From Discourse to Logic:
Introduction to Model-Theoretic Semantics
of Natural Language, Formal Logic
and Discourse Representation Theory

Varol Akman
Bilkent University, Ankara

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Abstract

This a concise review of the above title by Hans Kamp and Uwe Reyle, Dordrecht, The Netherlands: Kluwer Academic Publishers (Studies in Linguistics and Philosophy, Volume 42), 1993, 2 parts, viii + 713 pp., Hardbound, ISBN 0-7923-1027-6 (Part 1), ISBN 0-7923-2402-1 (Part 2), ISBN 0-7923-2403-X (Set).

"We van lick gravity, but sometimes the paperwork is overwhelming." These words of the late Wernher von Braun, during the early months of the U.S. space program, seem to translate to the area of natural language semantics rather nicely. Here's a thick volume which shows that one can also lick several Herculean problems of semantics, but only if one is willing to display the equivalent of Sisyphean labor. It reports work by Hans Kamp and Uwe Reyle, who have been busy for the last thirteen years or so grappling with such problems and finding clever answers.

If you are a semanticist you already know that anything Kamp writes matters. Now that there is a book in which he appears as the principal author, I'll make the sensible prediction that this 2-part magnum opus will make history. It (and a sequel which is in the making, see presently) will be consulted as an essential reference for the years to come and will surely join the ranks of distinguished books such as Montague's celebrated *Formal Philosophy* (1974), Dowty et al.'s orderly presentation of Montague's ideas (1981), Barwise and Perry's elegant *Situations and Attitudes* (1983), and Devlin's lucid reworking (1991) of the latter.

And all this despite the fact that K&R wrote a textbook (used in a non-derogatory fashion here)—one including exercises, painstaking historical analyses, and having a careful, top-down design for the classroom. The book is aimed at students (researchers are also students!) with varying degrees of proficiency in semantics; in fact, it even includes the necessary material for those who were never exposed to semantics and formal logic. (Witness K&R's remark (p. 4): "[W]e ended up writing a book without prerequisite.")

From Discourse to Logic tells, in glittering composition, the story of Discourse Representation Theory (DRT), a particular way of thinking about the semantics of natural language. DRT owes its origins to Kamp's consistent efforts to solve two important problems: (i) donkey anaphora, and (ii) tense and aspect. The first problem has to do with sentences such as *If Hitler owns some book, he burns it*: the anaphoric connection between *some book* and *it* is hard to justify in the light of the logical meaning of *some*. The second problem, especially manifest in French, has something to do with the difficulty of explaining the nuance between the Passé Simple and the Imparfait—two morphologically distinct past tenses.[1]

K&R trace the enigmatic nature of these problems to the static perspective that classical (model-theoretic) semantics provides. It is true that Montague's vision (going back to Frege) to characterize linguistic expressions in terms of the referential relations was a breakthrough of a very high order. However, questions of anaphora and aspect require another dimension, the dimension of what is commonly known as 'interpretation': the process by which a speaker assigns a meaning to the strings of signs or sounds which she reads or hears. K&R's theory of meaning attempts to utilize both the Montagovian outlook and the interpretive outlook in a truly integrated fashion. Accordingly, DRT can be thought of as a remedy to the one-sidedness of the classical paradigm by combining its truth-conditional perspective with the interpretation-oriented world-view.

Here's a structural summary of the book:

- Part 1
  - Chapter 0. Preliminaries (approx. 60 pp.)
  - Chapter 1. DRT and Predicate Logic (approx. 80 pp.)
  - Chapter 2. Quantification and Connectives (approx. 95 pp.)
  - Chapter 3. Loose Ends (approx. 65 pp.)
- Part 2
  - Chapter 4. The Plural (approx. 180 pp.)
  - Chapter 5. Tense and Aspect (approx. 210 pp.)

Chapter 0 offers a very instructive (informal) discussion of the fundamental ideas about logic and semantics, and their natural relationships. It also defines a phrase structure grammar (enriched with assorted syntactic features) which is used to explicitly describe the details of DRT. The grammar is not all-encompassing but then again, it is not a toy either. Chapters 1 and 2 give a formal, systematic presentation of the theory; the core of these chapters is a famous paper of Kamp (1981). Additionally, they offer lengthy discussions on negation and disjunction/conjunction, respectively. Chapters 4 and 5 extend these into new realms, namely, plural constructions and tense/aspect, respectively. Chapter 3 serves as a bridge between Chapters 1 and 2, and Chapters 4 and 5. It deals with reflexives, proper names, and scope ambiguity, to name a few. Construction of Discourse Representation Structures (DRSs) are given for plurals and tensed sentences in Chapters 4 and 5, together with detailed model theories. In order to understand the essentials of DRT, Part 1 is probably sufficient; however, to see DRT at work one should study Part 2 in detail. In fact, this is where one can see the real power of DRT, as applied to realistic problems.

I must note that K&R intend to publish a sequel to the book under review. This second volume will contain, among others, the following topics:

- Implications of DRT for certain issues in the philosophy of language and philosophical logic.
- The proof theory of the formal representations used by DRT.

[1] *Aside:* This reminds me the last words of Dominique Bouhours, French grammarian: "I am about to–or I am going to–die; either expression is used."

- The theory of propositional attitudes.
- The theory of verbal communication, of mutual information, etc.

Finally, I would like to draw the attention of the reader to another excellent book which complements the volume under review rather nicely. This is the thought-provoking treatise of Asher (1993), which presents a novel approach and scrutinizes the ways we refer to 'abstract objects' (things like propositions, properties, states of affairs, and facts) in natural language discourse. Asher devotes about 50 pages to a crash course on DRT and then uses this framework to give a semantic analysis of eventuality (an object that is either some kind of event or state) and abstract object denoting nominals in English.

Yogi Berra once said "95% of this game is half mental." I think his remark also applies to semantics. Traditionally, semantics has been conceived as a primarily philosophical discipline with little to prescribe but much to analyze. However, Asher's book is also important for the readers of this journal because of its due regard to implementational aspects. The following excerpt (Asher, 1993, p. 11) affirms this: "Finally, DRT is a major semantic framework for which implementation has been a consistent goal. Careful attention to the DRS construction process has yielded computational implementations of the theory relatively easily, and fragments of the DRS construction algorithm now run in LISP and PROLOG at a variety of sites in the US and Europe."

Go and read *From Discourse to Logic* and follow up with Asher's book. This will be a demanding experience but you won't regret it. In the end, you'll know a great deal about one of the most original and influential semantic theories of our time (I think the primary competition comes from Situation Semantics) and furthermore you'll encounter along the way many interesting problems with a strongly computational flavor. In these days of the commonplace, who can ask for more?

1 References

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2 About the Reviewer

Varol Akman is associate professor of computer engineering at Bilkent University. His recent papers treat the computational aspects of Situation Theory and introduce the programming language BABY-SIT. From 1980 to 1985, Akman was a Fulbright scholar at Rensselaer Polytechnic Institute, New York, and received a Ph.D. degree in computer engineering. He then held a senior researcher position with Centrum voor Wiskunde en

Informatica (CWI), Amsterdam. Akman's address is: Department of Computer Engineering and Information Science, Bilkent University, Bilkent, Ankara 06533, Turkey. E-mail: akman@cs.bilkent.edu.tr