MAIN SECOND LANGUAGE ACQUISITION THEORIES: FROM STRUCTURALISM TO COMPLEXITY

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RESUMO

Este artigo apresenta uma revisão de literatura das principais teorias de aquisição de segunda língua. Primeiramente, discorre sobre o começo dos estudos em aquisição em meados do século 20 com os estudos de Fries e Lado e então descreve algumas das propostas teóricas nas últimas quatro décadas. Dez teorias são brevemente descritas: a abordagem estrutural ou behaviorista; a hipótese da pidnização ou teoria da aculturação; a abordagem da identidade; a hipótese do input ou da compreensão; a hipótese da interação; a hipótese do output; a teoria da gramática universal; a teoria sociocultural; a teoria conexionista; e a abordagem dos sistemas complexos.

Palavras-chaves: *Aquisição de segunda língua; Ensino de línguas; Complexidade*.

ABSTRACT

This article presents a literature review of the main second language acquisition (SLA) theories. It first deals with the very beginning of SLA studies in the middle of the 20th century, focusing on the studies of Fries and Lado, and then moves on to describe some of the theoretical proposals over the past four decades. Ten theories are briefly described: the structural or behaviorist approach, the pidginization hypothesis or acculturation theory, the identity approach, the input or comprehension hypothesis, the interaction hypothesis, the output hypothesis, the universal grammar theory, the sociocultural theory, the connectionist theory, and the complex systems framework.

Key-words: *Second language acquisition; Language teaching; Complexity*.

Research on additional language teaching dates back to the middle of the twentieth century. Since then, several attempts have been made to explain how languages are learned. The several theories focus on different aspects of the phenomenon with emphasis on either the mental or social aspects of learning processes.

The very beginning

The first works on SLA are those by Charles Fries and his student Robert Lado. Fries (1945) emphasized the importance of contrasting "patterning of the sounds of two languages" (p.15). He claimed that

> This determining of the distinctive sounds that differ is only the first step (although an important one) in the scientific comparison of the language to be learned with the native language of the learner. Each language has not only its own set of distinctive sound features; it also has only a limited number of characteristic sequences of consonants and vowels which make up the structural pattern of the syllables and words. (p.16)

Fries (1945:27) also called the reader's attention to the need to approach "a new language by a more "natural" method", but he adds that it should not "conflict with the so-called "natural way in which a child develops in the grasp of his native language" (p.28). He presents an interesting point about the assertion that a child learns by imitating what he hears. He claims that children use forms they have never heard, such as "knowed" or "swimmed", because "they have grasped (unconsciously of course) the "pattern" of form which English uses regularly in expressions of past time and have extended it to words that are exceptions to the pattern" (p.28). Fries (1945: 35) defends that "[T]he adult need not repeat the slow processes of the child, when he attempts to learn a foreign language". He is in favor of the mastering of basic structural patterns and defends that structural exercises, "as far as possible, have practical relevance to the circumstances of the situation in which the student is originally living in order that they may avoid artificiality and gain their meaning from immediate experience" (p.35).

Robert Lado has influenced researchers on language acquisition all over the world with his books. First with *Linguistics across cultures*, published in 1957, and then with *Language teaching: a scientific approach*, published in 1964. In the foreword of Lado's first book, Fries (1957) states:

> The struggle to apply to the problems of foreign language learning the new views of language arising out of "structural" analyses has served to shift the focus of first attention from methods and techniques to the basis upon which to build these materials.

Fries advocated, also in the foreword, for the importance of "finding out the special problems arising out of any effort to develop a new set of language habits against a background of different native language habits". Seeing language acquisition as a matter of acquiring habits was the basic assumption of the Structural Approach or the Behaviorist Approach.

Lado (1957) was influenced by Fries's works, and he acknowledges his importance by explaining that the fundamental assumption guiding the preparation of teaching materials was given by Fries (1945:9), who claimed that "[t]he most effective materials are those that are based upon a scientific description of the language to be learned, carefully compared with a parallel description of the native language of the learner."

