KNOWLEDGE SEMANTICS

Author’s Foreword

I am not sure if it was my engineering background or the general tendency to think and act my own way regardless of the consequences, which has manifested itself so clearly in my literary writing, that made me select this particular topic for my dissertation and the approach to it, but it was likely both. Your background and your personality stay always with you.

One reason I decided to study linguistics was to find out how and why metaphors work, since they played such an important part in my literary work, but, for patriotic reasons, my first choice was Ukrainian syntax, in particular its tendency toward free word order, most likely occasioned by its highly developed morphology, and such features as its ability to front multiple wh-type words, something not permissible in English. (In Ukrainian you can say Хто кого коли де чому поцілував?—Who whom when where why kissed?, meaning Who kissed whom when where why?) This turned out to be unfeasible, however, because there wasn’t anyone in the linguistics department who knew any Slavic language let alone Ukrainian and who could steer me along.

As I recall, I actually breathed a sigh of relief when this became apparent and immediately set out to work on my new proposal, whose main thrust was that meaning of a sentence is dependent on what the hearer knows and that metaphorical use of language is not an anomaly but an inherent part of everyday language use. I was lucky to find a professor who was willing to support my work—Ray C. Dougherty, a student of Chomsky, who taught most of the syntax
courses in department and who, like me, had an engineering background and whose views on semantics were close to mine.

After getting my degree, I didn’t go into linguistics but stayed with IBM, where I worked on Artificial Intelligence, including Natural Language Processing and Expert Systems, and did little to promote what I had done. The approach I developed in my dissertation was totally contrary to anything being proposed in transformational-generative grammar semantics in those days, and I didn’t feel like spending any time sparring with windmills.

Fortunately, times have changed. Great strides have been made in natural language processing, enabling people to communicate in their language with automata, and the demarcation line between theoretical and computational linguistics has become blurred; the former lately has even been teaming up with neuroscience in its effort to explore the language faculty of the human mind. So, I wasn’t overly surprised, although obviously pleased, when an offer to publish my work in Ukrainian translation came along from Prof. Orysia Demska of National University of the Kyiv-Mohyla Academy, who had come across my dissertation almost by accident, and readily accepted it. It would take a lot of effort developing the terminology and overseeing the translation, but it was worth it if I were finally to see my work in print.

I hadn’t looked at my dissertation for a while with publication in mind, however, and wasn’t sure what I would find. I was pleasantly surprised, though, that, except for some easily correctible errors of oversight and misjudgment which I encountered, its main tenet didn’t require reshaping and seemed as sound as it did when I was originally putting my words down on paper—it is naive to think you
can state what a sentence means without referring to a repository of knowledge it will be pitted against; and since knowledge can vary not only between different people but also for the same person at different instants in time, the best you can do in this respect is state what the meaning is in terms of a particular repository of knowledge. A sentence in English from an article on string theory means one thing to a string theory physicist, and something quite different—mysterious, or perhaps gobbledygook—to a butcher, even though both are fluent speakers of the language. (It would mean something still more mysterious or nonsensical to a four-year old child even if the sentence fell within that child’s grammar.) And, since an undefinable repository of knowledge could not be part of a linguistic theory of meaning, if we want to formulate such a theory, its scope must be limited to describing the mechanisms operating on sentences in the process of interpretation but not the meanings they generate. The mechanisms could be described in terms of an arbitrarily determined repository of knowledge and the meaning they generate viewed as mere illustrations of the mechanisms’ potential. (They could have practical value only in cases when the knowledge repository was created for a specific purpose.)

In the book, I call this repository a knowledge base, which gives the name to the theory—a knowledge-based theory or knowledge semantics. Since meaning is generally assumed to include both entailments and presuppositions, the knowledge base contains both, and since the latter doesn’t form part of the theory, it may contain both linguistic and factual (world) knowledge, thus enabling the mechanisms to generate the full range of the sentence’s meanings.

