

Identity, motivation, and autonomy from the perspective of complex dynamical systems¹

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In this world, nothing is permanent except change.
American Proverb

In this chapter, I discuss some characteristics of complex dynamical systems as a framework for the understanding of language and language acquisition. In order to investigate what motivates the SLA system dynamicity, and how identity construction and autonomy influence their trajectories and changes, I will examine some empirical evidence drawn from a corpus of English language learning histories written by Japanese and Brazilian English learners. It is my intention to demonstrate that small changes in identity, motivation and autonomy, among other factors, may trigger important developments in second language acquisition.

It is not my intention in this chapter to present a documentary history of the origins of Complexity Theory, but I must draw attention to the fact that what we call Complexity Theory today encompasses findings from a number of fields, such as the ones in mathematics, with Poincaré (1921) demonstrating that even systems whose behaviors are well known display indeterminate behaviors, and with Mandelbrot (1982) and his work on fractal geometry; in meteorology, with Lorenz (2001) and his research on weather prediction and the coinage of the butterfly effect metaphor to represent the notion of sensitive dependence on initial conditions in chaos theory, i.e. the idea that small inputs can trigger enormous consequences; in chemistry, with Prigogine (1984) showing the role of dissipative structures in thermodynamic systems and offering us the concept of self-organization; in biology, with Maturana and Varela (1987) and their

concept of autopoietic system, understood as a system that exhibits a self-structuring characteristic.

Complexity is a new metaphor pervading different fields of knowledge and, as Waldrop (1992:329) observed,

[I]nstead of relying on the Newtonian metaphor of clock work predictability, complexity seems to be based on metaphors more closely akin to the growth of a plant from a tiny seed, or the unfolding of a computer program from a few lines of code, or perhaps even the organic, self-organized flocking of simpleminded birds.

However, Complexity has become more than a metaphor; it is now a new paradigm in science which offers concepts to help us understand different phenomena in different knowledge fields, including Applied Linguistics. Larsen-Freeman (1997), in her inaugural work in this new perspective, sees “many striking similarities between the science of chaos/complexity and language and SLA” (p.141). She presents several arguments for the understanding of language and SLA as a complex, non-linear, dynamic phenomenon. Later on, Larsen-Freeman and Cameron (2008) demonstrated the applicability and usefulness of complexity concepts in Applied Linguistics research, and offered us some methodological principles and practical implications for the empirical investigation of language development.

In the next section, I will discuss some characteristics of complex dynamical systems with the help of Lewin (1992), Holland (1995, 1998), Cilliers (1998), Williams (1997), Lorenz (2001), and Larsen-Freeman and Cameron (2008).

Dynamical complex systems

According to Holland (1995: 6) complex systems are “made up of large numbers of active elements”. These interacting elements, also called agents (be they human or not), adapt themselves and change their behaviors because of the interactions and “any element in the system influences, and is influenced by, quite a few other one s” (Cilliers, 1998: 3). Those systems are nonlinear because their changing behaviors are not proportional to their causes. They are also open systems as energy or information flows in and out the system due to its interacting process. As Larsen-Freeman and Cameron (2008: 29) point out “[T]he complexity of a complex system arises from components and subsystems being interdependent and interacting with each other in a variety of different ways.” The overall system behavior emerges from those interactions, but cannot be described as just a matter of the sum of each agent’s behavior. A good example can be the emergence of a family due to the union of a couple or the emergence of a pidgin due to the interaction of groups of people speaking different languages. A pidgin is not the sum of two languages, but a new language that emerges from the interaction of members of two different linguistic communities and that may expand and become more complex.

Those systems are also dynamical systems, which, according to Lorenz (2001: 8) refers to two kinds of systems, the ones which “vary deterministically as time progresses” and those which “vary with an inconsequential amount of randomness”. The latter seems to be the case of language and of language acquisition. Williams (1997:19) points out that “[T]he word **dynamics** implies force, energy, motion, or change” and that “[A] **dynamical system** is anything that moves, changes, or evolves in time.” During this dynamical process, agents learn from each other, they get feedback, they gain experience and change. Those systems are also referred to as chaotic systems because, as explained by Holland (1998:45), “ (...) small changes in local conditions

can cause major changes in global, long-term behavior (...).” This characteristic of chaotic systems is known as sensitive dependence on initial conditions. However “initial” does not mean necessarily the time a system was created, but can refer to “any stretch of time that interests an investigator, so that one person’s initial conditions may be another’s midstream or final conditions (Lorenz, 2001: 9).”

