

# Neurolinguistic Study of Language Disorders in Aphasic People

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## INTRODUCTION

Language is more often than not taken for granted, especially when it is a mother tongue. Even linguists may not have a clear idea of what language is, although language is what linguists have attempted to study from various dimensions : language and its uses ; its functions in society ; its structure (how humans use it, interact with it create with it and construct it).

In this article, language is thought of as behavior. In this sense, it is taken as the ways in which humans use to create various situations such as a discussion about politics, an argument between husband and wife about education of the children, or a negotiation between a buyer and seller. As such, then, language is something which changes all the time, and is time-sensitive mainly because humans change ; their needs change. However, when a change occurs to the human brain, whether from an organic or external source, the human must change to cope with the new environments.

All of the study of language as mentioned above is incorporated in the generic term called *linguistics*. However, the specific study of language in the brain and the behavior for coping with the above circumstances is called *neurolinguistics*.

Neurolinguistics delves further into the study of language which involves the relationship of language to the brain.

Thus, linguists have devised two ways in which such behavior can be examined : through (1) social perspective and (2) individual perspective. The social perspective is a means by which to examine the functions of the language behavior between two or more people. In this instance, linguists would examine the behavior as a negotiation between people ; that is, the meanings that are created, reconstructed and negotiated. The second is an individual aspect. That is, linguists would examine language as the manifestation of brain functions internally in each individual and determine how such brain functions enable the individual to make proper adjustments to the external and internal environments.

This latter is a neurolinguistic approach because one must refer to functions of the brain as the "power plant" of language itself (Peng 1994). After all, it is the individual who learns a language and it is s / he who produces information for and receives information from another in

the form of impulses.

It is this individual aspect of language which will be examined in this paper. The object of consideration will be pathological discourse, in particular, aphasic discourse. The study of pathological discourse is necessary to further understand the realms of language and the capacity of the brain, for only through the analysis of limitations placed on language can the neuro-linguist attempt to comprehend the functions of the brain.

### APHASIA

Before continuing further, it would be beneficial to give an explanation of aphasia. Aphasia, put simply, is a language impairment subsequent to some brain damage; usually from a stroke, post-operative damage or from a head injury caused by some external trauma. Some prominent language difficulties which seem to emerge are troubles with articles and inflections or so-called function words, and comprehension problems. Other difficulties occurring concurrently with aphasia can result, such as dysfluency which is an articulation difficulty or dysprosody which is a monotonous intonation in speech.

Aphasia is rather complex because many complications can occur. In addition, aphasia has become a multidisciplinary area of study which span from neurology to linguistics and also to psychology. One aspect which renders understanding of aphasia as complex is the view of language itself. Language itself is not always the primary focus of the study. That is, language in many respects becomes a vehicle to examine other problems. Thus, language can be viewed in two ways: formal and functional.

By formal, it is meant that language is described as an entity of discrete units. The units must be countable and so the type of units described are not above the unit of sentence. Thus the focus of analysis is the structural aspects. For instance, in a study by Goodglass and Berko (1960), the focus was on inflectional endings in order to determine the level of difficulty of various inflections. The complex possessive / -ez / — as in “The blanket is for the horse. Whose blanket is it? It is the ....” (1960: 262) — was the most difficult. Another example would be of a study by Saffran, Berndt and Schwartz (1989) in which they were developing a text to evaluate narrative data. Saffran *et al.* gathered narrative data — retelling the Cinderella story — and edited each narrative according to criterial features. The subsequent, edited data was analyzed for such features as the number of nouns + main verb forms, noun + copula + adjective forms, topic-comment structures, number of content verbs and number of open class words.

