HPSG II: the plot thickens

1 Passive: a lexical rule that rearranges ARG-ST!

(1) **Passive Lexical Rule**

$$\left\langle \boxed{1}, \begin{bmatrix} tv\text{-}lxm \\ \text{ARG-ST} \left\langle \left[\text{INDEX } i\right] \right\rangle \oplus \boxed{a} \end{bmatrix} \right\rangle \Rightarrow$$

$$\left\langle F_{PSP}\left(\boxed{1}\right), \begin{bmatrix} part\text{-}lxm \\ \text{SYN} \left[\text{HEAD} \left[\text{FORM pass}\right]\right] \\ \text{ARG-ST } \boxed{a} \oplus \left\langle \left[\begin{matrix}\text{PP} \\ \text{FORM by} \\ \text{INDEX } i\end{matrix}\right] \right\rangle \end{bmatrix} \right\rangle$$

[The role of the index is to preserve the theta-role of the first member of ARG-ST in the input as the theta-role of the object of *by* in the output. The index is the value for INDEX.]

(2) **Lexical Entry for *be* in passive sentences**

$$\left\langle \text{be}, \begin{bmatrix} be\text{-}lxm \\ \text{ARG-ST} \left\langle \boxed{1}, \left[\begin{matrix}\text{SYN} \left[\begin{matrix}\text{HEAD} \left[\begin{matrix}verb \\ \text{FORM pass}\end{matrix}\right] \\ \text{VAL} \left[\begin{matrix}\text{SPR} \left\langle \boxed{1} \right\rangle \\ \text{COMPS} \left\langle\ \right\rangle\end{matrix}\right]\end{matrix}\right] \\ \text{SEM} \left[\text{INDEX } s\right]\end{matrix}\right] \right\rangle \\ \text{SEM} \left[\begin{matrix}\text{INDEX } s \\ \text{RESTR} \left\langle\ \right\rangle\end{matrix}\right] \end{bmatrix} \right\rangle$$

- Notice how the subject of the embedded clause serves as the subject of *be*.
- The notation SPR $\left\langle \boxed{1} \right\rangle$ internal to the second member of ARG-ST entails that the SPR list is non-empty. Thus, *be* is selecting a non-saturated VP -- in effect, a V'. [Notice that COMPS is empty, i.e. it's not a V^0!]
- That is, the Head-Specifier rule just does not apply to the embedded VP. *Onward to Raising!*
- The reference to "FORM pass" is replaced by "PRED +" in the next chapter, to allow *be* with other complements.

Review:

(3) **The Valence Principle** (p. 106)
Unless the rule says otherwise, the mother's values for the VAL features (SPR and COMPS) are identical to those of the head daughter [i.e. SPR and COMPS are "head features" by default]

(4) **HEAD SPECIFIER RULE (p. 106)**

$$\begin{bmatrix} phrase \\ \textbf{VAL}\left[\textbf{SPR} \left\langle\ \right\rangle\right] \end{bmatrix} \rightarrow \boxed{2} \qquad \textbf{H}\begin{bmatrix} phrase \\ \textbf{VAL}\left[\begin{matrix}\textbf{SPR} \boxed{2} \\ \textbf{COMPS} \left\langle\ \right\rangle\end{matrix}\right] \end{bmatrix}$$

(5) **HEAD COMPLEMENT RULE** (p.106)
[No mention of SPR, thanks to the Valence Principle.]

$$\begin{bmatrix} phrase \\ \textbf{VAL}\left[\textbf{COMPS} \left\langle\ \right\rangle\right] \end{bmatrix} \rightarrow \textbf{H}\begin{bmatrix} word \\ \textbf{VAL}\left[\textbf{COMPS} \left\langle \boxed{1}, \ldots \boxed{n} \right\rangle\right] \end{bmatrix} \boxed{1}, \ldots, \boxed{n}$$

- **Notice that because the Passive rule manipulates ARG-ST, we predict that Binding Theory in passive sentences will look at the "new ranking" rather than the old -- see the problem on p.247.**

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2 CP-complementation

A new type *comp* joins *noun* as subtypes of a type *nominal* (subtype of *agr-pos*). *Nominal* licenses the feature CASE.

Note that C adds no semantics to the S to which it attaches.

