

Two Styles of Construction Grammar Do Ditransitives

Cognitive Construction Grammar (CCG)

and

Sign Based Construction Grammar (SBCG)

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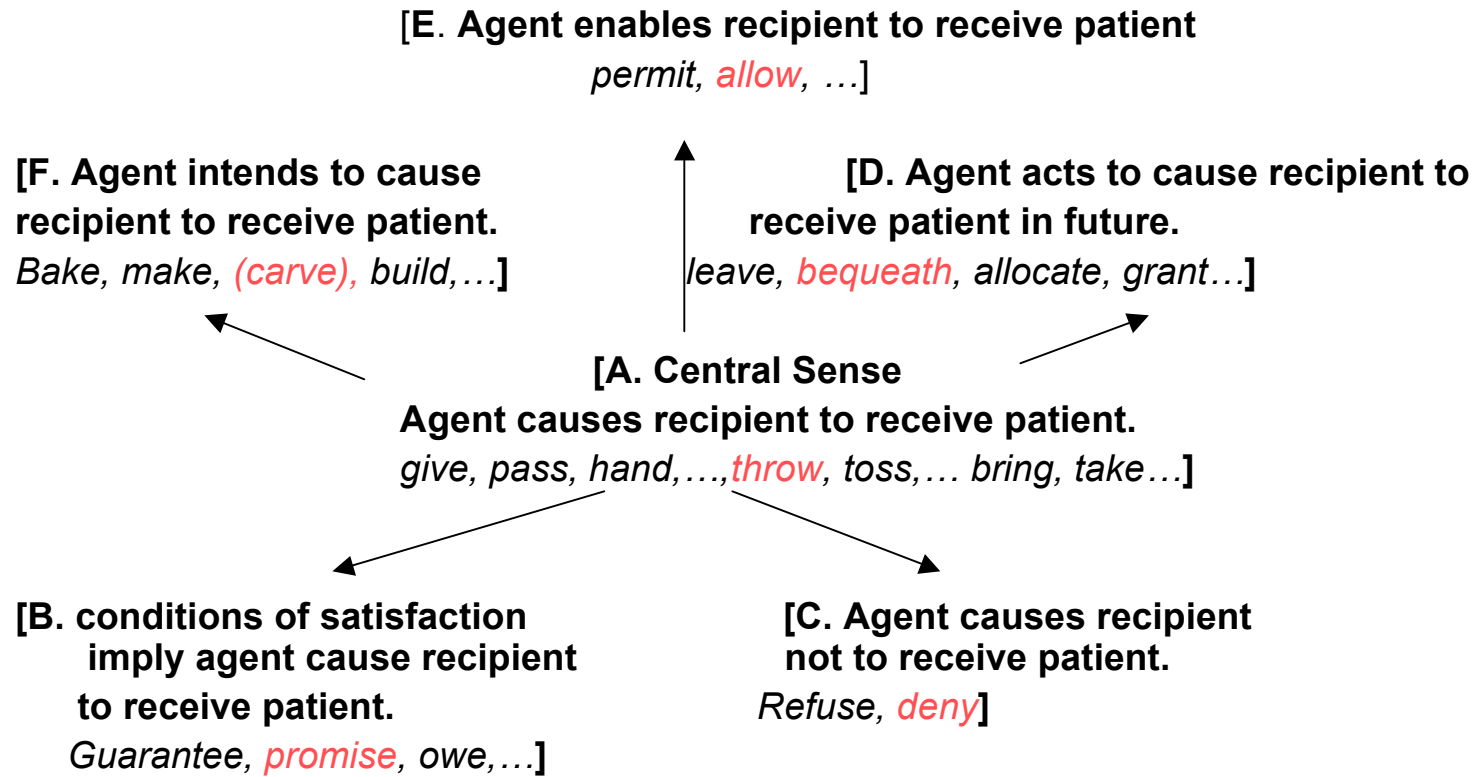
Note, 7/7/07: Some notes have been added and numerous corrections made, following class observations. I would appreciate hearing about additional errors you find. <paulkay AT-SIGN berkeley.edu>

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Some ditransitive sentences

- (1) a. The catcher **threw** Pat the bean bag.
- b. The boss **promised** me a raise.
- c. The administration **denied** the late arrivals permission to enter.
- d. Aunt Maude **bequeathed** me a collection of risqué postcards.
- e. The referee **allowed** Kim two free throws.
- f. A famous sculptor **carved** my sister a soap statue of Bugs Bunny.

Goldberg's analysis



Adapted from Goldberg, Adele E. *Constructions*. 1995. Chicago: U. Chicago Press.
Figure 2.2, p. 38.