Lado's book was divided into six chapters. In the first, he defended "the necessity for a systematic comparison of languages and cultures," while in the others he taught the readers how to compare two sound systems, two grammatical structures, two vocabulary systems, two writing systems, and two cultures. He considered that what was similar in both languages would

be easier to be learned. By comparing the two languages, teachers would be able to predict learning problems and focus more on the practice of the difficult aspects.

In his second book, Lado (1964:8) points out that "language teachers cannot ignore the results of linguistics (the scientific study of language), the psychology of human learning, the age and education of the pupils, or the personality and capacity of the individual student". He calls the reader's attention to research carried out during the Second World War, when languages were described in terms of "distinctive elements of intonation, pronunciation, morphology, and syntax that constituted the structure of language, which gradually emerged as one mastered the basic sentences and variations" (LADO, 1964:6). He claims that "[t]he powerful idea of pattern practice was developed; that is, practice that deliberately sets out to establish as habits the patterns rather than the individual sentences, particularly where transfer from the native language creates learning problems" (LADO, 1964:6). This quote synthesizes the theoretical principles for the first SLA theory.

Lado's dialogical quote clearly echoes three fields of research: linguistics, with the concept of language as a set of patterns (BLOOMFIELD, 1933); behaviorist psychology, defending that learning is a matter of habit formation (WATSON, 1930; SKINNER, 1957); and Applied Linguistics, when he refers to the contrastive analysis by mentioning the phenomenon of "transfer from the native language creates learning problems".

The prevalent psychological theory at that time was Behaviorism (WATSON, 1930; SKINNER, 1957). Behaviorism influenced the studies in language learning with the axiom that language learning was a matter of habit formation. Language was seen by the Structuralists as a set of structures, and they believed that, by comparing the structures of native and additional languages, learning problems could be predicted.

Lado (1957, 1964) offered important contributions to additional language teaching, including the awareness to language variation and the idea that "language is part of the culture of a people and the chief means by which the members of a society communicate" (LADO, 1964:23).

Contrastive analysis was later criticized because: (1) it ignored the developmental phases in SLA and (2) learners did not make all the predicted mistakes, yet made others that had not been predicted. Nevertheless, we cannot disregard that students do have difficulty in mastering some language structures that are different from their native language.

After the sixties

From the seventies on, a series of theories have emerged and put further emphasis either on cognition or on social experiences. Another tendency has been to see both as essential elements of the same process, as is the case of studies conducted based on complexity theory (See LARSEN-FREEMAN, 1997; LARSEN-FREEMAN and CAMERON, 2008; and MENEZES, 2013).

In the following subsections, I will describe some of these theories.

Pidginization hypothesis or the acculturation theory

Schumman (1976, 1978) explains SLA by means of the Pidginization Hypothesis, also known as the Acculturation Theory, which was the first to take identity into account.

Schumman's theory was constructed based on case studies, conducted by him and by his associates (CAZDEN; CANCINO; ROSANSKY; SCHUMMAN, 1975), who observed Spanish speakers (2 children, 2 teenagers, and 2 adults) learning English in the United States without formal instruction. Schumman's most famous study (SCHUMMAN, 1976) was his

investigation of the performance of Alberto, a thirty-three-year-old Costa Rican low class immigrant living and working in the United States.

Schumman (1976) realized that Alberto did not develop a good performance when compared to other research participants. His outcomes were a kind of pidginized English: simplified language, absence of inflections, and grammatical transformations. Schumann concluded that social and psychological distances were responsible for the poor results. Alberto belonged to a low working class that was subordinate to Americans and did not integrate himself into American Society. In addition, he maintained a strong affiliation with the Costa Rican group who lived in the same neighborhood and participated the same social activities (church, school, associations).

Schumann (1978) sustains that SLA is influenced by social, affective, cognitive, biological, aptitude, personal, instructional, and input aspects, and emphasizes that the most important of these are the social and affective aspects, which he gathers under the acculturation label. He defines acculturation as "the social and psychological integration of the learner with the target language (TL) group". For Schumann, SLA results from acculturation. Moreover, the ideal conditions for learning would be less social and psychological distance between the learner and the TL group would be minimized, given that, in such a situation, the learner would be integrated within the SL context.

