Bulletin of the *Transilvania* University of Braşov
Series IV: Philology and Cultural Studies • Vol. 10 (59) No. 1 – 2017

The role of linguistics in the evaluation and treatment of aphasia

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According to the National Institute on Deafness and other Communication Disorders (2015), "aphasia is a neurological disorder caused by damage to the portions of the brain that are responsible for language production or processing." The evaluation of language disorders is a complex process usually conducted within a clinical framework by a speech-language pathologist with the help of several assessment tools. However, in order to obtain a better insight regarding the type of impairment the patient suffers from it is necessary to analyse the patient's language taking into account the linguistic components of language - phonology, morphology, syntax, semantics, and pragmatics. By performing this analysis, the language pathologist or linguist easily observes if aphasia, as a language disorder, affects only one or more of these components and suggests the adequate treatment to the patient.

Keywords: *linguistics, aphasia, language disorder, language pathologist, linguist*

1. Introduction

Transferring information from one person to another in different ways, written, spoken, or other medium is defined as communication. Sociolinguists emphasise the importance of communication in maintaining certain relationships and in expressing feelings and emotions (Holmes 2001, 275). Fiske (1990, 2) claims that without communication the risk of social withdrawal increases and thus there will be no culture to survive.

The communication process is not as easy as it seems. The message sent to multiple recipients can be perceived in different ways but there is always the possibility not to be understood at all. The information or message does not always have the desired effect when sent from the transmitter to the receiver. Each person perceives the message differently. Perception is the term used for decoding and interpreting a message. Generally, communication is represented by different models which display the message transferred from the transmitter to the receiver. In the literature, we can find information regarding several models due to the fact that

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scientists are interested in the various aspects of the communication process. According to Fiske (1990, 1), each type of communication implies signs and codes. Signs are acts which have a different meaning than themselves, thus having important roles in the communication process. Codes are systems in which signs are organised. All these signs and codes are transmitted to different people their transmission and reception representing a social practice. As stated by Ciocîrlan and Drăgulescu (2013, 23) "if decoding is not carried out, the act of communication fails and we cannot talk of communication anymore." Although the communication process can be described through multiple definitions, the common thing between them is that communication involves an exchange of messages and information between two or more participants. This message is encoded and decoded and exchange of information is carried out through different channels (e.g. air or paper) and signals (signs such as letters or pictures) or by verbal or non-verbal (e.g., facial expressions or gestures). The elements which are important in the communication process are represented in Figure 1. (Ciocîrlan and Drăgulescu 2013, 23).

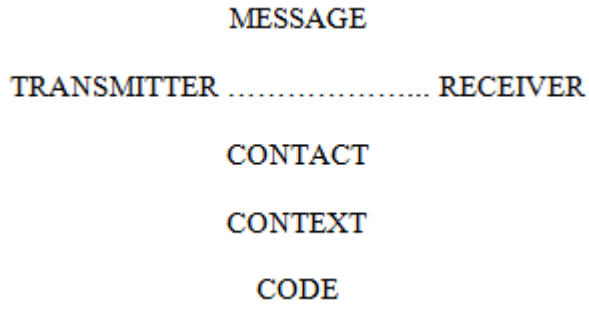


Figure 1. Elements of the communication process

Throughout the years, researchers performed studies concerning communication and its disorders identifying its importance in people's life. The two essential elements in communication are speech and language which are continuously changing due to the development of an individual's identity. A person's ability and inability to communicate or to transmit the desired information depends on many factors. Therefore, communication is a complex and multi-layered process. Because linguistic ability is useful in selecting the correct signs and codes as well as in their decoding, it is clear that a language disorder (such as aphasia) is also a communication disorder. As specified by Roy Harris (1996) there are three types of communication: intrapersonal, communication as a ritual and interpersonal. All these categories could be disturbed after a brain injury such as stroke, located in the left hemisphere, after which a person can be diagnosed with aphasia.

