



# "Post-Stroke Aphasia: A Psycholinguistic Approach to Speech Disorder Identification"

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## Abstract

This study aims to identify changes in the way individuals speak after a stroke based on psycholinguistic studies. The methods used to obtain information are descriptive qualitative and literature review. Information was obtained from interviews with respondents who had had a stroke. The respondent is a woman and she is 55 years old. The results showed that there were many changes experienced by individuals both in terms of physical social and emotional after a stroke. The most significant change is in the way individuals speak. Damage to the brain causes the patient to experience a stroke and its implications for other body nerves. One of them is speech disorders (speech aphasia). In conclusion, the brain and language influence each other both in processing language, acquiring language and understanding language. Therefore, if there is damage to the brain, it is difficult or even impossible for humans to process, produce and understand a language.

**Keywords:** *Speech Disorder, Post-Stroke, Psycholinguistic Studies*

## Introduction

Language is a communication system that allows humans to communicate spoken and symbolic expressions. Language has a social function, allowing humans to express themselves and interact with their surroundings. Functional theories of human language view it as a closed system of rules that connect specific signs to their meaning. Language is a mental faculty that allows humans to learn and communicate effectively. This definition highlights language's universality and its biological basis as a unique brain development.

According to Kuntarto (Kuntarto, 2017), language and the brain work together to process and produce speech, as well as to acquire language. A normal brain will generate language normally. In contrast, a dysfunctional brain (disease) will result in linguistic disorders, both in terms of production and perception. The

human ability to talk is not the same for everyone; some are normal, while others are not. Someone who can speak is considered normal according to linguistic rules such as stress, language structure, intonation, and so on, whereas someone who is unable to speak is considered abnormal in the typical human environment, resulting in communication that does not fulfill the target and is hampered.

There are many people in society who are unable to speak appropriately. Several causes contribute to this incapacity, including psychological and physical aspects (articulatory organs and brain). If a person has psychological illnesses or physical abnormalities (disorders of the organs of articulation and the brain), it is certain that they will not generate language. There are various brain disorders that can cause in speech difficulties. One of these is aphasia. Aphasia is an illness that develops when a person already possesses a language system. The most common cause of aphasia is a stroke produced by blocked or ruptured blood arteries in the brain. One of the stroke patients is unable to talk properly and appropriately; his speech is stuttering, and his pronunciation is incomplete.

In this article we will discuss the meaning of language, brain, speech aphasia, stroke disease and relationship between language and human brain. As well as understanding the causes of speech problems or speech aphasia in those who have suffered a stroke. Then we can look for samples of sentences that a stroke patient can and cannot speak. We can also learn about the causes of speech aphasia in people who have had a stroke, how the brain functions, and other topics. The discussion in this article is designed to provide writers and readers with knowledge and more understanding so that we are able to distinguish between language disorders, language and the human brain, and speech aphasia in stroke survivors.

## **Method**

The method used in this research is descriptive qualitative and literature study technique. Adhi et al (2019), state that descriptive qualitative is a research strategy in which researchers investigate events, phenomena of individuals' lives and ask a person or group of individuals to tell about their lives. This information is then retold by the researcher in a descriptive chronology. The sample of this research is an individual who has had a stroke. The respondent is a woman. The age of the individual when he had a stroke was 42 years old, which was about 11 years ago.

The data collection instruments used by researchers is interview. The purpose of this interview is to find out changes in speech in individuals after a stroke. Data was obtained by conducting interviews with both respondents and the family of respondent and to support the writing of this article to be complete and more systematic, literature studies were carried out to obtain theories relevant to the problems studied both from books, journals, and research reports related to

this psycholinguistic study.

## Results

Based on the results of interviews conducted on 19 May 2024, researchers obtained data through interviews with respondent. From the results of the interview, information was obtained that the respondent had a stroke in 2011. When the disease affected the respondent was 42 years old and in the interview the respondent was 55 years old. The cause of the individual's stroke was due to a clot in the right side of the brain, which caused the individual to experience paralysis for two months and also the implications of other diseases such as high blood pressure, high cholesterol, and high uric acid. The individual gradually recovered after various medications and device therapies. However, the impact of the stroke had a lot of influence on the individual both physically and emotionally.

