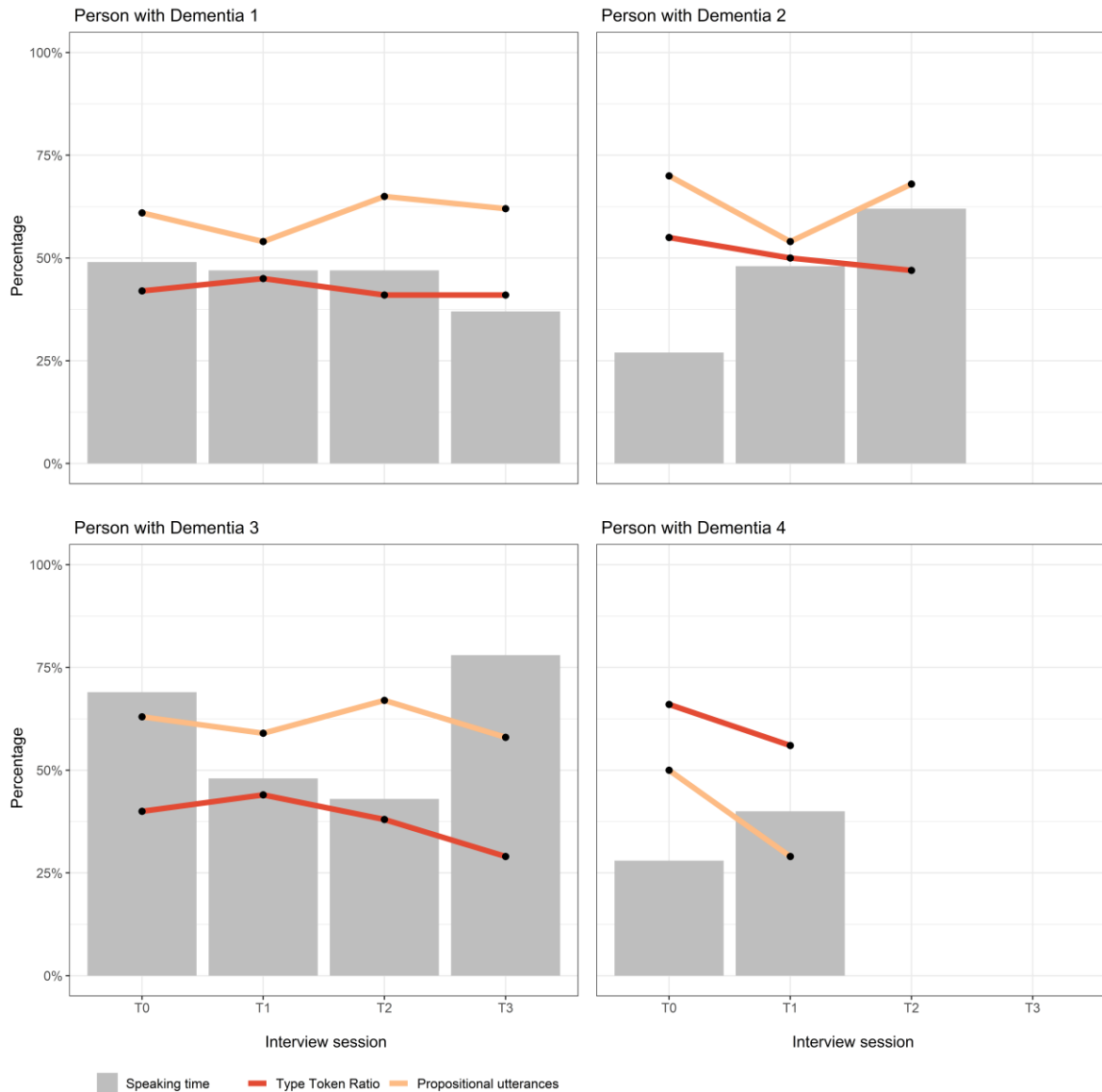
Results

The results are reported on a group level first, and secondly per individual dyad. Also, first we report on the joint verbal functional communication measures followed by the language ability measures of the person with dementia. Figure 1 supports the descriptions visually for each dyad.