(6) **Complementizer lexemes**

$$comp-lxm: \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{HEAD} \begin{bmatrix} comp \\ \text{AGR} \;\; 3sing \end{bmatrix} \\ \text{VAL} \;\; [\text{SPR} \;\langle\;\rangle] \end{bmatrix} \\ \text{ARG-ST} \left\langle \begin{bmatrix} \text{S} \\ [\text{INDEX} \;\; s] \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{INDEX} \;\; s \\ RESTR \;\langle\;\rangle \end{bmatrix} \end{bmatrix}$$

(7) **Extraposition [a word-to-word rule]**

$$\begin{bmatrix} word \\ \text{X}, \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{VAL} \begin{bmatrix} \text{SPR} \;\; \boxed{2}\,\text{CP} \\ \text{COMPS} \;\; \boxed{a} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \Rightarrow$$

$$\begin{bmatrix} word \\ \text{Y}, \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{VAL} \begin{bmatrix} \text{SPR} \;\langle \text{NP} \;\; [\text{FORM it}] \rangle \\ \text{COMPS} \;\; \boxed{a} \oplus \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

3 Raising-to-Subject verbs

Infinitival *to* treated as an auxiliary verb:

(8) **Lexical entry for *to* [p. 362]**

$$<to, \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \text{FORM base} \\ \text{INF} \;\; + \\ \text{AUX} + \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} \left\langle \boxed{1}, \begin{bmatrix} \text{HEAD} \begin{bmatrix} verb \\ \text{INF} \;\; — \\ \text{FORM} \;\; base \end{bmatrix} \\ \text{VAL} \begin{bmatrix} \text{SPR} \;\langle \boxed{1} \rangle \\ \text{COMPS} \;\langle\;\rangle \end{bmatrix} \\ \text{SEM} \;\; [\text{INDEX} \;\; s] \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{INDEX} \;\; s \\ \text{RESTR} \;\langle\;\rangle \end{bmatrix} \end{bmatrix}>$$

(9) ***subject-raising-verb-lx, (srv-lxm)***

$$\begin{bmatrix} \text{ARG-ST} \left\langle \boxed{1}, \begin{bmatrix} \text{SPR} \;\langle \boxed{1} \rangle \\ \text{COMPS} \;\langle\;\rangle \\ \text{INDEX} \;\; s_2 \end{bmatrix} \right\rangle \\ \text{SEM} \;\; [\text{RESTR} \;\langle\; [\text{ARG} \;\; s_2] \rangle\;] \end{bmatrix}$$

(10) **Lexical entry for *continue***

$$<continue, \begin{bmatrix} srv\text{-}lxm \\ \text{ARG-ST} \left\langle \text{X}, \begin{bmatrix} \text{VP} \\ [\text{INF+}] \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{INDEX} \;\; s_1 \\ \text{RESTR} \left\langle \begin{bmatrix} \text{RELN} \;\; \text{continue} \\ \text{SIT} \;\; s_1 \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}>$$

- By (9), the first member of ARG-ST is unified with the SPR value of the second member of ARG-ST.
- *Continue* has only one semantic argument, even though there are two members of ARG-ST.
- Because *continue* takes a second argument that has a non-null value for SPR, it is taking an unsaturated VP, not an S -- hence there is no overt embedded subject.

4 Subject control verbs

(11) ***subject-control-verb-lxm (scv-lxm)***

$$\begin{bmatrix} \text{ARG-ST} \left\langle \text{NP}_i, \begin{bmatrix} \text{SPR} & \langle \text{NP}_i \rangle \\ \text{COMPS} & \langle\ \rangle \\ \text{INDEX} & s_2 \end{bmatrix} \right\rangle \\ \text{SEM} \left[\text{RESTR} \left\langle \left[\text{ARG } s_2\right] \right\rangle\right] \end{bmatrix}$$

(12) ***try***

$$< try, \begin{bmatrix} scv\text{-}lxm \\ \text{ARG-ST} \left\langle \text{NP}_i, \begin{bmatrix} \text{VP} \\ \text{INF+} \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{INDEX } s_1 \\ \text{RESTR} \left\langle \begin{bmatrix} \text{RELN} & try \\ \text{SIT} & s_1 \\ \text{TRIER} & i \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} >$$

- "Note that the first argument of *try* and the subject of the VP are not identified; only their indices are." [p. 373] Coindexing vs. unification is motivated by the evidence that movement-based theories use to argue for control vs. movement -- e.g. transmission of quirky case with raising verbs, but not with control verbs in Icelandic.
- But the key difference is the fact that here a theta role is assigned to the SPR of *try* (cf. the assimilation of control to movement by Wehrli, Bowers, Hornstein, etc.)
- Likewise, ECM vs. object control is a question of whether the second argument is or is not assigned a theta-role (in RESTR), with (once again) a subsidiary difference in unification vs. coindexing. [pages 377ff].