One problem with Schumann's proposal is that it does not take into account the contexts in which the language being learned is not spoken. Furthermore, it is impossible to make such broad generalizations, because explanations for Alberto's performance might not be applicable to other learners.

The identity approach

Schumman was the first to call our attention to identity, although he had not used this term. This important aspect of language acquisition is only studied again in the early 90's by Peirce in her doctoral dissertation (NORTON PEIRCE[1], 1993), which resulted in the book *Identity and language learning: gender, ethnicity and educational change* (NORTON, 2000). In her study, Norton (2000) shows "how relations of power in the social world impact on social interaction between second language learners and target language speakers (p.4)" and "how inequitable relations of power limit the opportunities second language learners have to practice the target language outside the classroom" (p.5).

Norton (2000:5) defines identity as "how a person understands his or her relationship to the world, how that relationship is constructed across time and space, and how the person understands possibilities for the future". She adds that language is not neutral and claims that "it is through language that a person gains access to – or has access denied to – powerful social networks that give the learners the opportunity to speak".

Norton (2000) proposes the concept of investment rather than motivation. She believes that investment "signals the socially and historically constructed relationship of learners to the target language, and their often ambivalent desire to learn and practice it". For Norton (1995), motivation is not equivalent to investment, because motivation is an individual property, and investment implies the relationships of learners with the transforming world. In this view, acquisition is not a matter of motivation or desire to learn the language. It can also be explained by the social opportunities to use the language.

As far as social distance or marginalization is concerned, Schumann also seems to anticipate the notions of peripheral and legitimate participation proposed by Wenger (1998), which are also present in Norton's research, as explained by Block (2003:105):

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[1] Peirce was the previous surname of Bonny Norton, one of the leading researchers on identity studies.

> The peripheral participation is achieved via exposure to 'mutual engagement with other members, to their actions and their negotiation of the enterprise, and to the repertoire in use' (Wenger 1998:100). However, as Wenger points out and Norton has shown in her recent publication (Norton 2000, 2001), '[i]n order to be on inbound trajectory, newcomers must be granted enough legitimacy to be treated as potential member's (Wenger 1998:101). Thus, participation must always begin peripherally and if the individual is not deemed legitimate, or in Norton's work 'worthy to speak' (Norton 2000; see Chapter 3 of this book), or if the individual chooses not to participate as a reflective form of resistance (Norton 2001), then it might not begin at all.

Although the identity approach highlights an important aspect of the learning environment, it does not make any mention of the mental processes. Participation, on the other hand, is not acknowledged in theories that point out the importance of the cognitive processes. In this direction, the most famous and controversial SLA model is that proposed by Stephen Krashen, who was influenced by Chomsky's concept of language as an innate capacity.

The input or comprehension hypothesis

Krashen first named his model the Monitor Hypothesis (KRASHEN, 1977, 1978), then the Input Hypothesis (KRASHEN, 1985) and, more recently, the Comprehension Hypothesis (KRASHEN, 2004).

The five basic hypotheses of this model, according to Krashen (1985:1-2), are:

1. The Acquisition/Learning Hypothesis: Krashen believes we have two distinct modes of learning, a subconscious process (acquisition) and a conscious process (learning). Learning is equivalent to 'knowing about' the language, in Krashen's words.
2. The Natural Order hypothesis: the rules of language are acquired in a predictable order, "some rules tending to come early and others late".
3. The Monitor Hypothesis: Learning, the conscious process, "serves only as an editor, or monitor. We appeal to learning to make corrections, to change the output of the acquired system before we speak or write (…)".
4. The Input Hypothesis: "humans acquire language in only one way - by understanding messages or by receiving 'comprehensible input'".
5. The Affective Filter Hypothesis: "The 'affective' filter is a mental block that prevents acquirers from fully utilizing the comprehensible input (…)". It happens when learners are not motivated, anxious or when they do not have enough self-confidence.

Krashen's model brought chaos into SLA research due to the radicalism of his proposal. First of all, he goes against the grammar teaching tradition by insisting that teaching grammar rules does not lead to acquisition and by emphasizing that all a learner needs is comprehensible input. Second, he ignores the importance of interaction. But chaos is an ideal moment for creativity, and the instability brought into the field by Krashen's cognitive view motivated important theories, two of which are the interaction hypothesis and the output hypothesis.