Group

The regression analysis on a group level showed evidence for the hypothesis that the TTR decreased over time (*estimate* = -0.052, *S.E.* = 0.021, *t* = -2.50, *p* = 0.029). There was no evidence found that the proportion of speaking time changed over time (*estimate* = 0.046, *S.E.* = 0.038, *t* = 1.19, *p* = 0.258) or that the proportion of propositional utterances changed over time (*estimate* = 0.014, *S.E.* = 0.029, *t* = -0.50, *p* = 0.63).

Figure 1. Percentage of speaking time (gray bars), the Type Token Ratio (red lines), and the percentage of propositional utterances (orange lines) per person with dementia per interview session.



Dyad 1

The proportion of speaking time by the person with dementia remained relatively stable around 50% of the time, with a slight decrease to 37% at T3. The total amount of communication breakdowns before the intervention (T0) was eight and decreased after the intervention to three at T1, remaining stable at three at T2 and T3. Nine out of the 15 breakdown repairs were initiated by the conversation partner. Only two communication breakdowns remained unresolved (one at T1 and one at T3).

The lexical diversity of the person with dementia measured by the TTR remained relatively stable over time, around 42%. The total number of utterances of the person with dementia increased over time. Before the intervention (T0) the person with dementia had a total number of 54 utterances, which slightly decreased after the intervention to 52 at T1, remained at 52 at T2 and increased to a total of

76 utterances at T3. The proportion of propositional utterances compared to non-propositional utterances remained relatively stable around 60% over time, with a slight decrease to 54% at T1. Within the propositional utterances, the proportion of sentences compared to ellipses decreased. The proportion of sentences was 97% at T0, decreasing to 89% at T1, decreasing again to 85% at T2, and to 68% at T3.

Dyad 2

For this dyad, interview session T3 was not available, because of a technical issue (dead battery). The proportion of speaking time by the person with dementia increased from 27% at T0 to 48% at T1 and to 62% at T2. The total amount of communication breakdowns remained stable over time with two before (T0) and after the intervention (T1 and T2). All communication breakdowns were resolved in this dyad. Three out of the six breakdown repairs were initiated by the conversation partner

The TTR scores decreased over time, from 55% at T0 to 50% at T1 and to 47% at T2. However, it is important to note that this number should be interpreted cautiously as the sample for this participant did not reach the required 300 words per measurement (see Table 2). The total number of utterances of the person with dementia increased. Before the intervention (T0), the person with dementia had a total number of 20 utterances, which increased after the intervention to 27 at T1 and again to a total of 41 utterances at T2. The proportion of propositional utterances compared to non-propositional utterances fluctuated over time. The proportion of propositional utterances was 70% at T0, which decreased to 54% at T1, but increased again to 68% at T2. The proportion of sentences compared to ellipse remained at 79% at T0 and T1, and slightly increased to 86% at T2.

Dyad 3

The proportion of speaking time by the person with dementia fluctuated over time, decreasing from 69% at T0 to 48% at T1 and 43% at T2, but increasing to 78% at T3. The total amount of communication breakdowns before the intervention (T0) was two and increased to six at T1, but decreased again to two at T2 and remained at two at T3. All communication breakdowns were resolved in this dyad. Eight out of the 12 breakdown repairs were initiated by the conversation partner.