The most significant impact after a stroke is the way the individual speaks is not like before. Where the individual's speech before the stroke was smooth like other people in general but after the stroke the way the individual spoke changed drastically. Whether it is from the way of mentioning words that are already imperfect, words that are spoken repeatedly, stammering and slow and sometimes seem like children so they sound funny. In addition to the physical impact on individuals, stroke is also very influential on social and emotional individuals. Individuals are sometimes lazy to socialize with new interlocutors because individuals feel that people will not understand about their current situation, individuals also often lose control and are easily angry, sad and offended and individuals sometimes feel embarrassed when the words spoken are not perfect.

After doing drug therapy and tool therapy for two months the individual gradually recovered physically but the individual's way of speaking had not fully recovered so the doctor also advised the Individual to often do independent therapies such as, shouting when at home, singing, and also doing heart exercises. One of the therapies suggested by the doctor is AIUEO therapy. Individual is asked to often say the vocal letters AIUEO to train stretching in the mouth so that there is no stiffness when speaking.

In restoring the speech of post-stroke individual, support from the surrounding environment is also very important, especially from family members. Family is an encouragement that is needed by stroke patients. The family must provide support to individual to be more enthusiastic about taking medication and therapy to recover quickly and also pay more attention because stroke patients are easily offended and seem to need more attention. And the family should also be patient in caring for individual who have a stroke.

## **Discussion**

### ***The Language***

According to the Indonesian Dictionary, language is an arbitrary set of sound symbols used by members of society to collaborate, interact, and identify themselves. Sumarmo Markam defines language as a verbal form of communication between persons. In a wide sense, language is a way of communication between people that includes writing, signs, and other protocols. Language is an essential component of cognitive processes. It is difficult to think about a civilization without language.

Language is a distinct human cognitive system (managed by formulas) that can be used by humans to generate an infinite number of linguistic sentences based on limiting materials for use as a means of communication and information acquisition. The brain, sometimes known as the mind, is the component of the human body that regulates all movements and processes, including language. Every language analysis requires an understanding of two concepts: structure and system. Structure refers to the relationship between the constituents of a speech unit, such as phonemes with phonemes in words, words with words in phrases, and phrases with sentences. While the system focuses on the connection between language elements.

According to generative linguistics, the transformation of each phrase we are born with has two structures: deep and surface structure. The deep structure is the abstract structure of a sentence that exists in the speaker's mind before it is pronounced. The outer structure is the structure of the sentence as it is spoke, which we can hear. So, it's concrete. According to this hypothesis, our brains have an order of abstract representations for the sentences we produce. Change formulas relate the abstract in-structure representation to the out-structure representation, which is the sentence we hear or speak.

### ***Human's Brain***

The brain as we know it is an organ that holds millions of secrets about how it works in regulating other organs in our body. Not to mention its role in making us speak and be able to communicate well. The human nervous system consists of two parts of the backbone and the brain. The backbone consists of a series of connected vertebrae (spinalcord). The brain itself also consists of two parts, the brainstem and the cerebral cortex. This backbone and cerebral cortex is the central nervous system for humans.

All forms of human activity, whether physical or mental, are controlled by this nervous system. In the first part of the brain is the brain stem, consisting of the medulla, pons, midbrain, and cerebellum. These parts are related to the physical functions of the body including breathing, heartbeat, movement, reflexes, digestion, and the generation of emotions. The second part, the cerebral cortex, deals with

intellectual functions and language.

The human cerebral cortex is divided into the left hemisphere and the right hemisphere. These two hemispheres are connected by  $\pm$  200 million fibres called the corpus colosum. The left hemisphere controls all the right limbs, including the right face. Conversely, the right hemisphere controls the left limbs and face. The role of the corpus colosum is to integrate and coordinate the two hemispheres. The left hemisphere is responsible for linguistic matters.

For this reason, when the left hemisphere is disrupted, the person's ability to talk suffers significantly. The right hemisphere influences a person's language, but not as much as the left hemisphere. If the right hemisphere is affected, they will struggle to sequence the events of a story (narrative) and form inferences. Humans have a language creation process that is separated into three brain areas that play key roles, including Wernick's area, which is responsible for 'lexical meaning' or meaning of meaning. Second, Broca's area is in control of 'grammatical planning'. Third, the supplementary motor area is responsible for 'monitoring' or supervising and managing the outcomes of speech. (Suherman, 2005: 259).