5 Raising-to-Object verbs (ECM)

(13) ***object-raising-verb-lx, (orv-lxm)***

$$\begin{bmatrix} \text{ARG-ST} \left\langle \text{NP}, \boxed{1}, \begin{bmatrix} \text{SPR} & \boxed{1} \\ \text{COMPS} & \langle\ \rangle \\ \text{INDEX} & s_2 \end{bmatrix} \right\rangle \\ \text{SEM} \left[\text{RESTR} \left\langle \left[\text{ARG } s_2\right] \right\rangle\right] \end{bmatrix}$$

(14) **Lexical entry for *expect* [p. 378]**

$$< expect, \begin{bmatrix} orv\text{-}lxm \\ \text{ARG-ST} \left\langle \text{NP}_j, \text{X}, \begin{bmatrix} \text{VP} \\ \text{INF} & + \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{INDEX } s \\ \text{RESTR} \left\langle \begin{bmatrix} \text{RELN} & \textbf{expect} \\ \text{SIT} & s \\ \text{EXPECTER} & j \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$

6 Object control verbs

(15) ***object-control-verb-lxm (ocv-lxm)***

$$\begin{bmatrix} \text{ARG}-\text{ST} & \left\langle \text{NP},\ \text{NP}_i,\ \begin{bmatrix} \text{SPR} & \langle \text{NP}i \rangle \\ \text{COMPS} & \langle\ \rangle \\ \text{INDEX} & s_2 \end{bmatrix} \right\rangle \\ \text{SEM} & \left[\text{RESTR}\ \left\langle \left[\text{ARG}\ \ s_2\right] \right\rangle\right] \end{bmatrix}$$

(16) ***persuade***

$$< \textit{persuade},\ \begin{bmatrix} \textit{ocv - lxm} & \\ \text{ARG - ST} & \left\langle \text{NP}_j,\ \text{NP}_i,\ \begin{bmatrix} \text{VP} \\ \text{INF}\ \ + \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{INDEX}\ s & \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \textbf{persuade} \\ \text{SIT} & s \\ \text{PERSUADER} & j \\ \text{PERSUADEE} & i \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} >$$

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7 Binding meets Raising in Balinese: Wechsler 1998

[http://uts.cc.utexas.edu/~wechsler/Balinese-bind.pdf]

Balinese: Agentive Voice - top argument is subject. Type *acc-verb*.
Objective Voice - any non-top argument is subject. Type *erg-verb*.

(17) a. $acc-verb:$ $\begin{bmatrix} \text{SYN} & \left[\text{VAL}\ \left[\text{SPR}\ \langle \boxed{1} \rangle\right]\right] \\ \text{ARG - ST} & \langle \boxed{1}, \ldots \rangle \end{bmatrix}$

b. $erg-verb:$ $\neg \begin{bmatrix} \text{SYN} & \left[\text{VAL}\ \left[\text{SPR}\ \langle \boxed{1} \rangle\right]\right] \\ \text{ARG - ST} & \langle \boxed{1}, \ldots \rangle \end{bmatrix}$

[NB: Wechsler uses "SUBJ" instead of "SPR", and has a different type hierarchy.]

- ***Binding Theory*** makes reference to the ARG-ST list -- not to SPR and COMPS or to tree-structure (UG?). So it is indifferent to AV/OV.

(18) a. Ida nyingakin ragan idane.
3sg AV.see self

b. Ragan idane cingakin ida.
self OV.see 3SG

- ***Raising-to-subject*** involves unification of 1st argument of upstairs ARG-ST with downstairs SPR. Thus, if downstairs verb is OV, it is a downstairs non-top argument that "raises".

(19) **Raising-to-subject + downstairs AV/OV**
a. you seem much [AV.hide her-mistake] [(15b)]

b. her-mistake seem much [OV.hide you] [(14b)]

- ***Raising-to-object*** involves unification of second member of ARG-ST with SPR of third member. Upstairs AV/OV alternation yields predictable results

(20) **Raising-to-object + upstairs AV/OV**
a. I AV.know Nyoman Santosa go.home. [(16b)]

b. Nyoman Santosa OV.know I go.home [(16a)]

- Though space limitations left the examples out, presumably downstairs AV/OV behaves as predicted:

(21) **Raising-to-object + upstairs AV/OV and downstairs OV**
a. I AV.know you AV.hide her-mistake.

b. I AV.know her-mistake OV.hide you.

c. you OV.know I AV.hide her-mistake.

d. her-mistake OV.know I OV.hide you.

