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NEURO-LINGUISTICS AND LANGUAGE FUNCTION

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Abstract
This article talks about neurolinguistics, which studies the brain mechanisms of speech activity and those changes in speech processes that occur with local brain lesions.

Keywords: neurolinguistics, language, communication, brain.

В этой статье говорится о нейролингивистики изучающая мозговые механизмы речевой деятельности и те изменения в речевых процессах, которые возникают при локальных поражениях мозга.

Ключевые слова: нейролингивистика, язык, коммуникация, мозг.

Neurolinguistics is a field of study that comprises the linguistics and medical science the study about the relationship between language and human brain. How does the language process occur in human brain? Harry Whitaker who is a well-known journal founder explained that neuro-linguistics as technical term in the field for the use in academic field. Another well-known person Roman Jacobson has an important role in studying and explaining the knowledge of neuro-linguistics. As to Jacobson, neuro-linguistics study is the study of understanding the functions of brain in processing the language activity. In this study, the researcher studies on how brain plays its role in processing the activities such as speaking, listening, reading, writing, and using the sign language for those who use the technique to communicate in the daily lives. The study is not only about the functions of the human brain, but it also focuses on the field in order to understand the difficulties using language or language disorders that involve the activities of speaking, listening, writing and using the sign language. Language process occurs when people utter the words or express the utterance, and they understand the process. As neuro-linguistics closely connected with medicine, there are many implications between the subject and brain.

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Medicinal science states that, human brain consists of three parts which are known as forebrain, midbrain, and hindbrain. Hindbrain is the lowest part of the brain located at the base of skull. It has two main structures which control respiration, reflex movement, digestion, and heart-beating. Midbrain functions for receiving the sensory signal from sense organ to clarify to receptor such as eyes and ears. The most vital part of human brain is forebrain while the largest one is cerebral cortex which functions as the communication connector between the both parts of cerebral hemisphere. The relation between brain and language is a theory that became argumentative statement for a long time. In 384- 322 B.C.E, Aristotle argued about the functions of brain. However, the indicator for this issue was argued after the findings by Broca and Wernicke in 1860. According to their theory, human brain consists of two areas that are important for language.

Communication is a process of sharing or being in relation with one's self and other, to clarify between private and public, inner thought and outer world as well. According to John Peters (a linguist), communication is both a universal phenomenon as everyone throughout the world communicates and a specific discipline of institutional academic study.[1.2]. Various understandings and definitions are existed in terms of Communication that define it to be one of the means of exchanging information between individuals through a common system of symbols and signs of behavior. An American linguist Robert Anderson stated that communication is interexchange of thoughts, opinions or information by speech, writing, or signs. [2.1]

As it is seen, every individual discovers "communication" based on their vivid imaginations. Communication is being used by approximately 90 percent of humans' lives all over the world in two different forms:

1. Verbal communication
2. Non-verbal communication

Verbal communicationis having a type of communication which is made by using words, sounds to convey a message while non-verbal communicationinclude facial expressions, gestures, paralinguistic such as loudness or tone of voice, body language (sending a message by moving the body parts). Communicators very actively use both of the forms of communication in their daily life sometimes with intention and without realizing in most cases as well during oral communications.

Communication is believed to be a vital factor of humans' resources. In fact, majority consider it as a key component of happiness since an ability to build oral

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communications is a precious gift by their creator. People who are capable of speaking have a great tendency to communicate orally and it is genetically and biologically transferred by their parents. Generally, children start to babble from around the age of six months and say their first words when they are between ten and fifteen months. However, the cry of the infant can be one of the means of communication as it sends information (hunger, thirst, any type of ache). People develop their speaking skill during their life and majority lose it or create language disorders as a consequence of injuries and as well as it may be caused during the pregnancy period.

Majority struggle with language disorders but cannot comprehend how and when it is caused?! It is known that, most infants or toddlers can understand what their parents are saying before they can clearly talk. As they get older and their communication skills develop, most children learn how to put their feelings into words. Yet, some children have language disorders such as receptive language disorder and expressive language disorders which is having trouble while understanding words that they hear and read as well as in the process of speaking with others and expressing thoughts and feelings. A child will frequently have both disorders at the same time. For a significant number of children and adults, speech and language skills are disordered to such an extent that they pose a significant barrier to effective communication. According to the statistics, The Royal College of Speech and Language Therapists estimates that 2.5 million people in the UK have a communication disorder. Of this number, some 800,000 people have a disorder that is so severe that it is hard for anyone outside their immediate families to understand them. In the US, the National Institute on Deafness and Other Communication Disorders estimates that one in every six Americans has some form of communication disorder. The impact of these language and communication disorders are seen not only on humans' personal life but also often experienced on educational and occupational circumstances.

