

Speech Disorder in Iraqi Patients with Stroke

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ABSTRACT

Language is an essential part of life, by which we can communicate with each other about thoughts, feelings, send messages, and communicate with each other, etc. Language, a core intellectual ability, is supported by complex neural and psychological mechanisms. These papers are divided into three chapters. The first chapter contains clinical-neuro linguistics. I found this title more suitable for the first chapter, because of aphasia links between clinical linguistics on one side and neurolinguistics on the other side. It also contains the main parts of the brain, which are important to know about, to know the position of language in our brain. The second chapter talks about aphasia and its main types. The third chapter includes the application side, depending on the specialist in neurology (Dr. Abd Al-Razzaq M. Al-Asfoor), an Iraqi neurologist. The study involved five patients at Al-Hussain Hospital in Iraq, Kerbala.

1. Introduction

Language is a process of communication. It is an important device for people to communicate with each other since Life without language is lifeless. In order to achieve its role, language involves two tasks, which are encoding and decoding symbols. In other words, it involves comprehension and production of the symbols of language. Linguistics is the scientific study of language. It studies the structure of languages. In linguistics, by are three levels, which are important to the speaker to produce his intention, and for the listener to interpret the speaker's purpose. Leech (1981, 13) argues that any given piece of language is structured simultaneously on more than one level. At least three linguistic levels are important and necessary for linguistic competence and linguistic

performance. In linguistic competence, we can generate and understand linguistic utterances.

These levels are based on sound, structure, and meaning. In sound, we are involved with phonetics and phonology, in structure with syntax and morphology, in meaning with semantics and pragmatics. The mechanism of language is based on these levels, i.e., by encoding, as speakers, we have to choose the suitable meaning from our mind, then arrange the meaningful utterances into grammatically correct sentences by using the syntactic rules, and finally, we produce these utterances by our speech organs related to phonetic rules. While by decoding processes, as listeners, we analyze abstract symbols by the

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acoustic organs and then match these abstract symbols with meaning in our mind to distinguish these syntactically and meaningfully uttered utterances from others. We know that we are producing speech by our speech organs (articulators), which include the lips, teeth, alveolar ridge, hard palate, velum (soft palate), uvula, glottis, and various parts of the tongue. These articulators are divided into two types: the active organs (movable), which include the tongue, the lower lip, while passive organs (unmovable) include: the upper lip, teeth, alveolar ridge, hard palate, soft palate, uvula, and pharynx. Active articulators move relative to the passive articulators; this refers to the physical production of sounds. All the previous processes of language that people use to produce and understand linguistic messages are controlled by **the brain**.

Chomsky's revolution against structuralism and traditional grammar views of linguistics was a major step in the development of linguistics. Modern linguistics focuses on studying language scientifically. It aims to study: the relation of language with other branches within itself, like phonetics, phonology, grammar, semantics, pragmatics, etc., and the relation of language with other sciences outside itself like; psycholinguistics, applied linguistics, sociolinguistics, anthropological linguistics, etc. psycholinguistics studies the relationship between language and the mind or thinking, it studies human ability to comprehend, produce, and acquire language and to understand how our mind works. Crystal (2008; 31) defines applied linguistics: the application of linguistics theories, methods, and feelings, and the problems related to language. The most advanced area of applied linguistics is the instruction and acquisition of foreign languages, but recently, other fields of application have appeared, one of them related to language disorder (clinical linguistics). Clinical linguistics studies the application of linguistics theories to a medical condition, which involves a language disorder (pathology). It argues that limitations in memory influence both speech production and understanding, and studies The study of speech impairments. These parts have been developed in recently through technical details regarding language and the brain, which is a branch of neurolinguistics. (Finch, 2000: 196)

The study of the relationship between language and the brain is called neurolinguistics. Yule (13:2006) states that the term Neurolinguistics was recently found, it comes back to the nineteenth century, and it establishes the location of language in the brain. Richards and Schmidt, in their dictionary Longman (2002: 358), define neurolinguistics as: the study of the role of specific information concerning language and the brain. It encompasses the effects of brain structure on language acquisition, the specific region of the brain where language is held, and the impact of brain injuries in a specific part of the brain will affect the ability to use language. Thus, we notice that neurolinguistics is related to psycholinguistics, which is the study of language and mind, on one hand, and related to clinical linguistics: the learning of language disorders, on the other hand. Crystal (2008:325) defines neurolinguistics as: a subfield of linguistics that examines the neurological foundations of language acquisition and usage.

It seeks to clarify how the brain manages the functions of speaking, listening, reading, and writing, and other activities of language. He argues that: the central study of neurolinguistics is the study of Clinical linguistics conditions, which includes three areas: the cases of aphasia, dysarthria, stuttering. Also, the study of the errors of speech production, especially in the phonetic level of articulation, which involves: slips of the tongue, and hesitations, and the third area involves the study of lexical access processes. Crystal (2008:80), in his dictionary of phonetics and linguistics, defines clinical linguistics as the utilization of linguistic theories, techniques, and descriptive results for analyzing medical conditions, which involves the pathologies of language disorders. The task of a linguist, in cooperation with language therapists and audiologists, is to evaluate, diagnose, and remediate disorders of the production and comprehension of verbal and written language. This research involves the study of Aphasia, which is a type of language disorder. It attempts to respond to the following inquiries which are What is meant by neurolinguistics? Where does language reside in the brain? What is aphasia? What are the types of aphasia?

CHAPTER ONE

1.1. Clinical-Neuro-linguistics

Clinical linguistics is a branch of applied linguistics. It studied language disability. Specialists of this branch extend from research and teaching interests in language disability to practicing professionals, such as speech and language pathologists, language therapists, educational and clinical psychologists, and neurologists. A researcher in this field tends to possess a broad spectrum of various fields, like psycholinguistics, cognitive science, neuroscience, and biomedical science, in addition to linguistics. Clinical linguistics didn't appear as a coherent field, including pragmatics, semantics, phonology, and grammar, until the late 1970s. The field coined by David Cristal, by establishing his book *Clinical Linguistics* (1981). It was an influential book in the history of language deficits. Also, the establishment of the journal "*Clinical Linguistics and Phonetics*" in 1987 and the institution of [ICPLA], the "International Clinical Phonetics and Linguistics Association", were the other markers for creating the field of clinical linguistics. (Staanz encyclopedia of linguistics, 213)