### ***The Relationship Between Language and Brain in Psycholinguistic Review***

In essence, in communication activities there is a process of producing and understanding speech. It can be said that psycholinguistics is the study of mental mechanisms that occur in people who use language, either when producing or understanding speech. In other words, in the use of language there is a process of converting thoughts into codes and converting codes into thoughts. Speech is a synthesis of the process of converting concepts into code, while understanding the message is the result of code analysis.

Language as a form or result of the process and as something that is processed in the form of both spoken and written language. Psycholinguistics is the study of humans as language users, namely the study of language systems that exist in humans. These language systems can explain how humans capture other people's ideas and how they can express their own ideas through language, either in writing or orally. When associated with language skills that must be mastered by someone, this relates to language skills, namely listening, speaking, reading, and writing.

All acquired language is essentially needed to communicate. Psycholinguistics is the study of the relationship between our needs for expression and communication and the objects offered to us through the language we learn from childhood onwards. Humans can only speak and understand each other in spoken words. Language learnt as a child is not neutral in coding objective reality. Language has a subjective orientation in describing the world of human experience. This orientation further influences how humans think and speak.

From the description above, it can be concluded that the scope of Psycholinguistics is about language acquisition, language use, language production, language processing, coding processes, the relationship between language and human behaviour, and the relationship between language and the brain. Psycholinguistics includes language acquisition or acquisition, the relationship between language and the brain, the effect of language acquisition and language acquisition on intelligence on how to think, the relationship between encoding (coding process) with decoding (interpretation / interpretation of code), the relationship between language knowledge with language use and language change.

### ***Post-Stroke Speech Disorder***

Capla and Curtiss (Arief. 2015) utilize the same concept of speech disorders such as humans' inability to create normal language due to physical and psychological abnormalities. The language created does not suffer from mental illnesses, and there are no abnormalities in the means of speech production, therefore it is referred to as normal language. In order to produce a word or utterance, the diaphragm, lungs, chest muscles, vocal cords, mouth, tongue, teeth, and lips are all manipulated. As a result, if these tools are defective, the quality of speech will be compromised.

The limitations and types of speech disorders or abnormalities in language written by psycholinguistic experts, although somewhat diverse, still lead to the same problem, namely abnormalities in language and the same causes, namely psychological and physiological factors. Speech impairment is a disorder in a person to communicate normally. People often confuse speech disorders with language disorders, but these two terms actually have different meanings. Speech disorders refer to problems in speech production or problems with sound quality; whereas language disorders usually involve barriers to word comprehension or the inability to use words that have nothing to do with speech production.

Kasznik (in Kuntarto, 2017), who states that speech disorders or disorders in a person are caused by physical and psychological factors; however, physical factors are more dominant than psychological factors. What is meant by this physical factor is a disorder of the brain and speech organs, while the psychological factor is everything related to psychiatric disorders (for example, trauma, feelings of pressure (stress) or fear). One of the disorders of verbal expression that can be found in everyday life is apraxia (hereafter referred to as apraxia of speech).

Speech apraxia causes individuals to be unable to consistently and correctly say what they mean. Speech apraxia generally occurs in children as a congenital condition, but it also occurs in adults often due to defects in the part of the brain that controls language use. The severity of apraxia depends on the type and magnitude of the defect/injury to the brain as well as the age of the patient. (Sastra, 2009).

Speech disorders occur due to damage to the brain. Brain damage can be caused by insufficient blood flow to the brain, or narrowing of blood vessels, or other disorders that cause the amount of oxygen needed to be reduced. This can lead to the onset of a disease. This kind of illness is called a stroke. Stroke is defined as the sudden loss of function of the brain due to blockade or rupture of cerebral blood vessels. The classification of stroke pathology types is ischaemic stroke and haemorrhage stroke (Arief. 2015). According to Kusumoputro and Sidiarto, (Kusumoputra and Sidiarto, 2009), one of the strokes is a haemorrhagic stroke, where a blood vessel ruptures so that it blocks normal blood flow and blood seeps into an area in the brain and damages it.