Lewin (1992:20) argues that “[M]ost complex systems exhibit what mathematicians call attractors, states into which the system eventually settles, depending on the properties of the system.” Larsen-Freeman and Cameron (2008:49) define attractors as “states, or particular modes of behaviors, that the system ‘prefers’.” As Sade (2008) highlights, “the word “attractor” may lead us to think that it is something that attracts”, but, in fact, it refers to long-term behavior or a temporary stability.

When the systems exhibit properties that are found in different scales or stages, we say that they display fractal dimensions. The word fractal is used to name patterns with similar shapes whatever scale we view them by, due to its self-similarity property. As Gleick (1988: 98) beautifully claims “IN THE MIND’S EYE, a fractal is a way of seeing infinity.” When we think of fractals we also think of recursive operations such as the ones we find in the language system. Language organizes itself from phonemes to words, from words to sentences, from sentences to utterance units, from utterance units to discourse which itself triggers other discourses in an endless flow.

Most systems are made up of nested systems and to study a human complex system it is necessarily to see it as a nested living system. One example of a nested system is second language acquisition which is an essential component in language itself, also understood as a complex system, as we will see in the next section.

Language and language acquisition as complex adaptive systems

I understand language as a non-linear dynamic and adaptive system, made up of interrelated bio-cognitive-socio-cultural-historical and political elements, which enables

us to think and act in society. The *Five Graces Group* (2008:1), a workgroup made up of 10 scholars sponsored by the *Santa Fe Institute*, offers us the following description of language as a complex adaptive system [CAS]:

The system consists of multiple agents (the speakers in the speech community) interacting with one another. The system is adaptive, that is, speakers' behavior is based on their past interactions, and current and past interactions together feed forward into future behavior. A speaker's behavior is the consequence of competing factors ranging from perceptual constraints to social motivations. The structures of language emerge from interrelated patterns of experience, social interaction, and cognitive mechanisms.

As language is in evolution, so too is SLA and any change in a subsystem can affect other elements in the network. It develops through dynamic and constant interaction among the subsystems, alternating moments of stability with moments of turbulence. As complex systems are in constant movement, after chaos – understood here as the optimal moment for learning – a new order arises, not as a final static product, but as a process, i.e., something in constant evolution.

There is evidence to support the claim that SLA is a complex adaptive system due to its inherent ability to adapt to different conditions present in both internal and external environments. As pointed out by van Lier (1996:170), “we can neither claim that learning is caused by environmental stimuli (the behaviourist position) nor that it is genetically determined (the innatist position). Rather, learning is the result of complex (and contingent) interactions between individual and environment”.

A complex view of SLA can simultaneously admit the existence of *innate mental structures* and sustain that part of the language is acquired by means of

repetition and the creation of *automatic linguistic habits*. In such a model, *input*, *interaction* and *output* are also considered of paramount importance for language acquisition as they trigger both *neural* and *sociocultural connections*. Three elements – *identity*, *motivation* and *autonomy* – are of paramount importance for the dynamicity of the system. Those interconnected agents in the process of language acquisition work as a potent fuel to move the SLA system. In this paper I will focus on those last three elements. It is my contention that minimal differences in identity, motivation and autonomy, among other factors, can cause very different results in the acquisition outcomes

Identity

Learning a language is also a process of identity construction. 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.” As explained by Wenger (2000:239)

An identity is not an abstract idea or a label, such as a title, an ethnic category, or a personality trait. It is a lived experience of belonging (or not belonging). A strong identity involves deep connections with others through shared histories and experiences, reciprocity, affection, and mutual commitments.

However, identity is not a unified experience of belonging but an array of multiple memberships in a fractal dimension. Sade (2008:15) explains that “no matter the number of internal fragmentations, the parts are interconnected into a whole which is self-similar to the parts.” Identity is a complex system which displays a fractalized process of expansion as it is open to new experiences. Learning a language is necessarily engaging oneself in linguistic social practices the learner identifies with.

