

Brain and Language

A Case Study of a patient with Anomia

by Nada Kara

*The following is a case study of a patient who will be referred to as **DF** for the sake of confidentiality.*

General Information

DF is 64 years old. She has two married sons and three grandchildren, who all live locally. DF worked as a teacher until she retired. Her retirement was due to a frozen shoulder that affected her ability to lift things.

Medical History

DF suffered a left CVA (cerebrovascular accident) in June 2018. A CT scan showed damage in the left middle cerebral artery territory. As a result, she walks with a stick and walking long distances has become an effort for her. She reports no problems with her vision post-CVA but wears glasses. Prior to the CVA, she informed us that she was ambidextrous but now uses her left hand for fine motor tasks and writing. She also shows no evidence of motor speech difficulties.

DF was referred to a speech and language therapist, which will be abbreviated to SLT from here on end, for rehabilitation. She has attended eleven weeks of intensive speech and language therapy. The block of therapy consisted of 45 minute individual therapy sessions three days a week. The sessions were carried out in a controlled clinical environment.

Assessment of Patient for Diagnosis

DF uses gestures and pointing to augment her production of single words. Some of her output may be classified as jargon, as she uses fillers such as “umm,” “يعني” and “اممم.” Also, according to her husband (taken from a conversation sample, which was recorded on 8.10.2018), DF does not really use complete and meaningful sentences. She also has a communication book that has the names of her family, friends, local places, etc., as recommended by the SLT to enable her to get her messages across to her family. The lists that are contained in her book are also posted up in her house to facilitate competent communication with them.

DF has reported no difficulties with her auditory comprehension. Though, in conversation, she sometimes required the repetition of questions. During testing, instructions needed supplementation with non-verbal cues or repetition. On formal testing, SWPM (spoken to picture matching), she scored 25/40 on PALPA (Psychological Assessments of Language

Processing in Aphasia), selecting close semantic distractors. Spoken word-picture matching, requires the individual with aphasia to listen to a spoken word and correctly choose from five distractor pictures (target, close semantic, distant semantic, visually related and semantically unrelated). At the sentence level, she scored 16/32 on an informal assessment. She also showed difficulty with reversible and embedded sentences.

DF is able to read books at home. She was tested on her repetition of single words, and had a score of 31/40 on PALPA WWPM (Written Word to Picture Matching). Written word requires the patient to read a word and correctly choose the target word from five distractor pictures. As can be seen, this is better than her score on the auditory version. Her errors were those of close semantic distractors.

DF's spontaneous speech is very non-fluent. It consists of stereotypical automatic phrases and a few single high frequency nouns and names. High frequency words are those that are used more commonly and frequently in comparison to low frequency words which are not. She often repeats what other people have said and reverts to her communication book, reading from it aloud. On informal testing, her reading aloud of high frequency, common nouns was generally accurate, scoring 45/50. Longer, less frequent words were more difficult for her, with a score of 11/50. Within the picture description task, she was unable to produce any of the key words to convey the message of the picture.

On testing her written output, DF was able to write her surname and make recognizable attempts at her address. Her spelling errors consisted of the omission of one or two letters and she could copy single letters and words. A test for written naming was abandoned since she was unable to attempt the first three items.

DF showed no apparent cognitive difficulties. She scored within the norm on the Ravens Matrices section of the CAT (Clinical Aphasia Test). Raven's Progressive Matrices or RPM is a nonverbal test typically used to measure general human intelligence and abstract reasoning and is regarded as a non-verbal estimate of fluid intelligence.