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2. Aphasia, a communication disorder

According to the National Institute on Deafness and other Communication Disorders (2015), "aphasia is a neurological disorder caused by damage to the portions of the brain that are responsible for language production or processing." There are several types of aphasia in which the communication process can be more or less affected. The discipline that deals with the study of aphasia is Aphasiology. Defined as a symptom of brain injury, aphasia is not considered to be a disease. A person suffering from aphasia has difficulty in communicating with other people. Most people who suffer from aphasia do not completely lose their ability to speak; there are patients who are just insecure in finding the correct word while others totally lose their ability to speak, to understand what they are being told, to read or write, while other cognitive functions such as memory or orientation are not seriously altered. Thus it is very important to highlight that the intelligence of these people is not affected.

As reported by Alfredo Ardila (2010, 366) there are two main forms of aphasia *Broca-type* and *Wernicke-type* aphasia. Over the years a new classification pattern was introduced:

- The classification proposed by the Boston Group (Kaplan, Goodglass etc.) which continue the development of the ideas suggested by Wernicke regarding the organization of the language in the human brain. According to this group, the two main subtypes of aphasia are:
    - fluent and non-fluent aphasia
    - cortical, subcortical or transcortical
- Luria's classification, a well-known Russian neuropsychologist, who originally described six and later seven subtypes of this disorder:
    - motor efferent or kinetic, motor afferent or kinesthetic, acoustic-agnostic, acoustic-amnesic, amnesic, semantic, and dynamic

2.1. Broca's aphasia

This disorder (non-fluent or expressive aphasia) also known as ***agrammatism*** is referred to as the most common of all aphasic disorders characterized by:

- poor vocabulary including only a few words or syllables, the patient thus adopting a telegraphic style;
- phonematic paraphasias or 'phonetic disintegration' (production of linguistic structures, especially words with incorrect phonemes);
- syntax disorder (agrammatism);
- word finding problems;
- poor pronunciation;
- poor melodic prosody;

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- poor right-hand writing;
- depressiveness;
- limited communication.

2.2. Wernicke's aphasia

This disorder (fluent, sensory or receptive aphasia) is characterized by:

- inability to understand written and spoken language;
- verbal diarrhea;
- semantic paraphasias (word salad);
- the use of neologisms;
- paragrammatism- the substitution (or omission) of grammatical morphemes in spontaneous speech;
- alexia - loss of the capacity to read;
- inability to communicate;

Due to the fact that these impairments are caused by the affection of the different areas of language (lexical, semantic, grammar etc.) linguistic theories were integrated into the study, evaluation and treatment of aphasia.

3. Aphasia and linguistics

The word linguistics has its origins in Latin being derived from the word *lingua* (*tongue*) and *itics* (*knowledge*). It has always been considered to be the field that studies human natural language having a great impact on other fields of study such as sociology, philosophy, psychology, neuroscience, etc. Basically, linguistics as a science is concerned with the study of language and communication.

According to Saussure (1966, 1-2) the development of this science is based on three stages:

1. At the beginning the single linguistic level studied was grammar used only to set rules regarding correct and incorrect forms.
2. The second stage was represented by the development of philology which was purely used by philologists to compare texts from different periods or to interpret and describe inscriptions. They were more interested in the written language rather than the oral one.
3. Finally, the third stage consisted in the discovery of comparability of languages. In this respect Franz Bopp's contribution is to be mentioned being the one that compared different languages after W. Jones, an English orientalist.

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These comparative methods generated a set of false notions that could not demonstrate the facts of speech as language was considered a peculiar sphere. At present, the reading of these texts is easier as people are not surprised by the meaninglessness and the terminology used to explain these absurdities. Only around 1870s specialists tried to describe the rules that govern the life of languages. Also, in this period, they realized that comparison only helps in the reconstruction of certain facts. Thanks to the analysis of Romance and Germanic languages performed by researchers a new perspective concerning linguistic studies was opened as they were able to discover the evolution of different dialects. Later neogrammarians shed light on their studies stating that language is "a product of the collective mind of linguistic groups" (Saussure 1966, 5). The linguist or speech pathologist is the one who observes speech but he also has to take into account written texts as only by these will he be able to rediscover words that were long forgotten. Speech and language play an essential role in people's lives. Speech represents the articulated form of communication while language represents knowledge that permits speakers to interact with each other.