A. 'X CAUSES Y TO RECEIVE Z' (central sense) Example: Joe gave Sally the ball.
B. 'Conditions of satisfaction imply 'X CAUSES Y TO RECEIVE Z' Example: Joe promised Bob a car.
C. 'X CAUSES Y NOT TO RECEIVE Z' Example: Joe refused Bob a cookie.
D. 'X ACTS TO CAUSE Y TO RECEIVE Z at some future point in time' Example: Joe bequeathed Bob a fortune.
E. 'X ENABLES Y TO RECEIVE Z' [NOTE: CAUSE HAS DISAPPEARED.] Example: Joe permitted Chris an apple.
F. 'X INTENDS TO CAUSE Y TO RECEIVE Z' Example: Joe baked Bob a cake.

Table 1. Illustration of Effects of Polysemy Links in Senses of the Ditransitive Construction, adapted from Goldberg 1995: 75.

Illustration of Effects of Polysemy Links in Senses of the Ditransitive Construction, adapted from Goldberg 1995.

Insights of the CCG approach:

A. different entailments. These classes of cases appear to be real because they produce common entailments within classes that systematically differ across classes.

B. Some of these verbs occur with only one object. Where does the recipient object come from?

- (2) a. The catcher **threw** the bean bag.
- b. A famous sculptor **carved** a soap statue of Bugs Bunny.

So we have to do something beyond the lexical entries for the verbs to account for the added argument.

Our proposal

- Three (not six) lexeme class constructions, corresponding to
- A. The Direct Recipient case (e.g., *give*),
- B. The Intended Recipient case (e.g., *bake*, *peel*),
- C. Everything else... with the lexical entries doing the rest of the work.

[Not much special to say about the Direct Recipient pattern now.]

Three properties of the **Intended Recipient** Pattern:

1. No entailment of receipt

*He gave her flowers but she never got them. (Direct Recipient)

He bought her flowers but she never got them. (Intended Recipient)

Note: As a student pointed out after class, the judgment that receipt is entailed is less robust with verbs like *throw* or *send* than with verbs like *give*, *hand*, or *slip*. I think it still goes through for me, but I suspect some others will disagree. We might need to develop two distinct Direct Recipient constructions to capture the entailment distinction in those dialects that lack entailment of receipt for *throw*, *send*, etc. Do you accept

?I sent her the package but she didn't receive it.

Or do you insist on

I sent the package to her but she didn't receive it.

2. Intended recipients don't passivize... (at least for some [old?] people).

- (3) a. Pat was thrown a bean bag (by the catcher).
- b. I was promised a raise (by the boss).
- c. Late arrivals are always denied permission to enter (by the administration).
- d. I was bequeathed a collection of risqué postcards (by Aunt Maude).
- e. Kim was allowed two free throws (by the referee).
- f. *My sister was carved a soap statue of Bugs Bunny (by a famous sculptor).

3. Intended recipients must benefit.

- (5) a. I got the cats some medicine.
 - b. #I got the rats some poison. (Intended interpretation: I plan to use the poison to kill the rats.)
 - (6) a. Claudine is mixing the neighbor a potion to cure him.
 - b. #Claudine is mixing the neighbor a potion to murder him.
 - But the benefit is not asserted. It's part of the contextual background.
- (7) She baked her next victim a poisoned cake.

- The rest of Goldberg's distinctions come from **modalities furnished by the verbs**. We will let the verbs alone furnish the modalities.
- So, in SBCG, we need only 3 lexeme classes, not 6 constructions.
- We don't need to mention the modal info in both the verb and the construction.
- We don't need unconstrained links.
- We can be explicit.

Some elements of SBCG

- Typed *feature structures*...
- in a *multiple inheritance hierarchy*
- Main **model objects** are...
- **Signs**, our models of words, phrases and sentences as feature structures, and
- **Constructs**, feature structures equivalent to local trees, whose nodes are signs.
- **Signs** have phonology, syntax, semantics, context, and form features. **Lexemes** are signs. Signs have no daughters.
- **Constructs** have a MOTHER (MTR) feature whose value is a **sign** and a DAUGHTERS (DTRS) feature, whose value is a list of **signs**.
- **Lexical entries** are *descriptions* of classes of lexical signs (e.g., lexemes).
- **Constructions** are *descriptions* either of classes of **constructs (combinatoric constructions)** or of **lexemes (lexical class constructions)**.
- Today we'll only be concerned with lexical class constructions.

What is a feature structure?