Motivation

Motivation has been traditionally understood as either an integrative or instrumental orientation, as proposed by Gardner and Lambert (1972). They define integrative motivation as “a willingness to become a member of another ethnolinguistic group as an integrative motive (p.12)” while the instrumental orientation is “characterized by a desire to gain social recognition or economic advantage through knowledge of a foreign language (p.14).” Later on, Deci and Ryan (1985) developed “the self-determination theory” and added to the field two other different notions of motivation “*intrinsic motivation*, which refers to doing something because it is inherently interesting or enjoyable, and *extrinsic motivation*, which refers to doing something because it leads to a separable outcome” (Ryan and Deci, 2000: 55). By separable outcome they refer to the instrumental characteristic of extrinsic motivation and exemplify with a hypothetical student who does his work just to avoid parental sanctions and another who studies because she believes it is important for her future career.

I must agree with Dornyei (2003) when he says that “theories do not necessarily exclude one another but may simply be related to different phases of the motivated behavioral process” and with Dornyei and Csizér (2002: 424) who state that

Human motivation to learn is a complex phenomenon involving a number of diverse sources and conditions. Some of the motivational sources are situation-specific, that is, they are rooted in the student’s immediate learning environment, whereas others appear to be more stable and generalized, stemming from a succession of the student’s past experiences in the social world.”

It is my contention that motivation is an important complex subsystem nested in SLA systems which works as a moving force in any learning process. This seems to be consistent with Ryan and Deci's (2000:54) position that motivation "is hardly a unitary phenomenon" and, with Dörnyei (1994; 2001) who sees it as a complex, multi-dimensional construct. I consider that motivation is not just a matter of being integrated into a speaking community or using the language for an instrumental reason as posited in the earlier work of Gardner and Lambert (1972), or of an displaying intrinsic or extrinsic motivation orientation (Ryan and Deci, 2000). I view motivation as a dynamic force involving social, affective and cognitive factors manifested in desire, attitudes, expectations, interests, needs, values, pleasure and efforts. It is not something fixed, and as Winke (2005:1) claims it "varies widely, ebbs and flows over the course of the year (or even during a classroom activity) and stems from various sources, internal to the learner, external, or both." I would add that it varies over a period of time or over stages along the acquisition process which is not restricted to the educational context and that it is a necessary condition for autonomy.

Autonomy

In Paiva (2006), I argue that autonomy is a socio-cognitive system nested in the SLA system. It involves not only the individual's mental states and processes, but also political, social and economical dimensions. It is not a state, but a non-linear process, which undergoes periods of instability, variability and adaptability. It is an essential element in SLA because it triggers the learning process and leads the system beyond the classroom. It changes for reasons that are, usually, entirely internal to itself, such as willingness to learn in a more independent way. In Paiva and Braga (2008), we argue that

Autonomy, in the perspective of complexity, encompasses properties and conditions for complex emergence, and is inextricably linked to its environment. Likewise, its dynamic structure governs the nature of its interactions with the environment in which it is nested. In this sense, the language learner agent influences, and is influenced by, his/her social practices in a constant movement of organization and reorganization, a process which paradoxically possesses a certain degree of freedom and dependency.

As human beings are different, so are their contexts and so are SLA processes, which are mediated by different human agents and cultural artefacts. As a consequence, unequal learning experiences may occur in very similar situations. When we turn our observation to language teaching practices, we see that no matter how much teachers plan and develop their classes, students will react in different ways and unforeseen events will inevitably be part of their learning experiences. The seemingly orderly world of acquisition is in fact chaotic and chaos seems to be fundamental in such a process.

SLA consists of a dynamic interaction among different individual and social factors put into movement by inner and social processes. The random interaction among all the elements of the acquisition system yields the changes responsible for acquisition. The rate of change is not predictable and varies according to the nature of the interactions among all the elements of the system. A live acquisition system is always in movement and never reaches equilibrium, although it undergoes periods of more or less stability.

The study

In order to investigate the complexity of SLA system in what concerns three of its interacting elements – motivation, identity and autonomy – I “listened” to the voices of Japanese and Brazilian English language learners by reading and analyzing a corpus of twenty English language learning histories (ELLHs). As highlighted by Davis and Sumara (2006), “personal memories might be characterized in terms of fractal structure in which virtually any recollection, when closely inspected, can explode into a vast web of associations.” I consider that each history will provide a clue to make us understand the intricacies of the complexity of SLA.