Three important matters emerge in the relation between language and brain, which are comparison, localization, and lateralization. The **comparison** issue involves how the brains of humans differ from the brains of primates, which lack language. In this case, scholars argue that a human newborn must possess some form of genetic faculty to acquire language as successfully and rapidly. Thus, they expected the human brain to be structurally distinct from animal brains, which lack language ability. From the cognitive view, the operation of the human brain enables them to develop language, which other species cannot. **Localization** argues where language is located in the brain. During the nineteenth century, Chomsky and his followers at that time drew special attention to the theory of first

language acquisition, which indicates that every normal child successfully acquires a first language, regardless of their cognitive ability or learning approach. The theory recommended by some scholars suggests that language should be an independent ability and not included in our thoughts and reasoning. Evidence for that comes from persons who have difficulties in learning, but their language faculty appears to be spared. **Lateralization** refers to the difference in contribution between the left side and the right side of the brain. Primary evidence suggests that damage to the left hemisphere of the brain will impair language ability, while damage to the right side doesn't. A hypothesis "proposed by Lenneberg" indicates that damage in kids' brains before the 5th would sometimes, fully recover their ability to speak, because the relationship among the two sides of the brain is adaptable enough to relocate itself to the right side. This period of flexibility constitutes a critical period. (Field, 2003:7)

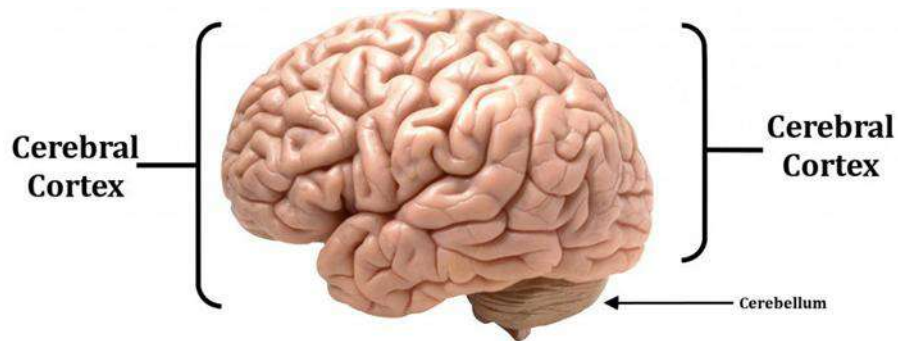
Psycholinguistics attempts to outline the processes occurring in the mind, regardless of the structure of language in the brain. Similar to how one can analyze bus routes in London without understanding the physical structure of buses, one can learn a great deal about the mechanics of language without delving into the neurons that facilitate this process. However, as understanding of the brain advances, psycholinguistics increasingly integrates with knowledge about the brain, which is known as neurolinguistics. The neuro-linguistics task is to investigate whether a particular type of "language disorder can correlate with damage to a specific area within the brain". (Aitchison: 2010, 175)

1.2. The Geography of the Brain

We all know how important our brain function is in our ability to get tasks accomplished. Our brain is divided into lobes. These lobes are based on three areas:

1-. Upper VS Lower

Figure (1)



a) The upper external surface of the brain is colored by “gray matter”; its color becomes gray when exposed to the air. It is known as the “**cortex or cortical area**”. This cortical area deals with a variety of complex procedures, including:

1. Making a connection with stored information.
2. Analyzing input information.
3. Controlling sophisticated muscular movements.

b) Sub-cortex is colored by ‘white matter’. It consists of “nerve cell fibers”. In general, the brain's lower regions manage reflex actions and regulate functions like breathing and heartbeat.

c) The cerebellum exists at the base of the brain. It is responsible for coordinating a series of muscle actions, which have turned extremely instinctive.

2. Left VS Right

Kendra Cherry, who is an author and educator with over a decade of experience helping students make sense of psychology, has written: The left-brain versus right-brain dominance theory suggests that each hemisphere of the brain governs distinct thinking styles. Moreover, it is claimed that individuals tend to favor one kind of thinking over another. For instance, an individual described as “left-brained” is frequently considered to be more analytical, logical, and objective, whereas someone labeled as “right-

brained” is regarded as more thoughtful, intuitive, and subjective. In psychology, the concept relies on what is referred to as the lateralization of brain activity. So, in this case, we have to ask: Does one hemisphere of the brain truly govern particular functions? Do individuals tend to be more left-brained or right-brained? Similar to numerous well-known psychology myths, this one is rooted in truth that has been significantly misrepresented and exaggerated. Subsequent studies have indicated that the brain is not nearly as binary as it was previously believed. Recent studies indicate that proficiency in areas like mathematics is most robust when both hemispheres of the brain cooperate.

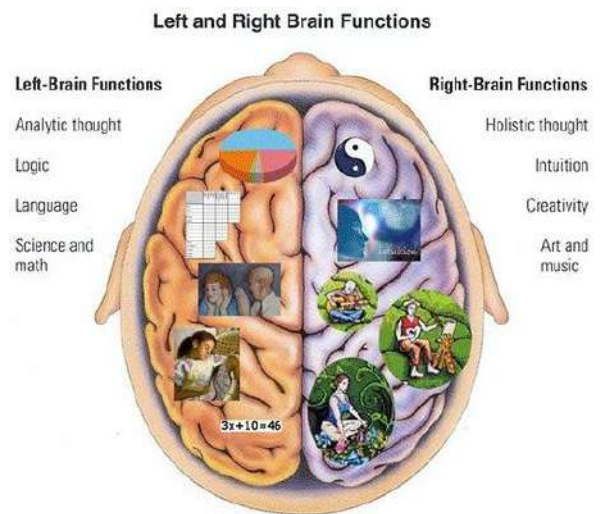


Figure 2

Internet source1:

<https://www.edwarddreyfusbooks.com/psychologically-speaking>)

According to Field (2006, 8), he states that; The brain consists of two halves, one located on the left and the other on the right. They are interconnected by an intricate network of nerve pathways, referred to as the corpus callosum

(Figure 3). The left side of the body is managed by the left hemisphere regarding movement and sensation. The right side of the body is associated with the right hemisphere. In general, the left hemisphere, in most humans, is associated with analytic processing and symbolization, while the right hemisphere is associated with perception and spatial representation.

