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BROCA'S APHASIA SYNTACTICAL STRUCTURES IN TWO YOUTUBE VIDEOS

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Abstract

Aphasia is a language disorder that is caused by the damage in the language processing areas of the brain, which is most commonly caused by stroke. The main study focus of this research is Broca's aphasia. Broca's aphasia is the type of aphasia caused by the damage in Broca's area – the part of the human brain whose function is related to speech production and located in the inferior frontal gyrus of the frontal lobe. Broca's aphasia is known to impart the sufferers' ability in expressing their thoughts in the correct syntactical manner. Therefore, this research aims to examine the syntactic of Sarah Scott's and Mark Paulovich aphasic expressions in videos uploaded to the *SymphUK and Mark Paulovich* YouTube channels. The researchers utilize the descriptive qualitative method as research methodology, as the existing data are in the form of two chosen verbal expressions by Sarah Scott and Mark Paulovich in two videos uploaded on the mentioned two YouTube channels. Moreover, the data analysis itself is done through determining the constituents by using phrase structure analysis as proposed by Fromkin, et al. (2014). The results of the study indicate that the chosen utterances contain the features of Broca's aphasia, which are mainly visible through the disturbances in producing grammatical words and inflections; in the setting of the more complex sentences; and the ordered subject-verb agreement, where in the same time still retain the ability to express utterances with conceptual words ('telegraphic speech'). Therefore, the researchers suggest that further research regarding aphasia is necessary, as a means to increase our knowledge regarding the disease and human brain, and that the awareness to prevent aphasia and its associated medical conditions are raised among everyone, including the readers.

Keywords: *broca aphasia; syntactical structures; verbal expression; videos*

INTRODUCTION

Language impairment particularly syntactical structures caused by Broca aphasia has gained more attention in these recent years. Broca's aphasia syntactical issue is mainly characterized by the omissions and substitutions during language production in constrained engagement and spontaneous speech (Yarbay Duman et al., 2021). Speakers with aphasia were recorded to retain relatively good syntactically, despite being under-researched (Herbert et al., 2021). Rehabilitations on syntactical production, the branch of cognitive domains, for Broca's aphasia patients is also concerned to be paid relatively less attention (Choi et al., 2021). The retained syntactical language production impaired found in speakers with aphasia presents a unique opportunity to explore and analyze based on the cause and effect of syntactical structures on word productions aimed to provide reactivation of syntactic application. (Herbert et al., 2021). It is interesting to find out whether persons with Broca aphasia exhibit syntactical reductions in expressing their thoughts (Yarbay Duman et al., 2021). This study aims to analyze impaired

sentences particularly evaluated from syntactical deficiency in youtube videos, Sarah Scott's aphasic expressions, on spoken word production. The steps of conducting syntactic classification are expected to promote fluency in the discourse-level treatment protocol which eventually improves the syntactical ability; Thus, provide a further contribution toward psycholinguistics analysis particularly related to syntactical deficiency. The validity is limited to be generalized to other cases, and other factors that may influence the treatment results such as age, motivations, and family support are not counted. This study is expected to provide further awareness of what Broca's aphasia actually is, the impacts on adult speakers' syntactical expression, and how the treatment eventually is able to support the patient to recover syntactically. There, investigations into the syntactic abilities of persons with aphasia can be conducted further. This research is meant to be a form of contribution to the development of the understanding of aphasia; both aphasia in a general sense and mainly in Broca's aphasia, as the most common form of aphasia. Moreover, this research is expected to be beneficial in giving more comprehension of aphasia, especially Broca's aphasia, to its readers.