The ten Japanese histories were selected from a corpus of twenty four ELLHs collected in 2007 and published by Murray (2009) and the ten Brazilian ones were chosen from a corpus of nineteen ELLHs written by my undergraduate students in 2007 and published on the homepage of my research project on language learning memories which can be accessed at <http://www.veramenezes.com/narmulti.htm>. The criterion for the selection of the texts was the order of appearance in both ELLHs corpora.

I will compare their language learning ‘initial conditions’ to see what motivates the SLA systems set-up processes and compare the two groups of learners in what concerns (1) their ‘learning initial conditions’ and (2) the connections among the systems’ components – mainly identity, motivation, and autonomy – which are supposed to underpin change and dynamics in the acquisition system; and (3) points of change or transition and self-organization.

Data analysis

After reading the 20 ELLHs, I selected some excerpts and summarized the data in two charts, one for each group. They were divided into five columns, the first for students, the second for initial conditions, the third for identity data, the fourth for

motivational clues, and the fifth examples of autonomy. The chart made it easier for me to compare the data and the excerpts taken from both corpora. The texts were not edited as I considered it important to keep the form of each ELLH. After doing that, I analyzed each column in both charts in order to get a general portrait of those groups of English learners.

Learning initial conditions

There seems to be at least two distinct phases common to all the students in the ELLHs, the first one is the first contact with English in Junior High School and High School and the second is represented by diverse experiences outside school. Some students in both groups tell us they were curious about English when they were children. They also say that they had early contact with the language scaffolded by their relatives: A Japanese student imitated a cousin who used pictures to teach her some words; one narrator's brother told him the alphabet; and a Brazilian girl started learning English with her grandmother.

All of them register somehow their experience in junior high school or high school and most of them do not have good memories of that period. A Japanese student claims that she "preferred going out with friends, listening to songs, reading books, watching movies, etc., to studying." A Brazilian girl said, the only thing she had learned in junior high school was to hate the language and another said the classes were boring. Only one Japanese woman presents explicit positive references to high school. She says:

It has been said that Japanese high school English education is not effective for the students. Many people think that they are just like prep schools for the university; however, I can't agree with this idea. In my case without English education in high school I couldn't keep learning and speak English as I do now, I'm sure. I can say that the English

education in my high school was well organized. Luckily we had good English teachers. I learned many things from their classes. Let me introduce how and what I did in school.

The other ELLHs emphasize experiences out of school. One important thing we learn when reading both Japanese and Brazilian ELLHs is that language social practices outside school are important agents to make the SLA system work. They are the initial conditions for a new phase in the SLA process. Some of these practices emerged in experiences such as: working in places where English was spoken; living abroad; studying abroad; traveling to the USA; traveling to Europe and using English as a tool for communication even in countries where other languages were spoken; having fun and pleasant moments with cultural artifacts; interacting with English speakers, and enrolling in private language courses. Those experiences prove that SLA systems are highly sensitive to initial conditions, and each new experience changes the route of the systems.

It is worth mentioning that, although those students seldom mention good experiences at school, they seem to realize the importance of formal studies for SLA. All the Japanese narrators, for instance, were enrolled at Akita International University's Center for independent Language Learning and the Brazilians were enrolled in an undergraduate English Language and Literature Course at Federal University in Brazil.

In the next section, I present some discussion on the interrelation between identity, motivation and autonomy and SLA.

The connections among identity, motivation, and autonomy

For the sake of textual organization, identity, motivation and autonomy will be discussed in separate subsections, but I am aware that they represent interconnected elements in SLA complex system.

Identity

Learning a language involves coping with fractal dimensions of the identity complex system. Besides being a learner, one has other identities such as gender and social class, and additional ones can arise along the SLA process. For example, it is the identity of Michael Jackson's fan that urges a Brazilian learner to learn English. Listen to her: "I've started to study English by myself, when I was about 15, because of Michael Jackson. He's been my idol since 1991, and I really wanted to understand him and his music since I was a child". Another one took advantage of her identity of waitress to improve her English. All of them demonstrated in their ELLHs that they were highly motivated autonomous learners.

