Language and the Learning Curve
Anat Ninio

Language development remains one of the most hotly debated topics in the cognitive sciences. In recent years, we have seen contributions to the debate from researchers in psychology, linguistics, artificial intelligence, and philosophy, though there have been surprisingly few interdisciplinary attempts at unifying the various theories. This book offers a new view of language development. Drawing on formal linguistic theory (the Minimalist Program, Dependency Grammars), cognitive psychology (Skill Learning) computational linguistics (Zipf curves), and Complexity Theory (networks), it takes the view that syntactic development is a simple process and that syntax can be learned just like any other cognitive or motor skill. This book develops a learning theory of the acquisition of syntax that builds on the contribution of the different source theories in a detailed and explicit manner. Each chapter starts by laying the relevant theoretical background, before examining empirical data on child language acquisition. The result is a bold new theory of the acquisition of syntax, unusual in its combination of Chomskian linguistics and learning theory. This book challenges many of our usual assumptions about syntactic development.

Modeling Cities and Regions As Complex Systems
Roger White, Guy Engelen, and Inge Uljee

Cities and regions are highly complex but ordered systems. They are thus best understood by modelling within the framework of the theory of complex, self-organizing systems. This theory suggests that fractal structure is a signature of self-organized systems, and that systems...
that are far from thermodynamic equilibrium have open futures. These two phenomena have important consequences for the calibration and validation of realistic models, with the open futures phenomenon raising fundamental methodological issues that are addressed in the book. The models themselves are cellular automata (CA) based, because CA are inherently spatial, high resolution, and dynamic. The basic model focuses on land use change, using multiple urban land use classes, with the dynamics driven by linked demographic, economic, and natural system models. Subsequently, a zone-based model of the spatial dynamics of population and economic activity is inserted to constrain the CA model regionally. Ultimately, the dynamics of population and economic activity are modelled together with land use in an activity based variable grid CA which captures spatial interaction effects at all scales, not just local, and permits multiple activities on a single cell. These models show how the complex but ordered urban and regional structure emerges; thus they constitute an advance in urban theory. They also provide a platform that planners can use to investigate the likely effectiveness of proposed plans and policies. Applications to a number of cities and regions are discussed, and applications to Flanders, implemented as part of the official planning process, are described in detail.

Syntactic development, its input and output

Anat Ninio

Published in print: 2011 Published Online: May 2011
Item type: book

This book places the syntactic learning process under close scrutiny. The focus of the book is on the characteristics of linguistic input and the resultant output, which, the book shows, do not necessarily follow the orderly uniform processes assumed by some versions of formalistic linguistic theory. Unique to this book is its reliance on very large English corpora of parental speech and child utterances, revealing surprising new facts about the input and output of syntactic development. Drawing on linguistic theory (the Minimalist Program, grammaticalization), Complexity Theory (Self-Organizing Criticality) and quantitative linguistics (corpus linguistics, Zipf curves), it analyzes the input and output languages both theoretically and empirically, building on the contribution of the different source theories in a detailed and explicit manner.
This book challenges the use of the terms 'history' and 'event' to register the shift from historical necessity in Marxism to contingent events in contemporary philosophy. It argues both classical Marxism and a strand of French theory after Louis Althusser understand history and event not as binary opposites but as a complementary pair. For Marxism, the fusion is accomplished by Hegelian dialectics and the idea of quantity to quality leaps. After Althusser, epistemological breaks in science provide the model for thinking revolutions as discontinuous with the status quo. Through critical readings of Hegel, Marx and Lenin, the first part of the book interrogates the politics of Marxist philosophy. While defending Marx from charges of 'historicism', the inability of Hegel's 'leaps' to think epistemological breaks is shown to support political gradualism and technological determinism. The book's second part, on Althusser, Badiou and Meillassoux, argues that although their philosophies think discontinuity more successfully, they tend towards a self-referential rationalism that shores up the authority of theorists. The final part of the book suggests that a way forward can be found in complexity theory and 'weak' notions of emergence.

Afterword: Towards a Complex Science of History

Nathan Coombs

This chapter begins by taking stock of the first two parts of the book. It argues that although classical Marxism cannot think events discontinuously, its science of history can at least be subjected to empirical verification. By contrast, while post-Althusserian theory succeeds in thinking events radically it does so on the basis of a self-referential rationalism that grants authority to theorists and is resistant to empirical control. To go beyond these philosophical traditions, the afterword suggests that complexity theory and ‘weak’ notions of emergence provide a way forward. Agent-based modelling of complex
social systems offers a mediation of necessity and contingency that could help orient political strategy.

Relationship and rehabilitation in a post-‘what works’ era
Aaron Pycroft

in Risk and rehabilitation: Management and treatment of substance misuse and mental health problems in the criminal justice system


The research illustrates how substance misuse and mental health problems are not being addressed satisfactorily by the criminal justice system, as it is failing to keep pace with our understanding of these issues. The author argues for the development of therapeutic and social-work oriented knowledge in working with people in the criminal justice system. Complexity theory, Mimetics and Virtue ethics are identified as areas with the potential to develop interventions. If engagement with people with mental health problems and substance misuse is to be successful, there needs to be an increased awareness in our understanding of the factors that affect human behaviour.

Parser-grammar relations:
Colin Phillips

in Language Down the Garden Path: The Cognitive and Biological Basis for Linguistic Structures


This chapter takes up the issue of the role of grammar in processing, arguing against Townsend and Bever's LAST hypothesis-testing model (Late Assignment of Syntax Theory). The author reviews the reasons that led to the assumption that mental grammar is not recruited during processing. He argues that the arguments against the Derivational Theory of Complexity (DTC) oversimplified the issue and led to the erroneous conclusion that grammar plays no significant role in language processing. Heuristics in processing, he argues, are less pervasive than generally assumed and often result from the interplay of grammatical constraints in a noisy cognitive architecture. In the alternative view presented here, that grammar is directly involved...
in language processing, both in perception and production, there is no division of labor between grammar (knowing that) and processing (knowing how) in language, and processing is essentially a process of incrementally constructing a linguistic representation determined by grammatical constraints.

When the Levee Breaks
D. Shane Miller and Jesse Tune

in Investigating the Ordinary: Everyday Matters in Southeast Archaeology
Published in print: 2018 Published Online: September 2018

This chapter offers an examination of complexity theory and everyday decision-making in the Paleoindian Period and its effects on the archaeological record. Using several studies, the authors argue that the variation in how people learned knapping at quarry sites led to the regionalization of projectile point styles, and that everyday microeconomic decisions about what to eat, where to live, and what tools to use generated macro-scale patterns concerning people adapting to climate change, and in particular the Younger Dryas. Finally, the authors argue that decisions made by hunters to take advantage of species clustered and stranded by floods could have altered their long-term availability during the Younger Dryas.

Woolf as a Model Builder: Complex Form in the “Ode to Cutbush”
Adam Hammond

in Virginia Woolf and the World of Books
Published in print: 2019 Published Online: January 2020

This chapter argues that literary studies is returning to the concerns of the modernist period and interests of Woolf. Hammond draws on complexity theory to present Woolf as a model builder: she understood that the form was interactive and so provides impressions rather than telling reader what exists.