REVIEW OF LITERATURE

Aphasia is a form of language disorder that is caused by damage in the areas of the brain that are responsible for the production and processing of utterances (Damasio, 1992). It is most commonly caused by stroke, where it is known that approximately one-third of the patients who are suffering from acute stroke experience it (Jianu et al., 2021). Those who suffer from aphasia may face symptoms that range from problems finding vocabularies to being in the state of being unable to express thoughts, write, or read (Nolen-Hoeksema, 2014). Therefore, this disorder is known to affect the sufferers' and their caregivers' quality of life (Papathanasiou, et al., 2011). The disorder is classified into several types based on the brain's damaged language processing areas or the disorder's primary symptoms, which include (Gazzaniga et al., 2002; Rogalsky et al., 2008; Yule, 2017)

Broca's (Expressive) Aphasia

Broca's aphasia occurs due to the damage in Broca's area; the part of the brain located in the inferior frontal gyrus of the frontal lobe whose function is related to speech production. Thus, this type of aphasia is marked by disruptions (or inability) of the sufferers to produce language in its proper, syntactically correct form. It is the most common type of aphasia. Its symptoms include (Caramazza, et al., 1981; Jianu et al., 2021): Agrammatic, indicated by the high incidence of lacking function words, which include articles, pronouns, and prepositions, auxiliary verbs; Ignoring of proper subject-verb agreement (mainly the inflections, such as past and progressive forms of the verb and plural forms of both verbs and nouns); and Understanding complex sentences becomes more difficult, especially when the complex sentences are mainly relying on syntactic structure.

Thus, someone who suffers from Broca's aphasia cannot properly express their ideas or feelings in a grammatically correct verbal manner even though they have the ability to comprehend expressions. This is known as 'telegraphic speech' (Caramazza, et al., 1981; Jianu et al., 2021).

Wernicke's (Receptive) Aphasia

Wernicke's aphasia, on the other hand, is the type of aphasia that is not marked by the loss in the ability to produce utterances, but the produced thoughts tend to be meaningless. This is related to the function of Wernicke's area, the brain region located in the superior temporal gyrus in the dominant cerebral hemisphere, in the comprehension of both textual and vocal aspects of language. This type of aphasia is known to be the most common type (Ardila, 2014).

Conduction Aphasia

The latter type of aphasia is where the sufferers sometimes pronounce expressions incorrectly but often lack problems articulating them; in other words, they are relatively fluent, but the rhythm of their verbal expression is uneven due to pauses and some degrees of difficulty. This is caused by the sufferers' inability to transfer what they have heard and grasped to the utterance production area of their brain successfully. Regarding the explanation above, it is important to take into account that the symptoms of each type of aphasia can exist in every type of Aphasia and in various kinds of neurodegenerative disease (Gazzaniga et al., 2002; Rogalsky et al., 2008; Yule, 2017).

Therefore, based on the provided discovery that Broca's aphasia is marked by the partial (or total) disruption in the syntactic aspect of language ability, researchers have chosen Broca's aphasia as the main focus. The disturbance in sufferers' syntactic ability is the main discussion provided in this research.

Syntax

Syntax is the study that concerns the combination of unities (words or morphemes) into a systematic unity of sentences or phrases (Luuk, 2015). It is the study that focuses on sentence, phrase, and clause formation, along with the agreements and relationships between their components (Britannica, 2016). In the scope of syntax, there are numerous topics that are specified to be handled under syntactic theories, which include: the sequencing of subject, verb, and object of a clause or sentence; the grammatical relationship between unities; and therefore constituency (Luuk, 2015; Britannica, 2016; Shibatani, 2021). Syntax is one of the elements of grammar, as it is about the set of valid grammatical relations in a language. Therefore, when an utterance is not produced under the correct syntax, it can be considered agrammatical (Shibatani, 2021; Jianu, 2021). Related to this, syntax is also a scope of psycholinguistics. Psycholinguistics itself is the field that is concerning human mental processes of language acquisition and usage, and under psycholinguistics, syntax is one of the forms of linguistic processes in the human brain (besides lexical (vocabulary) and semantic (the meaning of words)) (Yudes, C, et al., 2013). Therefore, proper syntax is one of the features of grammatical, proper language.