The interaction hypothesis

The Interaction Hypothesis, as a counterpoint to the importance of input, supports the relevance of interaction. The importance of interaction was first defended by Hatch (1978), who assured that in first or second language acquisition "[o]ne learns how to do conversation, one learns how to interact verbally, and out of this interaction syntactic structures are developed" (p. 404). She observed that, in the beginning stages of second language acquisition, adult learners use strategies, such as asking for repetition and clarification in order to identify conversation topics. Once the topic has been identified, the learner "can further use his knowledge of the world and of discourse in his own language to predict the possible questions about the topic" (p.2004).

In spite of the pioneerism of Hatch, the credits to this hypothesis are given to Long (1980, 1996) who, in his PhD dissertation (LONG, 1980), recognizes the importance of input but concludes that it is insufficient and that the conversational strategies – repetitions, confirmation check, asking for clarification, comprehension verification – are essential for SLA.

Long (1996:451-2) suggests that

> *negotiation for meaning*, and especially negotiation work that triggers interactional adjustments by the NS[2] or more competent interlocutor, facilitates acquisition because it connects input, internal learner capacities, particularly selective attention, and output in productive ways.

Negotiation for meaning, in Long's terms, implies speech situations where learners interact with more competent speakers who produce utterances "such as repetitions, extensions, reformulations, rephrasing, expansions, and recasts". By reformulating speech, target forms are made salient and are likely to be noticed by learners.

According to this hypothesis, the ideal condition for SLA is an environment (classroom or natural environment) where learners should have tasks that stimulate negotiation for meaning.

Rod Ellis (1991:36) revises the interaction hypothesis and presents the following assumptions:

> (1) Comprehensible input is necessary for L2 acquisition.
>
> (2) Modifications to the interactional structure of conversations, which take place in the process of negotiating a communication problem, help to make input comprehensible to an L2 learner.
>
> (3) a. Tasks in which there is a need for the participants to exchange information with each other promote more interactional restructuring.
>
> b. A situation in which the conversational partners share a symmetrical role relationship affords more opportunities for interactional restructuring.
>
> (4) Interaction that requires learners to modify their initial output facilitates the process of integration.

Rod Ellis's (1991) proposal joins three different hypotheses: input, interaction, and output (the last will be described in the following sub-section), and as Larsen-Freeman

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[2] NS = native speaker

(1991:266) states: "they [interactionists] invoke both innate and environmental factors to explain language learning" (p. 266).

One criticism to this hypothesis is that there is little evidence to support it and that not all interactions necessarily lead to acquisition.

The output hypothesis or lingualization hypothesis

The Output Hypothesis, later named Lingualization, was proposed by Swain (1985, 1995, 2005, 2006). She recognizes that both comprehensible input and interaction and negotiation of meaning are important elements of SLA. Nevertheless, she considers that the learner must also produce a comprehensible output, that is, produce oral or written language.

Swain (1995) disagrees with Krashen (1989), who thinks that output is merely a sign of SLA. She has formulated the Output Hypothesis that asserts that output enhances fluency, promotes 'noticing' and opportunity for hypothesis testing. Swain (1995) believes that learners recognize their linguistic problems when they are using the language and explains 'noticing' as "a gap between what they *want* to say and what they *can* say, leading them to recognize what they do not know, or know only partially" (p.126). In addition, when learners produce language, they are at the same time testing hypotheses about how the language works and reflecting on the language. It is her contention that "output serves a metalinguistic function, enabling them to control and internalize linguistic knowledge" (p.126).

In sum, Swain has suggested that "the output hypothesis serves at least three functions in second language learning beyond that of enhancing fluency. These are the noticing function, the hypothesis testing function and the reflective (metalinguistic) function" (SWAIN, 1995:140-141). In spite of defending these functions, Swain (1995) is also aware that they, together or separately, might not operate in every language production.

The output and the interaction hypotheses are also considered to be sociocultural approaches, because they emphasize the social aspects of learning. In the next section, I present some of the theoretical assumptions of the Sociocultural Approach.