Aphasia is considered to be a multi-level language disorder as it can affect one or more language levels, including *phonology, grammar (morphology, syntax), semantics and pragmatics* and their subdivisions (see Figure 2).

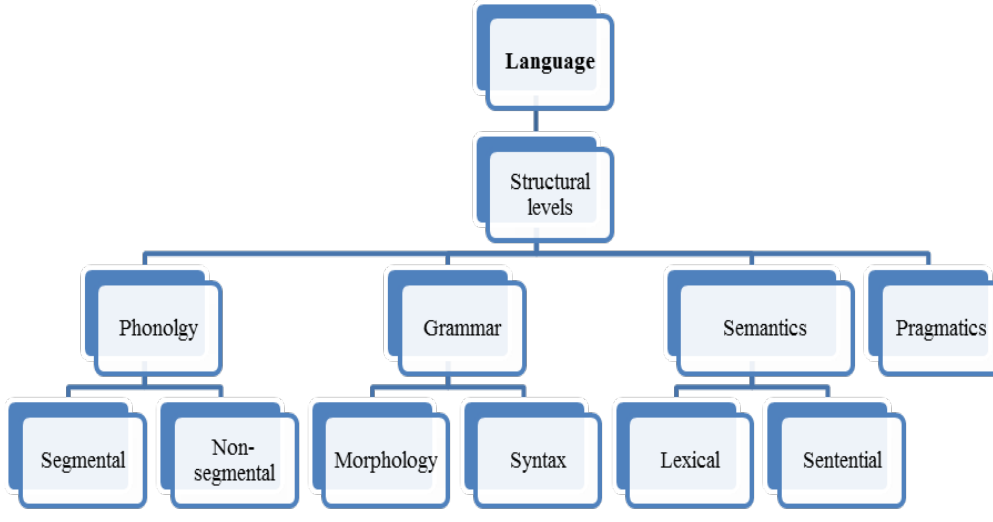


Figure 2. Levels of language analysis

Also, there is a chance for all levels of language processing to be affected. Before describing or classifying aphasic syndromes one must be sure of the aspects of language that are impaired. According to the affected level(s), aphasia can differ in severity. Some individuals may find it difficult to utter words; others may have

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difficulties in writing or forming correct sentences or understanding what other people would like to say. According to Parr et al. (1997, 3) besides all the above-mentioned difficulties aphasia can also affect gesture. This classification and description must be performed by qualified linguists who have the necessary knowledge about the patterning and functioning of language. In order to help aphasic patients to regain their ability to communicate, we must first comprehend, as suggested by Jakobson (1987, 95) "the nature and structure of the particular mode of communication that has ceased to function". Due to the fact that aphasia is seen as a breakdown of language, it is the linguistic knowledge that has to be applied to help people understand the exact nature of this breakdown. According to the same author when investigating aphasia from a linguistic standpoint one has to take into account the delimitation of the linguistic levels meaning that the person who evaluates the aphasic patient has to identify and distinguish the linguistic level that is disintegrated. The analysis always starts with the identification of the distinctive features making it possible to differentiate between the two types of aphasia.

With the aim of being able to make a thorough linguistic analysis of aphasia, it is absolutely necessary to have a corpus which includes different aphasic texts that can be used for the assessment of aphasic patients. These texts, that are actually aphasic discourses, are necessary for the classification, evaluation and eventually treatment of aphasic syndromes from a linguistic approach. Thus, linguistics is an aid in treating aphasia. It is very difficult for a clinician or a linguist to treat aphasic patients unless they are not aware of the severity of the impairment. Each level has to be separately assessed and the treatment has to focus solely on one item. The clinician or the linguist has to identify the type of aphasia the patient suffers from and based on this classification to use linguistic notions in the treatment of the identified disorder. In order to perform this classification, the clinician or the linguist has to register the patient's speech and transcribe it using a special program thus helping him to convey a clinical approach to the disorder. According to Ludlow (1981, 163) "a detailed analysis of a patient's spontaneous speech is the first step in planning a treatment programme". A great emphasis has to be placed on the description and classification of verbal syndromes.