The TTR decreased over time, from 40% at T0, slightly increasing to 44% at T1, and decreasing to 38% at T2 and again to 29% at T3. The number of utterances by the person with dementia fluctuated over time. Before the intervention (T0) the person with dementia had a total number of 73 utterances, which decreased after the intervention to 54 at T1 and to 55 at T2, but increased again to 123 at T3. The proportion of propositional utterances compared to non-propositional utterances remained

relatively stable around 60% over time, with a slight increase to 67% at T3. Within the propositional utterances, the proportion of sentences compared to ellipses remained stable. The proportion of sentences was 80% at T0, increasing to 91% at T1, decreasing to 81% at T2 and to 83% at T3.

Dyad 4

For this dyad, only T0 and T1 were available due to drop out. The proportion of speaking time by the person with dementia increased from 28% before the intervention to 40% after the intervention at T1. The total amount of communication breakdowns at T0 was three and remained three after the intervention (T1). All communication breakdowns were resolved in this dyad. Three out of the six breakdown repairs were initiated by the conversation partner.

The TTR scores decreased over time, from 66% at T0 to 56% at T1. However, it is important to note that this number should be interpreted cautiously as the sample for this participant did not reach the required 300 words per measurement (see Table 2). The total number of utterances of the person with dementia increased. Before the intervention (T0) the person with dementia had a total number of 24 utterances, which increased after the intervention to 31 at T1. The proportion of propositional utterances compared to non-propositional utterances decreased from 50% at T0 to 29% at T1. Within the propositional utterances, the proportion of sentences compared to ellipses increased from 67% at T0 to 78% at T1.

Cross-modality interrater reliability

For calculating the cross-modality interrater reliability of the measure “repair of communicative breakdown”, we first selected the communicative breakdown situations that had agreement between the two raters. The two raters agreed on the definition of 18 out of 45 communication breakdown situations. The cross-modality interrater reliability for breakdown repair had a Cohen’s kappa of .658.

For calculating the cross-modality interrater reliability of the measure “propositionality”, we first selected the utterances for which the two raters agreed on the definition. The two raters agreed on the definition of 359 out of 841 utterances. The cross-modality interrater reliability for the language ability measure of propositionality had a Cohen’s kappa of .237.

Discussion and Implications

This study aimed towards exploring a tool set of observer rated outcome measures that both evaluates the joint verbal functional communication of people with dementia and their communication partners, and taps into the language ability of people with dementia. This study was highly explorative, as an

objective and quantitative measure for joint verbal functional communication was lacking. Our combination of measures has primarily been proven feasible and useful for assessing joint verbal functional communication between a person with dementia and the communication partner, and seems to have potential for measuring the impact of a communication intervention.

Individual differences were clearly visible in our data, but in some of our measures we saw indications of more general patterns across the four dyads. In general, there was a trend that the proportion of speaking time increased over time, although this was not confirmed by group-level statistical analysis. The amount of communicative breakdowns was very small, and almost all misunderstandings were resolved, mostly on initiative of the conversation partner. The lexical diversity of the persons with dementia decreased over time, as also evidenced by the group-level statistical analysis. The total number of propositional utterances seemed to increase over time and the proportion of propositional utterances fluctuated over time, although this was not confirmed by the group-level statistical analysis.

Taking the scores on the measures for joint verbal functional communication and language ability of the person with dementia together might indicate that the persons with dementia obtained a bigger share in the conversation during the course of time (i.e., no evidence that the measures for joint verbal functional communication declined), despite the score for the language ability of the person with dementia slowly decreasing over time (i.e., declining score on the lexical diversity). Additionally, there was a small amount of communicative breakdowns, and this amount did not increase over time, even though the disease progressed. These observations lead to the insight that, although the language ability of the person with dementia declines as a unavoidable result of the progressive disease, the joint verbal functional communication can still be kept sufficient for some time.

Evaluation of the measures

In general, we recommend to include (in future research) both the measures for joint verbal functional communication and for language ability, as this offers an unique perspective to the disease progression and the (potential) effect of a communication intervention. This approach adds on to previous developed measures of for example the scales of communicative behavior of Mok et al. (2021) and the questionnaire for Experienced Communication in Dementia by Olthof-Nefkens et al. (2021). It is also recommended to look at the individual level of the possible changes, as the communication intervention is tailored to the needs of each dyad and the disease progression is different in each individual.

