EXCELLENCIA
INTERNATIONAL MULTI-DISCIPLINARY JOURNAL OF EDUCATION
Volume 3, Issue 3, 2025 ISSN (E): 2994-9521

Early Theories in Neurolinguistics. Types of Neuroinguistic Study

Muqaddam Abdug'ofur qizi Jurayeva [1]

[1] Assistant teacher of Fergana State University of Technology
jonmukawi@gmail.com

Nargiza Rustamovna Umarova [2]

[2] Professor of Fergana State University, Fergana, Uzbekistan, nargiza@gmail.com

Abstract:

Neurolinguistics is the study of how language is represented in the brain: how and where our brain stores our knowledge about the language (or languages) we speak, understand, read and write, and what happens in our brain when we acquire it.

Keywords: Neurolinguistics, communication system, brain, linguistics

Introduction

Many other species outside of humanity(such as birds, primates, and marine mammals)have developed complex communication exchange systems, but human language is characterized by at least two - language aspects that contribute to the development of expressive/expressive power. Neurolinguistics studies the connection of language and communication with various aspects of brain activity, in other words, tries to study what language the brain understands, that is, how language and communication are formed, and also combines neuroscience/neurophysiology(the field of brain structure and how it works) with linguistic theory. [1] Although neurolinguistics is also associated with Psycholinguistics, neurolinguistics places more emphasis on the study of processes related to brain communication generation and is an area that studies the processes in our brain that occur when we acquire skills such as how language manifests in the brain, where and in what position our brain collects language knowledge, speak, write, read. Where, how do words come to our language when we speak? Just like other cognitive computing systems, does computing go in some part of our brain? An attempt is made to answer these and similar questions in the

neurolinguistic. Initially, in the 19th century, research began to be carried out on the study of aphasic syndromes that can cause disorders in the speech process, or its interruption, when damage to the left hemisphere of the brain occurs. [2] That is, the fact that a person who has suffered damage to the left area of his brain, although he understands language, cannot produce speech, became sufficient grounds for learning that the left hemisphere is responsible for communication. Interventions on brain injuries are the most common methods of learning, in addition to using techniques such as model building, computer simulation, and Neuroimaging. [3]

As you can see, neurolinguistics is deeply linked to Psycholinguistics, which studies the language processing stages necessary for speaking and understanding words and sentences, learning first and next languages, as well as language processing in Speech, Language, Language and speech disorders. and read. Information about these disorders can be obtained from the American Speech-Language Hearing Association (ASHA).

Our brain stores information in networks of brain cells (neurons and glial cells). [4] These neural networks are ultimately connected to the parts of the brain that control our actions (including those necessary to produce speech) and our internal and external sensations (which come from sounds, visions, touch and our own actions). Connections within these networks can be strong or weak, and the information a cell sends can increase the activity of some of its neighbors and affect the activity of others. It gets stronger every time the connection is used. [5] Densely connected neighbors of brain cells carry out calculations, which are combined with information coming from other neighborhoods, often involving feedback loops. Most calculations are carried out simultaneously (the brain is an array parallel information processor).[6]

LITERATURE ANALYSIS AND METHODOLOGY

Information or skill is achieved by establishing new contacts and/or by changing the strengths of existing contacts. Local and long-distance networks of combined brain cells exhibit plasticity-that is, they can change throughout our lives, which allows us to learn and recover (to a certain extent) from brain injuries. For people with aphasia (loss of language due to brain damage), intensive care and practice, possibly in combination with transcranial, depending on how serious the injury is. magnetic stimulation can lead to major improvements in language and Motion Control; see the afazia section below and the links posted there. Under the supervision of a defectologist, computer-based methods are becoming available for the implementation of such intense language practice.[7]

Most of the parts of the brain that are important for oral and written language are located on the left side of the cortex of the brain (left hemisphere), regardless of which language you read and how it is written. We know this because aphasia almost always occurs due to damage to the left hemisphere, not damage to the right hemisphere, no matter what language you speak or do not read or can read at all.[8] (This is true for about 95% of right hands and about half of left hands.) A large part of the brain ("white matter") consists of fibers that connect different areas with each other, since the use of language (and thinking) requires the rapid integration of information stored and / or processed in many different regions of the brain.[9]

Results

Many established ideas about neurolinguistics, notably the role of traditional "language areas" in the left hemisphere of the brain (Broca's field, Wernicke's field) - have been challenged by recent evidence and in some cases discarded. Perhaps the most important recent findings are: 1) comprehensive networks involving areas far from traditional language zones are deeply involved in language use, 2) language areas are also involved in extracurricular information processing, such as certain aspects of language. musika6 and 3) proved that the correlation between certain areas of the brain and individual language defects is much worse than thought. [10] This new information became available as a result of significant improvements in our ability to see what is happening in

the brain when people speak or listen, and the collection and analysis of detailed data from the multi-year afazia TEST .