A good example of gender identity is found in the Japanese corpus. Being a female implies certain constraints in the Japanese society. One narrator remarks that she worked in a Trade company which used to send employees to study abroad, but females were not included in that policy. Others were housewives and mothers and those identities demanded, for instance, taking care of children, which interfered with their studies or even interrupted the flow of their SLA processes. Nevertheless, as chaotic systems exhibit unpredictable and irregular dynamics, it is the very identity of a Japanese housewife which moved her SLA system. According to that narrator, she hated English in school and almost died of boredom, but something unexpected happened and she felt motivated and restarted learning English. She explains:

It was spring at my age of twenty-eight. As my youngest child went up to kindergarten, I began thinking about my own life which had had no free

time. I desired strongly that I could have something special providing me a sense of fulfillment. Whatever it was, I would be ok if it gave me satisfaction at that time. One day in those days, my husband once said to me: "I will take you to Hawaii some day." As I heard from him, I thought that's it. It was what I wanted to do. The idea of going shopping with fluent English in Hawaii suddenly popped in my mind. But at the same time I thought the English I would take must be practical, not useless. Now I come to think of my choice then, it was too childish, wasn't it?

That choice worked as a butterfly effect. The metaphor "the flapping of a butterfly's wing in Brazil can cause a tornado in Japan" can explain what happened to that student's SLA system. The promise "I will take you to Hawaii some day", in her own words "was a direct trigger to make me [her] restart it". The SLA system, which was temporarily at rest, was moved by sudden motivation and consequent autonomy.

She started following a radio language program, on NHK (Nippon Hoso Kyokai), the Japan Broadcasting Corporation, which broadcasts various language lessons on its international shortwave Radio Japan service. But again, her identity of mother was responsible for experiences of engagement in two different communities of practice. Let us listen to her again:

One and half years later after I chose it, a new cute girl from America enrolled in the kindergarten where my youngest child had been. The America girl and my daughter became good friends and both families became very close. Thanks to this relationship, my poor English was getting better little by little. I was lucky I could have the opportunity to use English. Necessity helped motivate me to brush up my skill. They

returned to the US after their five-year stay in Japan. During their stay, I got a job introduced by her father and worked for a while using English.

We can see that, new identities emerged: friend of an American family and worker. Not only had her SLA system changed, but also her identity system which increased its complexity with the addition of new identities: autonomous language learner, friend, and worker. She realized that she had changed: “I know myself that relearning English made me change. I have come to care about my own life. I have become a little bit more outgoing than I used to be.” This remark is a good example of how interrelated complex systems are. Acquiring a language is interrelated with the complexity of identity construction, social life and family complex systems.

Motivation

The ELLHs reveal that motivation is not a linear phenomenon and small changes in the student's experiences can yield an enormous change in motivation, as we saw in the case of the Japanese housewife. On the other hand motivation may disappear in face of monotonous activities in the classroom, but can revive if the learner meets a new teacher, a new school, or interesting experiences outside school. An example is the Brazilian student who said that “the only thing she learned was to hate the language” in junior high school. She lost her motivation in high school, but it came back with a rewarding experience when she attended private lessons. She says: “the teacher taught me not only there was not to be scared of, but also to love the language.” Then she started her major in English and motivation vanished, she hated the course and dropped out. Later on she traveled to Canada, lived there for six months, and when she got back to Brazil she went to another university to get her degree as an English teacher.

English culture, specially music and literature, seems to be a source of extrinsic motivation. In both corpora, some learners register in their histories that they wanted to learn the language to understand the lyrics. The Brazilians say: "I always liked foreign songs"; "The music was my motivation to study English"; "I was a big fan of a rock n` roll band called Guns n` Roses (certainly you know about them) and I really wanted to understand what those guys were saying in their songs."; "I`ve started to study English by myself, when I was about 15, because of Michael Jackson. He`s been my idol since 1991, and I really wanted to understand him and his music since I was a child". The Japanese also talk about their affiliation to western culture: "I love Western music"; "I was a lover of English poetry, especially Shakespeare, Wordsworth, Milton and so on."

Motivation is also a changing phenomenon, it can grow or decrease and it can differ depending on the school or social experiences. One Brazilian girl mentioned she hated repeating dialogues, but loved listening to music. Several narrators confessed their fear of speaking in public, but said they wanted to interact with foreigners. A Japanese learner claimed she was always willing to participate in class, but others did not feel motivated in high school. A Japanese narrator confessed that, when she was in high school, she was shy and did not want to learn more than she knew, but that changed and her fear of speaking disappeared during a two-month home stay in USA.

