Formalizing Construction Grammar in Tree Adjoining Grammar

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**Overview**

We envision a hybrid grammar that combines the advantages of Tree-Adjoining Grammar (TAG) and Zwickyan Construction Grammar (CG). A partial CG is formalized as a “metagrammar” for a TAG, defining the set of elementary trees anchored to lexical items and the all-important relationships between them. The TAG will then license sentences using its normal combinatorics of substitution and adjunction, which operate on the clause-sized elementary trees.

**TAG & Metagrammar**

**TAG formalism**

Adjunction: 

**Substitution:**

**TAG properties**

- formal properties of TAG are well-known
- with just two operations, the formalism is very restricted, thus yielding insights into the formal theory of natural grammar
- extended domain of locality allows integration of “core” and “periphery” phenomena, a goal of CG
- linguistic relationships of lexical items (subcategorization, semantic roles of arguments, agreement, etc.) are stated locally
- captures recursivity without affecting local relationships: specification of all simple constructions in the language produces a description of the complex constructions as well
- a lexicalized elementary tree states the properties of one (simple or complex) lexical item within one structure – but relations between elementary trees are not specified

**Metagrammar**

- captures similarities between elementary trees
- set of partial tree descriptions that model constructions
- descriptions are conjunctions of propositions in a First Order Logic designed to state dominance and precedence relations
- superimposition of constructions is FOL conjunction
- tree descriptions license elementary trees:
  - combined tree description licenses those elementary trees that satisfy the description and have the minimal number of nodes
  - more than one elementary tree can be licensed by the same tree description

**Notation**

The logic for tree descriptions is adapted from Xia (2001:49) and Rogers & Vijay-Shanker (1994).

X ∋ dom Y = if X immediately dominates Y
X ∋ dom Y = if X dominates Y
X PR Y = if X precedes Y

**Examples**

**WH Cleft and Inverted WH Cleft constructions**

<table>
<thead>
<tr>
<th>Name</th>
<th>Graphical notation</th>
<th>FOL notation</th>
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</thead>
<tbody>
<tr>
<td>Subj</td>
<td>S</td>
<td>(S dom &lt;Subj&gt;&lt;Arg&gt;)</td>
</tr>
<tr>
<td>VP</td>
<td>(VP dom V)</td>
<td>A (VP dom &lt;Arg&gt;) A</td>
</tr>
<tr>
<td>SVP</td>
<td>Subj A VP</td>
<td></td>
</tr>
<tr>
<td>WH Cleft</td>
<td>(S=E&lt;Arg&gt;)</td>
<td>(V dom BE) A</td>
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<tr>
<td></td>
<td>(XP=Arg&lt;Arg&gt;)</td>
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<tr>
<td>WH Cleft</td>
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<td></td>
<td>SVP A WH Cleft</td>
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</table>

The last metagram licenses two elementary trees:

**Regular WH Cleft:**

**(S=E<Arg>) V**

**Inverted WH Cleft:**

**(((S' dom VP) A)**

These two permutations (in terms of grammatical relations and structural positions) of the WH Cleft Valency Set in combination with SVP naturally result from the conjunction of the logical sentences stating their formal conditions. They constitute two lexicalized elementary trees on which a TAG may operate, and they instantiate the regular “WH Cleft” and “Inverted WH Cleft” when “assembled into a C[Clause] by SVP” (Zwicky, 1994).

**Constructing the Embedded Question (EQ) construction**

**Focus Fronting**

**Selected References**