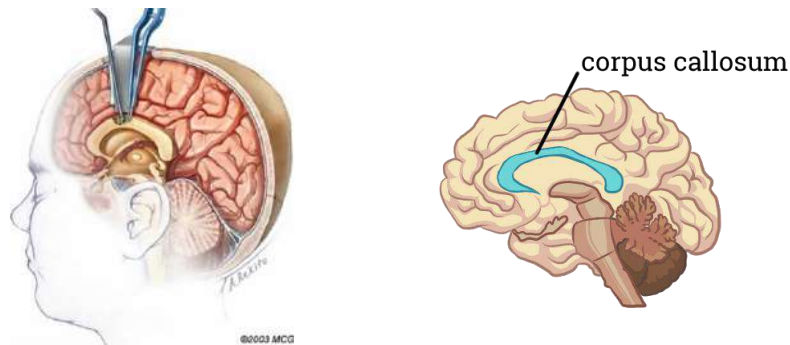
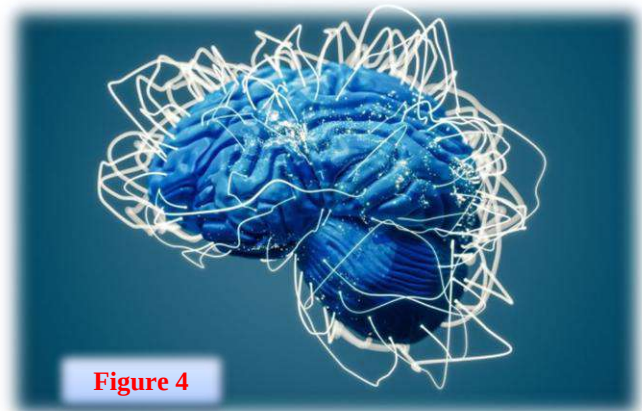


Figure (3)

The idea of localizing language in the brain, and other ideas, specialists have taken two views. One states that a language is restricted to a single location or a limited number of areas in the brain, while others state that “language is widely distributed” through the brain. Evidence from aphasia indicates that language is positioned in the left hemisphere of the brain (as we will talk about it in more detail in chapter three). Other evidence indicates that language is not located in a specific area, but is distributed in the brain (Figure 4). Thus, researchers of language and the brain didn’t depend solely on the aphasia evidence, but they used brain imaging techniques. Brain- image technique involves track of following the electrical impulses or changes the blood flow by heightening brain activities. (Field, 2006, p8)

One of the brain-imaging techniques is PET, “positron emission tomography”. In this experience, researchers set up cases to involve three tasks of increasing complexity, and they used the monitor of PET monitor to show how blood flow altered. It consists of three steps (as shown in Figure 5):



- a. In step 1, subjects listened to a rapid list of words.
- b. In step 2, they asked to repeat the words, as they had heard before.
- c. In step 3, they were requested to articulate words that were connected to those they had previously heard.

d.

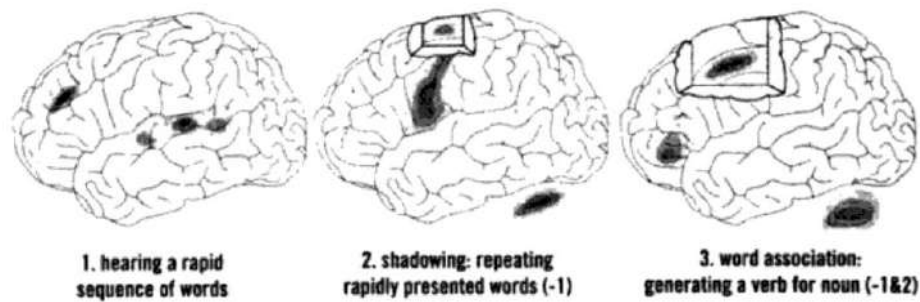
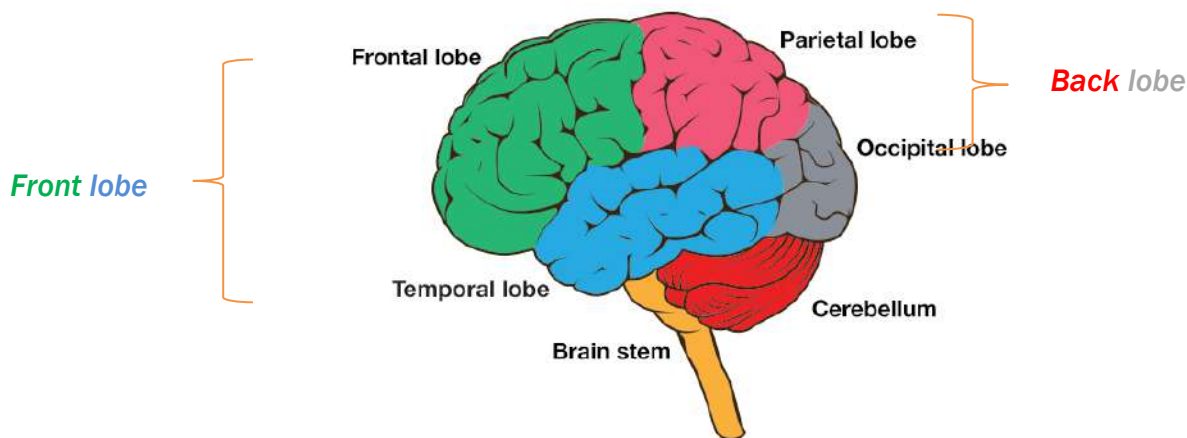


Figure (5)

Thus, besides this evidence, there is evidence suggesting that: different lexical sets (colors, tools, foods) may be stored in diverse places. So, from the previous experience, we conclude that the brain seems to differentiate between two types of language processes or activities. These processes involve:

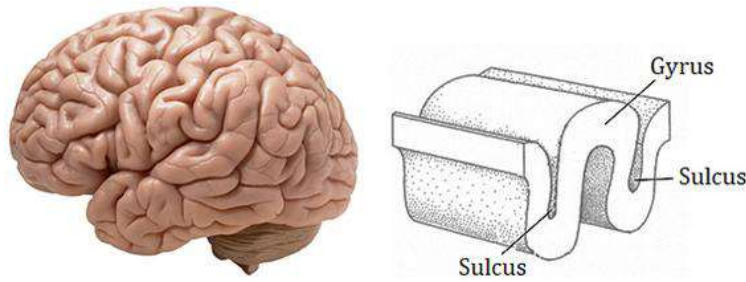
- a. Recognition phonemes: in the central parts, looking after more rapid analytic operations.
- b. Building meaning: other parts of the brain, looking after slower, associative operations, in which it builds a meaning. (Field:2006,53,56-57)

3. Front VS Back



• Figure 6

The outer surface of the brain is marked by “mounds known as gyri and valleys known as sulci”.



Cerebral folds: Gyri and Sulci

These work to mark out four major regions in each hemisphere; these regions are known as labels.