Functional, by contrast, implies language as something which is meaning based and so the context in which the language is used becomes an essential issue. “The purposes we have for using language and the meanings we express come from the social context and our language is organised to serve social functions. These are reflected in the grammar, which is central to the organisation of language” (Collerson 1994: 1). Therefore, units above the sentence can be considered. Such a view of language is reflected in functional approaches. For instance, Ulatowska and her colleagues (Ulatowska, North and Macaluso-Haynes 1981; Ulatowska, Freedman-Stern, Doyel and Macaluso-Haynes 1983) examined narrative data and procedural discourse — explaining how to brush teeth, cut bread, and change a tire. The investigators analyzed such things as cohesion, the number and type of propositions in the data. The conclusions stated

that aphasic and normal speakers did not differ in quality of errors but in the degree of errors ; that is, only the frequency of errors was higher for aphasic speakers. Additionally, Armstrong (1987) examined cohesion of narrative data in a more detailed method. She found that aphasic speakers had cohesion breakdown. According to the judgement of listeners, their informal judgments found differences of coherence between aphasic subjects while the standard test battery used for assessing aphasic speech evaluated the subjects as equal in level of severity.

Further studies are being done with respect to conversations and conversational skills. For instance, Schienberg and Holland (1980) examined turn-taking skills of aphasic subjects. They found that aphasic people have relatively minimal impairment of conversational format and so turn-taking was intact. Such studies reflect the functional use of language as a tool used for social negotiations. That is, some aphasic people may need to relearn some language skills which enable them to cope with various conversations — essential for establishing and maintaining social relations.

Thus, the view of language can be quite different between studies. The type of data being used is varied as well. Some use minimal language as in completing a sentence, while others use greater amounts of language as in narratives or conversations. The formal studies have been instrumental in creating standardized tests which help assess people to determine the severity of aphasia and the areas of speech which need rehabilitation, such as the Boston Diagnostic Aphasia Examination (Goodglass and Kaplan 1972). However, with the limited view of language, it becomes difficult to assess units above the sentence and so conversation and communication cannot be assessed properly. Aphasiologists, therefore, have moved to functional approaches in which they not only focus on communication but also view language in a different way ; language is meaning centered. Such studies can be instrumental in building foundations for rehabilitation methods that enable aphasic people to cope with various social situations (Armstrong 1993 ; Ferguson 1992, 1994 ; V. Peng 1994).

### NEUROLINGUISTIC THEORY

The primary emphasis in this paper is a neurolinguistic approach. As was stated earlier, there is a social perspective and an individual perspective to examine language. The social perspective of aphasic discourse would be to examine aphasic people speaking to someone such as a spouse or a therapist. Such a view would examine the topics which they discuss and how the aphasic person copes with such a setting. However, in neurolinguistics, a more in-depth view is involved. Language as behavior and the functions of the brain are corresponded. This perspective is the individual one.

Peng (1994) has established new views in neurolinguistics. He emphasized the view that meaning is the focus of language. He states that “language is based on the notion of function because it can only manifest itself when in use through choice between and among people” (1994 : 105). Thus, language is perceived as having meaning as the core and comes from social interactions. In line with the systemic-functional approach to language (Halliday 1995), Peng gives the following stratification of language.

Context of Situation

Meaning or Semantics

Wording or Lexicogrammar

Sound Patterns or Phonology / Phonetics

In a similar fashion, Peng perceives the brain as having functions which can be stratified in the following way.

Language

Specific Brain Functions

Higher Brain Functions

Basic Brain Functions

According to Peng (1994, in press), the Basic Brain Functions help the individual adjust to internal and external environments. Such brain functions are shared with non-human primates. Some examples are emotions as in anger, fear or hunger. But the difference is that humans have a capacity for language. For humans, the capacity for us to express emotions and other states by language is unique. In the following conversation between DM, an aphasic man, and VP the investigator expresses some emotions.

(473) VP : have have you been to Japan

(474) DM: one week

(475) VP : oh one week did you enjoy it

(476) DM: yes because it was it was uh the boss at D

(477) VP : uh-huh

(478) DM: somebody else that I was allowed to take (clears throat) one of the guys (clears throat) I could pick no I they could pick six some people for those deals

(479) VP : uh-huh

(480) DM: and went up to uh Sydney uh to Japan

(481) VP : right

(482) DM: so it was just to going going around

(483) VP : oh so they selected people within the company to go with you is that right

