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**HOW THE MIND WORKS WITH RESPECT
TO FIRST AND SECOND LANGUAGE ACQUISITION**

One of the issues that raises scholars' interest today is the role of the mind and how it works with respect to language acquisition. So, I think that tracing back the historical tracks which led them to study such a question would be a useful contribution to researchers and anyone else interested in such a challenging topic.

The paragraphs I divided my brief essay into, *definition of language acquisition*, *differences between first and second language acquisition* and *Chomsky's proposal*, to a distracted eye, seem to be apparently disconnected, but an attentive reader will soon realize that, *de facto*, they are closely tied by a common thread: *language acquisition*.

1. *Definition of language acquisition*

Before giving a definition of *language acquisition* it is necessary to consider that the origin of language has always stimulated the interest of various scholars inspiring a new multidisciplinary research world, called "cognitive sciences" whose object is human being's cognitive functions and processes and, more in general, the phenomenon of knowledge, where the language has, without any doubt, a central role. The scientific study of language acquisition began around the same time as the birth of cognitive science, in the late 1950's. Cognitive science aims at giving

naturalist and nativist explanations of the origin of the language, according to which, the human mind is comparable to the *software* of a computer, (where the brain would be the *hardware*). Saying that, it is able to manipulate information in an independent way from external stimulus. If the analogy mind-computer lets cognitive science investigate the mind without losing its scientific nature, so it is possible to study the mind with the same rigour and objectivity with which computer science studies its programs.

A careful look at recent studies shows how two authoritative cognitive scientists, Steven Pinker and Jerry Fodor, provide two different explanations of how the mind works. While they both consider the mind as a kind of form of computation, having specialization or composed of distinct faculties instead of a single learning device, and of an innate biological organization, they claim different ways on how these concepts should be applied to explain the mind. In particular, while Pinker in *How the Mind Works* (1997) says that “the human mind is a naturally selected system of organs of computation”¹, Fodor in a book titled *The Mind Doesn't Work That Way* (2000) claims that the mind has the architecture of a “Turing Machine”², asserting

¹ Pinker, S. (2005), *So How Does the Mind Work?* [Online]. Available from: http://pinker.wjh.harvard.edu/articles/papers/So_How_Does_the_Mind_Work.pdf, p.1.

² The term was coined in 1937 by Alan Turing, an English mathematician and computer scientist. He was crucial in the development of computer science and in formalising the concept of the algorithm and computation with the Turing machine, playing a significant role in the creation of the modern computer. He explained the Turing Machine as a theoretical device that manipulates symbols contained on a strip of tape. Despite its simplicity, a Turing machine can be adapted to simulate the logic of any computer algorithm, and is particularly useful in explaining the functions of a CPU inside of a computer.

that a “Turing machine can compute any partial recursive function, any grammar composed of rewrite rules”.³ But this model was never used practically to explain the functioning of the human mind and, as Pinker himself asserts, “It’s hard to credit that Fodor takes seriously the idea that the human memory is like a tape divided into squares”.⁴ When Pinker defends his theory of how the mind works basing it also on the concepts of *specialization* and *evolution*, in addition to *computation*, Fodor takes for granted that the mind cannot work that way “because Turing Machines cannot do abduction [...] and evolution adds nothing to our understanding of the mind”.⁵ Pinker, in this case, gives an exhaustive explanation on why Fodor’s statement is not valid. First of all, he points out that the human mind’s powers of abduction are universally conceived by the scientific community, which “use sophisticated mathematical and technological tools, pool their results in journals and conferences”.⁶ It contrasts with Fodor’s theory of a “common-sense inference [...] accomplished by a single brain working in seconds”.⁷ Moreover, the *specialization* or domain-specificity of the mind, according to Pinker, can not be assimilated to Fodor’s notion

³ See Pinker, op. cit., p. 6.

⁴ Ibid., p. 6.

⁵ Ibid., p. 22.

⁶ See Pinker, op. cit., p. 10.

⁷ Ibid., p. 10.

of *modularity*⁸ in that “the human mind organizes its understanding of reality into several domains, such as physical objects, living things, other minds, and artifacts. [...] Physical objects occupy space, persist over time, and are subject to physical forces. [...] Minds consist of nonmaterial beliefs and goals”.⁹ Finally, it can not be possible, according to Pinker, not to take into account the relevance of evolution to psychology, as Fodor does, in that it is “the source of innate biological structure”.¹⁰

A component of the human mind, physically represented in the brain and part of the biological endowment of the species, is the faculty of language, which appears to be a unique phenomenon, that is specific to humans, whose characteristic aspect is *recursion*.¹¹ The use of recursion in linguistics enables discrete infinity by embedding sentences in sentences of the same type in a hierarchical structure. Without recursion, language can not have discrete infinity and embed sentences into infinity. In the light of recent indications by Hauser, Chomsky and Fitch “recursion is the mechanism responsible for everything that distinguishes language both from other human capacities and from the capacities of animals”.¹² For this reason they carry out the

⁸ This term was widely treated in Fodor’s work *The Modularity of Mind* (1983) where he defends the “conception of a mental module as an informationally encapsulated processor”. See Pinker, op. cit, p. 15.

