Commentary on Perruchet and Vinter

Abstract: *69* words

Main Text: *1050* words

References: *170* words

Total Text: *1300* words

<CT>Language heterogeneity and self-organizing consciousness

<CA>William S-Y. Wang

<CAA>Department of Electronic Engineering

City University of Hong Kong

Tat Chee Avenue, Kowloon Tong

Hong Kong SAR

China

852–27887196

eewsyw@cityu.edu.hk

http://www.ee.cityu.edu.hk/~wsyw/

<CA>Jinyun Ke

<CAA>Department of Electronic Engineering

City University of Hong Kong

Tat Chee Avenue, Kowloon Tong

Hong Kong SAR

China

852–27887187

jyke@ee.cityu.edu.hk

<C-AB>Abstract: While the current generative paradigm in linguistics leans heavily toward computation, investigations on conscious representations are much welcome. The SOC model examines the acquisition of complex representations in individuals. We note that heterogeneity of representation in populations is a central issue that must be addressed as well. In addition to the self-organizing processes proposed for the individual, interactions among individuals must be incorporated in any comprehensive account of language.

<C-text>Perruchet and Vinter have examined the roles of representation and computation within the mentalistic framework suggested by Dulany. While the literature in linguistics over the last several decades focuses overwhelmingly on computation, that is, on how sentences are generated or computed by rules that operate on what the authors call unconscious representations, earlier deliberations on this issue have not always been so

one-sided. For example, in attempting to weigh rules against prestored language constructions, Dwight Bolinger asked in 1961:

<C-ext>Is grammar something where speakers “produce” (i.e., originate) constructions, or where they “reach for” them, from a pre-established inventory, when the occasion presents itself? If the latter, then constructions are not produced one from another or from a stock of abstract components, but filed side by side, and their interrelationships are not derivative but mnemonic.

<C-text>The early 1960s was the period when American linguistics switched paradigms from structuralism to generativism and shifted attention from phonology/morphology to syntax. In efforts to formalize syntactic dependencies, say, between X and Y, researchers were fascinated by the fact that X and Y can be separated indefinitely far from each other by intruding constructions, that the intruding constructions themselves may contain discontinuous constructions, and that these dependencies may even cross over each other, such as in constructions built on the word *respectively*. Much of linguistic theorizing over the past decades was shaped by these initial efforts of formalization, and sometimes highly abstract computational machinery is invented to explain rather marginal if not illusory linguistic phenomena.

In contrast with the generative paradigm, which assumes homogeneity in the rules speakers use, many linguists are now paying increasing attention to the fact that speakers

are tremendously diverse and varied in their language abilities and behaviors. An early statement of this realization is that of John R. Ross in his paper “Where’s English”:

<C-ext>The view of language that seems most plausible to me is that the sentences of a language are points in an *n*-space. An idiolect is a vector in this *n*-space. And each speaker’s vector, or path, through the space will, I expect, be as individual as his or her face – a linguistic fingerprint.

<C-text>Individuals certainly differ greatly in their preferred constructions, especially those prefabricated ones, be they cliches, epigrams, pause fillers, or whatever. English is actually a relatively poor language for studying these prefabs because of its relative youth; and its international status has bleached it of many language-specific characteristics (Wang 1991). More local languages with longer independent histories are much richer in such constructions, which are clearly more like conscious representations rather unconscious representations.

At any rate, linguists who are impressed with heterogeneity and variability in language, and who resonate with the remarks quoted here from Ross and Bolinger, would welcome Perruchet and Vinter’s emphasis on conscious representations. These authors reject “the notions of unconscious rule abstraction, computation, analysis, reasoning, and inference. Because unconscious representations have no other function than to enter into these activities, eliminating the possibility of these activities actually makes the overall notion

of unconscious representation objectless." While this statement may turn out to be too categorical and extreme, it is important to learn to what extent it can be pushed.