Assume:

- A finite set A of atoms $\{nom(inative), det(ermined), +, fin(ite), \dots\}$
- A finite set F of features $\{SYN(TAX), CASE, V(ERB)FORM, \dots\}$
- A set I of referential indices $\{i, j, k, \dots\}$

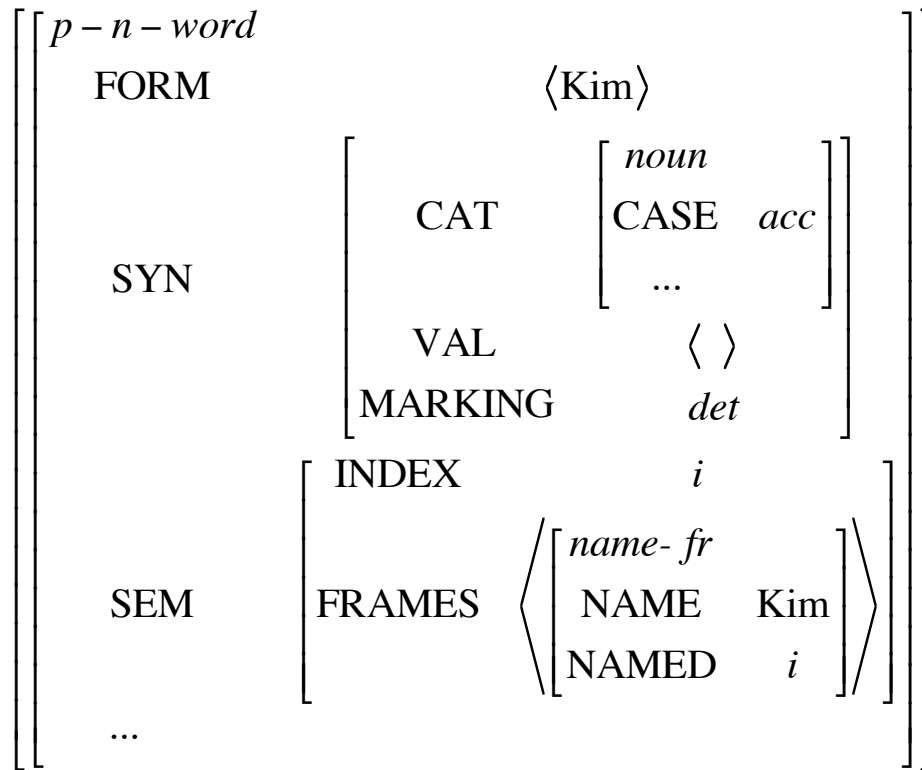
A function f in \mathcal{F} is a **feature structure** *iff* the domain of f is a subset of F and the range (counter domain) of f is the set $(A \cup I \cup \mathcal{F})$.

If that definition does nothing for you, think of a feature structure as a mathematical object that can be represented by an attribute value matrix (AVM) whose attributes are features, whose values are all either atoms, indices, or AVMS, and which “bottoms out” with all the ultimate values being atoms or indices (not AVMs),

If that doesn't help, just absorb the examples of AVMs you'll see.

So now: some examples of signs, constructs, lexical entries (licensing certain classes of signs), and constructions, especially combinatorial phrasal constructions (which license phrases). Lexical class constructions will be well exemplified when we get back to the main story.

- Example of a sign, the word *Kim*:



p-n-word stands for *proper-name-word*

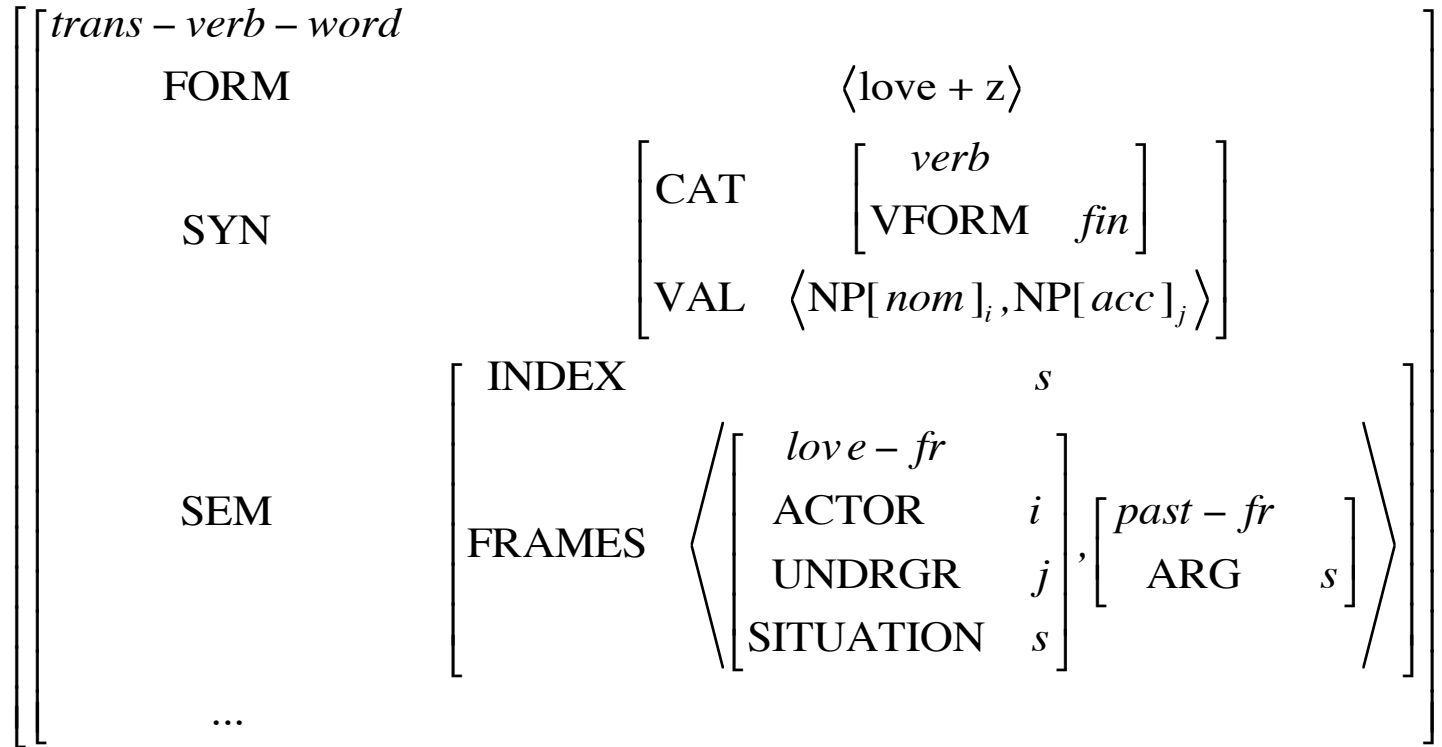
Note that representations of model objects appear in [[doubled brackets]]. Representations of description objects (parts of the grammar), notably constructions, will appear in [single brackets].

