



Kathol and Pollard

Jean Mark Gawron

Linguistics

San Diego State University

gawron@mail.sdsu.edu

<http://www.rohan.sdsu.edu/~gawron>

Recasting Reape

Reape allows two ways of combining the domains of constituents into those of larger constituents:

1. Lift the domain of the daughter as a single frozen unit
2. Domain union: “Liberate” the elements of the daughter’s domain into the domain of the larger constituent.

In Kathol and Pollard’s (K&P’s) formulation, domain union is the default operation and “freezing” is done by an operation called **compaction**

Compaction

compaction : $sign \rightarrow domain-obj$

$$\text{compaction} \left(\begin{array}{l} \left[\begin{array}{l} \text{sign} \\ \text{synsem} \quad \boxed{1} \\ \text{dom} \quad \boxed{2} \langle [\text{phon} \boxed{3}], \dots, [\text{phon} \boxed{n}] \rangle \\ \text{dtrs} \quad \langle [\textit{sign}], [\textit{sign}], \dots \rangle \end{array} \right] \end{array} \right) = \left[\begin{array}{l} \text{dom-obj} \\ \text{synsem} \quad \boxed{1} \\ \text{phon} \quad \boxed{3} \circ \dots \circ \boxed{n} \end{array} \right]$$

A dom object contains syntactic/semantic/phonological information, but no information about daughters. Linearization constraints make reference only to this kind of information.

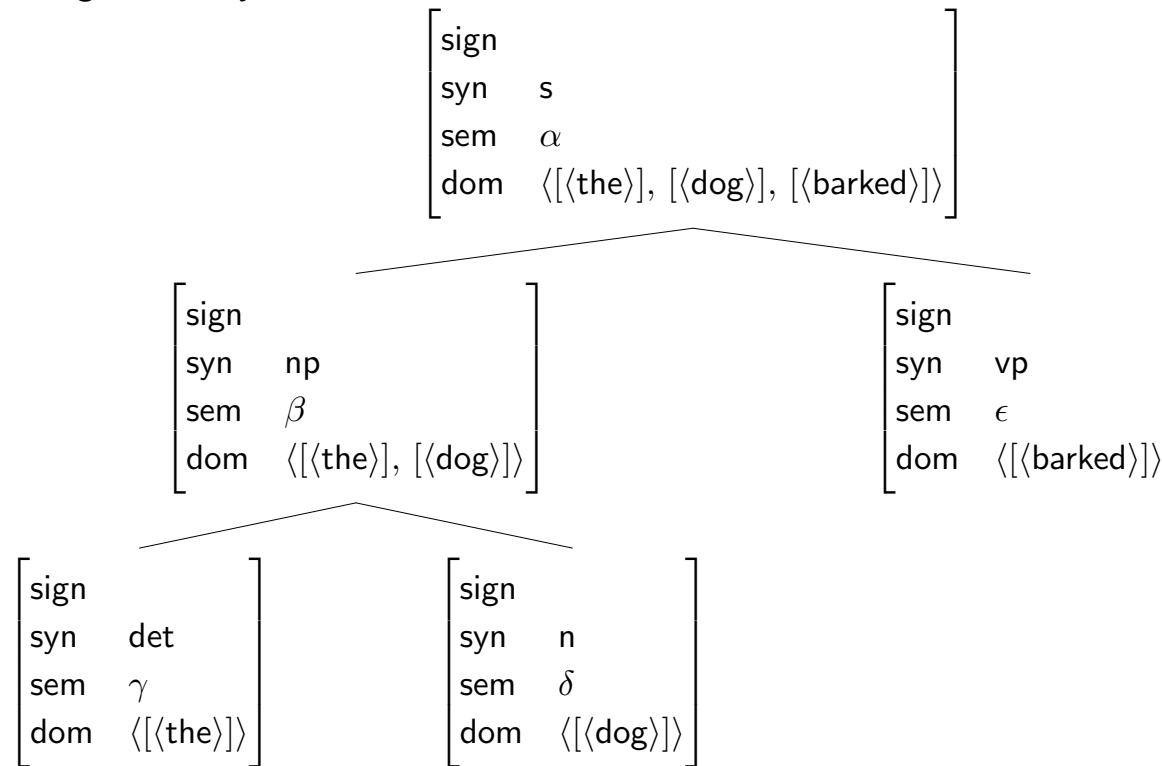
$$\left[\text{dom } \boxed{4} \left\langle \begin{bmatrix} \text{synsem } \boxed{1} \\ \text{phon } \alpha \end{bmatrix}, \begin{bmatrix} \text{synsem } \boxed{2} \\ \text{phon } \beta \end{bmatrix}, \begin{bmatrix} \text{synsem } \boxed{3} \\ \text{phon } \gamma \end{bmatrix} \right\rangle \right]$$