The sociocultural approach

The Sociocultural Approach has its origin in Vygotsky's social psychology (VYGOTSKY, 1962; 1978), the main assumptions of which are: (1) the human mind is socially mediated by means of physical or symbolic artifacts and (2) language plays an important role in mental development and is the main mediation tool. "As all tools, language is used to create thought, but it also transforms thought and is the source of learning" (ORTEGA, 2009:219).

One important concept from Vygotsky is the zone of proximal development (ZPD), which has been defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (VYGOTSKY, 1978:86). For Vygotsky (1978), what children can do with someone else's help seems to indicate the immediate stage of their development.

Lantolf (2002:105), referring to Vygotsky (1978), explains that ZPD "is the site where future development is negotiated by the expert and the novice and where assistance is offered, appropriated, refused, and withheld". Lantolf (2002:105) presents three kinds of mediation: by "experts and peers, self-mediation, and artifact mediation". In fact, in language learning histories, such as those in the AMFALE[3] project, we can find examples of different mediations and various examples of artifact mediation, such as songs and movies.

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[3] These language learning histories are available at <http://www.veramenezes.com/amfale.htm>

Wood, Bruner, and Ross (1976) call the assistance given to the learner by experts "scaffolding." Scaffolding has the following functions: recruiting interest, simplifying the task, maintaining the pursuit of the goal, demonstrating the relevant aspects of the task, controlling frustration, and demonstrating how the task should be done.

According to Johnson (2004:136), based on Aljaafreh and Lantolf's (1994) study,

> … for the assistance to be effective, it needs to be (1) *graduated* and (2) *contingent*. The former refers to the need to estimate the minimum level of assistance required for the novice to successfully complete a given task. (…) The latter indicates that assistance should only be offered when it is required and should be withdrawn as soon as the novice reveals signs of self-regulation, or control over the task.

SLA within sociocultural theory is seen as a matter of collaboration and a process of becoming a member of a community of users of the language one is learning. Having this as the basic assumption of the theory, their proponents (DONATO, 2000, PAVLENKO and LANTOLF, 2000; BLOCK, 2003; JOHNSON, 2004) criticize the acquisition metaphor, because it projects mind as a container and knowledge as a commodity and defend that it should be complemented by the participation metaphor[4] proposed by Sfard (1998), as they see learning as a process of participation in social practices.

But as pointed out by Norton (2000), the social space is also permeated by power relations, and collaboration is not always present in learning environments. It also offers constraints and obstacles for language learning, as can be seen in Paiva (2010).

In spite of the strong arguments brought by the sociocultural approach, other researchers have followed the opposite track. This is the case, for instance, for those scholars influenced by Chomsky's concept of language. One example is the Universal Grammar Hypothesis, described in the next subsection.

The universal grammar hypothesis

Chomsky's ideas influenced not only Krashen, but also a series of SLA researchers, such as Gass (1989) and White (1988), to mention only two. Those researchers brought the concept of universal grammar (UG) into the SLA field. As Larsen-Freeman (1991:324) explains, some of them defend that

> UG is in fact still available to second language learners such that their resulting grammar is shaped by its principles. White points out that the adult second language learner is faced with the same challenge as is a child first language learner: trying to learn a language from degenerate and limited input.

There is no agreement among those who defend the universal grammar model for SLA. Some of them believe that "UG may continue to operate even after puberty" (LARSEN-FREEMAN 1991:324), but others understand that first and second acquisition are very different and "that it is not likely that UG is present in its entirety in post-pubescent learners. It is

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[4]I disagree that participation is a metaphor. A metaphor requires a projection of an element of one frame into another, as is the case of the acquisition metaphor, when one projects learning a language to the frame of the acquisition of goods or commodities. I defend that participation is a metonym, because it is within a frame containing both learning and participation. Participation refers to an element of the concept of the community of practice: the process of becoming a member of that community.

possible, however, that if language learners do not have direct access to UG, they do through their knowledge of their L1 (CLAHSEN & MUYSKEN, 1989)".

As a counter point to the UG approach, the connectionist models deny the existence of a universal grammar.

