

# *Language as an emergent system*<sup>1</sup>

Scott Thornbury

How did we acquire our mother tongue? Was it like switching on an electronic circuit, hardwired into the brain? Or was it like Topsy, who “just grewed?” That is to say, did it emerge as a result of general learning processes responding to massive exposure and driven by the need to belong? The question divides linguists into two opposed camps: the Chomsky-ites, on the one hand, and the proponents of what are now called *usage-based* theories of language acquisition, on the other. And the debate has a long history.

“*Die Grammatik kommt aus der Sprache, nicht die Sprache aus der Grammatik*” (Grammar comes from speaking, not speaking from grammar). In the late nineteenth century Gustav Langenscheidt (he of the dictionaries) developed a teaching method based on that notion. It is an early statement of the principle of *language emergence*, although it was not known as such at the time. A century later, the idea that language could be learned as part of an ongoing conversation was rehabilitated in a number of forms, including task-based learning, community language learning, whole-language learning, and the notion of the process syllabus. All had in common the belief that, in Michael Breen’s words, “The language I learn in the classroom is a communal product derived through a jointly constructed process.”<sup>2</sup>

Basic to such approaches is the belief that – given the right conditions – the learner’s language system will *emerge*. But, in what sense is language an emergent system? And what grounds are there for believing that emergence is more effective than more interventionist processes, such as formal instruction?

The study of *emergence* – the idea that certain systems are more than the sum of their parts, and that “a small number of rules or laws can generate systems of surprising complexity<sup>3</sup>” – is a relatively new branch of science. It is closely associated with *complexity theory*. A system is said to have emergent properties when it displays complexity at a global level that is not specified at a local level. For example, the capacity of an ant colony to react in unison to a threat, or a flock of starlings to swoop and dive as if it were a single organism, is the aggregate effect of relatively simple interactions between individual members. These interactions are not co-ordinated in any centralised way, e.g. by a “leader ant” or “chief starling”. As John Holland puts it: “Somehow the simple laws of the agents generate an emergent behaviour far beyond their individual capacities”<sup>4</sup>. Because there is no “central executive” determining the emergent organization of the system, the patterns and regularities that result have been characterised as *order for free*. In Roger Lewin’s words: “A fundamental property of complex adaptive systems is the counterintuitive crystallization of order – order for free<sup>5</sup>.”

Emergent systems, then, have the following properties:

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<sup>1</sup> First published in: *In English*. Lisbon: British Council: Spring/Summer 2008.

<sup>2</sup> Breen, M. (1985). The social context for language learning – a neglected situation? *Studies in Second Language Acquisition*, 7.

<sup>3</sup> Holland, J. (1998, 2000) *Emergence: From Chaos to Order*. Oxford: Oxford University Press.

<sup>4</sup> *ibid.*

<sup>5</sup> Lewin, R. (1993). *Complexity: Life on the edge of chaos*. London: Phoenix.

- they are dynamic and do not always reach a fixed, final state
- they evolve over time
- they are non-linear, i.e. change doesn't happen in a one-step-at-a-time, incremental kind of way, but often in bursts (or "phase shifts")
- they have many interacting parts, often acting in parallel
- they have different levels of different scale sizes, and emergence happens across these levels
- their elements exhibit a degree of autonomy and randomness in their behaviour at times
- they are de-centralized – the order emerges from the system itself
- they are unpredictable and surprising!

Some scholars – notably Diane Larsen-Freeman, Lynn Cameron, and Nick Ellis – have been studying language through the lens of complexity theory, both in the way languages develop in society, and in the way that a learner's first language (or the second learner's *interlanguage*) develops over time. They have found some interesting parallels. For example,

- language development is dynamic, and does not always reach a fixed, final state – it is often highly variable, and it can also stabilise for long periods of time;
- it evolves over time – often many years;
- it is non-linear: both L1 and L2 learners sometimes seem to "get worse" before they get better, as when they "regress" from *he went* to *\*he goed*, for example; improvement may occur in sudden bursts;
- it has many interacting parts: there are different sub-systems at work, such as phonology, lexis, grammar, each working in parallel, and each comprising many – sometimes thousands – of different items;
- it has different levels of different scale sizes: texts, sentences, clauses, words, sounds, and a change in one of these levels can have an effect across levels. For example, formulaic chunks, like *I wanna, gimme*, can be "unpacked" into their individual elements, which can then provide a grammatical template for new combinations;
- it displays periods of random behaviour, or what is called "free variation", when the learner randomly alternates between standard and non-standard ways of saying the same thing;
- it is de-centralized: there is no single determining factor, such as instruction, that "causes" language development;
- although there are certain common patterns to development across learners, the path, and the pace, of learning is often idiosyncratic, unpredictable, and surprising.

