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Peer reviewed

The Interactional Instinct: The Evolution and Acquisition of Language by Namhee Lee, Lisa Mikesell, Anna Dina L. Joaquin, Andrea Mates, & John Schumann. Oxford University Press, 2009.

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The currently more widely accepted idea that human language could have emerged and developed without the need for a specific gene for Universal Grammar (UG) is the major contribution of this book. Offering an evolutionary view on the neurobiology of language acquisition, it argues that language is a cultural artifact that evolves as from a complex adaptive system through human interaction. It claims that through the process of communicative exchanges, individuals organize lexical items into structures, and if these are efficient, they are incorporated as part of this language's "grammar". This seems to be a highly efficient practice as it ensures that such newly created forms fit the cognitive and motor capacities of the human brain before being incorporated. In this perspective, language has evolved to fit the brain and not the other way around, as advocated by supporters of the UG perspective.

This book is divided into chapters written by professors and PhD students in the Applied Linguistics department at the University of California, Los Angeles, who are all members of the Neurobiology of Language Research Group (NLRG) at the same institution. The book has in total 7 chapters and delivers the content in a very straightforward manner: chapter 1 describes what complex adaptive systems are in order to show how language is one; chapter 2 lists evidence for language emergence, describing the creation of pidgins and creoles; chapter 3 anticipates the implications of interaction and the use of language in real life settings, as opposed to what traditional linguists have done so far in terms of describing language through prefabricated structures; chapter 4 describes interactional readiness in infant-caregiver interactions, associating apparently innate behavior in neonates and chemical rewards in a neurobiological level; chapter 5 reinforces the interactional instinct concept showing how the need for affiliation coincides with the ability to affiliate; and finally, chapters 6 and 7 describe the role of affect in first language acquisition and in cognition, respectively.

The first chapter, "Grammar as a Complex Adaptive System", begins by showing how Innatism can no longer be sustained by current findings in neuroscience, genetics and linguistics. The authors explain how nonlinear Complex Adaptive Systems (CAS) emerge from pattern formations out of chaos, analogically describing what happens with an emerging language. In order to show how languages can be seen as CAS's, the authors apply all the principles of CAS, i.e., aggregation, multi-strata of building blocks, local and random interactions, tagging,

internal model and pattern match, flow, bottom-up and indirect control, feedback and circular causality, and lock-in, to language emergence. They conclude by reminding us that language should be seen not as a part of our biological evolution, but as a cultural artifact that emerges out of social interaction, which is not genetically but culturally transmitted to the following generations.

The second chapter, “Evidence for Language Emergence”, investigates the properties of languages and linguistic interactions among agents, in order to develop additional arguments showing that the principles of CAS’s and emergence are intrinsic characteristic of languages. The chapter claims that advances in computer technology provide better and more efficient tools for the investigation of this issue. The authors show that grammar-like patterns can emerge purely out of local interactions, as a complex adaptive system derived from massive interaction among the language users.

Chapter 3, “The Implications of Interaction for the Nature of Language” claims that if performance means competence, it is crucial to understand its context in order to make meaning out of the linguistic signal. One major eye-opening point of this view is that oral, not written language, should be the main descriptor of language development. Although frequently oral language might erroneously be perceived as incomplete, close structural analysis of conversation shows that there are in fact simple rules that govern this type of discourse. It does not require an adaptation of the brain to the language, but the other way around, thus validating the book’s main claim that language fits the brain and that language only can exist between brains and not within one, as proposed by the UG model. The authors advocate the use of audio and visual technology and micro-transcription to capture authentic language, in order to provide an indexicalization of naturalistic language use.

The next chapter, “Interactional Readiness: Infant- Caregiver Interaction and the Ubiquity of Language Acquisition”, addresses the question that if language is an interactional artifact, what then ensures that interaction will take place? The author describes the fact that keen sensory abilities developed almost right after birth help the infant perceive and imitate facial expressions, gestures, and vocalizations of its caregivers. She shows that motivation plays a crucial role in mediating the interactions of infants with their caregivers, releasing beta-endorphins and dopamine to reward such interactions. The author also claims that mirror neurons, connected to the limbic system, are involved in relating actions and their outcomes to their corresponding neural motor representations, a probable neurobiological mechanism for imitation.

Chapter 5, “A Neurobiology for the Interactional Instinct”, reports research that has generated a model of social affiliation that may subserve the interactional instinct, being divided in two parts: an appetitive component and a consummatory phase. The authors believe that out of a basic survival instinct, infants are born with an appetite to interact and affiliate with their caregivers. The tools they have at hand are related to attention and imitative abilities, and neurobiological systems

of rewards and incentives, which are derived from these interactions. The consummatory stage is shown to be related to endogenous opiate expressions during child-caregiver interaction, providing both infant and caregiver with a sense of calmness, attachment, and affiliation. Such rewarding aspects of the bond become part of the child's memory and serve other future affiliative relationships.

In Chapter 6, the authors describe the role of affect in first language acquisition. They argue that the affective relationship between the caregiver and the child forms the basis for first language acquisition. Interestingly, the neural system involved in stimulus appraisal (amygdala, orbitofrontal cortex, body proper) also subserves attachment, affect regulation, and social cognition, functions that control decision-making in language pragmatics. Along the same lines, chapter 7 discusses the role of affect in cognition and shows how emotions encode problems by helping label the information that is seen as relevant to them, using processing strategies fostered by positive and negative affective states.

In sum, this book draws upon the evidence found in the most current research in the field to show what underlies the perspective of language being a cultural artifact which evolves from social interaction. It suggests that what is innate is our drive to socially engage, and it is from such social interchanges survival is ensured and language and culture are required. Finally, this book provides a thorough explanation of the neurobiology of interactions, in terms of what is behind our motivation to interact and to communicate.

This is undoubtedly a carefully structured and researched book with irrefutable arguments and a solid theoretical framework that adds to the growing field of Applied Linguistics and neurobiology of language acquisition. Anyone interested or involved in such lines of research should read it.