4. Discussions

In this paper, I would like to highlight some of the cases where linguistics plays a crucial role in the evaluation and treatment of this disorder. By performing a thorough analysis of the linguistic levels that may be impaired in the case of aphasic people, one may not only have the possibility to evaluate the patients' condition but also recommend different and personalized treatment methods for them. Thus, Wernicke's aphasia is characterized by a disorder at the *lexical* and *semantic* levels while Broca's aphasia at the *grammatical* one.

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Agrammatism is one of the most frequent disorders identified in patients defined as "an aphasic disorder which impairs syntax rather than vocabulary". (Pryse-Phillips 2009, 26) Jakobson (1971, 251) defines agrammatism as 'the syntactical rules organising words into higher units are lost and this causes the degeneration of the sentence into a mere words heap... Word order becomes chaotic; the ties of grammatical coordination and subordination ... are dissolved, words endowed with purely grammatical functions, like conjunctions, prepositions, pronouns, and articles disappear first... and a typical feature... is the abolition of inflection."

According to the Oxford Dictionary (2017) inflection is defined as "a change in the form of a word (typically the ending) to express a grammatical function or attribute such as tense, mood, person, number, case, and gender". In their study, carried out on ten aphasic patients, Yasmeen Faroqi-Shaha and Cynthia K. Thompson (2007, 136) identified examples of inflection elimination:

(1) a. *I will shaking the tree.*
"Eu voi scuturând copacul."
b. *He wore a crossing around his neck.*
"Purta o trecere în jurul gâtului."

In the same study, the authors have noticed errors in the agreement between the subject and the verb of a sentence, as:

(2) a. *I lock**s** the door.*
"Am încuiat ușa."

Such examples can be identified among Romanian aphasic patients, examples that have been extracted from the oral language samples recorded at the Neurology Clinic I, Mureş County Clinical Emergency Hospital. Protocols, such as personal narrative, four – paneled and six-paneled picture descriptions have been used to help patients in retrieving meaningful sentences, phrases. By signing a consent form patients have agreed to being recorded. Thus, examples such as:

(3) a. *[…]și fetiță stă să prindă pe pisică și cîine latră.*
"[…]and little girl stands to catch the cat and the dog bark."
b. *[…]fetiță a venit să alerge după pisică.*
" […]little girl came to run after the cat."
c. *Aveți grijă de nepoți?*
Nu, nu că la Cluj, băiatu'.
"Do you take care of your grandchildren."
"No, no in Cluj, son."

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These exemplify that during the speech of Broca's aphasic patients articles disappear or they are not adapted to the meaning of the sentence.
Broca's aphasic patients' speech is also considered to be telegraphic, characterized by the omission of functional classes, such as determiners and tenses. A study carried out by Nada Vasić (2006, 176) from the Utrecht Institute of Linguistics OTS on agrammatic Dutch patients revealed these omissions:

(4) a. *[…] ja, _ baas, administratief, he?*
yes, boss, administrational, right?
"da, șef, administrativ, corect?"
b. *[…] tweeveertig dertig jaar geleden ongeveer eventjes in Arnhem gezeten.*
forty-two thirty years ago approximately a while in Arnhem spent - participle.
"Patruzeci și doi de treizeci de ani în urmă aproximativ o vreme în Arnhem petrecut – participiu"

Mr. B. Gh, suffering from Broca′s aphasia when asked whether he has a family or not he simply replied:

(5) a. *[…]doi băieți care îs terminați, unul a terminat Medicină, unul terminat […]e la poliție, o fată care a terminat Medicină, adică e terminată.*
" […] two boys who are finished, one finished Medicine, one finished [...] is at the police, a girl who finished Medicine, meaning she is finished"

Another patient, N.M., stated:

(6) a. *[…]și pe urmă am venit direct la spital la Tîrgu Mureș și mi-am stat până în/la începutul lui septembrie.*
" […] and then I came directly to the hospital in Tîrgu Mures and I myself stayed as far as/until the beginning of September"

The use of the incorrect tense (prezent perfect) can be observed in both cases. Mr. N. Gh., a male patient who suffers from Broca′s aphasia, misuses the inflection for gender:

(7) a. *Ce lucrați dumneavoastră?*
Sunt pensionară.
"What is your occupation?"
"I'm (feminine) retired."