Example of a lexical entry: the lexical entry that licenses the sign *Kim* we just saw

Lexical entry for *Kim*

<i>p - n - word</i>											
FORM	⟨Kim⟩										
SYN	<table style="border-collapse: collapse; margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">CAT</td> <td style="padding: 5px;"><i>noun</i></td> </tr> <tr> <td style="padding: 5px;">VAL</td> <td style="padding: 5px;">⟨ ⟩</td> </tr> <tr> <td style="padding: 5px;">MARKING</td> <td style="padding: 5px;"><i>det</i></td> </tr> </table>	CAT	<i>noun</i>	VAL	⟨ ⟩	MARKING	<i>det</i>				
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<i>name - fr</i>											
NAME	Kim										
NAMED	<i>i</i>										

Another example of a sign (also a lexical sign): the word *loves*.



We won't have time to develop the (combinatoric) inflectional construction that licenses the lexical construct of which *loves* is the mother. But we will now look at two other combinatoric constructions. Specifically, the phrasal constructions that license (1) headed phrases and (2) simple declarative sentences.

We've seen *Kim* and we've seen *loves*. Now we're interested in putting them together to make the VP *loves Kim*, a *head-complement* phrase.

Some *head-complement* phrases:

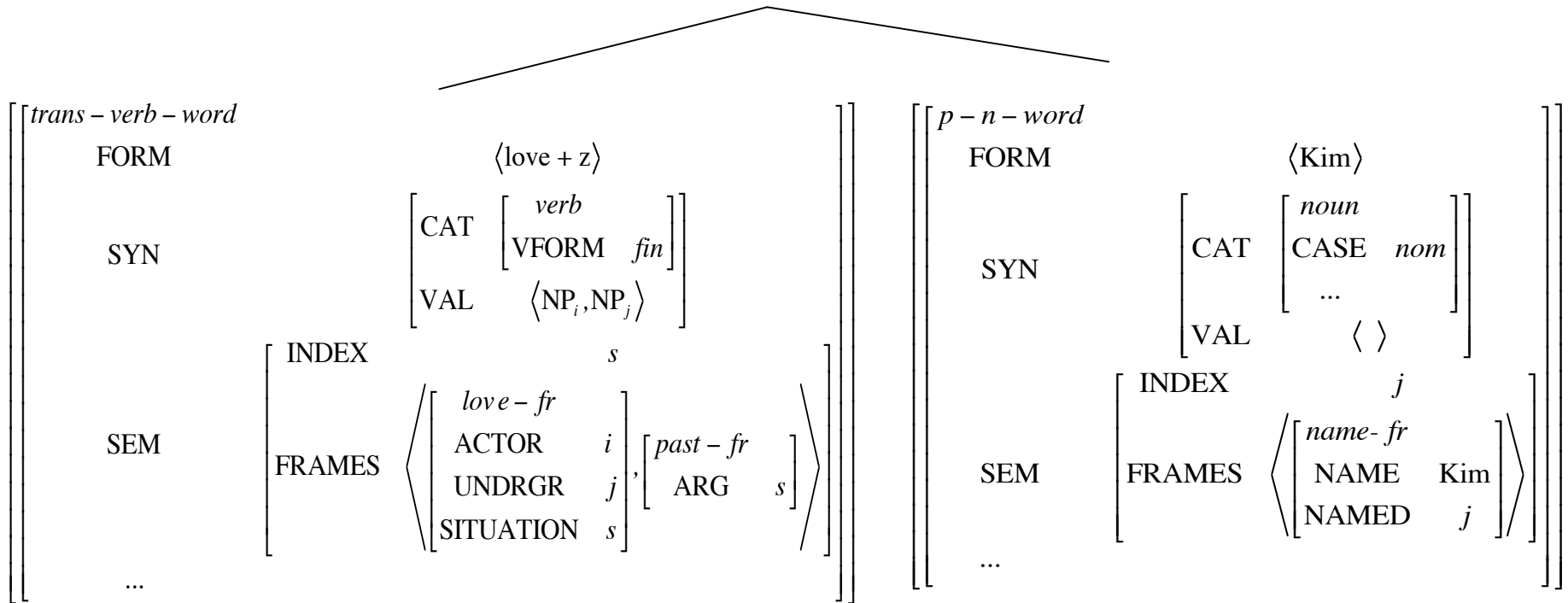
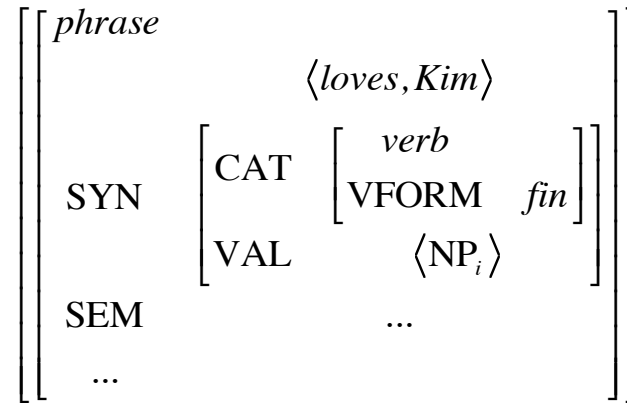
loves Kim (VP)

in Paris (PP)

herd [of cattle] (NP)

proud [of Dick Cheney] (AP)

The construct whose mother is the VP sign *loves Kim*

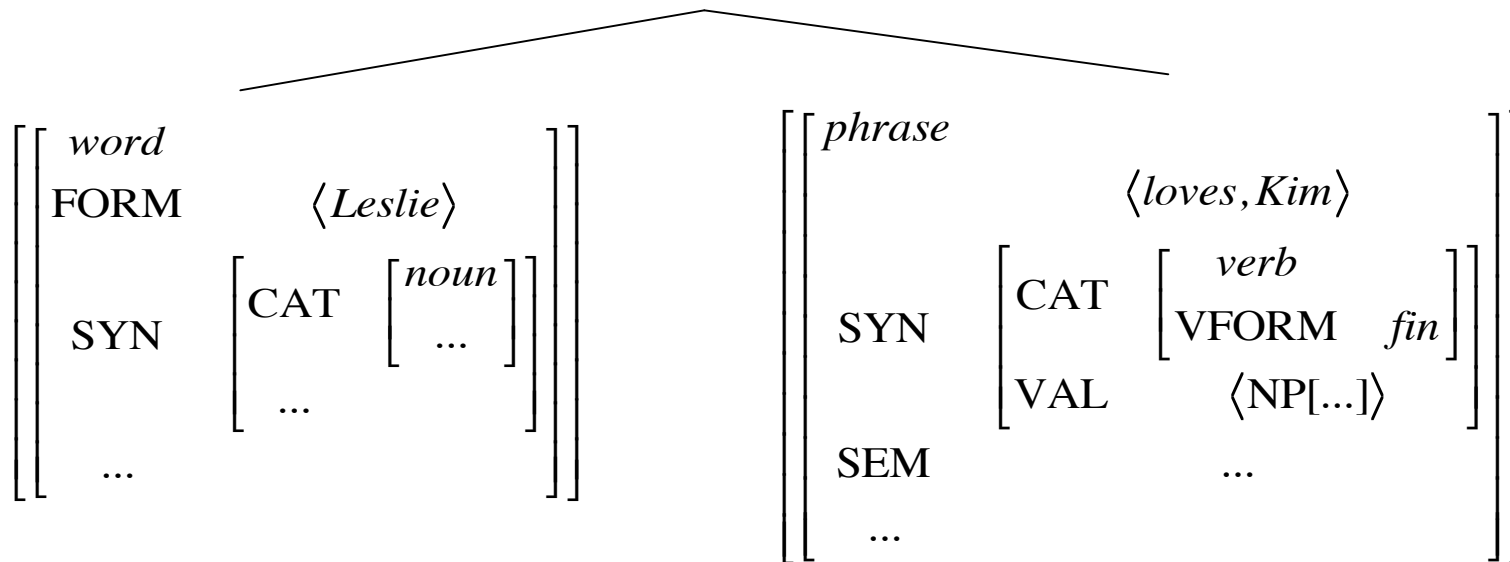
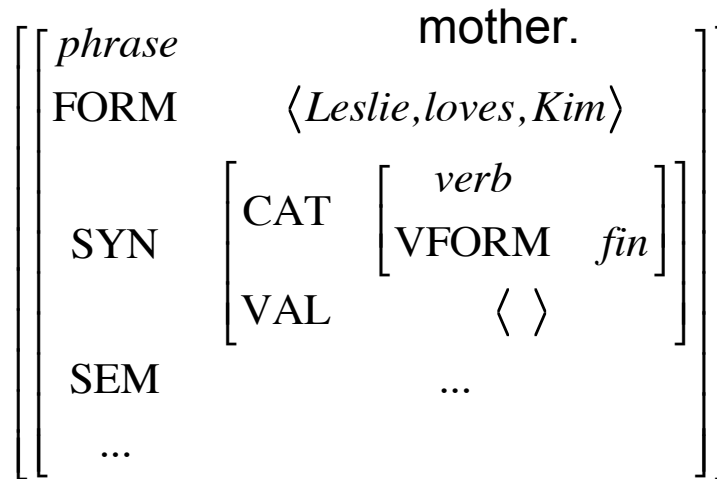


