PERSPECTIVES ON PARSING ISSUES

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Nowhere is the tension between the two areas of our field—computation and linguistics—more apparent than in the issues that arise in connection with parsing natural language input. This panel addresses those issues from both computational and linguistic perspectives. Each panelist has submitted a position paper on some of the questions that appear below. The questions are loosely grouped in three sections. The first concentrates on the computational aspect, the second on the linguistic aspect, and the third on their interactions.

A preliminary definition:

For purposes of providing common ground or possibly a common point of departure at the outset, I will define parsing as the assigning of labelled syntactic structure to an input by applying a grammar that defines syntactically well-formed sentences and phrases. Note that the question of whether the grammar does other things as well is left open. In this sense, parsing is distinguished from interpretation, which may take many forms, such as assigning representations in an unambiguous formal language and integrating those representations into a data base or into a hearer's belief system.

The questions:

1. The Computational Perspective:

What useful purposes, if any, are served by distinguishing parsing from interpretation? Is computational efficiency increased? Is system building made easier? Or is an insistence on parsing a hindrance? (Can we compute an interpretation better without assigning labelled syntactic structures?)

Computational linguists, using available computational equipment that is almost exclusively serial in design, have devised parsing algorithms that involve serial search. Yet it is obvious that many parts of the parsing process could be done in parallel. How might notions of parallel processing, VLSI, and the like change our views on parsing?

What might motivate our trying to make parsing procedures simulate human behavior, e.g., by intermixing syntactic with semantic and pragmatic processing? And for that matter, how do we know what human processing is like? Do our intuitions agree and are they to be trusted?

2. The Linguistic Perspective:

Have our tools (computers and formal grammars) warped our views of what human languages and human language processing may be like? What legitimate inferences about human linguistic competence and performance can we draw from our experiences with mechanical parsing of formal grammars?

Our most efficient parsing algorithms are for context free (and even regular) grammars. Does this suggest that the core of grammars for natural languages is context free or even regular?

3. The Interactions:

Why do we usually have one grammar and procedure for sentence recognition and another grammar and procedure for sentence generation? Do we need a different pair for each direction?

What is the nature of the relationship between a grammar and a procedure for applying it? Are we influenced in the way we devise computational grammars by the algorithms we expect to apply to them? Can a grammar be psychologically valid (validated) independently of the parsing algorithm that works with it? Can a parsing algorithm be psychologically valid (validated) independently of the grammar?

The discussion to follow:

The position papers will serve to focus the discussion. That discussion may take the form of a debate about the best methods for language processing, but it can also be viewed as a gathering of diverse experiences with processing natural language.