Syntactical categories

A language has its own structures; the proper arrangements of each unity, and those arrangements should be based on the applicable orders. The arranged unity itself is called a constituent. Constituent is a part of a phrase, clause, or sentence in a whole, or as a unity within a structure in a hierarchical manner. In English language, the main constituents of a sentence are basically subject that contains a Noun Phrase (NP) and a predicate that contains a Verb Phrase (VP) (Bloomfield, 1984). This can be expressed in the following illustration:

$[_{NP}$She$]$ $[_{VP}$saw Rita$]$
S P

$[_{NP}$My friend$]$ $[_{VP}$saw the writer$]$
S P

The general constituents of English language (Noun Phrase (NP) and Verb Phrase (VP), in relation with the Subject (S) and the Predicate (P) of the sentences)

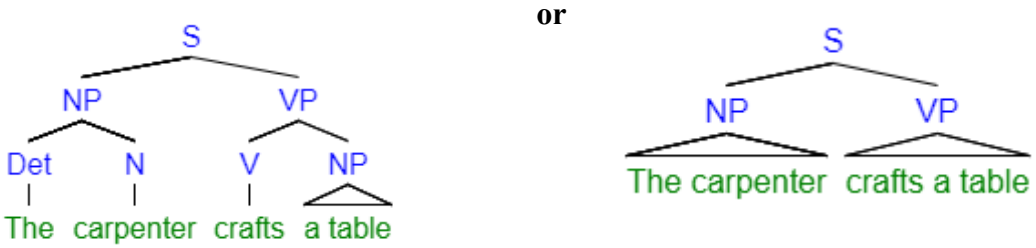
In syntax, constituents are also represented as syntactic categories. Syntactic categories are the kinds of constituents that correspond with their grammatical properties (Luraghi & Parodi, 2008). It is divided into two major types, namely the lexical (word) category and the phrasal category. Lexical categories are the syntactic categories corresponding with the parts of speech. Meanwhile, phrasal categories are the syntactic categories that consisted of more than one word with particular words that indicate their grammatical property as their head.

Phrase structure rules

In order to be able to reduce the sentence, the research employs the Phrase structure rules, according to Fromkin, et al. (2014). Phrase structure rules are specifying the existing known structures of a language in a thorough and clear manner. They express the language's orders and a speaker's (or writer's) mastery of the word orders and the grouping into syntactic categories as language users. Therefore, it can be used as the basis to assess a speaker's knowledge of the regularity of a particular language. Given a sentence:

'The carpenter crafts a table.'

Because the sentence is under one large complete unity, so it belongs to the syntactic category of S (sentence). 'The carpenter' and 'a table', as the words with a noun as their head and grammatically sit in the position of subject and object, are belonging to the category of NP (noun phrase). When reduced into a phrase structure tree, the entire syntactic categories of the sentence will be revealed, as this illustration shows:



Those trees depict that a sentence exists as a systematic combination of words and at the same time, as a hierarchical structure with phrases imbedded in phrases. Those tree diagrams can be utilized as an indicator of a speaker's comprehension of his/ her language's structures. In detail, the basic rules to express a sentence into a phrase structure tree are:

1. S → NP VP
2. NP → Det N
3. VP → V NP
4. VP → V
5. VP → V PP
6. PP → P NP
7. VP → V CP
8. CP → C S

Where:

1. S = Sentence
2. NP = Noun Phrase
3. VP = Verb Phrase
4. Det. = Determiner
5. N = Noun
6. V = Verb
7. VG = Verb Group Phrase
8. PP = Prepositional Phrase
9. CP = Complementizer Phrase.
10. P = Preposition
11. A = Adjective
12. Adv. = Adverb
13. Adv.P = Adverbial Phrase
14. Pro. = Pronoun
15. Aux. = Auxiliary Verb
16. M = Modal
17. Conj= Conjunction

