

How Language Implementation Neurally and Basis of Semantics?

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ABSTRACT

It deals with the implementation of language neurally and how infants to growing children learn the language and how human evolve the ability to communicate in the language.

Keywords: Infants Language, Neural Dynamic Implementation, Language, Cognition, Connectism, Logical Thinking, Pschyology, Pschyical Cortex, Enviroment

Infant language acquisition/first-language acquisition. How are infants able to learn language? One line of debate is between two points of view: that of psychological nativism, i.e., the language ability is somehow “hardwired” in the human brain, and usage based theories of language, according to which language emerges through to brain’s interaction with environment and activated by general dispositions for social interaction and communication, abstract symbolic thought and pattern recognition and inference [1].

Infants acquisition of language is usually based on the enviroment surrounded and the Wernicke area development or congenital development which lead to acquisition of the language and lead to development of pschyical cortex .

Terms Piaget vs Vygotsky

Language Development: Language development is relatively peripheral to Piaget’s theory that child’s cognition development results from the internalization of the means-ends organization of sensorimotor activity achieved in early development Language development is the principal motor of development, as it mediates the child participation in both intellectual and social life surrounding them. That is, the mechanisms of cognitive development are not independent from the... linguistic signs which the child confronts in his interaction with the world [2].

Egocentric Speech: The prevalence of egocentric speech over communicative speech in younger children became the real foundation of Piaget’s theory. He emphasizes that egocentric

speech does not provide communication. It is rather chanting, rhyming and accompanying the major melody of child’s activity. A child may merely repeat words, or play with words, without understanding the concept. It is not intended to convey information [3]. Vygotsky insisted that the earliest speech of the child is social. At a certain age this original social speech becomes rather sharply divided into egocentric speech, that is, speech-for-oneself and communicative speech, speech-for-others. Egocentric speech gives rise to inner speech which is later product of the transformation of a speech that earlier had served the goal of communication into individualized verbal thought. Egocentric speech is a form of self-guidance which occurs because it has not been internalized.

Language and Thought: Language is dependent upon thought. Language cannot be used to communicate ideas until the child has developed the appropriate concepts [4]. Language and thought are initially independent and separate, but that during childhood thought gradually becomes more and more verbal and that language requires and reflects thought.

Social interaction, context-dependency and language acquisition for Piaget, social-interactive and context-dependent properties of language are somewhat peripheral to the mechanisms which set development in motion. His view of language is explicitly inspired by a Saussurean framework [5]. He considers language as an abstract system of sign relations. With respect to language acquisition, decentering of children’s cognitive structures underlies a decontextualization of children’s speech, allowing them to speak of displaced entities, events, and relations among them which are not part of the here-and-now and/or to take into account the perspectives of their listeners. The clearest impact of decentering on language acquisition within this paradigm

is shown in the child's ability to use language as an abstract, context-independent system of signs (e.g. in logical reasoning). In contrast, the context-dependent and social nature of language is primary in Vygotsky's developmental theory. His approach to language is much more consistent with some functionally and/or pragmatically inclined semiotic and linguistic theories than with Saussurean approach. His linguistic framework is apparent in a number of ways: e.g., his focus on speech rather than langue, a distinction which can be compared to Saussure's distinction between langue and parole, his focus on the indicatory basis of communication in his discussion of both nonverbal signs and verbal signs, his distinction between sense and reference.

Is the human ability to use syntax based on innate mental structures or is syntactic speech the function of intelligence and interaction with other humans?

The below figure 1 shows the connection between the Broca's and Wernicke area and psychical cortex and the connectism shows that the all language understood and made travel through these two areas to psychical cortex and travel to oral and comes out as the language.

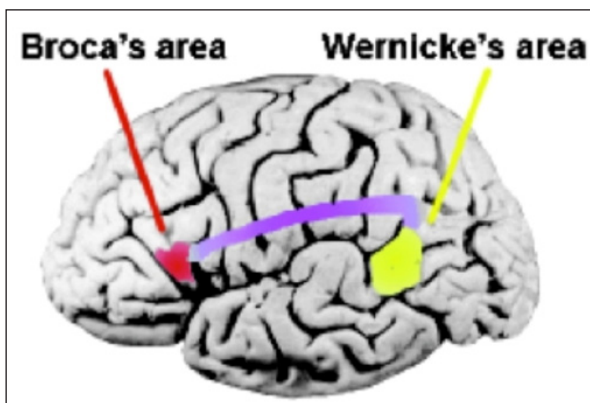


Figure 1: showing wernick area and broca's area [6]

PET Scan Comparison

Below figure 2 shows the perfect pet scan of person listening, viewing, speaking words and activity and coordination of psychical, wernick area and broca's area and their coordination

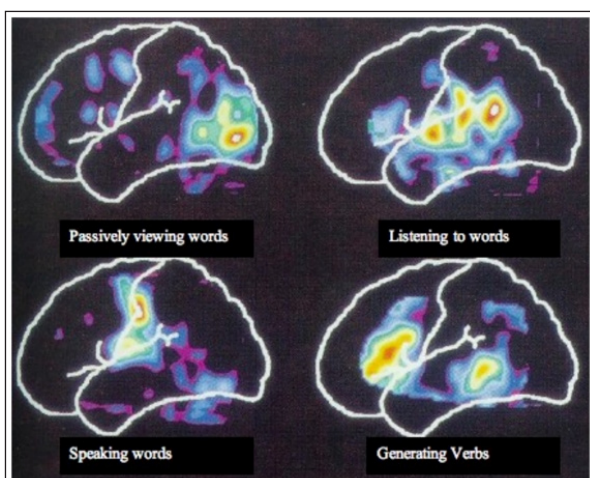


Figure 2: PET scan of human [7]

Is there a language acquisition device: How localized is language in the brain? Is there a particular area in the brain responsible for the development of language abilities or is it only partially localized? [8]

Yes the above PET can show that the wernick area and broca's area and the psychical cortex coordination shows that the language is acquisition is fully localized and the coordination is more at time of listening of words and generating words as shown in the PET scan [7,9]

Discussion

- language
- language implementation neurally
- coordination of psychical cortex and language arra
- language acquisition

Conclusion

Significance and acquisition of language is found and how is it implemented neurally.

Reference

1. Batterink L, Neville HJ. The human brain processes syntax in the absence of conscious awareness. *J Neurosci*. 2013. 33: 8528-8533.
2. Lieberman P. Human language and our reptilian brain. The subcortical bases of speech, syntax, and thought. *Perspect Biol Med*. 2001. 44: 32-51.
3. Perlovsky L. Language and cognition interaction neural mechanisms. *Comput Intell Neurosci*. 2011. 2011: 454587.
4. Fedorenko E, Varley R. Language and thought are not the same thing: evidence from neuroimaging and neurological patients. *Ann N Y Acad Sci*. 2016. 1369: 132-153.
5. Becker Y, Meguerditchian A. Structural brain asymmetries for language: a comparative approach across primates. *Symmetry*. 2022. 14: 876.
6. Chomsky's Theory of Language Acquisition | Stages & Examples. <https://study.com/academy/lesson/noam-chomsky-on-language-theories-lesson-quiz.html>
7. Innateness and Language. 2008. <https://plato.stanford.edu/entries/innateness-language/>
8. Chomsky's Theory. 2023. <https://www.structural-learning.com/post/chomskys-theory>
9. Evidence Rebutts Chomsky's Theory of Language Learning. 2016. <https://www.scientificamerican.com/article/evidence-rebutts-chomsky-s-theory-of-language-learning/>