(484) DM: yeah m

(485) VP : you were selected wow where did you go

(486) DM: Kyoto Osaka Nara [ ] only say factories there and we went up to um Tokyo on the bullet train we were in Tokyo (clears throat) then we flew out and we came back on the uh on the bullet train [and something right there] and it was uh ... most most interesting

(487) VP : oh so you must have been mostly in business uh meetings while you were there were you able to do some sightseeing

(488) DM: oh yes they say us uh and we sent to uh we were taken in by M

(489) VP : M

(490) DM: yeah

(491) VP : oh right

(492) DM: and so we all tied with them

(493) VP : they they would take you around to different things

For instance, in (475), VP asks DM if he *enjoyed* his trip to Japan and he answers *yes* in

(476).

The second level, Higher Brain Functions, work to partially segment the external world in order to pair or map Meaning to Wording. At this level, partial segmentation is carried out; further segmentation is carried out by Specific Brain Functions. Perhaps (480) is an example of improper segmenting. DM first answers *Sydney* and then corrects himself with *Japan*. His answer of *Sydney* most likely was produced due to improper segmenting at the level of Higher Brain Functions. He had proper meanings of place but the improper segments were paired with the meanings.

The third level is Specific Brain Functions which perform more delicate functions. At this level, chunking occurs to enable the pairing with meanings. Another function which occurs is function enhancement and integration in which the meanings are refined from the context of situation. In (476), DM uses the conjunction *because* which is incorrect in this instance. Perhaps, DM had the meanings of the proper connection to *it was uh the boss at D* but because of improper chunking, the meaning and wordings are not able to be paired properly. Another example is in (486) in which DM explains about his transportation. This portion is confusing to a listener because it is difficult to determine where he went from Tokyo — *then we flew out and we came back on the uh on the bullet train*. DM has the possible meanings of what he wants to say but he possibly did not chunk his information properly, and so some information is missing.

The impairments which have been discussed thus far relate to production of language. Further difficulties can be stated which are from the reception of language. For instances, DM does not realize the problems in (476) and (486). Of course, VP does not attempt to clarify any information, which could partly explain why DM does not catch the difficulties. However, his reception of his own messages might be somewhat impaired. He knows the meanings he selected but he does not hear that the information is missing in the outcome. However, in (480), he hears his own mistake, *Sydney*, and corrects himself — *Japan* — with no prompting from VP. Thus, in some cases, he can hear errors and in other cases he cannot, thereby giving evidence that indeed he does have receptive problems. These receptive difficulties may be included in Specific Brain Functions because the impairment seems to be with the chunking of meanings

### CONCLUSION

All of the functions above together produce what may be called language in the brain. It is only in neurolinguistics, however, that connection can be created between language and brain functions. Through the analysis of pathological discourse, the neurolinguist can attempt to understand language from a more delicate perspective, that of the individual, for it is the individual who creates meanings and reconstructs them when interacting with another individual in varying social contexts of situation.

The most important thing to remember is that meanings once created (or constructed) in the brain stay in the brain; what come out are the sounds which become sound waves that travel through the air to reach another individual's ears. It is the second individual who must reconstruct her / his own meanings in the brain. When the two individuals match their meanings,

they are said to “communicate” with one another. But often, the individuals’ meanings do not match. That is why there exist misunderstandings.

In the case of aphasic people or other brain damaged people, the patient’s reconstructed meanings are more likely to differ mildly, moderately, or drastically from the meanings created or constructed by the non brain damaged person in the same contexts of situation. The neuro-linguistic approach enables neuroloinguists to examine where the differences in brain functions may have occurred. Through examining language produced by people with brain damages, the neurolinguist can surmise what can occur with people having no brain damage. The reason is that the patient’s brain functions are seriously impaired and, as a result, the patient cannot match her / his reconstructed meanings with the meanings originally created or constructed by a non brain damaged person in a social interaction.

When examining language from the individual perspective, one finds that language is a complex mechanism. Peng (1994) suggests that language is memory-governed. Thus, language disorders may be caused by memory impairment, thereby rendering a person inept in adjusting properly to external and internal environments through language. Such a suggestion leads to a new topic and shall be discussed at another opportunity.

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