Binding:

- Key point: Raising is reflected in the ARG-ST of the higher verb, even though AV/OV is not reflected in the ARG-ST of the lower verb.

- Thus, for example, a raised subject with *seem* will be able to bind an *upstairs* experiencer -- even as it may be bindable by a downstairs agent when the lower verb is OV.

(22) **Binding and Raising-to-Subject**
a. *upstairs:* he seemed to-self to be ugly [(19)]

b. *downstairs:* self seem very OV.boast he [(22)]

- Likewise for Raising-to-Object

(23) a. *upstairs:* I AV.think myself/*me already dead. [(23a)]

b. *downstairs:* I AV.think himself already OV.see he [(26a)]

c. *upstairs:* myself OV.think I already dead [(23b)]

d. *downstairs:* himself OV.think I already OV.see he [(26b)]
'I believe that he already saw himself'

- The problem for GB: Suppose OV is binding-neutral because it involves, say, A-bar movement. Then downstairs OV + upstairs binding must involve improper movement. We can't let downstairs OV position be optionally A, or else we'd mess up the binding properties of the downstairs clause.

- The HPSG alternative is straightforward, since the theory allows for more than one mapping from ARG-ST onto SPR/COMPs and can do raising via SPR features.

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8 Long-Distance Dependencies

- An element present on the ARG-ST list may be missing from COMPs so long as it is present on a new list called GAP (a.k.a. SLASH):

(24) **Argument Realization Principle - old version**
A word's value for ARG-ST is $\boxed{a} \oplus \boxed{b}$ (append $\boxed{b}$ to $\boxed{a}$), where $\boxed{a}$ is its value for SPR and $\boxed{b}$ is its value for COMPS.

(25) **Argument Realization Principle (revised) [p. 432]**

$$word: \left[\begin{array}{l} \text{SYN VAL} \left[\begin{array}{ll} \text{SPR} & \boxed{A} \\ \text{COMPS} & \boxed{B} \ominus \boxed{C} \\ \text{GAP} & \boxed{C} \end{array}\right] \\ \text{ARG-ST} \quad \boxed{A} \oplus \boxed{B} \end{array}\right]_V$$

[Note: the subtracted list may be null, in which case the value for GAP is null as well.]

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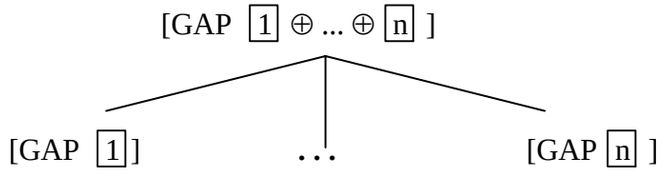
from the first edition of this textbook:

(26) **The GAP Principle [passes up values of GAP]**
A well-formed phrase structure licensed by a headed rule other than the Head-Filler Rule (see below) must satisfy the following SD:

