

Chaos/Complexity Theory for Second Language Acquisition/Development

Introduction

The change refers to first proposed in **the natural sciences** to explain the behavior of complex dynamic systems and now extended to the **social sciences**. The researchers are trying to understand how change occurs and how system components, i.e., elements or agents, interact to produce it. Change in such systems is often **nonlinear**, which means that the effect is not proportionate to the cause. The nonlinearity is attributed to the fact that such systems are sensitive to initial conditions, a characteristic popularly referred to as the butterfly effect, whereby even the flapping of a single butterfly's wings in one part of the world can have an effect on a weather system in another. It is this sensitivity to initial conditions that makes complex systems **chaotic**—they can change in unpredictable ways. That is, sometimes the change is not conditional, and there is the possibility of different points of view as to why it is changed.

Due to the complexity systems, it can be said that the complexity emerges in a bottom-up way through the mechanisms of **self-organization**, whereby systems grow in complexity without being guided by an external source, and **coadaptation**, where the system adjusts or adapts to its ever-changing context. The complexity includes neural networks, social networks, the ecology of a particular locale, and so forth. A **metatheory** (Overton, 2015), have been applied to a wide variety of phenomena, including organizational development, the spread of disease, and language evolution (Larsen-Freeman, 2017). Its influence is broad because **the theory affords** a unique perspective into dynamic systems, which has had the effect of shifting our understanding of **the nature of second language acquisition** (SLA; Larsen-Freeman, 1997).

Traditional views of SLA

Many scholars date the origin of the modern study of SLA to the late 1960s or early 1970s. This time a number of assumptions occurred including SLA researchers have inherited from linguists and from first language acquisition researchers. subsequently the view then changed around a "**developmental ladder' metaphor**" whereby second language learners are metaphorically seen as traversing the distance from the relatively fixed, homogenous mental competence of their first language to a target language competence through a series of stages. The journey is made manifest through learners' production of an "**interlanguage**" which ultimately gives way to target language structures that are stable over time and place. Theorists in this tradition write about linguistic structures being acquired from input and being assimilated as elements of an internal mental grammar. Researchers have traditionally assumed that it was

possible to pursue a segmented research agenda, focusing on 1) **the nature of the SLA process** or, alternatively, on 2) **learners' differing levels of success** while learning a new language.

Shifting a metaphor

The metaphor of a **developmental ladder** has been the dominant view since the inception of the field. However, C/CT sees that **SLA has been viewed** from the development ladder to one where development is seen as multicausal process of dynamic construction within multiple ranges in multiple directions (Fischer et. al., 2003), more a web than a ladder. New points of view that language is not fixed but rather a dynamic system which evolves and is learned between and among individuals from the bottom up organically to complex systems. Complexity will occur at higher level as seen with the **flocking birds**.

A complexity-inspired view of language also rejects the notion of language as something that is taken in a static commodity that one acquires and therefore possesses (Larsen-Freeman, 2002). Instead, language is seen to be as much a process as a product, something in which one participates. Language is a dynamic systems that could change or develop all times and never fully realized including speech community and the individual of language learners such as second language learners.

Highly unstable behavior occurs when learners are free to explore new behaviors in response to task demands the lead to new solutions as the source of novel forms.

Language users/ learners

Learners are **soft-assemble** which refers to processes involving the articulation of multiple components of a system, where “each action is a response to the variable features of the particular task” (Thelen & Smith, 1994, p. 64). Meaning “It is the multiple integrations of many component processes in many different tasks that leads learners to construct a system that is flexible, inventive, and exquisitely adaptive”. The interaction of the product of dynamic to a specific content creates this Soft-assembled patterns. This **adaptation** includes the process in which each individual in an interaction imitatively adapts and synchronizes to the language of another.

Language acquisition is a sociocognitive process that is used for social action within a context of language use, where pressure and affordances, learners' identities, goals, and affective states will all have a profound effect on language performance. The use of Second language development is better than Second language acquisition meaning that learners have the capacity to create their own patterns with meanings and uses and to expand the meaning potential of a given language, not just to internalize a ready-made system. Each learner's

developmental trajectory is unique, sculpted by the learner's prior experience, including other languages that they know, the (social) ambient language to which they are exposed, and the application of particular domain general mechanisms, such as inferencing, pattern perception, categorization, and memory.

Nativists believe that the input to children acquiring their native language underdetermines the complexity of language, and they therefore assume that the complexity needs to be prespecified in the form of a universal grammar, an innate faculty with which all humans are endowed.

The perspective of C/CT, first and second language development can be seen to stem from the emergence of new forms in a complex system. What is striking from a complex systems view is that the language learning child or adult produces language that is richer or more complex than the language addressed to her or him (van Geert, 2003, p. 659).

Usage-Based Emergentism

A usage-based (e.g., Tomasello, 2003) or emergentist (Ellis & Larsen-Freeman, 2006) view of language acquisition aligns well with C/CT. According to this view, language has the shape that it does because of the way that it is used, not because of an innate bioprogram or internal mental organ. The patterns can be characterized as Zipfian, where certain prototypical forms occur with far greater frequency than do others, recruiting learner attention and thus aiding the implicit language acquisition process.

Individual differences

Individuals tend to actively select and manipulate the contexts in which they function (van Geert & Steenbeek, 2005). In fact, it could be said that individuals not only determine what aspects of the outside world are relevant to them, but they actively construct a world around themselves and are constantly altering it.

Individual difference factors, such as motivation which is seen as operating under the influence of various interacting elements producing continuous change within the system (Dörnyei, 2009).

Implications for research methods

What are needed are individual microdevelopmental longitudinal studies that seek to understand the mechanisms by which learners “forgo old ways of behaving and adapt new ones” (Thelen & Corbetta, 2002, p. 60). Microdevelopment studies require much denser data collection intervals than is typical in SLA research.