We recommend using speaking time as a measure of joint verbal functional communication, because giving the person with dementia more space to contribute to the conversation is one of the aspects that is targeted in communicative interventions (e.g., Olthof-Nefkens et al., 2018). The other measure used for joint verbal functional communication was the detection of communicative breakdowns and their resolution. We experienced that this measure was more difficult to use and to analyze, as shown by a sustainable cross-modality interrater reliability. There were only a few breakdowns detected and almost all were resolved. Additionally, interpreting and scoring a part of the conversation as a breakdown without participating in that conversation is subjective and complex, for example not resolving a misunderstanding can be even pragmatically seen as beneficial for the flow of the conversation itself. Moreover, the communication intervention does not focus on the resolution of breakdowns. Therefore, we do not recommend to use this measure in this way. However, including a more quantitative, content based analysis, like the Roter Interaction Analysis System (RIAS, Roter & Larson, 2002). By annotating (coding) each utterance of the person with dementia, it can be determined what type of communication behaviour it is (e.g., an open question) and what function that utterance has in the context (e.g., dealing with a miscommunication). This could give a more objective and clear image of the joint verbal functional communication.

Lexical diversity as measured by the type token ratio is a good index of the language ability of the person with dementia. We would recommend to keep this measure, with the note that there should be enough words included in the calculation (Wright et al., 2003). The differentiation between propositional and non-propositional utterances is also recommended to keep as a measure for language ability of the person with dementia, but we note that utterance boundaries should have a better and clearer definition, as this turned out to be problematic in the comparisons between the two raters. The fair cross-modality interrater reliability for the language ability measure of propositionality could be explained by this. Besides, the subjectivity of the utterance rating remains problematic. Thus, it is recommended to set stricter definitions and have a clear guideline in a codebook beforehand.

Limitations

The small number of participating dyads in this study is the main limitation. This is due to the fact that most people did not want to be video recorded. By including the cross-modality interrater reliability we took a first step towards investigating whether the measures we devised could be derived from audio recordings instead of from video recordings. Our cross-modality interrater reliability was low for the propositionality measure, but we think this could be explained by the fact that propositionality was insufficiently operationalized (i.e., insufficiently detailed in the codebook) and improving this would solve the issue. We did not have comparable audio data of other dyads, because we included this

audio-only analysis retrospectively after finishing data collection. Additionally, our small sample does also have a selection bias. The participating people with dementia had all just received the diagnosis and were relatively young. Therefore, we can only encourage further research with a bigger sample.

Future perspectives

This exploratory study showed that it is worthwhile to further investigate joint verbal communication, because it presents a new perspective on how to measure implications of a communication intervention that might not be captured by questionnaires. It is recommended to optimize recruitment procedures, which include using audio recordings instead of video recordings. This may increase participants' willingness to participate. The analysis in its current form is time-consuming and reducing this for its further implementation is desirable. Additionally, improving the guidelines in the codebook could result in more reliable data analyses by multiple persons. Including quantitative, content based analysis, like the RIAS (Roter & Larson, 2002), would offer an even more detailed insight. Analyzing daily conversation as we approached it, is ecologically valid, especially if one can expand it to include multiple communication contexts. We propose to expand our initial ideas as explored in this study, and investigate the measures for joint verbal functional communication within daily conversations of people with dementia and their communication partners in a larger sample, including the proposed changes we discussed.

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Conflict of interest declaration

We have no conflict of interest to declare.

Data availability statement

Data are available upon request via the corresponding author.

Description of authors' roles

All authors were involved in designing the study, data analyses and interpretation. Author MO collected the data. Author RW wrote the manuscript and the other authors had a contribution in editing and reviewing the manuscript. All authors approved the manuscript.

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