- 1- *Frontal lobe*: at the front.
- 2- *Temporal lobe*: extends from the front part to the back of the brain.
- 3- The *occipital lobe*, at the back.
- 4- *Parietal lobe*, at the back.

The most important areas during these lobes are the prefrontal areas. They are tasked with identifying the commonalities among objects and organizing them into categories. Any damage to these areas may affect the ability to choose between various objects. Also, it may suppress or defeat our old routine habits or information when "new information tells us to modify them. Also, it may limit the patient's ability to perform tasks that involve seeing things from the perspective of others". The midbrain, down the side of each hemisphere, controls motor operations, which involve muscular movements. (Field: 2006, 8-9)

1. Language/speech disorder

A language disorder is a communication disorder in which a person has difficulties in learning and using various forms of language (i.e., spoken, written, sign language). Patients with language disorders have difficulties that limit their ability to communicate in many social, academic, or professional settings. Indicators of language disorders initially surface during the early developmental phase when children start to acquire and utilize language. Language acquisition and utilization depend on both productive and comprehension abilities. On the other hand, for adults by stroke or injury to the head, which

affects the brain in specific areas. Expressive ability relates to generating verbal or gestural signals, while receptive ability involves the process of comprehending and interpreting language. People with a language disorder might experience difficulties in either their receptive or expressive skills, or in both. Generally, Individuals with this condition exhibit difficulties in comprehending and generating vocabulary, sentence construction, and discourse. Since individuals with language disorders usually possess a restricted grasp of vocabulary and grammar, their ability to participate in conversations is also constrained. (Internet source2: <https://www.psychologytoday.com>)

There are several types of language disorders, which involve problems of speech production and perception. Field (2004:92-93) mentions categories of language disorders and their ways, which are:

3.1. Acquired VS developmental:

The acquired disorder involves impairment of language, which takes place once a primary language has been mastered fully. It may result from brain damage to the left hemisphere caused by an accident or surgery. It may cause dementia, which affects the cognition of the child and mental processes.

A developed disorder involves impairment during first language acquisition. It results from various problems, such as dyslexia and dysgraphia, which involve, the first is a general term for disorders that involve difficulty in learning to read or interpret words, letters, and other symbols, but that does not affect general intelligence, while the second is the inability to write coherently. It may

affect language learning associated with autism, which refers to a mental condition, existing in early childhood, characterized by difficulty in communicating and forming relationships with other people and in using language and abstract concepts, Down's syndrome or Williams syndrome, and also cases of delayed language acquisition called specific language impairment.

In general, a developmental disorder has three effects: it may delay the normal process of language acquisition, it can change the order and levels of language acquisition, or it may deviate from the normal language development.

Thus, we can distinguish between acquired and developmental disorders by the marker of the prefix. The prefix [dys--] indicates a developmental condition of disorder, while the prefix [a--] indicates an acquired condition.

Thus:

- *Aphasia = acquired dysphasia*
- *Alexia = acquired dyslexia*
- *Agraphia acquired dysgraphia*

3.1. Organic VS functional: In organic disorders, there is a neurological or physiological cause, while in functional there are problems of psychological processes.

3.2. Reception VS production: it indicates that language disorder may affect the perception, production, or both. In this, the cause will result in aphasia, which is restricted to either receptive aphasia or expressive aphasia, or both.

3.3. Performance VS system: In this type of disorder, a distinction is made between speech disorder, which affects phonology and phonetics, and language disorder, which affects the lexicon and the system of syntax. In other words, these two disorders may affect the performance of phonetics and graphemic level or may affect the underlying system, which involves the phonology, graphology, semantics, or syntax.

Generally, there are major topics involved in language/speech disorders, some of which may be

related to psychology, and others may be related to neurology. These are problems of fluency, problems of written language, and the relationship between language and cognition. (Field, 2004, 92-93)

Problems of fluency it related to the task of psycholinguists, as in the case of stuttering. While other sufferers of such problems may have physiological defects in the speech organs or articulators [mouth, tongue, jaws, palate, etc.]. Impairing the ability to speak doesn't affect the hearing and intelligence of the patient. Problems of written language in which there is a distinction between dyslexia (reading difficulty) and dysgraphia (writing difficulty), though many patients may have both. In other words, Dyslexia and dysgraphia are both learning differences. Dyslexia primarily affects reading. Dysgraphia mainly affects writing. While they're different issues, the two are easy to confuse. They often occur together. There are some differences between them. dysgraphia is an issue that involves difficulty with the physical act of writing. Kids may also find it hard to organize and express their thoughts and ideas in written form, while dyslexia is an issue that involves difficulty with reading. It can also affect writing, spelling, and speaking. Kids may find it hard to isolate sounds, match sounds to letters, or blend sounds into words". The relationship between language and cognition indicates that language is independent of other cognitive aspects. Thus, the task of the linguist, in this field, is to investigate how humans organize language. For example, fluent aphasics suggest that speech production and speech comprehension might be, to a large extent, separate since one can exist without the other. (ibid., 93)

A language disorder can arise from impairment at many distinct levels of a process. These processes are composed nominally of input, output, and word meaning. For instance, failure in naming objects called [anomia], may result from perceptual deficits in visual object identification [agnosia], while degradation or failure of the core concept that links the linguistic form with meaning [semantic impairment], or failure to link the word with the target concept [lexical retrieval deficits]. Internet source3: (www.sagepub.com)

Dysarthria is a communication issue resulting from a disruption in muscular coordination. Dysphasia (or aphasia) refers to a language impairment. They frequently exist together. Technically, the terms anarthria and aphasia indicate a complete lack of the capacity to produce speech or language, yet they are frequently employed when dysarthria and dysphasia would be more accurate. Specifically, dysphasia and aphasia are often used synonymously, with aphasia being more frequently utilized. (ibid)

We conclude that language disorder is a weakening that makes it hard for someone to find the correct word and produce clear utterances. Thus, a child may have difficulty understanding what people say, may struggle to put thoughts into words, or both. Also, for adults, those who suffer from stroke or injury in a specific area. Language disorders can either be acquired or developmental. Acquiring a language disorder, like aphasia, causes damage to specific areas of the brain from stroke or traumatic head injury. While developmental disorders are more common in children. Children with developmental language disorders often begin speaking later than their healthy peers. Kids with a language disorder may have intelligence above average. (ibid)

Chapter two

1. Aphasia

Aphasia is recognized as a disorder of language ability, characterized by a loss of language function. The ability indicates the processes of production and understanding the spoken language. This disability usually results from brain damage to specific areas, especially the left hemisphere of the brain. The damage may be caused by an accident, a stroke, or invasive surgery. Evidence of aphasia indicates the location of language in the brain. (Field:2004,16)