Discussion

For more than a hundred years, research in neurolinguistics was almost entirely dependent on the study of language comprehension and production by people with aphasia. Research into their language skills has been supplemented by relatively rough data on the location of the injury in the brain. Neurologists had to draw conclusions taking this information into account, for example, what other abilities were lost and autopsy data that were not often available. Several patients who wanted to undergo surgery to get rid of severe epilepsy or tumors could be studied directly using brain stimulation, which, from a medical point of view, had to move the surgeon away from the areas necessary for the patient to use the language.

Early - generation computerized radiological studies (CAT scans, CT scans) and Radiological studies of cerebral blood flow (angiograms) began to intensify experimental and observational studies related to aphasia in the 1970s, but they provided very rough information on where the damaged part was. the brain was located. These early brain imaging techniques could only see which parts of the brain were severely damaged or limited blood flow. They could not provide information about the actual activity taking place in the brain, so they could not observe what was happening in the process of language processing in ordinary or aphasic speakers. The research of lay speakers at the time mainly looked at which side of the brain was more involved in the processing of written or spoken language, as this information could be obtained from laboratory assignments that included reading or listening in difficult conditions such as listening to different types of information. presented to two ears at the same time (dichotic listening).

Since the 1990s, there has been a major change in the field of neurolinguistics. With the help of modern technologies, researchers can learn how the brain of ordinary speakers processes the language and how the damaged brain processes and compensates for the injury. This new technology makes it possible to observe the brain activity that occurs when people read, listen and speak, as well as to make the location of damaged areas of the brain very sensitive spatial resolution. Fine spatial resolution comes from magnetic resonance imaging (MRI), which gives excellent pictures of which areas of the brain are damaged; the accuracy of computed tomography has also been significantly improved. Monitoring the ongoing activity of the brain can be done in several ways. For some purposes, the best way is to send the electrical and magnetic signals that neurons send to each other to sensors outside the skull (functional magnetic resonance imaging, fMRI; electro-enecephalography, EEG; magnetoencephalography, MEG; and event-related potentials)to determine. ERP). Another method is to observe an optical signal associated with the phenomenon, EROS; this involves detecting rapid changes in the path of the transmission of infrared rays of nerve tissue, which can penetrate the skull and see about an inch into the brain. The third family of methods involves monitoring changes in blood flow to different areas of the brain by looking at oxygen concentration (BOLD) or changing the way blood absorbs near-infrared light (near-infrared spectroscopy, NIRS) .

Conclusion

Learning what people with language disorders can and cannot do continues to help us understand the relationship between the brain and language. For example, comparing how people with speech impairments work in syntactic tests with detailed descriptions of their brains has shown that there are significant individual differences in the parts of the brain involved in the use of grammar. In addition, comparing people with aphasia by language shows that different types of aphasia differ slightly in different languages, depending on the possibilities of making mistakes in each language. For example, in languages with different forms of masculine and feminine pronouns or masculine

and feminine adjectives, people with aphasia may make a gender error in speaking, but in languages that do not have different forms for different genders, this problem does not appear.

LIST OF BIBLIOGRAPHY

1. M. F. Schwartz, G. S. Dell, N. Martin, S. Gahl, и P. Sobel, «A case-series test of the interactive two-step model of lexical access: Evidence from picture naming», Journal of Memory and Language, т. 54, сс. 228–264, 2006.
2. R. Bandler и J. Grinder, Frogs into Princes: Neuro-linguistic Programming. Real People Press, 1979.
3. F. Ramus, «Genes, brains and cognition: A roadmap for the cognitive scientist», Cognition, т. 101, сс. 247–269, 2016.
4. C.-Y. Tse и др., «Imaging cortical dynamics of language processing with the event-related optical signal», Proceedings of the National Academy of Sciences of the United States of America, т. 104, сс. 17157–17162, 2007.
5. J. O'Connor и J. Seymour, Introducing Neuro-Linguistic Programming. HarperCollins, 2000.
6. A. D. Patel, Music, Language, and the Brain. Oxford University Press, 2018.
7. M. A. qizi Jurayeva и S. S. Usmanova, «NEYROLINGVISTIKA SOHASINI O'RGANISH TENDENSIYALARI», Involta Scientific Journal, т. 2, вып. 1, сс. 53–59, 2023.
8. R. Dilts, Strategies of Genius: How to Use NLP to Achieve Peak Performance. Meta Publications, 1991.
9. M. Abdug'ofur qizi Jurayeva, «The Cognitive Study of Neurolinguistic Elements in English», Educational Research in Universal Sciences, т. 2, вып. 3, сс. 1052–1056, 2023.
10. A. U. Turken и N. F. Dronkers, «The neural architecture of the language comprehension network: Converging evidence from lesion and connectivity analyses», Frontiers in Systems Neuroscience, т. 5, сс. 1–20, 2011.