- subcategorization of lexical units according to their proper complementation,
- quantifier scopes,
- de re/de dicto readings,
- treatment of temporality.

ORTAX deals with all the main syntactic categories and treats them in a non-syncategorematic manner, which treatment is not entirely assumed by PTQ. Consequently, Hausser notes himself that any extension of his grammatical model must be done via transformations in the lexicon (the set of all molecules).

I have tried here to give a rapid overview of SCG and it would be necessary to go into the details of Hausser's presentation to estimate its consistency. It cannot be done here, but, as a conclusion, I shall give my own evaluation according to the two following criteria:

- the adequacy of the model for Hausser's own objectives,
- its relevance for computational linguistics.

To take the first point, I have not been convinced that Hausser's model is a *strictly* surface compositional grammar. In my opinion, dummy elements, which are here molecules without any surface realization, are by definition incompatible with a strict surface compositionality. These elements are present in Generative Transformational Grammar and even in PTQ (introduced, notably, by the non-context-free rules). Of course, the use of such artifacts seems to be justified in the context of formal linguistics, but they are in contradiction with the adoption of a principle of strict surface compositionality of meaning if they have an associated semantic representation. And computational linguistics? One could evade the question by saying that, if formal model like PTQ have any computational interest, so has SCG. What is interesting is that Hausser tries to treat some important aspects of language frequently ignored. SCG gives some solution to the following problems which are particularly relevant to computational linguistics (automatic translation, automatic text processing, man-machine dialog, etc.):

- What should be the description of peculiar structures such as ellipsis?[2]
- How to use the information given by punctuation marks (or intonation)?
- How to deal with morphology within a formal semantic framework?
- How to build a general coherent system which would be modular enough to allow easy improvements and adaptations?

This last point is particularly important and, in fact, Hausser's book could be seen as the explanation of a general algorithm for treating natural language. Such an algorithm can give interesting insights and, like PTQ, inspire some researchers in the field of computational linguistics.

To conclude this presentation, it is important to note that Hausser's style is clear and very "pedagogical". He tries to explain every detail of his model progressively (even if, sometimes, the exposition of problems is a little bit reductive). Obviously, this book is suited best for logicians interested in studying a syntactic-semantic model for natural language. The description of ORTAX and of its connections with other syntactic models is particularly clear and precise. The one of intensional logic? It is absolutely hermetic for uninitiated readers. They should, at least, try Dowty et al. (1981) or an equivalent presentation.

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[1]In SCG, as in PTQ, the translation process is the general mechanism that associates at least one semantic representation in intensional logic to each grammatical sentence, or piece of sentence.

[2]For instance, "Peanuts." could be quite grammatical as a response to "What are you eating, Bob?".

References

Dowty, David R.; Wall, Robert E.; and Peters, Stanley 1981 *Introduction to Montague Semantics.* D. Reidel, Dordrecht, Holland.

Kaplan, Ronald M. and Bresnan, Joan W. 1982 Lexical-Functional Grammar: A Formal System for Grammatical Representation. In: Bresnan, J.W., Ed., *The Mental Representation of Grammatical Relations.* The MIT Press, Cambridge, Massachusetts: 173-281.

Montague, Richard 1973 The Proper Treatment of Quantification in Ordinary English. In: Hintikka, K.J.J.; Moravcsik, J.M.E.; and Suppes, P., Eds., *Approaches to Natural Language.* D. Reidel, Dordrecht, Holland: 221-242. (Reprinted in Montague 1974.)

Montague, Richard 1974 *Formal Philosophy: Selected Papers of Richard Montague.* Edited by Richmond Thomason. Yale University Press, New Haven, Connecticut.

Talking Minds: The Study of Language in the Cognitive Sciences

Thomas G. Bever, John M. Carroll, and Lance A. Miller, Editors

The MIT Press, 1984, 283 pp.
ISBN 0-262-02181-1

The major emphasis in this book seems to be on the role of linguistic theory and behavior in leading to an understanding of human cognition. The book is divided into three sections which present different perspectives on the problem within the disciplines of linguistics, psychology, and artificial intelligence.

