HPSG: Binding Theory

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1   Introduction

Binding Theory is to do with the syntactic restrictions on the distribution of referentially dependent items and their antecedents:

- reflexives/reciprocals (*X-self, each other*)
- overt pronouns (*they, them*)
- non-anaphoric, non-pronominals (*Sam, Every student*)
- NP trace
- PRO ("big PRO")
- Wh-trace (variable)
- pro ("little pro")

1.1   Typical Data

(1)   a. John$_i$ likes himself$_i$.
    b. *John$_i$ likes him$_i$.
    c. *He$_i$ likes John$_i$.

(2)   a. John$_i$ depends on himself$_i$.
    b. *John$_i$ depends on him$_i$.

(3)   a. Mary described John$_i$ to himself$_i$/*him$_i$.
    b. John$_i$ knows Mary likes him$_i$/*himself$_i$.
    c. They$_i$ like [[each other's]$_i$ friends].
    d. They$_i$ like [[their]$_i$ friends].

2   Approaches

2.1   Jackendoff

Thematic Hierarchy Jackendoff (1972)

(4)   Agent < { Location, Source, Goal } < Theme

A Reflexive cannot outrank its antecedent:
*Xself$_i$[Goal] ... NP$_i$[Theme]

(5)   a. I sold the slave$_i$[G] himself$_i$[T]
    b. *I sold himself$_i$[G] the slave$_i$[T]

But:

(6)   a. John$_i$ seems to himself$_i$ to be unproductive.   (Theme ... ?)
    b. Max$_i$ strikes himself$_i$ as unproductive.   (Theme ... ?)

(7)   a. I sold the slave$_i$[T] to himself$_i$[G]   (Theme ... Gaol)
    b. *I sold himself$_i$[T] to the slave$_i$[G]   (Goal ... Theme)

(8) a. I sold the slave$_i$[G] himself$_i$[T]   (Goal ... Theme)
     b. *I sold himself$_i$[G] the slave$_i$[T]   (Theme ... Gaol)

2.2 Government and Binding

Chomsky (Chomsky (1981, 181)):

- Configurational (based on Government, involving (c-) command), and co-indexation.
- Features: ±pro, ±ana.
- An anaphor is bound in its governing category.
- A pronominal is free in its governing category.
- An R-expression is free.

(Here "is" means "must be").

2.3 HPSG

- Non-configurational.
- Based on notion of *obliqueness*.
- Larger role for 'non-syntactic' factors:
- processing ('intervention')
- 'point of view'

3   HPSG Background: indices, etc

See Pollard and Sag (1994), Sag and Wasow (1999, Ch 7).

3.1 Indices, etc

"Nominal objects" (*nom-objs* – the CONTENT of NPs) have indices:

$$
\begin{bmatrix}
\text{INDEX} & \begin{bmatrix} \text{PER} \\ \text{NUM} \\ \text{GEND} \end{bmatrix}_{index} \\
\text{RESTRICTION} & \{\dots\}
\end{bmatrix}_{nom\text{-}obj}
$$

she: SYNSEM | LOC | CONTENT :

$$
\begin{bmatrix}
\text{INDEX} & \begin{bmatrix} \text{PER} & \text{3rd} \\ \text{NUM} & \text{sing} \\ \text{GEN} & \text{fem} \end{bmatrix}_{index} \\
\text{RESTRICTION} & \{\dots\}
\end{bmatrix}_{ppro}
$$

(9) Sam$_{\boxed{1}}$ admires herself$_{\boxed{1}}$.

2

$$
\left[
\text{CONTENT}
\begin{bmatrix}
\text{REL} & \text{admire} \\
\text{ARG1}_{npro} & [\text{INDEX} \quad \boxed{1}] \\
\text{ARG2}_{ana} & [\text{INDEX} \quad \boxed{2}]
\end{bmatrix}
\right]
$$
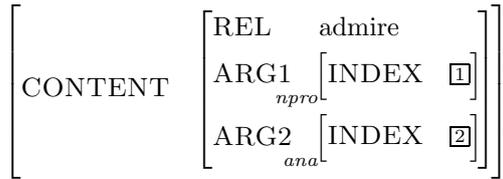
Where $\boxed{1}=\boxed{2}$, of course.