The historical overview of aphasia focuses on the changes both in approach and topics concerning language disorders caused by brain injuries Initial instances of language disorders were documented without any speculation regarding language or its connection to the brain. Additionally, three types of speech disorders were identified: "translates, pellets, and misophonia", which are marginally

associated to aphasia. During the 18th century, certain writers, especially Gesner and Crichton, sought to clarify language disorders through mental processes. The significant controversy regarding both the anatomical (Broca, Wernicke) and functional dimensions of aphasia prevailed in the late 19th-century discourse on the localization of function, resulting in the emergence of what we currently refer to as cognitive neurosciences. During this time, language processing was characterized by a straightforward functional model of word recognition and production, with no involvement of linguistic principles. In the early 20th century, interest in language disorders diminished as focus shifted away from localization; aphasia was mainly viewed as a clinical matter regarding optimal patient classification. In the latter part of the 20th century, the area of aphasia advanced quickly because of research conducted at the Boston Aphasia Unit and, more significantly, due to a shift towards linguistic concepts of language structure, as proposed by Chomsky. Internet source 4:
(<https://www.sciencedirect.com/>)

"Lovely rabbit," said a woman who had had a stroke, when shown a picture of an apple. By chance, she had been talking about rhubarb[®] previously, and so had somehow blended the words apple and rhubarb into a rabbit. She was suffering from aphasia"

(Aitchison:2010,173)

Under the heading of speech disorder, Aitchison mentions this evidence of losing the ability to communicate. She states that aphasia, in general, means serious speech disorders, literally means 'without speech'. Patients with types of disorders usually have some speech, but rather of an odd kind. She also states that we must distinguish people with aphasia from those who simply have a problem in speech, such as "stutterers". Aphasic patients are difficult to classify because of damage to the brain, which is hardly specified, because of its complex structure hardly ever neat and tidy. The tissues may swell, and some areas are likely to lack blood and oxygen, and the brain may work in unpredictable ways. Most of the patients have difficulty in finding words, a problem known as anemia, which literally means "without naming ability". Sometimes patients may suffer from difficulty in linking words together to form

sentences, which is known as Agrammatism. In this type, the patient speaks effortfully, also, may use few words, and may omit function words or especially omitting the short words; a, and to. It is known as agrammatism because patients with this condition speak in an ungrammatical way, but they mostly understand other participants and answer appropriately. Crustal (2006:18) defines agrammatism as a language pathology and part of aphasia, in which the patient suffers from speech production, characterized by abbreviated syntactic structures, the loss of function words and inflections, and reduced grammatical range.

"One patient, when asked if he went home from the hospital at weekends, replied: 'Why, yes ... Thursday, er, er, er, no, er, Friday ... Barbara wife ... and, oh, car ... drive'"

(Aitcheson:2010: 174)

In addition to agrammatism, other patients may suffer from fluent aphasia. Those people may have speech, but without sense. They produce strange, made-up words and often have severe problems in comprehension. Their speech is irrelevant to the question, which is directed to them, and they may produce a chain of meaningless morphemes.

"One patient, when asked why he was in the hospital, produced a stream of meaningless gibberish: 'I can 't mention the tarripoi ... I impose a lot, while, on the other hand, you know what I mean, I have to run around, look it over, trebbin, and all that sort of stuff.'"

(Aitcheson:2010: 174)

In the Longman dictionary, Richards and Schmidt (2002, 28) refer to aphasia as the loss of language ability in using and understanding. The loss may be total or partial, and may also affect spoken and/or written capacities. They refer to different types of aphasia, which are: agraphia is difficulty in writing, alexia is difficulty in reading, anomia is difficulty in using proper nouns, and agrammatism is difficulty in using some grammatical words or function words.

These types of aphasia don't occur independently, but they occur together, or some of them will be affected by the damage to specific areas in the

brain. These types occur within two major types of aphasia: fluent and non-fluent, or may occur in both of them [more details during the next section].

2. Types of Aphasia

As we have mentioned previously, Aphasia is a condition caused by injury to areas of the brain that control language. For the majority of individuals, these regions are located on the brain's left side. Aphasia typically appears abruptly, frequently after a stroke or head trauma, but it can also progress gradually due to a brain tumor or a degenerative neurological condition. The condition affects the ability to express and comprehend language, along with reading and writing skills. Aphasia may co-occur with speech disorders, such as dysarthria or apraxia of speech, which also result from brain damage.

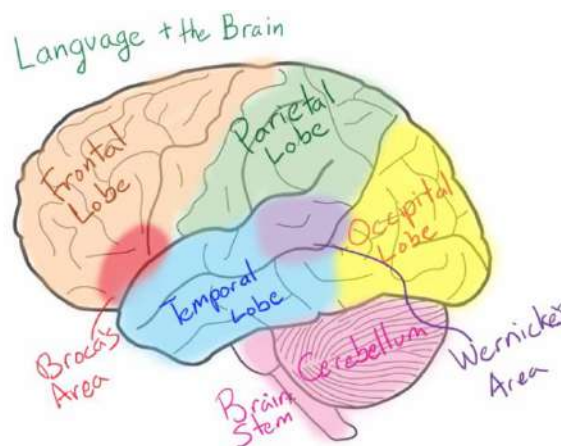


Figure 8

2.1. Broca's Aphasia

During the period (1861-1945), a French physician, Ernest Auburtin, presented a patient who had lost the ability to speak but was able to understand language. another French Physician named Paul Broca, who was an anatomist and anthropologist, had heard about that patient. The patient named 'Leborgne' had lost the ability to speak and had only produced the syllable 'tan', [after that he was known as Tan]. The patient had died on April 17, then his case was presented to other physicians. Broca named Tan's problem as Aphasia, which means loss of articulated speech. Broca determined that Leborgne's disease (or

called Tan's lesion) was situated in the left posterior frontal lobe.



