DISCOURSE: CODES AND CLUES IN CONTEXTS

Jane J. Robinson
Artificial Intelligence Center
SRI International, Menlo Park, California

Some of the meaning of a discourse is encoded in its linguistic forms. This is the truth-conditional meaning of the propositions those forms express and entail. Some of the meaning is suggested (or 'implicated', as Grice would say) by the fact that the encoder expresses just those propositions in just those linguistic forms in just the given contexts [2]. The first kind of meaning is usually labeled 'semantics'; it is decoded. The second is usually labeled 'pragmatics'; it is inferred from clues provided by code and context. Both kinds of meaning are related to syntax in ways that we are coming to understand better as work continues in analyzing language and constructing processing models for communication. We are also coming to a better understanding of the relationship between the perceptual and conceptual structures that organize human experience and make it encodable in words. (Cf. [1], [4].)

I see this progress in understanding not as the result of a revolution in the paradigm of computational linguistics in which one approach to natural language processing is abandoned for another, but rather as an expansion of our ideas of what both language and computers can do. We have been able to incorporate what we learned earlier in the game in a broader approach to more significant tasks.

Certainly within the last twenty years, the discipline of computational linguistics has expanded its view of its object of concern. Twenty years ago, that view was focussed on a central aspect of language, language as code [3]. The paradigmatic task of our discipline then was to transform a message encoded in one language into the same message encoded in another, using dictionaries and syntactic rules. (Originally, the task was not to translate but to transform the input as an aid to human translators.)

Coincidentally, those were the days of batch processing and the typical inputs were scientific texts -- written monologues that existed as completed, static discourses before processing began. Then came interactive processing, bringing with it the opportunity for what is now called 'dialogue' between user and machine. At the same time, and perhaps not wholly coincidentally, another aspect of language became salient for computational linguistics -- the aspect of language as behavior, with two or more people using the code to engage in purposeful communication. The inputs now include discourse in which the amount of code to be interpreted continues to grow as participants in dialogue interact, and their interactions become part of the contexts for on-going, dynamic interpretation.

The paradigmatic task now is to simulate in non-trivial ways the procedures by which people reach conclusions about what is in each other's minds. Performing this task still requires processing language as code, but it also requires analyzing the code in a context, to identify clues to the pragmatic meaning of its use. One way of representing this enlarged task to conceive of it as requiring three concentric kinds of knowledge:

* intralinguistic knowledge, or knowledge of the code

* interlinguistic knowledge, or knowledge of linguistic behavior

* extralinguistic knowledge, or knowledge of the perceptual and conceptual structures that language users have, the things they attend to and the goals they pursue

The papers we will hear today range over techniques for identifying, representing and applying the various kinds of knowledge for the processing of discourse. McKeown exploits intralinguistic knowledge for extralinguistic purposes. When the goal of a request for new information is not uniquely identifiable, she proposes to use syntactic transformations of the code of the request to clarify its ambiguities and ensure that its goal is subsequently understood. Shanon is also concerned with appropriateness of answers, and reports an investigation of the extralinguistic conceptual structuring of space that affects the pragmatic rules people follow in furnishing appropriate information in response to questions about where things are.

Sidner identifies various kinds of intralinguistic clues a discourse provides that indicate what entities occupy the focus of attention of discourse paticipants as discourse proceeds, and the use of focusing (an extralinguistic process) to control the inferences made in identifying the referents of pronominal anaphora. Levin and Hutchinson analyze the clues in reports of spatial reasoning that lead to identification of the point of view of the speaker towards the entities talked about. Like Sidner, they use syntactic clues and like Shanon, they seek to identify the conceptual structures that underlie behavior.

Code and behavior interact with intentions in ways that are still mysterious but clearly important. The last two papers stress the fact that using language is intentional behavior and that understanding the purposes a discourse serves is a necessary part of understanding the discourse itself. Mann claims that dialogues are comprehensible only because participants provide clues to each other that make available knowledge of the goals being pursued. Allen and Perrault note that intention pervades all three layers of discourse, pointing out that, in order to be successful, a speaker must intend that the hearer recognize his intentions and infer his goals, but that these intentions are not signaled in any simple way in the code.

In all of these papers, language is viewed as providing both codes for and clues to meaning, so that when it is used in discourse, its forms can be decoded and their import can be grasped. As language users, we know that we can know, to a surprising extent, what someone else means for us to know. We also sometimes know that we don't know what someone else means for us to know. As computational linguists, we are trying to figure out precisely how we know such things.

REFERENCES

[1] Chafe, W.L. 1977. Creativity in Verbalization and Its Implications for the Nature of Stored Knowledge. In: Freedle, R.O. (ed)., <<Discourse Production and Comprehension>, Vol. 1, pp. 41-55. Ablex: Norwood, New Jersey.

[2] Grice, P.H. 1975. Logic and Conversation. In: Davidson, D. and Harman, G. (eds.), <<The Logic of Grammar>. Dickenson: Encino, California

[3] Halliday, M.A.K. 1977. Language as Code and Language as Behaviour. In: Lamb, S. and Makkai, A. (eds.), <<Semiotics of Culture and Language>.

[4] Miller, G.A. and Johnson-Laird, P.N. 1976. <<Language and Perception>. Harvard University Press: Cambridge, Massachusetts