Now, the construction that licenses the construct *loves Kim* – and thereby licenses the sign *loves Kim* that is its mother.

Head-Complement Construction:

$$\text{hd-comp-cxt} \Rightarrow \left[\begin{array}{l} \text{MTR} \quad \left[\text{SYN} \quad \left[\text{CAT} \quad \text{Y} \right] \right. \\ \quad \quad \quad \left. \left[\text{VAL} \quad L_1 \right] \right] \\ \text{DTRS} \quad \langle \text{X} \rangle \oplus L_2 : \text{nelist} \\ \text{HD-DTR} \quad \text{X:} \left[\begin{array}{l} \text{word} \\ \text{SYN} \quad \left[\text{CAT} \quad \text{Y} \right] \\ \quad \quad \left[\text{VAL} \quad L_1 \quad \oplus \quad L_2 \right] \end{array} \right] \end{array} \right]$$

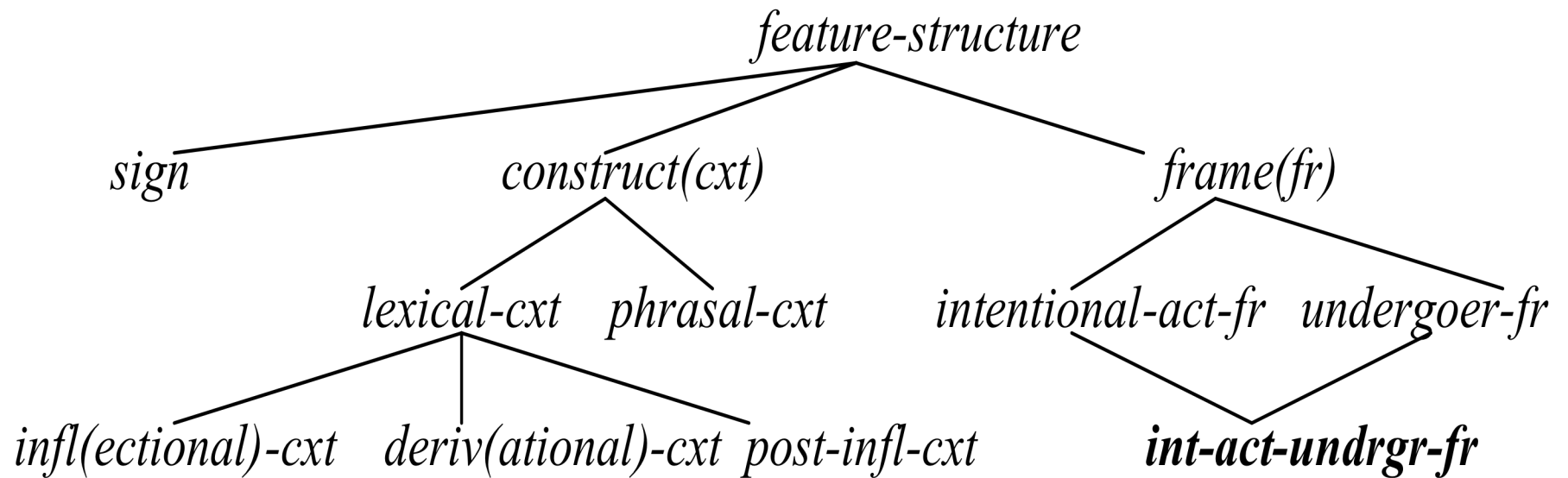
Now, let's look at the construct whose mother is the (sentential) sign *Leslie loves Kim*. After looking at this construct, we'll look at the construction that licenses it – and thereby licenses the sign that is its