METHOD

In this research, researchers decided to analyze the syntactic structures in the aphasic utterances in YouTube videos by Sarah Scott– a stroke survivor who has suffered from Broca's (expressive) aphasia. The videos were uploaded to a YouTube channel, namely the *SymphUK* (owned by Sarah Scott). To examine the syntactic structures that existed in the data, the researchers utilize the phrase structure rules – kinds of rewrite rules which functioned to describe a language's syntax – as proposed by Fromkin, et al. (2014) to analyze the data. And by the structurally examined, we will be able to determine the syntactic structures in a systematic way. As the method for gathering data, this research utilizes the descriptive qualitative method. The reason to choose this method is due to the data's presence in the form of aphasic expressions by Sarah Scott and Mark Paulovich. The data is gathered by transcribing the expressions into text and analyzing the utterance's syntactical structure. Sarah Scott herself is the one who suffered from Broca's aphasia when she was 18 years old. Since then, she has created a YouTube channel SymphUK, which tells about her development in her aphasia rehabilitation process. However, this research was restricted to taking only the first video taken and it was 9 months after. Similarly, Mark Pavlovich is also a survivor of a stroke that he encountered while he was 22 years old. He then recorded some videos which tell his improvement from time to time. The video was taken 2 years after he got a stroke. Regarding data analysis, the syntactic structure of the transcribed

aphasic expressions is analyzed through the applied phrase structure rule of syntax, as described in Fromkin, et al. (2014). Through the application of the phrase structure rule for determining the constituents of the aphasic expressions, the researchers are able to determine the syntactic structure in the data.

FINDINGS AND DISCUSSION

Language disorders resulted in the ability of communication and memory. In dealing with Broca aphasia, the effects occur in the ability of linguistics symptoms in which the patients demonstrate deficit production in their sentence level. This can be triggered by many factors. Many were caused by diseases and strokes. Research done by Choi, et. al. (2021) tried to find out the effects of language treatment on communicative abilities and working memory in Korean-speaking agrammatic Broca's aphasia caused by moyamoya disease. The research reported that the treatment gave tremendous implications for working memory abilities. Other research focusing on psycholinguistics variables influencing word retrieval in Persian-speaking people with aphasia (Bemani, et. al., 2021) was conducted. It revealed that out of four psycholinguistics variables, the most dominant variable affected word retrieval occurred in word familiarity. The patients retrieved the familiar words with a faster reaction time and gave more predictable in naming accuracy.

Moreover, in this research, the researchers tried to analyze the linguistics ability on how the form of syntactical structures showed in Broca's Aphasia people. The following is the data transcription taken from Mark Paulovich video in 2010.

Hi there, I'm Mark Povlavich. I'm 24 years old. I live in Annapolis, Maryland. I also had a stroke on October 11, 2010. The day I had a stroke, obviously. Mmm.. The correct term is Broca's aphasia. Mmm,,,Click here on YouTube or whatever it's like it's in there somewhere uhmm... but yeah uhmm... where to begin uh... october eleventh roll by uhmm... and uhmm... i'm working out on the px90 workout session or whatever and you know I feel dizzy. Go lie down on the couch. But ....about 10 or ....10 minutes gone by, okay I'm ready to go, I'm working so hard but I fell all of the sudden. That's odd, you know. That's never happened to me before. Uhmm,,,You know what? Sleep it off, you know. Mind you, ten o'clock in the morning. Mmm...About two o'clock maybe, backstairs my dog, ummm, she's also, er, she, he is also, sorry, he is also in, er,,, the anti-seizure or whatever, I'll get to that part, but uhmm,,,drawing downstairs,, and I wo.. dragging myself,,, uhmm... you know...umm,, to the back door but I can't reach. Umm, you know,, This is really , ,,you know.. what's happening to me. , you know Why am I feeling like this? , you know ..., you know ...call the phone ,,, , you know ,,,but I can't reach it's too high. It's like oh wow it's like it's like panicking and you know oh my god what am I doing? Uhmm ..About uhmm ..6 or 6.30, dad's finally home. Uhmm...All I can say is one word and that word is ow ow ow. You know, um, um,,,, I should have said help me please something is seriously wrong with me... hmm... or you know called 911 you know but oops oh well. Uhmm... uhmm...The paramedics came and took me to an Rendell Medical Center I stayed about four days, um, uh, transferred me to NRAs in D.C. for about six weeks, um, and my right arm, as you can see, I can move it, but, you know, I can't, you know, my left arm is fine, but my right arm, not so much. Umm...Initially, I'm in a wheelchair. I ditched that months ago. And, yeah, I don't know. Therapy is going well. Umm,,,Emily is so great and umm...I don't know, hang in there, you know. It's ... it's a ...like hang in there ...And...umm ... umm... hang in there...

