

A Procedural Grammar for Sentence Production

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A sentence construction device is developed which aims at both psychological and linguistic plausibility. By psychological plausibility we mean that all sorts of empirical psychological data on how speakers put together natural language utterances during spontaneous speech are taken into account, so that the device may be said to simulate human sentence production processes as closely as possible. The goal of linguistic plausibility implies that we try to incorporate into the device grammatical (syntactic, lexical, morphological) rules which a linguist would not qualify as ad hoc, i.e. which cover a range of grammatical phenomena as broad as is possible by current standards of linguistic research.

We call the grammar forming part of the device "procedural" because symbols such as S, NP, PP, N, SUBJECT, OBJECT, etc. are not viewed as node labels for syntactic trees but as names of procedures which take a semantic structure (to-be-expressed meaning) as input and produce a (partial) surface structure tree as output. While computing its surface tree, a procedure usually calls on other "syntactical" procedures. Procedure S for instance, when deciding it needs a subject and an object phrase, will transfer control to procedures SUBJ and OBJ, after having supplied them with suitable arguments (these are regions within the semantic structure that S is trying to express). The flow of control between syntactic procedures and subprocedures is conveniently depicted as a tree. The tree representing flow of control for a certain sentence turns out to look very similar to the deep structure of that sentence - deep structure as in recent versions of interpretative transformational grammar. The syntactic procedures we devised are able to construct a surface tree directly, that is, without transforming trees into trees. So, in a sense, where traditionally a deep structure is transformed into a surface tree, here a deep structure produces a surface tree. To this purpose the procedures use facilities not available to linguistic grammars, for instance, the possibility of assigning syntactic nodes to variables having a limited scope.

The final section of the paper reviews some linguistic and psychological advantages of procedural grammar. Currently, the grammar is implemented as a LISP program that translates meanings expressed in conceptual dependency notation into Dutch.