Diagnosis

The above mentioned assessments suggest that DF has *lexical selection anomia*, that is, a deficit in the access from semantic memory which, in turn, inhibits productive speech and language. It must be pointed out here that the term speech does not mean spoken language but implies to the sound level or in other words the production of letters. This is evident in her non-fluent speech and use of automatic phrases, circumlocutions and high frequency nouns and names. Also, for the sake of clarification, non-fluent speech implies difficulty with the production of grammatically correct sentences and language is limited mainly to short utterances. This deficit, according to Lesser and Milroy (1993, p. 65) will affect naming. This can be seen in her score on an informal test of naming everyday objects, such as common household items and appliances,

foods, etc. of 12/50, whereas in the Repetition and Reading Aloud, she scored 49/50 on each. Anomic aphasics demonstrate selective difficulty in word retrieval, whereas, their repetition of the same words is adequate (Nadeau, Rathi and Crosson, 2000, p. 114). According to Lesser and Perkins (2001, p. 16) "... it is postulated that words can be repeated without their meaning being activated." She showed 26/50 semantic errors. Semantic errors refers to words that are chosen from the same category for example, knife and spoon come under the category of kitchen utensils or cutlery, but not the intended target word. As stated by Holland (1984, p. 137), semantic errors illustrate that there is "incomplete access to the semantic properties of the intended word." This indicates a widening or misalignment of semantic features. DF also responds to phonemic cueing and her production of words is inconsistent.

Also, as mentioned above, DF's assessments indicated a general semantic deficit. On the PALPA WWPM, she scored 36/40, the errors being close semantic errors. In an informal test of semantic memory, she scored 43/52, which is below normal. In this informal test DF was presented with a main picture and three other pictures two of which were from the same category, and one which is not. For example, a picture of a pyramid, a camel, a palm tree and a Christmas tree. The patient must match the two related pictures to the main picture, in other words, the camel and palm tree with the pyramid. This indicates a deficit in retrieval of information from the semantic memory. On the PALPA SWPM, which assesses semantic comprehension, DF scored 25/40, which is also below the norm. Fifteen of these errors were close semantic errors. Some conclude that semantic memory may be "structurally and presumably functionally partially distinct modality-specific meaning systems" Caplan (1987). That is, a particular concept may be represented verbally and visually in the semantic memory. DF's score in PALPA WWPM also indicates that the orthographic route is intact.

From the above, DF presents classical symptoms of anomia. This results from trauma to Broca's area in the prefrontal lobe. Anomia, as stated above, is an impairment in the production of speech and language. Some of the most common symptoms of anomia are non-fluent language as illustrated above, naming, use of circumlocutions, among others. This does not mean that it is exclusive to the production of language. Patients with anomia also have problems with understanding grammatically complex sentences, reversible sentences, imbedded sentences, and poor attention spans. Many patients with anomia complain of what is called "tip of the tongue syndrome" where they feel that they know the word, and may be able to utter the first sound of the word but cannot produce it.

Therapy

Real Life Goals DF's own real life goals were to use more real single words and to improve her communication skills.

Long Term Goals The long term goals for this episode of care were (1) to improve her access and retrieval of key words chosen by her as core vocabulary, (2) to improve her auditory processing to facilitate improved auditory comprehension, (3) to improve her semantic

processing and (4) to reorganize categorizing the lexicon in her semantic memory to ease the retrieval of words.

Short-Term Goals The tasks for one to one therapy were (1) facilitating naming of core vocabulary, (2) 'Is it a ...?' type questions to strengthen auditory processing by using semantic foils, phonological real-word and non-word foils (in teaching and assessment a foil is simply an incorrect alternative. Any time a choice is given the foil itself can make or break a responses accuracy), (3) semantic therapy tasks and (4) reorganization and expansion of DF's communication book. This was then used to aid DF in its use and to initiate conversation.

It will be pointed out here that DF exhibited problems with the production or naming of action words (verbs). But it has not been assessed thoroughly as it was considered that she will be further assessed in detail in this area in another block of therapy.

An example of what was covered in therapy is given below.

Week 3

Aim: To establish core vocabulary pictures and written words, to reorganize communication book with DF to make it easier for her to use, to improve auditory processing of minimal pairs, to improve processing of semantically related words.

Tasks/Materials: 'Odd-one-out, word-association (DF selects a word from a group to match given word), auditory processing tasks to assess DF's level.