3.2 Nom-obj Sorts and Index Sorts

```
                        nom-obj
                   ╱              ╲
                pron               npro
              ╱      ╲               │
           ana        ppro        the boys
          ╱    ╲        │            Sam
       refl    recip   she
        │       │      her
        │       │
      X-self  each other
```

```
              index
           ╱    │    ╲
         ref    it    there
          │     │      │
         ...    it    there
```
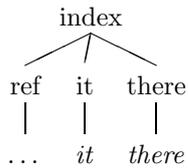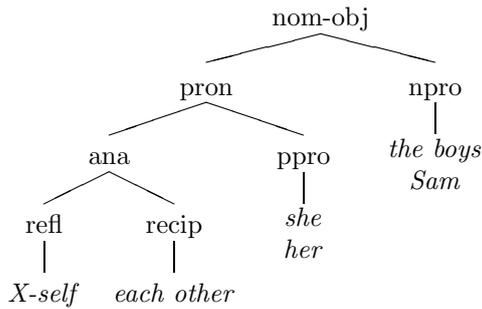
(e.g. the content of *she* is a subsort of ppro, its index *she* is a subsort of ref; the content of expletive *there* is a subsort of ppro, its index is a subsort of there).

4 HPSG Definitions: obliqueness, o-command

For *synsem* objects X, Y, and Z:

- Y is less oblique than Z iff Y precedes Z in the SUBCAT list of some lexical head.
- A *synsem* object is referential if its INDEX is of sort *ref*.
- Let Y and Z be *synsem* objects with distinct LOCAL values, with Y referential. Y *locally o-commands* Z just in case Y is less oblique than Z.
- Y *o-commands* Z iff Y locally o-commands X dominating Z.
- Y (*locally*) *o-binds* Z just in case Y and Z are coindexed and Y (locally) o-commands Z. If Z is not (locally) o-bound, then it is said to be (*locally*) *o-free*.

4.1 Examples

```
                        S
                 ╱             ╲
        ⬚ NP⬚                   VP
            │              ╱          ╲
           He           V< ⬚NP⬚, ⬚NP⬚ >    ⬚NP⬚
                             │                │
                          admires          himself
```
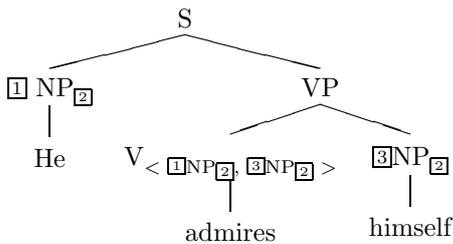
5 HPSG Binding Theory

- A locally o-commanded anaphor must be locally o-bound.
- A personal pronoun must be locally o-free.
- A non-pronoun must be o-free.

(10) John$_i$ likes himself$_i$.
$\langle NP : npro_i, NP : ana_i \rangle$

(11) *John$_i$ likes him$_i$.
$\langle NP : npro_i, NP : ppro_i \rangle$

(12) *He$_i$ likes John$_i$.
$\langle NP : ppro_i, NP : npro_i \rangle$

(13) John$_i$ depends on himself$_i$.
$\langle NP : npro_i, PP : ana_i \rangle$

(14) *John$_i$ depends on him$_i$.
$\langle NP : npro_i, PP : ppro_i \rangle$

(15) Mary described John$_i$ to himself$_i$
$\langle NP, NP : npro_i, PP : ana_i \rangle$

(16) *Mary described John$_i$ to him$_i$
$\langle NP, NP : npro_i, PP : ppro_i \rangle$

(17) John$_i$ knows Mary likes him$_i$.
knows:$\langle NP : npro_i, S \rangle$
likes:$\langle NP_j, NP : ppro_i \rangle$

(18) *John$_i$ knows Mary likes himself$_i$
knows:$\langle NP : npro_i, S \rangle$
likes:$\langle NP_j, NP : ana_i \rangle$

(19) They$_i$ like [[each other's]$_i$ friends].
friends:$\langle NP : ana_i \rangle$

(20) They$_i$ like [[their]$_i$ friends].
friends:$\langle NP : ppro_i \rangle$

5.1 Note

- Note that non-o-commanded anaphors need not be locally o-bound (or in fact bound at all), such anaphors are called *exempt* (i.e. exempt from Principle A, and hence binding conditions in general).
- There are a variety of positions which are not locally o-commanded: first position on a subcat list; second position on a subcat list after an expletive or other non-referential item. In such positions, either a pronoun or an anaphor can occur.