⁹ Ibid., p. 15.

¹⁰ Ibid., p. 2.

¹¹ See Pinker, S. & Jackendoff, R. (2004). *The Faculty of Language: What’s Special about it?* [Online]. Available from: http://pinker.wjh.harvard.edu/articles/papers/2005_03_Pinker_Jackendoff.pdf.

¹² Ibid., p. 203.

theory that *recursion* is what is special about language. Even if, according to Pinker and Jackendoff, “there is considerably more of language that is special”.¹³

The ability to acquire and use language is a cardinal aspect that distinguishes humans from other organisms. In other words, *language acquisition* is the process by which humans acquire the capacity to comprehend, create and use words to understand and communicate. This capacity regards also the whole set of different capacities including syntax, phonetics, and an extensive vocabulary.

The nature of language and language acquisition is one of the topics which has always interested humanity. Since Plato, in fact, the word-meaning was considered in some measure innate. Afterwards, with the empiricists Hobbes and Locke, knowledge (language for Locke) developed from abstracted sense impressions. In the 1950s, this question represented the focus of attention of the following linguistic approaches such as:

- Behaviorism (Skinner);
- Cognitive-Maturation (Piaget).

With regard to Behaviorism, it was discussed that language may be learned through a form of operant conditioning. Skinner, according to his stimulus response theory, suggested that the effective use of a word, given a certain stimulus, reinforces its contextual probability. This behaviourist idea was powerfully attacked by Noam Chomsky who considered it a failure. Instead, Chomsky asserted a more theoretical

¹³ Ibid., p. 204.

approach, based on a study of syntax, often named generative grammar, according to which language users possess a body of knowledge. Moreover, he asserted that “the brain contains a separate module for language (the language faculty) independent of cognition”,¹⁴ and each individual holds a *Universal Grammar* which represents “the basis on which knowledge of language develops”.¹⁵

As for cognitive development, this alludes to how a person perceives, thinks, and reaches understanding of his or her world through the interaction of genetic and learned factors. Among the areas of cognitive development are information processing, intelligence, reasoning, language development, and memory. The most widely known and significant theory of cognitive development is that of the psychologist Jean Piaget. According to his *theory of cognitive development*, intelligence is the basic mechanism of securing equilibrium in the relations between the person and the environment. At any time in development, the environment is assimilated into the schemes of action that are already accessible and these schemes are transformed or accommodated to the peculiarities of the objects of the environment. Therefore, the development of intelligence is a continuous process of assimilations and accommodations that leads to the expansion of application of schemes. The mental operations are gradually coordinated with one another, generating structures of mental operations. These structures of mental operations are

¹⁴ Galasso, J. (1999). *A Working Paper on 2nd Language Acquisition*, p. 1. [Online]. Available from: <http://www.csun.edu/~galasso/wkpap.htm>.

¹⁵ Ibid. p. 2.

applied to representations of objects rather than to the objects themselves. Language, mental images, and the numerical system are examples of representations symbolizing objects and therefore they become the object of mental operations. For Piaget, intelligence is not the same at different ages. It changes qualitatively, reaching broader, more abstract, and more balanced structures allowing access to different levels of organization of the world. Piaget's theory comes from an extensive observation of children in their natural environments as opposed to the laboratory experiments of the behaviorists. Although Piaget was interested in how children reacted to their environment, he proposed a more active role for them than that suggested by the learning theory. Recognising that child's knowledge is composed of schemes, that is basic units of knowledge, he considered them useful to organize past experiences and serve as a basis for understanding new ones.

The most significant substitute for the work of Piaget has been the information-processing approach, which uses the computer as a model to provide new insight into how the human mind receives, stores, recalls, and uses information. Researchers, using information-processing theory to study cognitive development in children, interested in the gradual improvements in children's ability to take in information focusing on certain parts of it and their increasing attention periods and capacity for memory storage. In the light of this statement, scholars have found that the superior memory skills of older children are due in part to memorization strategies, such as repeating items in order to memorize them or dividing them into categories.