Stroke is a condition that can cause a person to experience death and paralysis, it occurs because of a bleeding disorder in the brain that causes the death of brain tissue (Batticaca, 2009 in Arief. 2015). Blockages and ruptures that occur due to blood vessels carrying oxygen and blood that can cause a stroke, therefore the onset of oxygen deficiency causes the function of controlling body movements controlled by the brain to malfunction (American Heart Association [AHA] (Purnamawati, 2018).

Stroke patients have difficulty in speaking. Such as incomplete or incomplete sentences, the words spoken are often reversed, slow in speaking or take a long time in pronouncing sentences, the words are often abbreviated (sometimes mentioned only at the beginning of the word and sometimes only at the end of the word). What causes stroke patients to have difficulty in speaking is due to paralysis and weakness of the articulation muscles. Stroke patients also have damage to the motor cortex area that controls facial muscles, causing disruption of brain commands to partial muscles (face, tongue, chin and throat muscles) needed for articulation. (Sastra, 2009).

### ***Speech recovery of individuals post-stroke***

One form of aphasia rehabilitation therapy is by providing speech therapy. Speech therapy is an action given to someone who has communication disorders, speech language disorders, or swallowing disorders. One of the speech therapies that can be given to stroke patients who experience aphasia is AIUEO therapy (Wiwit, 2010).

AIUEO therapy is a therapy that aims to improve speech so that it can be understood by others and improve swallowing ability by moving the tongue, lips, facial muscles, and saying words (Wardhana, 2011). The advantages of AIUEO therapy according to Haryanto et al (2014) are the easiest and most practical therapy, which does not require tools/media compared to other therapies for aphasia patients. In addition, AIUEO therapy also does not cause any side effects.

Another advantage of AIUEO therapy according to Sofiatun et al (2016) is that respondents are easier to imitate vocal formation, tongue, lip and jaw movements compared to other therapies. The method used in AIUEO therapy is the imitation method, where every movement of the speech organ and the sound produced by the nurse is followed by the patient (Gunawan, 2008). Stroke patients who experience speech difficulties will be given AIUEO therapy which aims to improve speech so that it can be understood by others (Wiwit, 2010).

Puspitasari (2017) said that there was an effect of AIUEO therapy on the speech of stroke patients with motor aphasia. This is evidenced by the results of his research which shows that the average speech ability before being given AIUEO therapy is 13.86 and after AIUEO therapy for 7 days to 15.14 there is an increase of 1.29.

Sofiatun et al (2016) also suggested in their research that AIUEO therapy carried out once a day for 3 days had an effect on speech in stroke patients with motor aphasia. Prihatin et al (2017) stated that there were differences in speech before and after AIUEO therapy for 5 days. The value before AIUEO therapy was 12.38, after AIUEO therapy on day 3 the value obtained was 16.62 and after AIUEO therapy on day 5 the value obtained was 21.38. Severe aphasia is said if the value is 0-8, moderate aphasia 9-12, mild aphasia 16-23 and normal if the value is 24 using the derby communication functional scale (DFCS).

## **Conclusion**

Based on the results of research and discussion, it can be concluded that the brain plays an important role in producing language. A normal brain will produce language normally. Conversely, an abnormal brain (illness) will cause language disorder, both in producing and perceiving language. Speech disorders occur due to damage to the brain. Damage to the brain can be caused by insufficient blood flow to the brain, or narrowing of blood vessels, or other disorders that cause the amount of oxygen needed to be reduced. This can lead to the onset of a disease. This kind of disease is called a stroke. One form of aphasia rehabilitation therapy is by providing speech therapy. Speech therapy is an action given to someone who has communication disorders, speech language disorders, or swallowing disorders. One of the speech therapies that can be given to stroke patients who experience aphasia is AIUEO therapy.

The writing of this article is expected to provide benefits and increase knowledge for writers and readers about language and speech disorders that occur in the brain, as well as knowing the relationship between language and the brain, then knowing speech aphasia in stroke patients, and knowing how to recover. And do not forget also the author reminds readers if there are relatives or other people encountered who experience speech disorders due to stroke disease so as not to ostracize and demean the person. What needs to be done is to encourage and



support them so that they do not despair in making recovery.

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