It is interesting to see that motivation varies from student to student and so does the degree of motivation in similar situations.

Autonomy

Identity, motivation and autonomy are interconnected elements in an SLA complex system as we can see if we go back to the Brazilian girl who was a fan of Michael Jackson. Her fan identity motivated her to learn English in order to understand

her idol's discourse and she demonstrates she was a very autonomous learner in order to achieve her goals. Let us listen to her:

I used to use a Dictionary in order to find the meaning of each word in songs or in texts written by him. I was very patient, and that was one point that helped me a lot in the process of learning English by myself.

Actually, I can't describe the techniques I used to learn it, because it was almost automatic for me to start understanding English after a period of hard work trying to translate texts, dialogues and songs, so I really can't say exactly how I've achieved proficiency. One thing that I can say is that I started learning English through comparing patterns and observing the language structure, comparing it to Portuguese and trying to memorize rules, and I used to make lists of words in order to memorize them and their meanings. Another thing that helped me a lot was the fact that I would spend hours studying and memorizing every rule I could notice, the uses, tenses, etc. of the words. After having a good vocabulary, I started working on pronunciation, which was the hardest part of the process for me, because the only source I had was music, although I used a Pronunciation Dictionary, too. Despite of the difficulty, I could learn everything well, and I could enter UFMG and really start studying English. Today I'm a teacher at an English Course, and I'm really enjoying it, because I can improve my English more each day.

This student is the only one who talks about comparing structures and using dictionary and translating. The other students in the Brazilian group mentioned practicing the

language alone and monitoring pronunciation; listening to music and radio; repeating song lines; reading books; watching TV; looking for opportunities to communicate and volunteering in a school.

The Japanese learners talked about watching and recording movies and TV programs; repeating and writing down lyrics; listening to NHK radio English programs; creating opportunities to use English; talking to native speakers; memorizing and reciting poems; reading books, magazines and newspapers; and volunteering to help others. Only one mentioned using the Internet.

No matter what students did or do, the fact is that the SLA system changes and self-organizes. I would like to conclude this text talking about points of changes and self-organization in the SLA complex systems represented in both corpora of ELLHs.

Points of change and self-organization

As we saw in our corpus, each learner's SLA system displays a different dynamicity and their SLA systems follow different routes at different paces. The learners' experiences lend support to Larsen-Freeman and Cameron (2008: 158) when they say that "language learning is not about learning and manipulating abstract symbols, but it is enacted in real-life experiences, such as when two or more interlocutors co-adapt during an interaction." Brazilian and Japanese ELLHs demonstrate that SLA system is always open to change: learning contexts are always changing and so are identities, motivation and autonomy. They change and adapt themselves with the emergence of a more complex order, a new linguistic behavior much more complex than the previous ones. As Larsen-Freeman and Cameron (2008: 44) point out, "a complex systems can change smoothly and continuously for periods of time but may then go through more dramatic types of change when they alter their

nature radically, sometimes entering a period of turbulence, or 'chaos', where the system keeps on changing dramatically." Our narratives demonstrate that SLA systems undergo phase shifts and self-organize from second language school experience to linguistic social practices with the emergence of new identities, motivation and new autonomous learning strategies.

The main points of change identified in our corpus are: (1) from pleasant early contact in a family environment initial condition, the system self-organizes and shifts from having fun to formal learning in junior or higher school. Some felt like crying, other felt bored, others were scared, but there is at least one who recognizes that she learned a lot in this phase. No matter what they feel, this is a phase common to all the students, although the rate of acquisition, autonomy and motivation are not similar. (2) A second point of change has to do with autonomous movements when highly motivated learners experience linguistic social practices by means of cultural artifacts (music, TV, reading, etc.). (3) New changes and new identity constructions (marriage, traveling, new neighbors, friendship, new jobs, etc.) occur and the system adapts and moves to another phase or attractor where it settles down until a new change happens. It is important to notice that some changes decrease the dynamicity of the process or even puts the system at rest for a period of time. That is the case of the Japanese housewives who interrupted their studies when they got married. We heard the voices of successful ones, but, probably, others would have told us that their SLA systems had simply died.

We can conclude that there are no optimal formulae to learn a second language. It is not a matter, for example, of possessing a specific identity, plus a good amount of motivation and autonomy. It is a matter of emergence that results from the interaction among different elements which make up any SLA complex system or as put by Larsen -

Freeman and Cameron (2008: 60) and confirmed by our corpus, it is a matter of “a succession of cycles of emergence.”