Figure 1. Mark Paulovich Video's Transcription

From figure 1, it is shown that Mark mostly filled his utterance with language fillers every time he tried to recall his memory of language production. The fillers that occurred in his speech were mostly "uhmm" and "you know". Other fillers were "It's like", "oh well", and "I don't

know". Similarly happened in Sarah Scott's utterances where she often replied and answered her mom's questions with fillers "uhmm". This is shown in datums 1.a and 1.b

1.a Mom: Okay, so what's your name?
Sarah: Uhmm, Scott. Oh, no. Sarah Scott.
b Mom: What happened to you?
Sarah: Uhmm, stroke.

The fillers also occurred when she tried to utter longer sentences as it is shown in datum 2.a below

2.a Mom: And what happened? Can you remember what happened?
Sarah: Uhmm..(writing on notebook) uhmm..uhmm .. school .. and English class.. and I ..uhmm ..book..and I read it aloud. And ..uhmm..but I can't coz stroke. And so I eh stand there and.. uhmm ..also arm...it's uhmm ,, the same as ..uhmm..the same as kind of thing as uhmm,, you know ..

Some syntactical structures in the utterances after breaking them down through the means of phrase structure rule, in form of tree diagram, were considered well-structured but some others were not. The syntactic structures found is in accordance to the description provided by Caramazza, et al., (1981) and Jianu et al. (2021), where there are agrammatical words; missing conjunctions, articles, prepositions, auxiliary verbs, while conceptual words; verbs, adverbs, and nouns, are still employed frequently with problems in inflectional forms (e.g. past and participle) and subject-verb agreement is often violated; a phenomenon known as 'telegraphic speech'.

Datum 3: Sarah Scott

'*I'm not doing speech therapy um just…and I think … just going out and talking to strangers is really really scary ……um...but the best thing is to…actually figure out that you can do it…*'

Datum 4: Mark Paulovich

"*Um…um… The paramedics came and took me to an Rendell Medical Centre. I stayed about four days…uh……transferred me to NRH in DC for about six weeks*"

As an attempt to analyze, each data is broken down into sentences. A sentence is indicated by the state where it is a complete thought and therefore stands as its own. A complete sentence will contain a subject and a predicate. Each of them is made up of a phrase – the subject is made up of a Noun Phrase; while the verb, of Verb Phrase. The following is a determination of sentences of each data:

3.a '*I'm not doing speech therapy um just…and I think … just going out and talking to strangers is really really scary and I think…um...*'; and

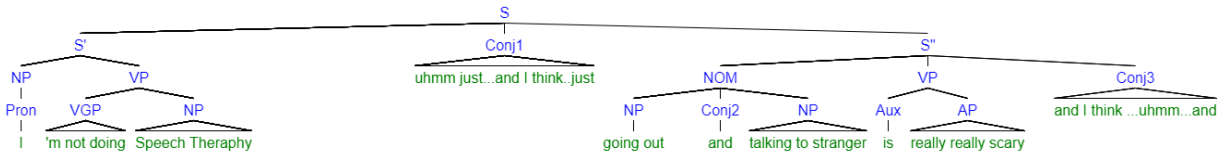
b '*but the best thing is to…actually figure out that you can do it…*'.

4.a '*Um…um… The paramedics came and took me to an Rendell Medical Centre'*; and

b. '*I stayed about four days…uh……transferred me to NRH in DC for about six weeks*'.

