

# Briefly Noted

## The Semantics of Prepositions: From Mental Processing to Natural Language Processing

Cornelia Zelinsky-Wibbelt (editor)  
(University of the Saarland)

Berlin: Mouton de Gruyter (Natural Language Processing 3, edited by Annely Rothkegel), 1993, viii + 526 pp; hardbound, ISBN 3-11-013634-1, DM 258

This book contains a series of papers, the majority of which come from a workshop on the semantics of prepositions held at the Institut für Angewandte Informationsforschung, Germany, in February 1990. The broader topic of the book is the conceptualization of space and the editor's intention is to shed light on this by bringing together people working on the mental interpretation of prepositions. The editor is particularly interested in the computational processing of prepositions.

There are 14 papers in the book, falling under the following headings: Introduction (by Zelinsky-Wibbelt); lexicalization patterns of prepositions; semantic categorization of prepositions and context; contrastive implications of prepositions; and image understanding and prepositions.

Zelinsky-Wibbelt gives an excellent introduction to the book by motivating the importance of looking at the semantics of words in general and prepositions in particular. She points out that if we are not able to make the right semantic distinctions, then natural language processing, machine translation, and vision processing will be futile. I like the fact that she has seen that prepositions and their meaning lie at the junction where language and vision processing meet and this is certainly a focus of much of this work of late (McKevitt 1995–96). It is certainly becoming clear now that spatial relations between, and reference to, objects in the world lie at the center of integrated artificial intelligence, natural language processing, and vision processing (Olivier 1995).

The volume focuses on two major paradigms: Cognitive Grammar, whose followers are Lakoff (1987) and Langacker (1988), and the two-level approach to semantics followed by Bierwisch and Lang (1989). In Cognitive Grammar, it is recognized that all mental experience is gained from physical ex-

perience functioning in a physical environment and that prepositions and hence spatial expressions can function as higher-order mental models for abstract and complex situations. Abstract concepts are metaphors of concrete spatial predications. In the two-level approach, a distinction is made between objects that are **inherently oriented** (e.g., coin, book), and thus have meaning independent of their orientation in context, and those that are **canonically oriented** (e.g., wardrobe, chest, tower), and thus don't; and of course there are *neutral* objects (e.g., ball, cube, star). The two-level approach is axis-based and object-oriented, and focuses on the speaker's line of sight and the orientation of objects, whereas the Cognitive Grammar approach focuses on how the speaker's intentions and perspective constrain his or her conceptualization. Cognitive Grammar is more concerned with how cognitive, biological, and pragmatic principles underlie how the speaker attributes salience to objects in a given scene. Lang has a paper in this book but neither Lakoff nor Langacker do.

In my view, Jorg Schirra's paper stood out in the book; it focuses on the integration of language and vision processing with respect to reference semantics for spatial expressions (especially geometric relations). He introduces the project VITRA (VISual TRANslator), which started in 1985 and which examines the relations between speaking and seeing. CITYTOUR and SOCCER are two systems constructed in VITRA that transform visual perceptions into language. SOCCER simultaneously analyzes and describes in German short scenes from soccer games like live radio reports. This involves perceiving the locations and movements of the ball and players, interpreting movements with respect to conventions of soccer games (especially plans and intentions), and selecting which events to utter in what sequence. The spatial relations considered are close to (German) prepositions and the location of an object is relevant only relative to other objects' positions. Probability clouds are used to give meaning to relations between objects such as *being in, near, and in front of*. The dense centers of such clouds mark those positions rated as good examples for the relations.

This book is worth reading for those who are interested in machine translation and the integration of natural language and vision

processing, and the spatial relations, reference to the world, and grounding of representations that this entails. Such work is important for the construction of the future of SuperInformationHighways.—*Paul McKeivitt, Aalborg University, Denmark*

### References

- Bierwisch, Manfred and Ewald Lang, editors. 1989. *Dimensional Adjectives: Grammatical Structure And Conceptual Interpretation*. Berlin: Springer-Verlag.
- McKeivitt, Paul, editor. 1995–96. *Integration of Natural Language and Vision Processing*. Four volumes. Dordrecht: Kluwer Academic Publishers.
- Lakoff, George. 1987. *Women, Fire and Dangerous Things: What Categories Reveal About the Mind*. Chicago: University of Chicago Press.
- Langacker, Ronald W. 1988. A view of linguistic semantics. In Brygida Rudzka-Ostyn, editor, *Topics in Cognitive Linguistics*. Amsterdam: John Benjamins Publishing Company, pages 49–90.
- Olivier, Patrick, editor. 1995. *Proceedings of the Workshop on Representation and Processing of Spatial Expressions*. International Joint Conference on Artificial Intelligence (IJCAI-95), Montreal, Canada, August.

### The Empirical Base of Linguistics: Grammaticality Judgments and Linguistic Methodology

**Carson T. Schütze**  
(Massachusetts Institute of Technology)

Chicago: The University of Chicago Press, 1996, xv + 237 pp; hardbound, ISBN 0-226-74154-0, \$28.95, £23.25

“Native speakers’ judgments of the acceptability of linguistic examples have always

formed a major part of the data of linguistics, but linguists generally either have elicited such data in a haphazard fashion and accepted the results uncritically or have rejected acceptability judgments altogether and equally uncritically. Schütze’s book is a welcome relief from the failure of linguists to deal responsibly with what can be either the most fertile or the most misleading source of information about languages.”—*James D. McCawley, University of Chicago, quoted in the publisher’s announcement*

### A Course in Generalized Phrase Structure Grammar

**Paul Bennett**  
(UMIST)

London: UCL Press (Studies in Computational Linguistics, edited by Harold Somers), 1995, xi + 227 pp; paperbound, ISBN 1-85728-217-5, £14.95

“A course in Generalized Phrase Structure Grammar assumes an introductory knowledge of syntactic theory and covers all the main constructs of the grammar. A substantial part of English grammar is covered in a precise and formal manner using a large number of illustrative tree diagrams. Recent issues and developments are examined and an important final chapter outlines the importance of GPSG to computational linguistics.”—*From the publisher’s announcement*