The clinicians and researchers who study and treat communication disorders are called "clinical linguists". This is an extremely bread sphere that is automatically connected with the field of studies such as neurology, psychology and medicine also.

It is highly recommended to analyze the causes of such language disorders. There are many ways in which language and communication can break down among children and adults. Originally, these co-called communication disorders are the result of illness, disease and injury. These medical and traumatic events can

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compromise speech and language or the ability to produce voice, and have their onset in the developmental period or childhood, or adulthood and later life.

In fact, human communication is sensibly complex process and that requires much in order to utter even a single word. While producing linguistic utterance, the speaker needs to select the phonological, syntactic and semantic structures that will give expression to this intention. For that speech organs are automatically used to produce speech. Before the speaker forms an encoded intention, there are some ways to go till the listener receives it. The speaker must select from the range of motor activities that the human speech mechanism is capable of performing those that are necessary to achieve the transmission of the utterance to a listener. The start of this program is called motor programmingwhich can be only realized if anatomical structures such as lips, tongue, vocal folds receive nervous signals instructing them to perform particular movements. If all the speech apparatus work correctly, the communication will be performed clearly.

However, there are most cases when communication is not send or hold correctly as a result of language disorders. As previously mentioned, language disorders commonly appear in children and they will be developed during the life span of mankind. Language disorders can have many possible causes. They include:

- Medical conditions or disabilities, such as autism, a brain injury, stroke or tumor
- Birth defects such as Down syndrome, fragile X syndrome, or cerebral palsy
- Problems in pregnancy or birth, such as poor nutrition, fetal alcohol syndrome, early birth or low birth weight
- Sometimes, language disorders have a family history to clarify gender relations

During the analyses of the causes, it obvious to mention the Autism Spectrum disorder. ASD is a developmental disability that can cause significant social, communicationand behavioral challenges. The behavioral signs of ASD often appear early in development. Many children show symptoms by 12 months to 18 months of age or earlier. Moreover, ASD affects people of every race, ethnic group and socioeconomic background. According to the statistics, it is four times more common among boys than among girls.

Another main cause of language disorders is believed to be brain injuries and injury to language centers of the brain leads to a condition called aphasia. According to the medical information provided, Wernicke's area and Broca's area are two regions of the brain that are of importance for understanding and using

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language. These areas are found in the dominant side of the brain and for most people, particularly right-handers, they are in the left hemisphere. Injury to these areas leads to aphasia [4.2].

Moreover, most children with Down syndrome seem to have considerably more difficulty in learning the grammar and syntax of the language than with learning lexical items. Majority of the children with Down syndrome show specific productive delays, first in being able to say single words and then being able to produce sequences of words.

There exist various questions with meaning of inheriting speech disorders. Unfortunately, evidence exists linking genetic factors to a variety of speech and language difficulties. Researchers have already identified over 400 genes linked to hearing loss, and there are plethora of ongoing studies investigate genetic links to stuttering, voice disorders and language disorders. There are several types of speech and language disorders that appear to be closely tied with genetics.

- Specific language impairment (SLI)- approximately 50-70 % of children who have SLI have at least one family member who struggle with the disorder.
- Stuttering
- Speech-sound disorders- it usually common with male twins (70%), and in most cases it can also appear among fraternal twins (46%)
- Childhood apraxia of speech (CAS)

The correct work and function of brain is important while communication. The trouble and language disorders usually lead to ineffective communication. as it is clearly known, human brain is valuable gift from God to mankind because this is where it lays the human mind that distinguishes humans and animals. Brain injury will affect person that experiences it. Human brain that is injured might not be representative human brain that is normal. Studies that have been made by members of the neurology of two countries involved in the planning and understanding of the language such as in Broca's and Wernicke's area. When an injury occurs in Wernicke's area, it will cause the patient's speech understanding to be lost while for patients suffering from injuries to the Baroca's area, it will cause obstruction of speech production.

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