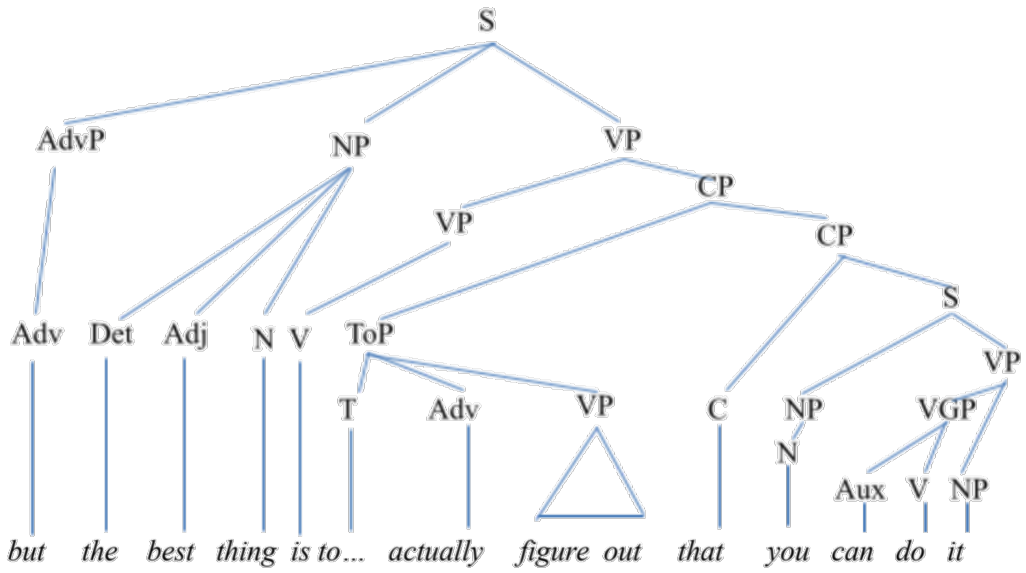
After separating the utterances into sentences, researchers can break down the constituents according to the phrase structure rules. The researchers were intentionally not including the compensative expressions (such as, '*um…*' or '*uh…*'), as they are merely a form of compensation in the attempts to find the proper words or expressions, which can be difficult due to the existing damage in the language processing area(s) of the brain. The dots (…) above a particular constituent indicates pauses or difficulties in recalling words. The analysis is described in the following:

Sentence 3.a



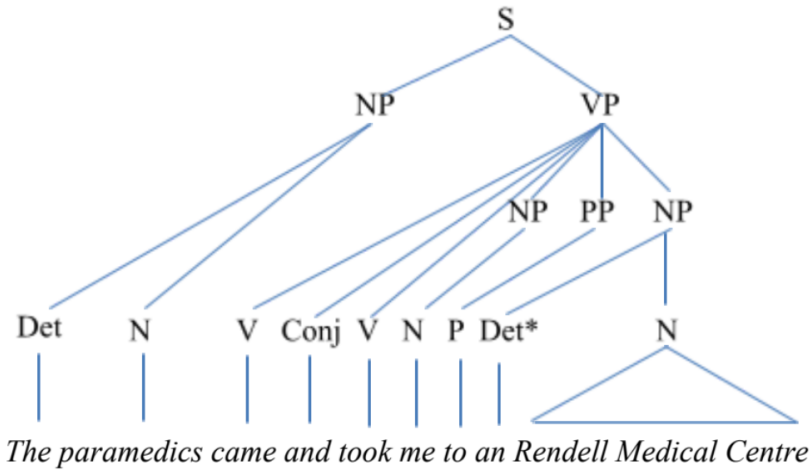
The analysis of the data above shows that there are noticeable mistakes that can be explained as forms of syntactic structures. The first sentence 3.a (by Sarah Scott) can be considered as ambiguous because even though it is a form of compound sentence (as indicated by the coordinating conjunction 'and'. The oddness is that beside that there are coordinating conjunction 'and', the utilization of adverb 'just' is not proper in such a condition, as it creates ambiguity. This depicts a particular obstacle in forming compound sentence. Moreover, sentence 3.b shows more accurate sentence. However, it still shows challenge in recalling the sentence (as indicated by the dots in the right side of infinitive).