2. *Differences between first and second language acquisition*

Each theory of cognition has always tried to explain what *language acquisition* is, in that it is uniquely human and represents the principal channel by which humans have knowledge of other people's thinking. It usually refers to *first language acquisition*, generated at the most vital stage of children's cognitive development and regarding the acquisition of their native language. Even if language acquisition is a phenomenon of remarkable complexity, it is also true that children can learn it without any kind of regular lesson. It is also widely known that adult language is very elaborate, and that children become adults. Thus, something in the child's mind must be capable of achieving that complexity. Human language is performed by special adaptations of the human mind and body that emerge in the course of human evolution, and which are carried out by children in acquiring their mother tongue. Children acquire their first language through a subconscious process during which they are unaware of grammatical rules, attaining a natural communication in such a way that the emphasis results on the text of the communication and not on the form.

Second language acquisition or *second language learning*, shortened *SLA*, *L2A* or *L2 acquisition*, on the other hand, dealing with the acquisition in both children and adults of additional languages, is the result of explicit instruction in the rules of language. Very often the terms "acquisition" and "learning" are not used as synonyms but to indicate the subconscious and conscious aspects of this process. The

syntax of the L2 is not acquired unconsciously and L2 learning is not a biologically-determined process. In L2 acquisition “learners are confronted with the dynamics of having two (or more) linguistic systems at work (in one brain/mind)”.¹⁶ Moreover, *second language*, also called *target language* or *L2*, as already mentioned, regards any language learned successive the native language, addressed as *mother tongue*, *first language*, *source language* or *L1*.

Comparing the two processes of L1 and L2 learning, several scholars point out their different opinions about the two. When Krashen talks about the Monitor Theory, he assumes that second language acquisition is only a new repetition of first language acquisition with some differences which depend on the quantity and the quality of input received by adults and children, in addition to some differences concerning where the *affective filter* is located in the learner’s mind. These differences would explain the different results of adult and child language acquisition and the similarity would be the result of the internal language processing system and the mechanisms used for the acquisition. Moreover, Krashen specifies there is a clear differentiation between *acquisition* and *learning*, underlining the conscious aspect which prevails in the latter.¹⁷ The same concept is assumed by Bley-Vroman who confirms that

¹⁶ See Galasso, J. (1999). *A Working Paper on 2nd Language Acquisition*, op. cit., p. 2.

¹⁷ See Krashen, S. 1985. *The Input Hypothesis: Issues and Implications*. London: Longman.

“acquisition refers to the unconscious internalization of knowledge, while learning refers to the conscious ‘learning’ of explicit rules”.¹⁸

Several linguists agree that rapidity is the characteristic of the way children learn their first language regardless of their mental immaturity and this is thanks to the existence of an innate Universal Grammar in their minds. Despite that, their positions diverge when they talk about the acquisition of a second language. While some of them claim the centrality of UG in second language acquisition, there are others, like Bley-Vroman, who maintain that UG is not totally involved in SLA. In his Fundamental Difference Hypothesis he explains two different mechanisms in L1 and L2 acquisition: that of a child made up of Universal Grammar and a Specific Language Learning Procedure; that of an adult composed of Native language knowledge and a *General Problem-Solving System*. In brief “the learner comes to the task of learning a L2 with a set of assumptions about the nature of language”.¹⁹

The researchers who work with the cognitive psychology do not consider this distinction at all, or in other words, they do not think there is a difference between language learning and the learning of any other skill. Scholars such as McLaughlin, for instance, assert that there exists only one single cognitive mechanism of assimilating knowledge which is utilized in any kind of knowledge and which is already represented in the mind. The assimilation of new knowledge into the existent

¹⁸ See Galasso, J. (1999). *A Working Paper on 2nd Language Acquisition*, op. cit., p. 5.

¹⁹ See Galasso, J. (1999). *A Working Paper on 2nd Language Acquisition*, op. cit., p. 5.

cognitive system means that knowledge is continuously changed, in that it assimilates new data that cannot completely adapt into the present pattern.²⁰

In the light of these considerations, there emerges a similarity between L2 learners and L1 speakers. The only distinction regards the extent of knowledge of the language within the short and long-term memory and its degree of assimilation into the existing cognitive system.

3. Chomsky's proposal

It is universally known that Noam Chomsky contributed to the development of cognitive sciences thanks to his nativist theory, which has had a huge influence on linguistics.

Through the study of how human beings can master a language, he arrived at the conclusion that language acquisition depends on a *mental faculty*, which is innate and specific to humans and therefore independent of one's own cultural linguistic conditioning. Differently from behaviourists, who claimed that the mind consisted of sensorimotor abilities with a few simple laws of learning governing gradual changes in an organism's behavioral repertoire, Chomsky asserted that language acquisition altered these beliefs in that children learn languages that are governed by highly abstract principles, without explicit instruction or any other environmental clues to the nature of such principles. Thus language acquisition depends on an innate,

²⁰ See McLaughlin, B. 1987. *Theories of Second Language Learning*. London: Edward Arnold.

species-specific module which is distinct from general intelligence. He talks about a *language organ* genetically determined or innate, the so called LAD (Language Acquisition Device), which makes each person acquire a language, constituted by a UG (Universal Grammar), an innate knowledge or “the initial state of the language faculty”,²¹ from which it is possible to draw the syntax of the different languages. With a limited set of grammar rules and a finite set of terms, humans are able to produce an infinite number of sentences, including sentences no one has previously said. For Chomsky the possession of rules comes before the language and its origin is independent of the linguistic and social interaction with other individuals. Strong evidence for the existence of UG is surely the fact that children acquire their native language in a very brief time.