Time perspective has played a role in my reaction to the rereading, however. What struck me upon viewing the theory from some distance in time is the
simplicity of its mechanisms which I didn’t see as clearly before. Parsed and grammatically labeled sentences can be reliably translated into a language in which the knowledge in the base can be also expressed, so that the former may be easily mapped onto the latter. The mechanisms that generate the meaning are: 1. Comparing the translated sentence against the knowledge base entries and establishing identity or lack thereof. 2. Pointing from a knowledge base entry to one or more entries in the base which are implied by it. 3. Copying these pointers for all the pointed out entries and unifying them into a single list which, together with the trace of the above comparison, constitutes the meaning of the sentence. 4. Adding new entries to the knowledge base and inserting and deleting matter in existing ones, in the cases of unidentifiable or anomalous elements in the sentence, which constitutes, respectively, acquisition and extension of meaning.

Simplicity suggests naturalness, and in connection with this I would like to mention one discovery I have made since completing the dissertation, which seems to give support to what I am proposing. During the day I often listen to the news programs on National Public Radio. These are organized into hour-long segments which are frequently repeated for the benefit of the listeners who have missed the earlier ones. I observed that, as I was hearing passages I had heard an hour earlier, I had a clear recollection—almost as if watching a movie on a screen, actually—of what I was doing when I heard them the first time. If I was driving down the road the second time, for instance, I recalled vividly what room I was in at home and what it was I was doing—down to the exact movements of the exercises I might have been going through at the instant; and conversely that, if I had heard the passage first while diving in my car, I would remember later the trees and buildings I was driving by, the traffic lights I was going under, and perhaps even some of the cars I was encountering on my way.
These are what are generally called associations, and I am sure, I am in no way unique in having had experiences like this. I suspect that many people, if not most or even all, have gone through something similar in their past and/or will do so in the future. But, to my mind, they are strikingly similar to meaning—pointers from one cluster of information to another, much as is the case with the entries in the knowledge base I am proposing. To what degree this is true, I am not sure (that is, I am not sure if associations may be called meaning and the other way around), but it is gratifying to see that a mechanism I am positing does play a role in the human mind in a different situation and that, therefore, I am not asking for anything outlandish. Similar pointing, moreover, appears to be at play in other aspects of the operation of the human mind, for instance in the case of processing proper name. The latter are generally considered not to have a meaning but to be mere pointers to entities in the world. But, if the man John I know has big elephant ears and a long elephant nose, when I think of John, this is how I remember him, and when asked what John looks like, I will say, *John has big elephant ears and a long elephant nose.* The situation here is somewhat different than in dealing with language, since it is unlikely there are entries in my knowledge base that directly support this, which seems to indicate there exist different levels of knowledge in the human mind and that some kind of translation takes place between what we would call linguistic knowledge, or meaning, and knowledge of another type, such as visual. But the phenomenon does involve pointing and I don’t think the difference invalidates anything that I have been saying. (This topic should be a fruitful area for research, which among other things might shed some light on the validity of the Sapir-Whorf hypothesis.)
I have a feeling it wouldn’t be too hard to find examples of the need for the three remaining mechanisms posited by the knowledge-based theory in other situations of the operations of the human mind, pointing out even more strongly the naturalness of the theory’s requirements. Comparison, for instance, I suspect, must be at play in recognizing anything new—seen, heard, and so forth. The same should be true for copying and forming unified lists for remembering received information and uniting pieces of it into one. And inserting and deleting information ought to be employed in the course of remembering received information and erasing existing one as a result of one received. But this is too broad a theme to be discussed in detail here and I will not talk about it any further.

Concluding, I would like to express my thanks to those who have made this book possible, in particular, IBM Corporation, under whose graduate work study program the courses leading to the dissertation and the research underlying it were funded; to Prof. Dougherty, who supported my original work in spite of its unpopular thrust and who has agreed to preface this book to elucidate some of the more important issues in it for the benefit of the reader; and finally to Prof. Demska for coming up with the idea of having my work translated into Ukrainian which, as I said, has led to the emergence of this book. My thanks also go to my wife Karina for tolerating my long virtual absences occasioned by this undertaking.

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