References

- Davis, B. and Sumara, D. (2006) *Complexity and Education: Inquiries into Learning, Teaching and Research*. Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Deci, E. L. and Ryan, R. M. (1985) *Intrinsic Motivation and Self-determination in Human Behavior*. New York: Plenum.
- Dörnyei, Z. (1994) Motivation and motivating in the foreign language classroom. *Modern Language Journal*, 78 (3), 272-284.
- Dörnyei, Z. (2001) *Motivational Strategies in Language Classroom*. Cambridge: Cambridge University Press.
- Dörnyei, Z. and Csizér, K. (2002) Some dynamics of language attitudes and motivation: Results of a longitudinal nationwide survey. *Applied Linguistics*. 23 (4), 421-462.
- Dörnyei, Z. (2003) Attitudes, orientations, and motivation in language learning: Advances in theory, research, and applications. *Language Learning*, 53 (1). 3-32.
- Gardner, R.C. and Lambert, W. E. (1972) *Attitudes and Motivation in Second Language Learning*. Rowley: Newbury House.
- Gleick, J. (1988) *Chaos: Making a New Science*. New York.
- Holland, J.H. (1995). *Hidden order: How Adaptation Builds Complexity*. Reading, MA: Addison-Wesley.
- Holland, J.H. (1998) *Emergence: From chaos to Order*. New York: Basic Books.
- Larsen-Freeman, D. (1997) Chaos/Complexity science and second language acquisition. *Applied Linguistics*, 18 (2), 141-165.

- Larsen-Freeman, D. & Cameron, L. (2008) *Complex Systems and Applied Linguistics*. Oxford: Oxford University Press.
- Lewin, R. (1992) *Complexity: Life at the Edge of Chaos*. New York: Macmillan.
- Lorenz, E. N. (2001) *The Essence of Chaos*. Seattle: The University of Washington Press.
- Mandelbrot, B.B. (1982) *The Fractal Geometry of Nature*. New York: W.H. Freeman and Company.
- Maturana, H. R. and Varela, F. J. (1987) *The Tree of Knowledge: The Biological Roots of Human Understanding*. Boston: Shambhala.
- Murray, G. L. (ed.) *Restrospective: Learning English in Japan*. Akita: Center for Independent Language Learning, Akita International University.
- Norton, B. (2000) *Identity and Language Learning: Gender, Ethnicity and Educational Change*. London: Longman/Pearson Education.
- Paiva, V.L.M. O. (2006) Autonomia e complexidade. *Linguagem e Ensino*, 9 (1), 77-127.
- Paiva, V.L.M. de O. and Braga J.C. F. (2008) The complex nature of autonomy. *Revista D.E.L.T.A.* 24 (especial), 441-468.
- Poincaré, H. (1921) *The Foundation of Science: Science and Method*. New York: The Science Press.
- Prigogine, I. and Stengers, I. (1984) *Order out of Chaos: Man's New Dialogue with Nature*. London: Heinemann.
- Ryan, R. and Deci, E.L. (2000) Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25 (1), 54–67.
- Sade, L. A. (2008) Complexity and identity reconstruction in second language acquisition. Symposium paper presented at AILA 2008 – 15th World Congress of

Applied Linguistics, Essen/Germany. Paper presented at AILA 2008 – 15th World Congress of Applied Linguistics, Essen/Germany.

The Five Graces Group. (2008) Language is a complex adaptive system. Online document: <http://www.santafe.edu/research/publicat...papers/08-12-047.pdf>

Van Lier, L. (1996) *Interaction in the Language Curriculum: Awareness, Autonomy, and Authenticity*. London: Longman.

Waldrop, M.M. (1993) *Complexity: The Emerging Science at the Edge of Order and Chaos*. New York: Touchstone.

Wenger, E. (2000) Communities of practice and social learning systems. *Organization*, 7 (2), 225-246.

Williams, G. P. (1997) *Chaos Theory Tamed*. Washington, D.C.: Joseph Henry Press.

Winke, P. M. (2005) Promoting motivation in the foreign language c lassroom. *Clear*

News. 9 (2), 1-6 Online document:

<http://clear.msu.edu/clear/newsletter/files/fall2005.pdf>

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