There is currently an intense debate on whether there is some mechanism that is specific and exclusive to language, and whether this mechanism is genetically determined (see, e.g., Schoenemann & Wang 1996). The notion that language evolves to be adaptive to human's cognitive capacity has been gaining more and more attention of late (Christiansen 1994; Deacon 1997); it is mentioned in the target article as well. To investigate how language has evolved calls for research with a population perspective, in addition to the viewpoint of the individual that the model of Perruchet and Vinter primarily deals with. With models from a population perspective, we see that many complex structures in language are actually the result of long-term evolution; no powerful language-specific processing module in the individual brain is necessary. There is a class of models that also makes important use of *self-organization* in pursuing this line of thought. They simulate how language evolves in a population, such as the model for the emergence and evolution of lexicon (Ke et al. 2002; Steels 1997), the emergence of sound systems (de Boer 2000), and the like. In these models, linguistic structures emerge from rudimentary states through interactions among individuals who are endowed with some basic perception and production constraints. Only very simple mechanisms, such as imitation, are required. We see this class of models as complementary to the SOC model in studying the two scales of language evolution, specifically, ontogenetic and phylogenetic.

The SOC model is a plausible framework in addressing the ontogenetic development of language in individuals. In the PARSER model, the primitive units are extracted and accumulated from a given complex text containing underlying structures. In the latter class of models, primitives are largely given, for example, the phones in phonology models and the words in lexicon models. Structures, such as a relatively stable vowel system or a lexicon that is shared by the individuals in the population, emerge by the diffusion of these primitives. These models are more applicable for phylogenetic emergence and language change. The self-organization mechanism that takes effect through the interactions between language users lead to continuous change, which is a hallmark of language.

Lastly, we note that the (quick) forgetting constraint is a key feature in the PARSER model, and that it presents an important parallel to the selection mechanism in evolution theory. In the PARSER model, those chunks that do not repeat themselves enough within a given time span will be forgotten and therefore cannot become primitives. This feature roughly corresponds to the “survival of the fittest” mechanism in Darwinian evolution theory, which says those individuals not adaptive to the environment, that is, having a bad fitness, will have less chance to pass their genes to the next generation. Therefore the genes that happen to exist only in unfit individuals cannot be sustained and will be lost from the gene pool. We can see these effects in many simulation models that implement these principles, such as the Genetic Algorithm model used in simulating the emergence of vocabulary (Ke et al. 2002) and the population dynamics model in simulating the evolution of universal grammars (Nowak et al. 2001).

<RFT>References

<Refs>Bolinger, D. L. (1961) Syntactic blends and other matters. *Language* 37:366–81.

Christiansen, M. H. (1994) Infinite language finite minds: Connectionism learning and linguistic structure. Unpublished doctoral dissertation, Centre for Cognitive Science, University of Edinburgh, U.K.

De Boer, B. (2001) The origins of vowel systems. Oxford University Press.

Deacon, T. W. (1997) The symbolic species: The co-evolution of language and the brain. Norton.

Ke, J-Y., Minett, J. A., Au, C-P. & Wang, W. S-Y. (2002) Self-organization and selection in the emergence of vocabulary. *Complexity* 7(3):41–54.

Nowak, M. A., Komarova, N. L. & Niyogi, P. (2001)¡@Evolution of universal grammar. *Science* 291:114–18.

Ross, J. R. (1979).¡@Where's English?¡@In: *Individual differences in language ability and language behavior*, ed. C. J. Fillmore, D. Kempler & W.S-Y. Wang. Academic Press.

Schoenemann, P. T. & Wang, W. S-Y. (1996) Evolutionary principles and the emergence of syntax. *Behavioral and Brain Sciences* 19:646–47.

Steels, L. (1997) The synthetic modeling of language origins. *Evolution of Communication* 1:1–34.

Wang, W. S-Y. (1991) Language prefabs and habitual thought. In: Explorations in language, W. S-Y. Wang. Pyramid Press.