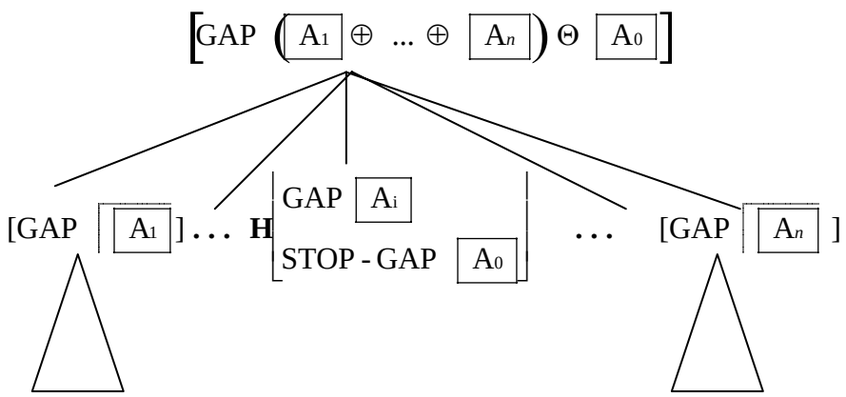


(27) **Head-Filler Rule [terminates GAP passing]**

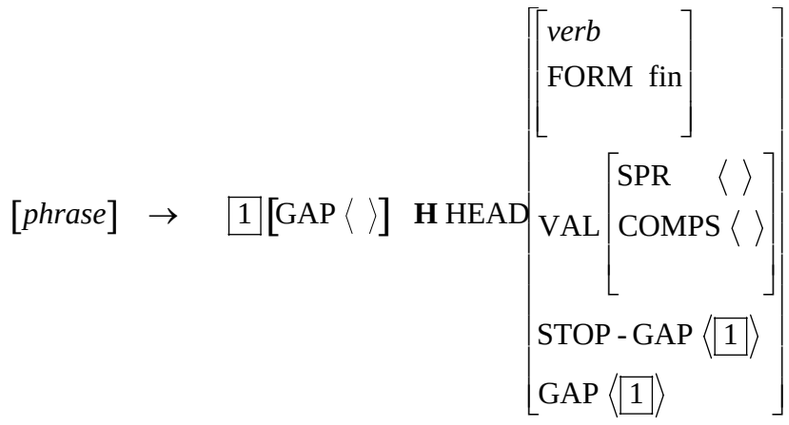
$$\left[\begin{array}{l} phrase \\ \text{GAP} \langle\ \rangle \end{array}\right] \rightarrow \boxed{1} \left[\begin{array}{l} phrase \\ \text{GAP} \langle\ \rangle \end{array}\right] \quad \mathbf{H} \left[\begin{array}{l} phrase \\ \text{FORM fin} \\ \text{SPR} \langle\ \rangle \\ \text{GAP} \langle \boxed{1} \rangle \end{array}\right]$$

The second edition:

(28) **The GAP Principle**
A local subtree Φ satisfies the GAP Principle with respect to a headed rule ρ iff Φ satisfiesL



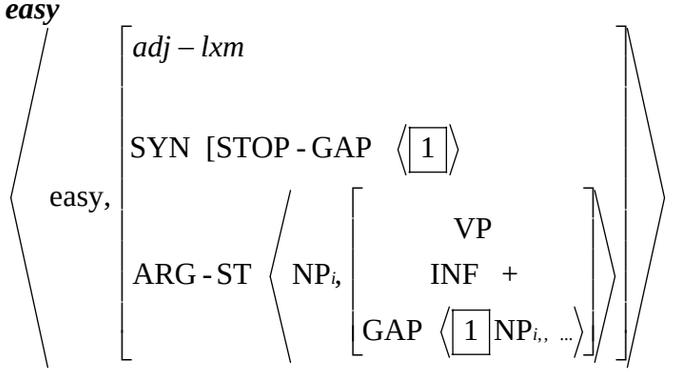
(29) **Head-Filler Rule**



"This rule says that a phrase can consist of a head with a gap preceded by an expression that meets whatever requirements the head places on that gap."

The independent existence of "stop-gap" allows elements other than the filler to stop the propagation of "GAP". An example: "Tough"-adjectives like *easy*:

(30) ***easy***



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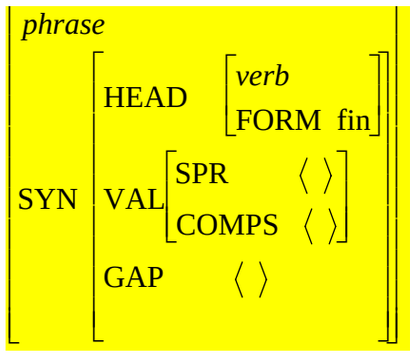
(31) **Initial symbol** **[p.440]**



- **Standard result: CSC**

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(32) **Subject Extraction Lexical Rule [!] [p. 442]**

$$\left\langle \text{X}, \begin{bmatrix} \textit{word} \\ \text{ARG-ST } \boxed{\text{A}} \\ \text{SYN} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{FORM fin} \end{bmatrix} \\ \text{VAL} \left[\text{SPR } \langle \text{Z} \rangle\right] \end{bmatrix} \end{bmatrix} \right\rangle \Rightarrow$$

$$\left\langle \text{Y}, \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{VAL} \left[\text{SPR } \langle\ \rangle\right] \\ \text{GAP } \langle \boxed{1} \rangle \end{bmatrix} \\ \text{ARG-ST } \boxed{\text{A}} \langle \boxed{1}, \ldots \rangle \end{bmatrix} \right\rangle$$