Subject-Predicate Construction:

$$sp\text{-cxt} \Rightarrow \left[\begin{array}{l} \text{MTR} \left[\text{SYN} \left[\text{CAT} \left[\begin{array}{l} \textit{verb} \\ \text{VFORM} \textit{fin} \end{array} \right] \right] \right] \\ \text{DTRS} \quad \langle X_1, X_2 \rangle \\ \text{HD-DTR} \quad X_2: \left[\text{SYN} \left[\text{CAT} \left[\begin{array}{l} \textit{verb} \\ \text{VFORM} \textit{fin} \end{array} \right] \right] \right] \\ \text{VAL} \quad \langle X_1 \rangle \end{array} \right]$$

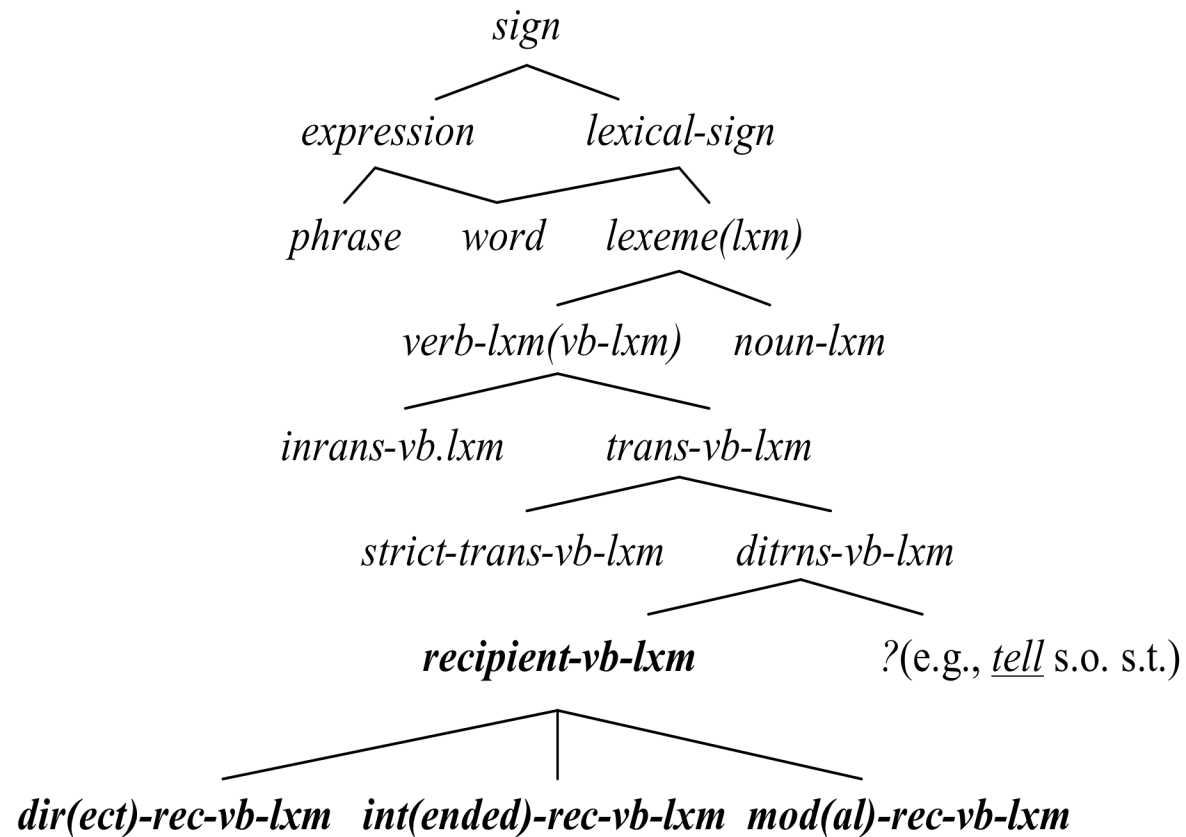
Part of the type hierarchy



- Coming up: More of the type hierarchy, developing subtypes of *sign*, noting the place of the kind of non-maximal lexeme that is inherited by the 3 subtypes of recipient lexemes .
- Look for *recipient-vb-lxm* and its heirs.