Rather than passing up the *dom* list $\boxed{4}$ of the sign on the left, we create a single domain object **joining** the phonologies of all the dom objects of $\boxed{4}$.

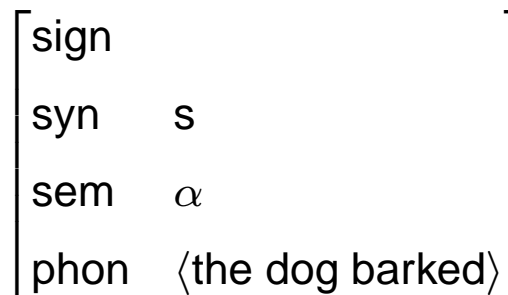
$$\text{join}_{\text{PHON}} \left(\boxed{4} \left\langle \begin{bmatrix} \text{synsem } \boxed{1} \\ \text{phon } \alpha \end{bmatrix}, \begin{bmatrix} \text{synsem } \boxed{2} \\ \text{phon } \beta \end{bmatrix}, \begin{bmatrix} \text{synsem } \boxed{3} \\ \text{phon } \gamma \end{bmatrix}, \dots, \right\rangle \right) = \alpha\beta\gamma\dots$$

Signs and domain obj's

1. A sign is a synsem tree:



2. A domain obj is a node:



Compaction and shuffle

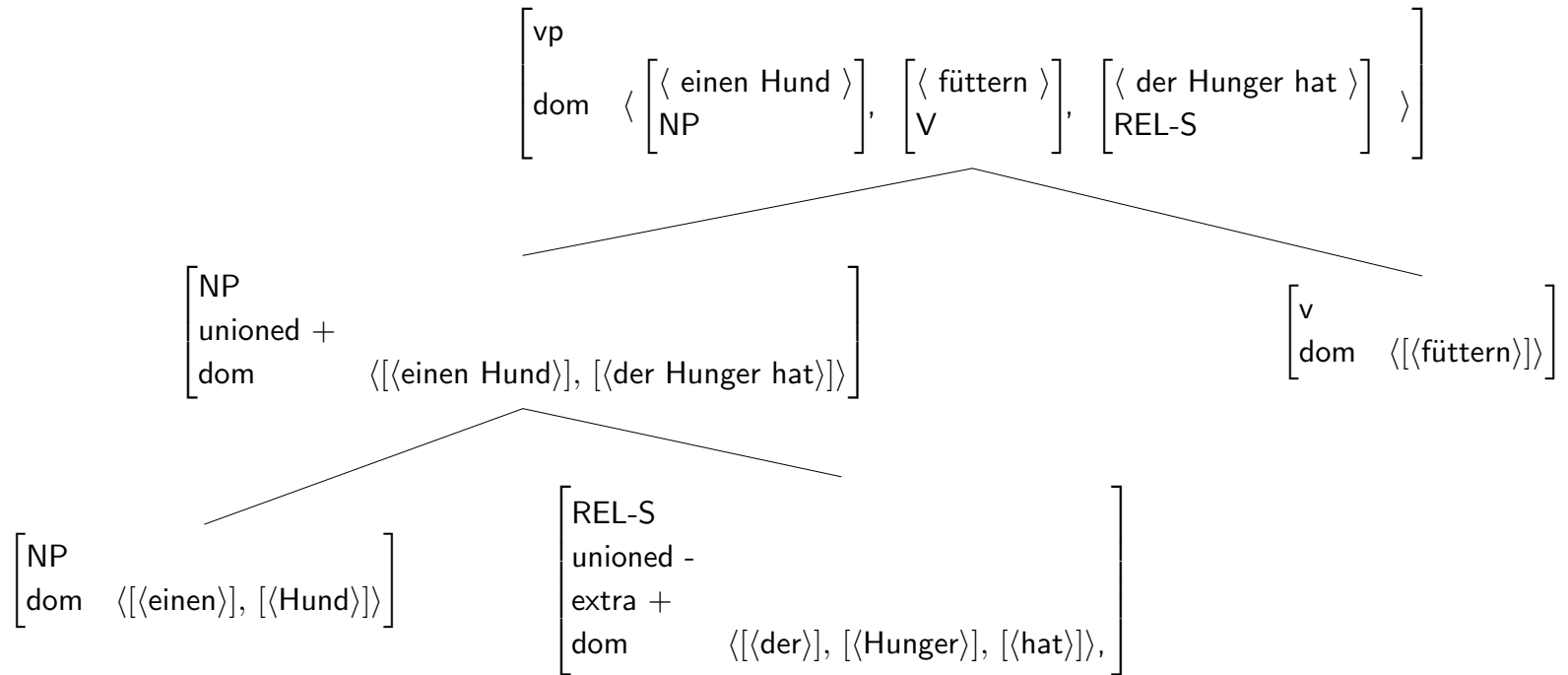
$$\left[\begin{array}{l} \text{vp} = \text{v}[\text{subcat } \langle \text{np} \rangle] \\ \text{dom } \boxed{4} \langle \left[\begin{array}{l} \langle \text{las} \rangle \\ \text{V}[+\text{INV}] \end{array} \right], \boxed{2} \left[\begin{array}{l} \langle \text{das Buch} \rangle \\ \text{NP}[\text{ACC}] \end{array} \right] \rangle \end{array} \right]$$

$$\boxed{1} \left[\begin{array}{l} \text{NP}[\text{ACC}] \\ \text{dom } \langle [\langle \text{das} \rangle], [\langle \text{Buch} \rangle] \rangle \end{array} \right]$$

$$\left[\begin{array}{l} \text{v}[\text{subcat } \langle \text{np}, \text{np} \rangle] \\ \text{dom } \boxed{3} \langle [\langle \text{las} \rangle] \rangle \end{array} \right]$$

$$\text{compaction}(\boxed{1}, \boxed{2}) \wedge \text{shuffle}(\langle \boxed{2} \rangle, \boxed{3}, \boxed{4})$$

Extraposition ala Nerbonne

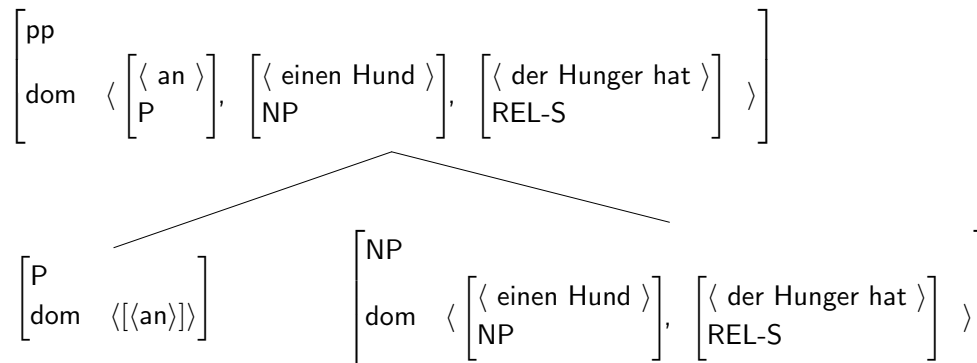


Problem: Mediating constits

1. Can't extrapose without dissolving (unioning) all the intermediate constituents.
2. This is wrong. A PP which is extraposed out of is still a PP constituent (still compacted).