In other words, language development displays many of the characteristics of an emergent system. As Diane Larsen-Freeman puts it: "Language is not fixed, but is rather a dynamic system. Language evolves and changes... [it] grows and organises itself from the bottom up in an organic way, as do other complex systems."<sup>6</sup>

### ***Tallying, chunking, and priming***

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<sup>6</sup> Larsen-Freeman, D. (2006). The emergence of complexity, fluency, and accuracy in the oral and written production of five Chinese learners of English. *Applied Linguistics*, 27/4.

The processes by which language “grows and organises itself” are thought to be processes that – rather than being language-specific – are basic to human cognition and hence learning. As Nick Ellis puts it: “Language is cut of the same cloth as other cognitive *processes*. ”<sup>7</sup> These processes include the following:

- *tallying*: the process whereby learners become automatically sensitised to the fact that certain elements and combinations of elements occur frequently in the language that they are exposed to;
- *pattern extraction*: the capacity to identify and extract regularly occurring sequences from input;
- *priming*: the gradual strengthening – through repeated use – of associations between elements, such as words and other words, or utterances and their contexts;
- *chunking*: the welding together of sets of already formed associations into larger units.

According to this view, the patterns and chunks that are extracted from the input are rehearsed in short-term memory, and eventually establish themselves in long-term memory, where they serve as a template for the acquisition of grammar. As Nick Ellis puts it: “Learning grammar involves abstracting regularities from the stock of known lexical sequences”<sup>8</sup>.

### ***Focus on form***

Given enough exposure and use, then, it would seem that language emergence – at least *first* language emergence – is the inevitable result. So, why is this not the case in second language learning? Sadly, the processes that make first language acquisition so easy, such as tallying and pattern extraction, function far less successfully for second language acquisition. Why is this?

For a start, the intricate associative network that has been created for the first language tends to slow down the forming of new associations in a second one, or even to block them entirely. It is like trying to install a software program on a computer’s hard disc without first un-installing a rival program. Also, the ability to discriminate sounds in a second language is much less sensitive than in the first, where the system was primed at infancy, when the neural “stuff” was at its most plastic. Because so many grammatical distinctions – such as verb endings, auxiliaries, articles and prepositions – are phonologically reduced in naturally occurring talk, it is often difficult to pick them out.

The good news, though, is that language emergence can be facilitated by some kind of direct intervention. What form should this intervention take? Nick Ellis suggests that “acquisition can ... be speeded by making the underlying patterns more salient as a result of explicit instruction or consciousness-raising”<sup>9</sup>. That is to say, if learners are having trouble identifying and abstracting patterns, their attention can be purposefully

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<sup>7</sup> Ellis, N. (2001) Memory for language. In Robinson, P. (Ed.) *Cognition and Second Language Instruction*. Cambridge: Cambridge University Press.

<sup>8</sup> Ellis, N. 1997. Vocabulary acquisition: word structure, collocation, word-class. In Schmitt, N., and McCarthy, M. (Eds.) *Vocabulary: Description, Acquisition, and Pedagogy*. Cambridge: Cambridge University Press

<sup>9</sup> Ellis, N. (1997), op. cit.

directed at them. This is what some writers, including Michael Long, have termed a *focus on form*. A focus on form “overtly draws students’ attention to linguistic elements as they arise incidentally in lessons whose overriding focus is on meaning or communication”<sup>10</sup>.

A focus on form, then, aims to redress the weaknesses in the second language learner’s innate capacity to notice, tally, and abstract patterns from the input, and to re-use these as output. There are many ways that this focus can be engineered. Traditional error correction is one, although for some learners this may have negative side-effects, inhibiting the free flow of talk. Re-casting (or reformulating) the learner’s utterances into a more target-like form, as part of the process of “scaffolding” conversations, is another. Identifying and labelling frequently occurring items in texts, or in transcripts of talk, is yet another. Writing the record of a conversation, after the event, can help focus attention on the non-salient grammatical items that might have been overlooked in the real-time interaction. A cycle of task performance followed by some kind of awareness-raising activity, followed by a repeat performance of the task (with different partners, for example) has been shown to have positive effects. Even the explicit teaching of grammatical rules, when the need arises, can help prime learners to notice occurrences of the targeted item in authentic use.

Second language learning, then, probably shares many of the emergent properties of first language acquisition, and, if left to its own devices, will “just grow”. But for most learners, direct intervention on the part of the teacher is necessary, if the full potential of this complex and dynamic system is to be realised.

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<sup>10</sup> Long, M. (1991) quoted in Doughty, C. and Williams, J. (eds) (1998) *Focus on form in classroom second language acquisition*. Cambridge: Cambridge University Press.