Good example of neurolinguistics literature review

Sociology, Communication

Abstract

This article offers an insight into the study of neurolinguistics as a subject of neurology. It also offers a theory of language that is developmental in nature and an insight into the neural systems that lead to linguistic capabilities. Language develops in four stages, as suggested by early perceptual experience. These four phases take place in an independent and fixed sequence. A different ontogenetic function is arrived at in every phase of language. The functions in question have neural systems, proprietary in kind, that differs in their respective degree of specialization.

Under evaluation is an analytical mechanism largely responsible for the grammar in linguistics. This mechanism largely follows a strict time schedule with the possibility of being turned on only in phase three. This is seen in children who take a little longer than usual in phase two of the process of learning language. These children do not store sufficient lexical material that will help trigger their analytic mechanism.

Inactivation of this analytic mechanism comes out as damage and shifts the functions of language towards homologous mechanisms in the hemisphere of the brain that is not dominant. This in turn increases functional symmetry and anatomical symmetry across both hemispheres of the brain.

This bringing together of neurolinguistic resources brings out, though functional, imperfect knowledge and command of verbal communication (language) and may make the learning of writing very complicated.

The theory therefore gives a divergent role for early experience and genetics.

Neurolinguistics is defined as the interdisciplinary study of the processing of language in the brain, with particular emphasis on the processing of spoken language when there is damage to the brain in certain areas (Ingram, 2007). This branch of neuroscience seeks to examine communication or human language which includes reading, writing, hearing, speech and non-verbal modalities in relation to the brain’s aspects, or operations of the brain (Ahlsen, 2006)

Neurolinguistics has an interdisciplinary focus that covers the fields of psychology, neurophysiology, neuroanatomy, psychiatry, computer science, neurology, linguistics and speech pathology. Other disciplines may also be involved when studying neurolinguistics and are relevant as they contribute greatly to the development of theories, methodologies and deductions in neurolinguistics. They are neurobiology, chemistry, artificial intelligence, anthropology, cognitive science among others. This ensures adequate representation of the social sciences, natural sciences, medical sciences, humanities and even technology (Ahlsen, 2006).

John C. L. Ingram, in his book “ Neurolinguistics: An Introduction to Spoken Language Processing and its Disorders” wrote the following:

It is uncontroversial, in scientific circles at least, that the human brain has undergone very rapid growth in recent evolution. The brain has doubled in size in less than one million years. This is very rapid growth. The cause of this cannot be debated conclusively. However, there is the possibility of a strong case being made that the expansion of the brain was brought about by the development of spoken language and the survival advantage that

possessing a language offers. The parts of the brain that developed most appeared to be specifically associated with language: the junction of the parietal, occipital, the frontal lobes and the temporal lobes.

It is imperative to note that neurolinguistic programmes and the nature they take have attracted a lot of research in recent years, more importantly in relation to speech production. It has been established that the brain does not give commands one segment after another in sequence. Considering the factors that influence the timing of speech events like breathing rate, vocal-fold vibration, stress location, duration and placement of pauses, breathing rate and coordination and movement of the articulators, it is accurate to say that a very sophisticated control system has to be adopted, or else speech would be degenerated to erratic, disorganized noises.

The study of neurolinguistics has revealed that the areas of the brain that are involved are many. Particularly, the thalamus and the cerebellum have been found to be of great assistance to the cortex in controlling speech. It is however, not possible to construct a model detailed enough to show neurolinguistic operation that considers all variables involved in the production of speech (Crystal, 2010).

Theoretical linguists bring forth models that explain how language is structured and the organization of language information. Psycholinguists, on the other hand, come up with models that try to explain the processing of language information in the mind while neurolinguists study in depth the activities of the brain and formulate deductions on biological structures; the number of neurons and their network, and how they carry out the psycholinguistic processing algorithms (Pylkkanen, 2009)

Results on how neurolinguistics addresses the sub departments of linguists have been worked out and determined.

Phonology is the study of the structure and organization of words in a language. While studying neurolinguistics, phonology is studied so as to find out the representation of a particular language's phonological system in the brain. This has become an essential part in the study of neurology.

Phonetics has been defined as the study of the sounds of speech. Of huge interest is how the extraction of speech sounds that come from an acoustic signal takes place in the brain. Also of utter importance when undertaking this study is how the brain undertakes the separation of speech sounds from noises in the background. That has been a phenomenon for the longest while.

In neurolinguistics, syntax has been defined as the study of the method of constructing utterances with multiple words. Syntax studies how the brain brings together words to form sentences and constituents.

Semantics also serve the same purpose. It has been defined in neurolinguistics as the study of the encoding of meaning into language. The use of semantic information in the understanding of phrases and sentences is of concern in neurology. Semantics also tries to examine the ability of the brain to combine many words into sentences.

Then there is Morphology and Lexicology. Morphology involves the study of the way words are structured and subsequently stored in the mental lexicon. This encompasses studying of how words familiar to a person are stored and accessed by the brain.

Much as numerous studies and research have been undertaken, controversy

still exists with concern on whether unitary aspects of language have a correlation with different specialized parts of the brain. Studies on aphasia is an example of the research carried out in this field. Electrically stimulating conscious patients' cortex with an aim of finding out where various functions of language are situated in the brain has induced temporary aphasia. The employment of electrophysical techniques has assisted in the analysis of the quick and timely processing of language. Several deductions have surfaced. For instance there is a theory in neurolinguistics that posits that three responses of the brain; the N400, ELAN and P600 arise from the diverse steps in semantic and syntactic processing (Friederichi, 2002).

Of particular interest has been charting the breakdown and the recovery of language patterns relying on what is commonly known on representation and normal processing of language. These patterns offer blueprints for medical procedures.

In these studies, the research question includes what way the information on language follows in the brain as it is being processed, whether or not specific areas of the brain take part in processing a particular kind of information, the difference in the way the different regions of the brain interact with each other in the processing of language and how there is a difference in the location of activation of the brain when an individual is speaking or hearing a language that is different from his first language. Research in the acquisition of first language has established that infants coming from different linguistic environments undergo the same predictable stages like babbling.

Some neurolinguistics have undertaken research to try and find out relationships between stages of development of the brain and stages of the

development of language. Others have investigated neuroplasticity- changes of a physical nature that the brain goes through when it is receiving a second language, like when an adult learns a new language.

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