(1) an einen Hund denken der Hunger hat
 of a dog think that hunger has
 'think of a dog that is hungry'

(2) * an gestern einen Hund denken der Hunger hatte
 'think yesterday of a dog that was hungry'



The Generalization

1. Nerbonne's solution links extraposition to the Head-Adjunct Schema
2. But extraposition of complements is also possible (complement clauses, anyway):

Planck hat [die Entdeckung t] gemacht

Planck has [the discovery t] made

[dass Licht Teilchennatur hat] .

[that light particle.nature has] .

Planck made the discovery that light has a particle-like nature.

3. Extraposition from topicalized constits is also possible.

Eine Dame is an der Tür [die Sie sprechen will].

A woman is at the door [who you(Dat.) speak wants].

A woman is at the door who wants to speak to you.

4. Extraposability is not determined by the grammatical function of host or extraposed consti, but by linearization properties:

Ceteris paribus, a rightmost non-head can be extraposed.

We want extraposition not to be accounted for the dominance-relations grammar, but by the linearization machinery.

The PP extraposition case shows that we need extraposed constits to “leak” out of “compacted” constits. That is, we need something between Reape’s domain union and the long distance dependency machinery.

Solution: we redefine compaction so that it is no longer a function, but a relation, like *shuffle*, allowing constits to “leak out”. This can be done using *shuffle*.

Partial compaction

In p-compaction, $\boxed{3}$ is a list of the new “liberated” constituents.

	compaction($\boxed{1}$) = $\boxed{2}$	p-compaction($\boxed{1}, \boxed{2}, \boxed{3}$)
$\boxed{1}$	$\left[\begin{array}{l} \text{sign} \\ \text{synsem } \boxed{4} \\ \text{dom } \boxed{6} \langle [\text{phon } \boxed{8}], \dots, [\text{phon } \boxed{n}] \rangle \\ \text{dtrs } \langle [\textit{sign}], [\textit{sign}], \dots \rangle \end{array} \right]$	$\left[\begin{array}{l} \text{sign} \\ \text{synsem } \boxed{4} \\ \text{dom } \boxed{6} \\ \text{dtrs } \langle [\textit{sign}], [\textit{sign}], \dots \rangle \end{array} \right]$
$\boxed{2}$	$\left[\begin{array}{l} \text{dom-obj} \\ \text{synsem } \boxed{4} \\ \text{phon } \boxed{7} \end{array} \right]$ <p>$\text{join}_{\text{PHON}}(\boxed{6}, \boxed{7})$</p>	$\left[\begin{array}{l} \text{dom-obj} \\ \text{synsem } \boxed{4} \\ \text{phon } \boxed{7} \end{array} \right]$ <p>$\text{shuffle}(\boxed{5}, \boxed{3}, \boxed{6})$</p>
$\boxed{3}$		$\text{join}_{\text{PHON}}(\boxed{5}, \boxed{7})$

Consequences

1. Compaction is now a special case of p-compaction.

$$\text{compaction}(\boxed{1}) = \boxed{2} \text{ iff p-compaction}(\boxed{1}, \boxed{2}, \langle \ \rangle)$$

2. The concept of domain has changed considerably.
3. Previously the highest domain of a daughter in the dominance tree was determined by some specific node at which compaction happened (often the barrier node was S or NP in Reape's system).
4. Now in principle, +EXTRA daughters may move an unbounded distance beyond where their sisters are frozen.
5. Added stipulations in the grammar may provide barriers to such +EXTRA daughters. ("Right roof" constraint in Head-Complement schema (10)).
6. The difference between the long distance movement machinery and the word-domain machinery is considerably smaller.

Right roof constraint

The extraposed constituent cannot cross a clause boundary (Ross 1967)

(3) a. [_S That [_S that John is a fool] is obvious] is absurd.

b. It is absurd [_S that [_S that John is a fool] is obvious] .

c. [_S That it is obvious [_S that John is a fool]] is absurd.

d. * [_S That it is obvious] is absurd [_S that John is a fool] .