Sentence 3.b

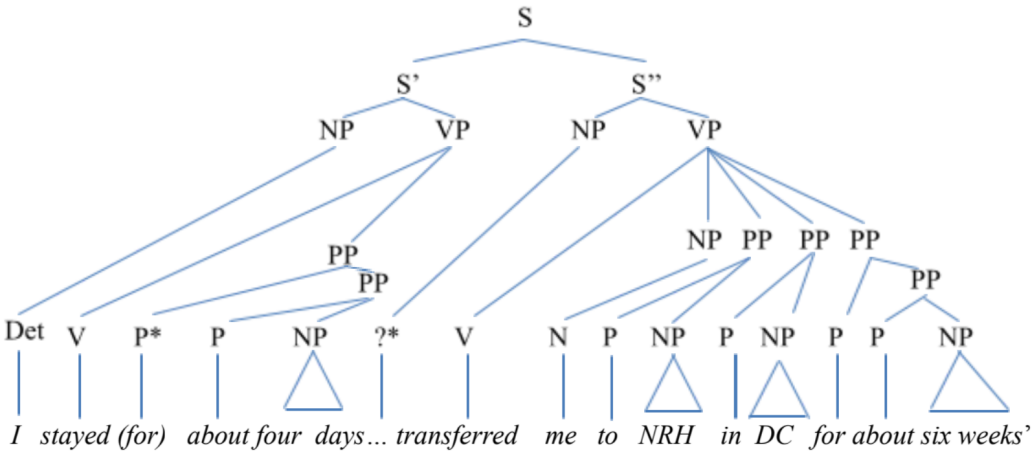


In accordance, for the utterance by Mark Pavlovich in sentences 4.a and 4.b, it is clear that there are also ambiguities or structures, such as the usage of the definite article (pre-determiner) *an* before the consonant-started and the proper noun *Rendell Medical Centre* in the first sentence.

Sentence 4.a



Sentence 4.b



Moreover, the latter sentence of his utterance is also showing signs of syntactic structures (as marked by asterisks), such as the possibly missing preposition 'for' and especially the possibly missing conjunction and noun phrase, as indicated by an asterisked question mark. All in all, all those utterances display syntactic structures similar to what is explained as telegraphic speech, which is marked by mistakes in grammatical words, inflections, setting of the more complex sentences, and in subject-verb agreement; meanwhile, still able to express utterances with conceptual words. This phenomenon is also called 'telegraphic speech'. Therefore, by the finding of this research, researchers suggested that there should be more effort in the research regarding aphasia, as it is also about the will to comprehend more about how language is processed. In addition, the results of this research is expected to be able to increase the readers' knowledge regarding Broca's aphasia and its related concepts and disciples, so that there can be an increase in public awareness against aphasia and the associated medical conditions, including stroke.

CONCLUSIONS

Broca's aphasia is a disease that affects its sufferers' ability in producing language. The subjects of this research are in form of two verbal expressions taken from two people with Broca's aphasia, namely Sarah Scott (from her YouTube Channel *SymphUK*) and Mark Pavlovich (from his YouTube channel *Mark Pavlovich*). The analysis above indicates that the utterances show particularly discernible numbers of syntactic structures. The structures observed include the massive usage of language fillers, misused conjunctions and determiners; disorganized compound sentences; missing prepositions and particular important words; and failure in forming the proper inflectional forms. The findings are consistent with the features of Broca's aphasia, which are mainly marked by misused or inability to produce grammatical words, inflections, setting of more complex sentences, and proper subject-verb agreement, where the same time the ability to express thoughts with conceptual words retained ('telegraphic speech'). Therefore, based on these research findings, the researchers suggest that further research regarding aphasia is needed in order to increase our knowledge regarding the disease and the human brain in general. Moreover, this research is expected to bring positive utilitarian benefits to everyone, especially its readers, in terms of raising awareness against aphasia and its associated medical conditions.

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