5.2 More Examples

(21) a. John and Mary heard that the journal had rejected each other's papers.
b. Why are John and Mary letting the honey drip on each other's feet?

(22) a. John$_i$, I like t$_i$
b. *He$_i$ knows that I like John$_i$
c. *John, he$_i$ knows that I like t$_i$

(23) a. They made sure
it was clear to each other that this should be done
clear: $\langle NP_{it}, PP : ana_i, \overline{S} \rangle$

b. John knew that
... only himself was left.
be:$\left\langle \boxed{1}PP_{\boxed{i}}, XP\left\langle \boxed{1}NP\right\rangle\right\rangle$
left:$\left\langle \boxed{1}NP\right\rangle$
... there was only himself left
be:$\left\langle NP : there_{\boxed{i}}, \boxed{1}NP_{\boxed{i}}, XP\left\langle \boxed{1}NP\right\rangle\right\rangle$
c. Who does John admire?
Only himself

(24) a. *Himself admires John.
b. John believes himself admires Sandy.
c. John believes himself to admire Sandy.

(25) a. The children$_{\boxed{i}}$ admired those pictures of each other$_{\boxed{i}}$.
pictures:$\left\langle DETP, PP : ana_{\boxed{i}}\right\rangle$
b. *The children$_{\boxed{i}}$ admired John's pictures of each other$_{\boxed{i}}$.
pictures:$\left\langle NP : ref, PP : ana_{\boxed{i}}\right\rangle$

5.3 Why "distinct LOCAL values"?

Let Y and Z be *synsem* objects *with distinct LOCAL values*, with Y referential. Y *locally o-commands* Z just in case Y is less oblique than Z (emphasis added).

Why is this restriction needed?

(26) A politician$_{\boxed{i}}$ who$_{\boxed{i}}$ met Kim$_{\boxed{j}}$ t$_{\boxed{i}}$

5.3.1 Relative Clauses

$$\overline{\text{N}}$$

```
            N̄
          /    \
        N̄       RP
        |      /    \
   politician NP      R̄
              |      /   \
           who_i    R      S
                    |     / \
              e⟨NP_i, S⟩  Kim met t_i
```

5.3.2 Raising

(27) Sam$_{\boxed{i}}$ seemed to like herself$_{\boxed{i}}$

S

[1] NP [i]
Sam

VP ⟨[1]⟩

V ⟨[1], VP⟨[1]⟩⟩
seemed

VP ⟨[1]⟩

V ⟨[1], VP⟨[1]⟩⟩
to

VP ⟨[1]⟩

V ⟨[1],[2]⟩
like

[2] NP:ana [i]
herself
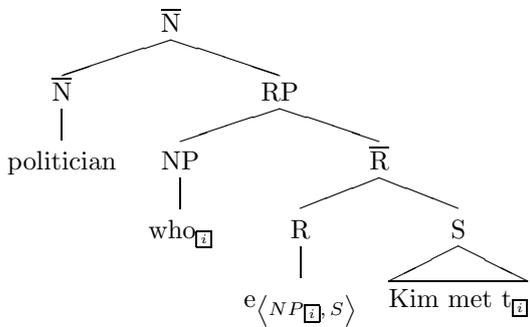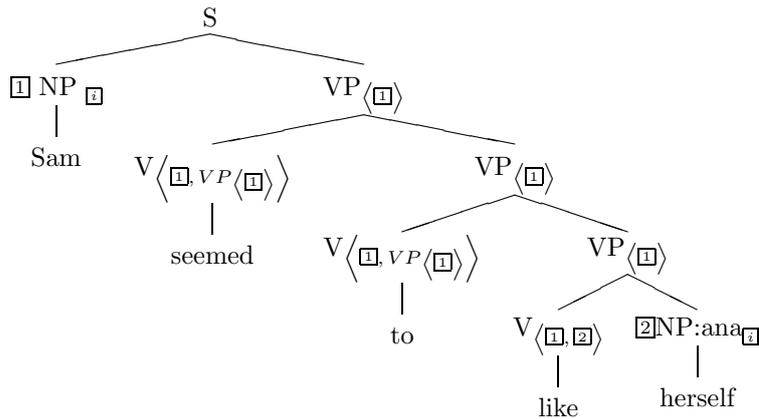
6 Issues, problems

Dalrymple (1993) Bredenkamp (1996)

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