Paul Broca

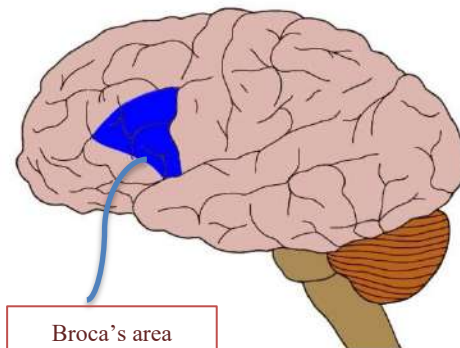
Figure 9

Later on, and especially for the next few years, Broca presented 12 cases like the case of Leborgne, to support the idea of localization of the articulated language. Then, he assumed that when a person has lost the capacity for speech, the condition is based in the left hemisphere, whereas lesions in the other hemisphere (the right one) will not cause such deficits. Thus, this area is named by the name of Paul Broca. (Ardila: 2014,14)

Broca's aphasia is a communication disorder. It is creating a disability in speaking and writing. It is also called non-fluent aphasia. It comes suddenly as a result of a stroke or brain injury. People with Broca's aphasia may understand everything said to them, but they have difficulty finding a word to express themselves or answering questions. Sometimes, they can make phrases, but with long pauses and repeated words. People with aphasia know that their speech is hardly produced, and effortfully produced. They are suffering from the disability in finding a word to answer a question said by the addressee.

Individuals with Broca's aphasia experience impairment that mainly impacts the frontal lobe of the brain. They frequently experience weakness on the right side of their body or paralysis of the arm and leg, as the frontal lobe plays a crucial role in motor movements. Individuals with Broca's aphasia can comprehend speech and are aware of

what they intend to express, yet they often communicate in brief phrases that require significant effort to produce. They frequently leave out minor words, like "is," "and," and "the". In other words, People with Broca's aphasia typically understand the speech of others fairly well. Because of this, they are often aware of their difficulties and can become easily frustrated. In other words, People with Broca's aphasia struggle with fluent speech, yet their understanding may remain fairly intact.



Broca's area
Figure 10

This kind of aphasia is referred to as non-fluent or expressive aphasia. Patients struggle to create grammatically correct sentences, and their tongue is limited mostly to short utterances of less than four words. Constructing the right sounds or finding the right words is often a laborious process. Certain individuals find it harder to use verbs compared to nouns. Nonetheless, they might struggle with grasping sentences that contain more intricate grammatical structures. People with this kind of aphasia might be able to read, but their writing abilities may be restricted.

Field (55) mentions the characteristics of aphasia:

- Effortful speech, many pauses
- Almost no syntax
- Few function words or affixes
- Mainly concrete nouns.
- Comprehension is often good, but they may use positional and semantic signals rather than fully understanding the meaning.

2.2. Werneck Aphasia

During (1801-1867, a second major development in the history of aphasia occurred with the representation of a German doctor named Karl Wernicke. Wernick proposed two diverse forms of aphasia, motor and sensory. Later on, he had added a third type of aphasia, based on the assumption that damage to different areas of the brain may cause diagrammatic language. later, Wernick, with Lichtheim, presented a model known as the “Wernick-Lichtheim model, or classical model”. Thus, conduction aphasia may influence language repetition because of the defects or “disconnection between the sensory and motor areas of the language”. (Ardila: 2014,15-16)



Karl Wernick
Figure 11

Yule (2006,139) states that Carl Wernicke found that damage in the area of the ‘posterior speech cortex’ [figure 11], what called the Wernick area, will lead to speech comprehension difficulties. Thus, the finding by Wernick has confirmed the idea of localization of the language, which indicates that language is based in the left hemisphere of the brain. Wernick also discovered an area that links between Broca and Wernick,

known as the “arcuate fasciculus”, later on, known as a crucial connection between Wernicke's and Broca's areas [figure 11].

people with Wernick aphasia can speak easily, but their speech makes without sense. Their answers may not match the questions. Patients with this type of aphasia may not know that they added non-existent words in their sentences. words in their speech, thus they aren't aware of their nonsense speech. It is very difficult for them to follow the conversation and or comprehend language, whether written or spoken. Wernick's aphasia is like any other sort of aphasia; it is treated by speech therapy.

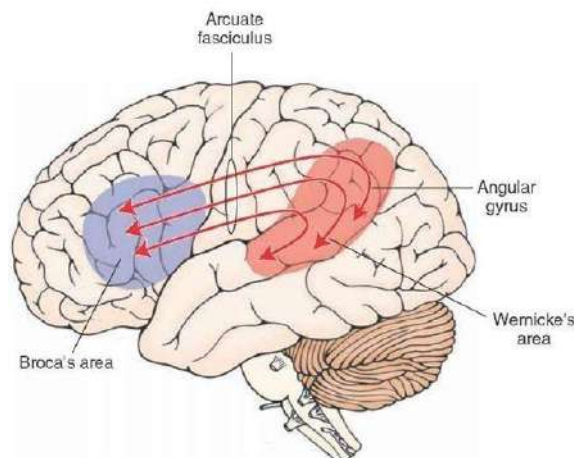


Figure 12

Field (2003, 56) mentions some characteristics of Wernick's aphasia:

- Effortless speech-fluent, rapid
- Syntactically well-structured, complex sentences.
- Function words, affixes.
- Using general nouns (thing, person), and verbs (do, go)
- Comprehension is often severely impaired.

Thus, Aphasia can be divided into two main categories: fluent and non-fluent, each containing various types. Injury to the brain's temporal lobe can lead to Wernicke's aphasia, which is the most prevalent form of fluent aphasia. Individuals with Wernicke's aphasia might produce lengthy, fully-formed sentences that lack significance, incorporating superfluous words and occasionally inventing new terms. Individuals with Wernicke's aphasia frequently do not realize their verbal errors. Another mark of this type of aphasia is difficulty understanding speech. In this type of aphasia, the capacity to comprehend the meaning of spoken words and sentences is diminished, whereas the fluency of producing coherent speech remains largely unaffected. Consequently, Wernicke's aphasia is known as 'fluent aphasia' or 'receptive aphasia' as well. Reading and writing are often severely impaired. Similar to other types of aphasia, people may retain fully intact intellectual and cognitive abilities that are not associated with speech and language. Individuals with Wernicke's aphasia can generate numerous words, and they frequently express themselves using grammatically accurate sentences at a typical rate and with natural prosody. Nevertheless, frequently what they express lacks clarity, or they clutter their phrases with meaningless or unrelated terms. They might not recognize that they are choosing incorrect words or using a word that doesn't exist, and frequently, they are not completely conscious that their statements are nonsensical.

2.3 Global Aphasia

Another type of aphasia, global aphasia, results from injury to general portions of the language areas of the brain. People with global aphasia experience significant challenges in communication and may have very restricted capabilities in both speaking and understanding language. They might struggle to express even a couple of words, or could continually repeat the same words or expressions. They might struggle to comprehend even basic words and phrases.