The order of the words in the uttered sentences sometimes becomes chaotic:

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(8) a. *[…]și fetița se întinde către pisică, către pisică după.*
" […] and the little girl stretches to the cat, to the cat after?"

Another issue that characterizes aphasic speech is the omission of pronouns or the difficulty to understand reflexive and pronoun structures such as *himself* and *him* that, unless bound to an expression, lack meaning (Choy and Thompson 2010, 553). Aphasic patients usually do not understand the sentences below:

(9) a. *Justin told [Thomas to shave himself].*
"Justin îi spuse lui [Thomas să se bărbierească]."
b. *Justin told [Thomas to shave him].*
"Justin i-a spus lui [Thomas că îl bărbierească]."

or they simply omit pronouns like in the example below identified in the Romanian population:

(10) a. *Doi pompieri vor să ajungă la băiat să deie jos.*
"Two firefighters want to get the boy to take off."

Word finding problems are also characteristic for agrammatic patients usually nouns, adjectives, adverbs and main verbs. Most of the difficulties appear in finding the correct grammatical and phonological form of a specific word (get, gets, getting, got, gotten). Incorrect phonological forms of nouns like: "*ia umbrela, ia iozdanu'"* instead of "*ghiozdanul"* or *„Am fost mecanic automomente și după aia m-am mol…., bolnăvit„* instead of "*automobile"* and "*m-am îmbolnăvit"*.

On the other hand patients with sensory aphasia (Wernicke type) exhibit different types of disorders. The main dissimilarity is illustrated by the disappearance of nouns in patients with Wernicke's aphasia while agrammatic patients' vocabulary is rich in these elements. Patients with sensory aphasia simply omit or replace these nouns with pronouns, figurative expressions etc. Typically, their speech is full of phonological and semantic paraphasias which give a jargon like feature to their speech. Word-finding problems are highlighted through circumlocutions, semantic paraphasias and the use of semantically weak words. Circumlocutions are described as word replacements; sometimes aphasic patients describe the object rather than name it ("*pencil→ for writing*"). Semantic paraphasias refer to word substitutions like: "*hand→foot"*, "*small→big"*, "*cat→animal"*. (Ardila 2014, 53).

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5. Conclusions

In conclusion, it can be asserted that linguistic theoretical framework is an important aid in assessing and treating patients with aphasia. Linguistic analysis must be carried out on multiple levels in order to correctly identify the problems aphasic patients suffer from. These levels are damaged in different ways in each type of aphasia. Once the disorder is identified the linguist or the clinician can start the treatment that eventually will help patients to recover their speech. By recording aphasic people's speech and by performing a thorough analysis of each linguistic level one can observe that the majority of the mistakes are related to the semantic, lexical or grammatical level.

Speech recovery is not an easy process but by using the correct evaluation methods and tools and by correctly interpreting the obtained results it can be easily achieved among aphasic patients. In order to have a clear interpretation and classification of aphasic disorders, one needs to take into consideration the use of linguistic criteria. Only by using linguistics as a means in the recovery process will one obtain clear and useful information with the help of which he will be able to help aphasic patients recover and lead a normal life. A detailed description of the disorder is mandatory in order to set the correct diagnosis and prescribe the adequate therapy. Also, Jakobson (1980, 94-95) emphasizes the importance of linguistic analysis in aphasia:

> The question of levels is relevant indeed. Too often, attempts to treat the linguistic aspect of aphasia suffer from inadequate delimitation of the linguistic levels. One could even say that today the most important task in linguistics is to learn how to delimit levels.

The same author continues:

> But in all linguistic questions and especially in the case of aphasia, it is important to approach language and its disruption in the framework of a given level….and that the totality and the interrelation between the different parts of the totality have to be taken into account.

Acknowledgements

The author would like to thank the staff from the Neurology Clinic I, Mureş County Clinical Emergency Hospital who made it possible to record aphasic patients.

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