Connectionism

As stated by Larsen-Freeman (1991:325), connectionism assumes that "Learning is held to consist of the strengthening of connections in complex neural networks. The strength of their connections or their weight is determined by the frequency of patterns in the input". According to Mitchell and Myles (2004:121):

> Connectionism, or parallel distributed processing, likens the brain to a computer that would consist of **neural networks**: complex clusters of links between information nodes. These links or connections become strengthened or weakened through activation or non-activation, respectively. Learning in this view occurs on the basis of associative processes, rather than the construction of abstract rules. In other words, the human mind is predisposed to look for associations between elements and create links between them. These links become stronger as these associations keep recurring, and they also become part of larger networks as connections between elements become more numerous.

The most well-known connectionist model is that of *Parallel Distributed Processing* developed by Rumelhart and associates in 1986. According to this model, information is stored in different locations of the brain in the form of networks. In SLA, it is worth mentioning the research carried out by Nick Ellis and Schmidt (1997), who used computer simulations with artificial language to investigate the acquisition of plural forms by adult learners. They concluded that acquisition is triggered by associative mechanisms.

In Brazil, Poersch (2004) mentions a simulation study by Gabriel (2001) that tested the production of the passive voice. This study concluded that the computational model was able to acquire information about the passive voice.

A common criticism to the connectionist studies is that it focuses on a single linguistic aspect and, for Nick Ellis (2007), the problem of focusing on a part instead of the whole prevents a broader view of the phenomenon. He advocates "a complex systems framework that views SLA as a dynamic process in which regularities and systems emerge from the interaction of people, their conscious selves, and their brains, using language in their societies, cultures, and world" (ELLIS, 2007:85).

A complex systems framework

Larsen-Freeman (1997) was the first to defend that acquisition is a complex system and to "call attention to the similarities among complex nonlinear systems occurring in nature and language and language acquisition"(p. 142). She points out that acquisition is a dynamic, complex, and nonlinear system that is also chaotic, unpredictable, and sensible to initial conditions. It is self-organizing, feedback sensitive, and adaptive. She adds that "[T]he path that a dynamic system takes can be traced in space and is called an attractor. It receives this name because it is the pattern to which a dynamic system is attracted" (p.146).

She conceptualizes language "as aggregations of paradigmatic and syntagmatic units (e.g. phonemes, morphemes, sentences, etc.)…" (p. 147) and adds that it is dynamic because it changes and grows and that universal grammar, with its universal principles, might be considered the initial condition of human language.

Larsen-Freeman (1997:151) explains that there are many elements in interaction in the development of interlanguage:

> The source language, the target language, the markedness of the LI, the markedness of the L2, the amount and type of input, the amount and type of interaction, the amount and type of feedback received, whether it is acquired in untutored or tutored contexts, etc. Then, too, there is a multitude of interacting factors that have been proposed to determine the degree to which the SLA process will be successful: age, aptitude, sociopsychological factors, such as motivation and attitude, personality factors, cognitive style, hemisphencity, learning strategies, sex, birth order, interests, etc. (Larsen-Freeman and Long 1991). Perhaps no one of these by itself is a determining factor, the interaction of them, however, has a very profound effect.

In Brazil, I (PAIVA, 2002, 2005 and MENEZES, 2013) have been defending that a complex model can accommodate opposing theories, because it can defend the existence of innate mental structures and, at the same time, highlight the importance of neural connections, language identity, social mediations, input, interaction, output, etc.

Finally, I would like to mention Borges and Paiva (2011), who discuss language and second language acquisition as complex adaptive systems, as well as the nature of teaching/learning in the perspective of complexity theory. These authors are the first to offer a teaching approach supported by a complex systems framework.

Conclusions

In this article, we have seen ten different ways to approach SLA. We saw that each theory, hypothesis or model, is unable to explain how languages are acquired, because, with the exception of the complexity framework, all of them focus on one aspect of a complex phenomenon. However, all have their merits and help us understand that acquiring a language or participating in a community of practice depends on mental and environmental aspects. It is my contention that none of them should be ignored, given that the sum of them all will offer a more complete landscape of acquisition processes.

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