Week 9

Aim: Improve retrieval of key words (core vocabulary) using phonemic cues, strengthen auditory processing using minimal pairs and semantic, phonological real word and non-word foils and pictures, facilitation of DF's communication with the use of communication book.

Tasks/Materials: Core vocabulary (spoken and written), 'Is it a- ?' semantic foils, DF answers questions related to her communication book, minimal pairs task.

Post-therapy Assessment

The pre-therapy assessment showed a mild impairment in reading comprehension, as can be seen from her score in PALPA WWPM 31/40. At this time, DF can read single words with accuracy and short functional phrases. Beyond this level, her comprehension of what she has read breaks down.

As for verbal expression, pre-therapy showed that she has limited, non-fluent spontaneous speech, mainly producing a few automatic phrases and appropriate single words and phrases. She uses her communication book well to supplement her speech. Her naming was severely impaired, but her repetition and naming were relatively intact. Post-therapy, DF showed a great improvement in her naming abilities, as is evident in her assessment scores. Naming of core vocabulary was one of the targets of therapy, and as can be seen, DF showed an improvement in this area, which was one of DF's goals for herself. Furthermore, her score on naming

everyday objects, 24/50, is still low, but when compared with her pre therapy score of 12/50, has shown that DF's retrieval of nouns (names) has increased. Furthermore, the amount of jargon she produces is less prevalent.

DF's auditory comprehension of words and sentences was moderately impaired. As stated previously, she required repetition of instructions and non-verbal cues to increase the accuracy of her comprehension. She particularly found complex and embedded phrases difficult to understand, due to auditory processing and semantic problems, but coped well with simple phrases. The improvement of auditory processing of single word has been a target of therapy, and this area has shown an improvement. This is indicated in her score of 38/40 when she was reassessed with the PALPA SWPM. She is less echolalic and information does not always have to be repeated.

DF's general semantic problem also took a turn for the better. In reassessing her semantic memory with the three picture matching test, DF scored 47/52, compared to her pre-therapy score of 43/52, with seventeen close semantic errors. On the PALPA SWPM, she scored 38/40 (four close semantic errors). Whereas, pre-therapy, she showed a score of 25/40. Pre-therapy, in the informal test of 'Is it a...?', DF had 26 semantic foil errors, whereas, post-therapy, she had 17.

All in all, reassessment showed an improvement in the following areas:

- Naming of core vocabulary treated in therapy
- Naming of untreated informal test 'Is it a...?'
- Auditory processing of treated and untreated single words
- Phrase level auditory comprehension
- Ability to produce gestures

Efficacy

To measure efficacy, informal test 'Is it a...?' was initially administered using 97 items along 4 sessions. Then, the test was divided into two sections. The first 48 items were treated in therapy and the last were left untreated. Post-therapy, DF was again tested on one hundred items. She showed an improvement in her naming of both groups of items. The overall pre-therapy 4 sessions. The overall pre-therapy score was 328/388, and post-therapy was 362/388.

DF's improvement in naming untreated items indicates generalization which is a core target in all types of speech and language therapy. This shows that the area affected by the CVA has either been reactivated or new neural pathways were laid down in DF's semantic memory.

Recommendations

DF would benefit from further therapy, such as group therapy. Group therapy would further enable her to communicate with others and this would in turn not only improve her lexicon in her semantic memory but would also most probably help her to utilize what she has learned to other social settings, i.e. generalization.

As stated earlier, DF was not formally assessed on her deficit in the production of verbs, but this should be taken into consideration and targeted in future therapy.

Conclusion

As may be seen from the above case study the comprehension and production of speech and language is a very complex function. In the case of a breakdown in any stage of this complex process provides knowledge of the different language areas in the brain. This in turn provides professionals (teachers, educational psychologists...) a better understanding of how information is received, stored and processed. It sheds light on how information is processed in the working memory and how it is then transferred, stored and categorized in the long-term memory. As a result, this has provided professionals with better tools to aid students to learn, better store and retrieve new information, e.g. learning a new language.

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