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Language production, cognition, and the lexicon

[Gala N.](#), [Rapp R.](#), [Bel-Enguix G.](#), Springer Publishing Company, Incorporated, New York, NY, 2014. 586 pp. Type: Book (978-3-319080-42-0)

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This book is an impressive collection (in terms of number, scope, and level of contributors) of short papers dedicated to Michael Zock for his retirement. Michael Zock is one of the pioneers of natural language generation, a field in computational linguistics devoted to simulating the process of planning, constructing, and producing sentences from thoughts and communication goals. This is a fascinating area of scientific inquiry, fraught with philosophical, psychological, and cognitive implications. How do humans verbalize their thoughts? To what extent are these thoughts verbal (or nonverbal) in the first place? Is this a strategic, creative, and incremental process, whereby individual concepts prompt words and words are concatenated online on the basis of more or less local syntactic restrictions? Or is it rather a rough assembly of largely prefabricated "chunks" of text, cached as ready-made, fully verbalized conceptual wholes in our long-term memory?

The book thoroughly addresses these and other related issues, but eventually takes no conclusive stand on them for two good reasons. As often happens in cognitive science, conflicting linguistic theories stake out a continuous space of graded variation whose individual instantiation may depend on the nature of the task being monitored and on inclinations, levels of fluency, and lexical knowledge of the speakers engaged in the task. The main scientific challenge is not to decide which account works better, but rather to provide the most suitable computational framework capable of dynamically accommodating such diverse strategies as online processing and memory caching. Second, natural language generation is a relatively young field of inquiry, whose complexity has so far only been briefly investigated. The volume provides a broad and clear overview of the considerable progress scholars have made over the last 40 years (more or less those spent by Michael Zock throughout his outstanding professional career). Yet, many questions still need to be answered.

To just give a flavor of the motley assortment of topics covered over nearly 600 pages, the book starts with an introductory overview of a cognitively aware use of computers for human language understanding and generation, then moves to issues of lexical content and processing, speech recognition and synthesis, and assistive technologies for reading and writing. The variety and complexity of issues may at times overwhelm the nontechnical reader, but there are at least two takeaway points.

First, the approach to natural language generation endorsed here cannot be located within the engineering mainstream of classical artificial intelligence. Issues, questions, and methodological approaches do not aim at developing better and faster algorithms outperforming humans in classifying documents or scoring web pages for query relevance. The fundamental goal is to gain a better understanding of the way people communicate verbally.

Second, in their daily lives, people often stumble into verbal communication problems, both in sending a message (false starts, misspellings and mispronunciations, selection of a nontarget word, tip-of-the-tongue problems) and in receiving a message (misinterpretation of ambiguous or unfamiliar words, failure to get nonliteral or humorous usages of known words or to parse complex syntactic structures and noisy or missing information). Understanding why these problems occur so often is key to understanding that language communication, far from being optimal, is highly adaptive, interactive, and cooperative. Language messages are often dramatically incomplete and radically goal oriented, and require considerable empathy and world knowledge on the hearer's part for them to be interpreted. In looking for a gas station, for example, a car driver can ask, "Where can I get gasoline here?" Understanding and answering such a simple question require not only knowledge of English, but also commonsense reasoning; an understanding of basic communicative goals and needs of the speaker; general knowledge about cars, fuel, and gas stations; and a fairly detailed knowledge of roadmaps.

Most verbal communication calls for the integration of two substantial sources of information: the subjective, perspective-taking, context-sensitive, and goal-oriented

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information that a speaker wants to get, and the objective, classificatory, global, background knowledge that both speaker and hearer must share for communication to take place successfully. Understanding the nonverbalized goal and context of a message is at least as important as interpreting its letter.

Language plays a fundamental role in our lives, and problems in getting our thoughts across can make life hard, not only socially, but also cognitively and professionally. This book reminds us that language is primarily communication and that any "language-intelligent" computer technology must approach communication needs. Computer-aided language technology will not only help scholars to better understand human communication problems, but can also provide valuable support to people writing a message, translating a text in a foreign language, learning a second language, reading and understanding a document, persuading other people, and thinking aloud creatively.

Reviewer: [Vito Pirrelli](#)

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