The Principles and Parameters approach (P&P)—developed in his Pisa 1979 Lectures, later published as Lectures on Government and Binding (LGB)—make decisive assertions concerning universal grammar: that the grammatical principles implicit in languages are innate and established, and the differences among the world’s languages can be characterized in terms of parameter settings in the brain (such as the pro-drop parameter, which indicates whether an explicit subject is always required, as in English, or can be optionally dropped, as in Spanish). For this reason the term principles and parameters is often given to this approach. Taking into consideration this perspective, a child learning a language need only acquire the

²¹ See Galasso, J. (1999). *A Working Paper on 2nd Language Acquisition*, op. cit., p. 3.

necessary lexical items, such as words, grammatical morphemes, and idioms, and define the appropriate parameter settings, which can be done based on a few basic examples.

In his more recent *Minimalist Program* (1995), Chomsky maintains the theory of principles and parameters, and, in particular, he talks about principles of economy of derivation and representation. The minimalist model considers Universal Grammar as furnishing a unique computational system, with derivations determined by morphological properties, to which the syntactic variation of languages is also restricted.

He also formulates that vast extension of a language such as English is possible only by the recursive device, one of the key properties of generative grammar, of embedding sentences in sentences.

Chomsky's theories have had a substantial influence on research workers investigating the acquisition of language in children, even if some of them today do not defend Chomsky's ideas, sustaining emergentist theories, which rather seem to borrow the best from each of the prior theories, bringing language to an example of general processing mechanisms in the brain.

In the light of these considerations, it is possible to infer that, both in acquisition and learning, the mind has an active role in defining the nature of the acquired knowledge.

Cognitive science, in this case, gives a great support to explain language acquisition and, in particular, the process of learning a native or a second language.

With regard to the acquisition of one's native language, considering that children learn to speak rapidly, imitating what they hear from adults, it is supposed that human beings have a natural aptitude for understanding grammar. In other words, this is what Noam Chomsky assumes, that is, that in each individual there is an innate, *deep structure* capable of generating numerous, related linguistic expressions, each of which are *surface forms*. This concept of deep structure and surface form has greatly changed since the 1990's, being substituted by a new one which considers "deep structures as representing meanings, and surface structures as representing sentences expressing those meanings".²²

As for the acquisition of a second or foreign language, it seems that people learn it according to the same stages that children pass through when learning their native language. But, not always do people become fluent in a second language as children do in their native tongue. It is as if the mind loses the facility for assimilating new language. While there are the traditional methods for learning a second language which include a systematic approach in order to comprehend grammar or new vocabulary, the cognitive approach accentuates conversation, full immersion and other techniques to reproduce the same situation in which children, for example, acquire their native tongue.

²² For more details see http://en.wikipedia.org/wiki/Deep_structure.

In the light of this reflection, language might seem the easiest and simplest thing a human being can learn, as a primary instinct. In fact, it is the most difficult skill a human being will master. Language represents, in a few words, what it means to be human.

Bibliography

Chomsky, N. (1968). *Language and Mind*, New York: Harcourt, Brace & World.

Galasso, J. (1999). *A Working Paper on 2nd Language Acquisition* [Online]. Available from: <http://www.csun.edu/~galasso/wkpap.htm>

Jackendoff, R. & Pinker, S. (2005) *The nature of the language faculty and its implications for evolution of language* (Reply to Fitch, Hauser, & Chomsky), *Cognition*, 97(2), 211-225. [Online]. Available from: http://pinker.wjh.harvard.edu/articles/papers/2005_09_Jackendoff_Pinker.pdf

Krashen, S. 1985. *The Input Hypothesis: Issues and Implications*. London: Longman.

Pinker, S. (Harvard University) & Jackendoff, R. (Brandeis University) (2004). *The Faculty of Language: What's Special about it?* [Online]. Available from: http://pinker.wjh.harvard.edu/articles/papers/2005_03_Pinker_Jackendoff.pdf

McLaughlin, B. 1987. *Theories of Second Language Learning*. London: Edward Arnold.

Pinker, S. (Harvard University) (2005). *So How Does the Mind Work?* [Online]. Available from: http://pinker.wjh.harvard.edu/articles/papers/So_How_Does_the_Mind_Work.pdf