Rather than approaching an integration of perspectives, the book leaves one with a feeling that they are still very distant. Although the issues raised in the introduction are discussed by the authors of each paper, there is no attempt to integrate the discussion. Instead, I felt that each paper presented a "different side of the problem" and that several of the authors were taking issue about problems which were more specific to their discipline and not immediate to the issues raised.

Overall, there are several relevant discussions of language and mental process. However, while the discussions border on integrated processing, the presentations and information processing models described are

all sequential or serial order. They all presuppose a rule-based system that can be enumerated in a "decidable" sense and that includes hierarchical enumeration during rule-application. Even the discussion of the computational approach presented by Schank and Birnbaum includes nuances of this.

There are relevant discussions of how one can acquire language and how it might map the real world into a "usable" representation that permits variability. However, these are presented at a theoretical level. There is not sufficient material included to "make the theory computational". It is very interesting to note that the processor, meaning the human brain, can constrain how the real world projects into a subjective perceptual world, and to provide discussion of same, but the issues of how such a processor might control such a happening are avoided. In contrast, for artificial intelligence, determining the process and the control presents the greatest problem.

The psychological perspective provides a brief historical introduction to the issues considered important by psychologists with respect to the language problem. Many of the concerns regarding the function of representations, and the relationship between theoretical and applied work and psycholinguistics are similar to those expressed by the computational discussions. However, the stress on evaluation of theories which is of utmost importance to psychological approaches does not appear of such concern in AI.

One area which the psychological discussion merely touches has to do with CONTROL of the processes. While control is mentioned, no suggestions as to how it should become a viable part of language process or theory from a psychological perspective are presented. Instead, all of the theories presuppose a sequential process, at least as they are presented in the included papers. No CONTROL alternatives are discussed, as if the problem is already solved.

One other psychological paper discusses whether there are language-specific tasks, i.e., tasks that cannot be "learned" or performed unless one has language. While the issues raised are interesting, the presentation and discussion of the evidence is far from convincing. Perhaps it is available elsewhere, but certainly is just touched upon here.

Finally, the discussion within the computational approaches to language is not anything that has not been presented many times before. Basically, two viewpoints are presented, one the semantically driven approach to language processing and the other which demonstrates that there are critical aspects of language understanding that can only be syntactically determined.

The arguments presented in Marcus's paper advocating a separate role for syntactic processing were the most clearly described in the book. If anyone is seeking example inputs which require syntactic decision processes that cannot be handled entirely within semantic processing, or cannot even be recognized as a problem if one is doing strictly semantic processing, this paper includes several. They are all discussed from a linguistic standpoint and not a performance one, even though there is performance evidence to support a distinct role for syntax in processing. (Cf. the vast literature of neurolinguistics on aphasic language problems as well as evidence discussed with respect to children with language impairments.)

After finishing this book, I felt that I had re-read a discussion of many issues which were first being addressed in the early attempts to define cognitive science. They are still undecided, but there presently are more cohesive approaches being undertaken. While each paper presents discussion of important cognitive science issues, given the title of the book I had hoped there would be a more integrated discussion of how these issues might be resolved.

The book is useful as a reference for anyone seeking an introduction to the magnitude of problems within cognitive science. It also provides some historical perspectives which are not explicitly documented elsewhere. But, it does not reflect any more recent attempts to integrate the viewpoints expressed that are the focus of research in many schools of cognitive science, where the integration, the shared discussions of the problems, the common approaches are underway.

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COMPUTATIONS FROM THE ENGLISH.

Robert F. Simmons

Prentice-Hall, Englewood Cliffs, New Jersey, 1984
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The book appears to be concerned with three major points. First, the reader can find a brief outline of the state of the art in many fields of Artificial Intelligence: natural language parsing, question-answering, questioning and summarizing of texts, paraphrasing and translating into different languages, and finally a survey on knowledge systems. Therefore the book is extremely useful to those who wish to know what has been done or can be done in AI. Secondly, it is also conceived as an introduction to procedural logic and how to apply it to the analysis of natural language and to the various performances listed above. Hence, the book is also important for those who want to achieve this specific programming competence.

The third point (which, however, is not explicitly declared by the author) has to do with the way natural language and the human cognitive system must be approached. Obviously, the approach described in the book is a procedural one; i.e., the author describes algorithms for performing various cognitive tasks, such as understanding natural language, producing natural