They may find it difficult to articulate even a few words or might continuously reiterate the same phrases or terms. They may have difficulty understanding even simple words and expressions. In other milder forms of aphasia,

individuals can have fully preserved intellectual and cognitive capabilities unrelated to language and speech. [source of internet 5, This information cited in <https://www.aphasia.org/aphasia-definitions/>]

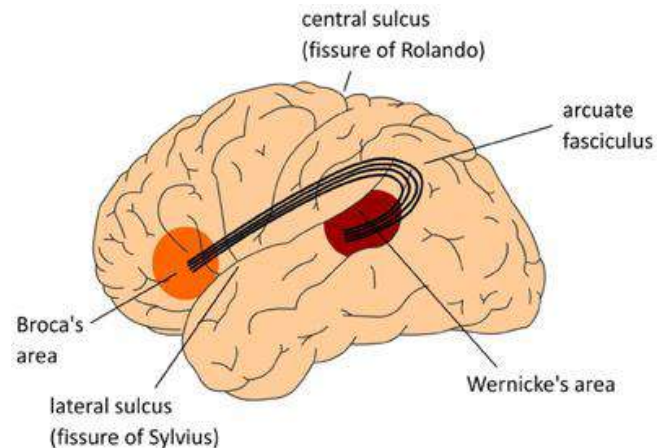


Figure 13

Global Aphasia results from damage to various language-processing regions of the brain, including Wernicke's and Broca's areas. These brain regions are especially crucial for comprehending spoken language, retrieving vocabulary, applying grammar, and generating words and sentences. In other words, it may be caused by damage to the left side of the brain, which affects receptive and expressive language skills (needed for both written and oral language) as well as auditory and visual comprehension. Patients with global aphasia may be able to express a few brief utterances and use non-word neologisms, or what is called coinages, but their general production ability is limited. Their ability to repeat words, utterances, or phrases is also affected. Patients with global aphasia may still be able to express themselves through facial expressions, gestures, and intonation. This type of aphasia often results from a large lesion of the left inferior cortex area, or the area which links Broca with Wernick's area, named arcuate fasciculus [figure 13]. The injury is associated with damage to Broca's area, Wernicke's area, and insular regions, which are related with aspects of language. [source 6: <https://en.wikipedia.org/>]

Chapter Three

3.1. Data Analysis and Findings

In this section, the author introduces a detailed linguistic analysis of five aphasic individuals using documented clinical recorded clinical interviews. The study is based on spoken responses, pragmatic features, and non-verbal cues to categorize the type of aphasia for each patient. The spoken conversation between Neurologist (Dr. Abd Al-Razaq Al-Asfoor), an Iraqi Neurologist, and the patients. Besides, each case is detailed using excerpts from the transcript, accompanied by an interpretive linguistic profile.

Patient No.1

Doctor: What's your name?

Patient: Fawziya

Doctor: How old are you?

Patient: (another patient replies that she doesn't know)

Doctor: Where are you now?

Patients: Here I'm with Naeema what's I!

Doctor: Now, morning or night?

Patient: What?

Doctor: Now, is it morning or night?

Patient:

Doctor: What's your relation with this woman?

Patient: What is my relation with her?

Doctor: What is her name?

Patients: Fawziya

Doctor: And, what's your relation with this woman?

Patient: She is my aunt.

Doctor: Your aunt, what's her name?

Patient: Nasima, Nasima ... (her relative replies: Yep, her name is Nasima, but not her aunt)

Patient (1) Analysis

The above transcript reflects a dialogue between the patient and the Doctor, reflecting moderately reasonable sentence construction with significant deficits in semantic memory and awareness. Responses to basic questions such as "Where are you now?" or "Is it morning or night?" Where unclear or missing, and the patient repeated segments of the questions, showing slight echolalia. Altered memory and orientation, Misidentifications of patients suggest semantic confabulation and fabrication. Despite these issues, sentence construction remained complete

and intact, demonstrating mixed-type aphasia with relatively conserved grammar but impaired semantics.

Patient No.2

Doctor: Her name is Ajeba?

Her relative: Yep

Doctor: What did you have yesterday?

Patient: All are chicken, dinner is chicken ...

Doctor: How many children does she have?

Patient: No, I'm not married.

Doctor: Your children, what is the name of the older?

Patient: Me?! I have boys.

Doctor: What is the name of the older?

Patient: three boys.

Doctor: What is the name of the older?

Patient: Jasim.

Doctor: Yasir?

Patient: JASIM.

Doctor: Jasim, ok, how do you do with counting?

Patient: "Better than anything God can give."

Doctor: It means 'two dinars and three dinars, how much?

Patient: Two dinars and three dinars, how much?

Doctor: How much?

Patient: three dinars, it's three.

Doctor: Yeah, excellent.

Doctor: Where is the location of your house?

Patient: in Al-Jahiz.

Doctor: in Al-Jahiz.

Patient: We are immigrants from Diyala.

Doctor: Diyala is a province?

Patient: Yeah,

Doctor: Which province?

Patient: Baqubah

Doctor: That means you are from Balad or Al-Dujail?

Patient: Buqubah.

Patient (2) Analysis

The above transcript reveals that Patient 2 produced fluent grammatical expressions, yet responses were regularly pragmatically inappropriate or semantically off-topic. The patient misinterpreted individual questions and provided metaphorical replies to simple calculation tasks, suggesting effort with semantic control and abstract cognitive. Whereas some naming capacity remained (e.g., 'Jasim'), besides

relevance and comprehension were inconsistent, representing mild to moderate fluent aphasia with issues in semantic-pragmatic aspects. This type resembles Wernick's type of aphasia characteristics.

Patient No.3

Doctor: How are you, Amera? Amera what?

Patient: I'm fine.

Doctor: What's your father's name?

Patient: What?

Doctor: Amera, what?

Patient: Abaas.

Doctor: What is your relation with this Girl?

Patient: (talking rubbish with a smile, ambiguous speech)

Doctor: Have you had your breakfast?

Patient: (nodding with her head, indicating not yet ..)

Doctor: Where is your house?

Patient: Our house? (her facial expression reflects that she is trying to remember, but her tries are useless)

Doctor: Do you have children?

Patient: Yeah.

Doctor: Count your children? What are their names?

Patient: (smiles without naming)

Doctor: Your children's names?

Patient: What? Zain Al-Abdeen a-----nd Mohammed.

Doctor: (asking her relative, if the information is true, and the woman confirms that.)

Patient (3) Analysis

The 3rd patient displayed mostly intact fluency and syntax but showed noticeable lexical retrieval problems. Delayed responses, repetition of WH-questions, and dependence on nods and facial expressions were obvious. The patient struggled to recall the names of places and people; hitherto could retrieve her children's names after a brief interruption. These features correspond with mild anomic aphasia, characterized by word-finding difficulty among preserved comprehension and grammar of simple questions.

Patient No. 4

Doctor: How are you?

Patient: Grateful for Allah.

Doctor: What is this?

Patient: Thank Allah!

Doctor: What is this?

Patient: Thank Allah! ... God willing!

Doctor: What is this?

Patient: God willing! Dod willing! Oh Allah..... Oh Allah

Doctor: What's your name?

Patient: Oh Allah Oh Allah

Doctor: Do you hear me?

Patient: Just a little Just a little...

Doctor: No, just listen to me, this is a pencil? Or Key?

Patient: after, after, after

Doctor: What is this?

Patient: after

Doctor: Is this a pencil or a key?

Patient: It's ok It's ok

Doctor: What is this?

Patient: yeah ... yeah It is still

Doctor: Is this a pencil or a key?

Patient: yeah ... still, still

Doctor: Who is this boy?

Patient: I said two days and I'll be fine ... maybe... maybe ... Oh God.

Patient 4 Analysis

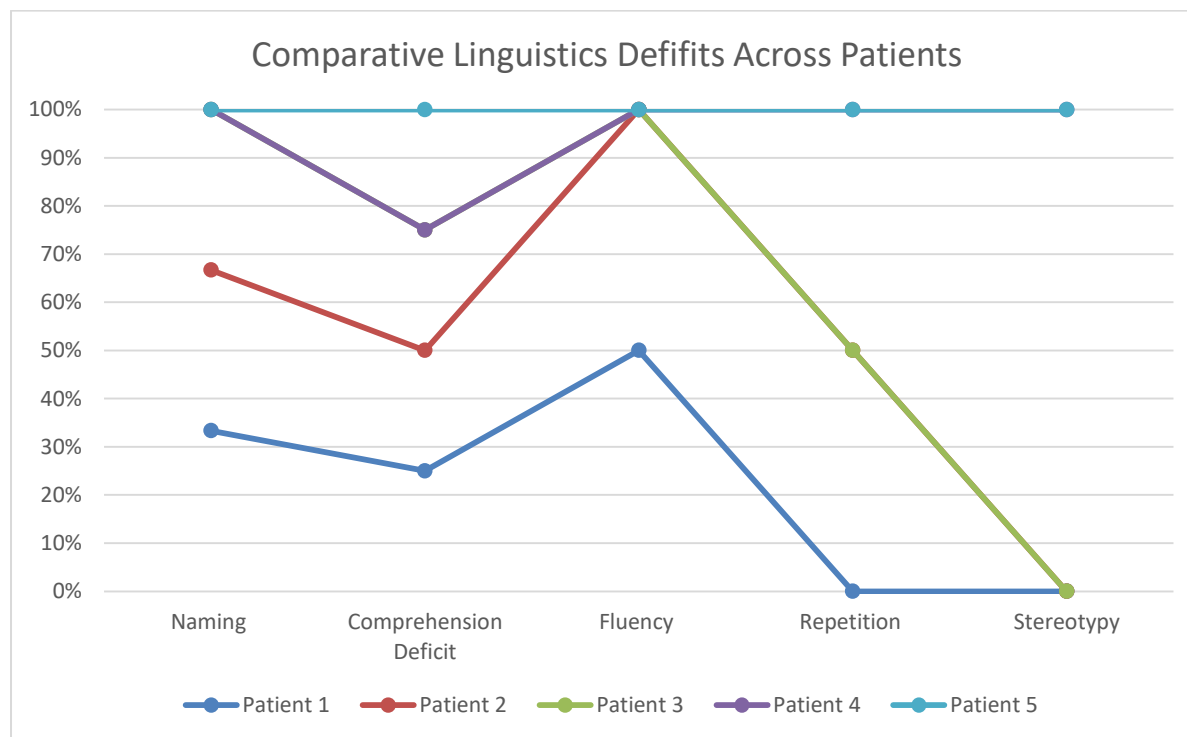
Patient 4, an old woman about 70-75 years old. This patient exhibited restricted expressive capacity dominated by recurring automatic expressions such as 'Thank Allah' and 'Oh Allah'. Attempts to produce object names or personal data resulted in unrelated, filler dialogue, and coinages ('after... still...'). Comprehension was minimally conserved for yes/no inquiries ('Just a little'), but propositional language was absent. The Profile shows profound global aphasia accompanied by repetitive automatisms and significant semantic impairments.

Patient No. 5 Analysis

Patient X is a 64-year-old male diagnosed with global aphasia following a left-hemispheric stroke. The patient exhibits total anarthria and cannot generate any spoken communication. All

observations relied on nonverbal communication cues such as facial expressions, head movements, and eye contact gaze." Besides suggesting retained receptive abilities and sensitive awareness. In spite of the absence of spoken expression, the patient participated in the communication environment by gestures and facial expressions. His replies suggest preserved nonverbal understanding and limited comprehension. This

situation highlights the importance of integrating multimodal communication approaches in both therapy and assessment of aphasia patients. This behavior indicates that nonverbal cognitive-linguistic channels may remain functional, even in cases of severe aphasia. This type is called Severe Global aphasia with stereotyped automatisms and minimal propositional speech.



Reflects linguistic Symptom Severity across Patients with stroke.

Figure:

Conclusion

Aphasia is a condition that arises due to injury in the left side of the brain, which is responsible for language functions. For many individuals, these regions are located on the left hemisphere of the brain. Aphasia typically arises suddenly, frequently after a stroke or head trauma, but it can also progress gradually due to a degenerative neurological condition. The disorder impairs the expression and understanding of language as well as reading and writing. Aphasia may co-occur with speech disorders, such as dysarthria or apraxia of speech, which also result from brain damage. The idea of aphasia supports the hypothesis of localization, which indicates that language is based on the left hemisphere of the brain, and in different

places of other thoughts and mental activities. Also, we conclude that the left hemisphere of the brain controls the right side of our body, while the right hemisphere of the brain controls the left side of our body.

There are two types of aphasia: fluent and nonfluent, and there are several types within these groups. Damage to the temporal lobe of the brain may result in Wernicke's aphasia, as a result with effect out comprehension of language. Nonfluent aphasia, also known as Broca's aphasia, will affect our production of language. People with Broca's aphasia have damage that primarily affects the frontal lobe of the brain.

It is a crucial matter for a linguist to know and understand the mechanism of language in our brain. Also, to differentiate language processing from other mental activities. People with aphasia in some cases, we can communicate with others by using sign language and facial expression.

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