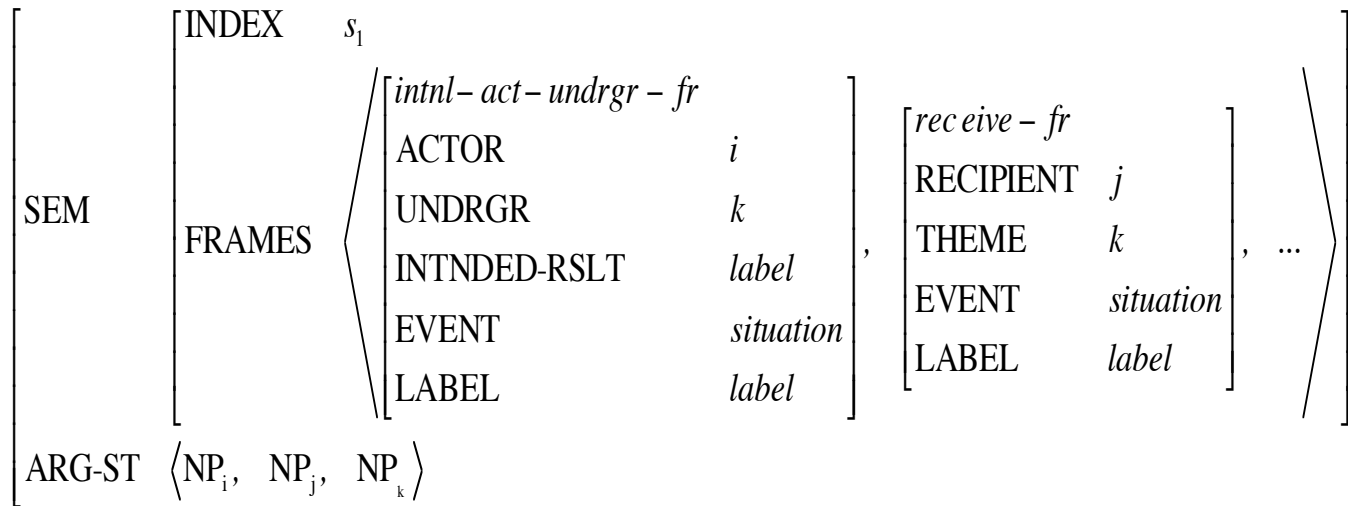
Part of the sign hierarchy
Notice *recipient-vb-lxm* and its 3 subtypes

(4)



The *recipient-verb-lexeme* lexical class construction:

(5) *rec(ipient)-vb-lxm* \Rightarrow

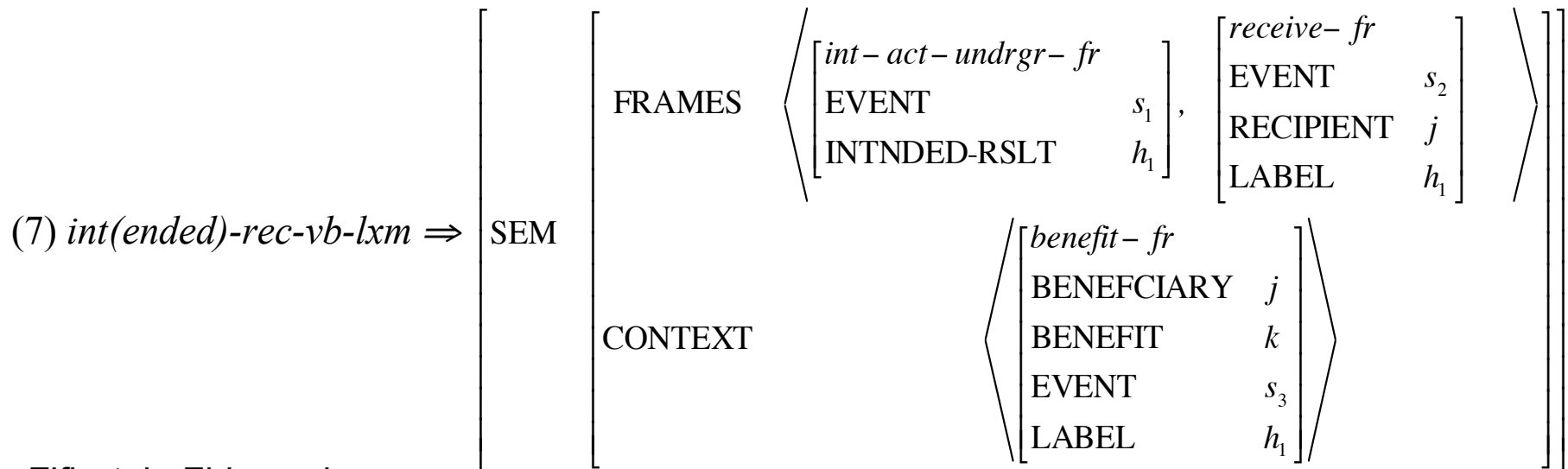
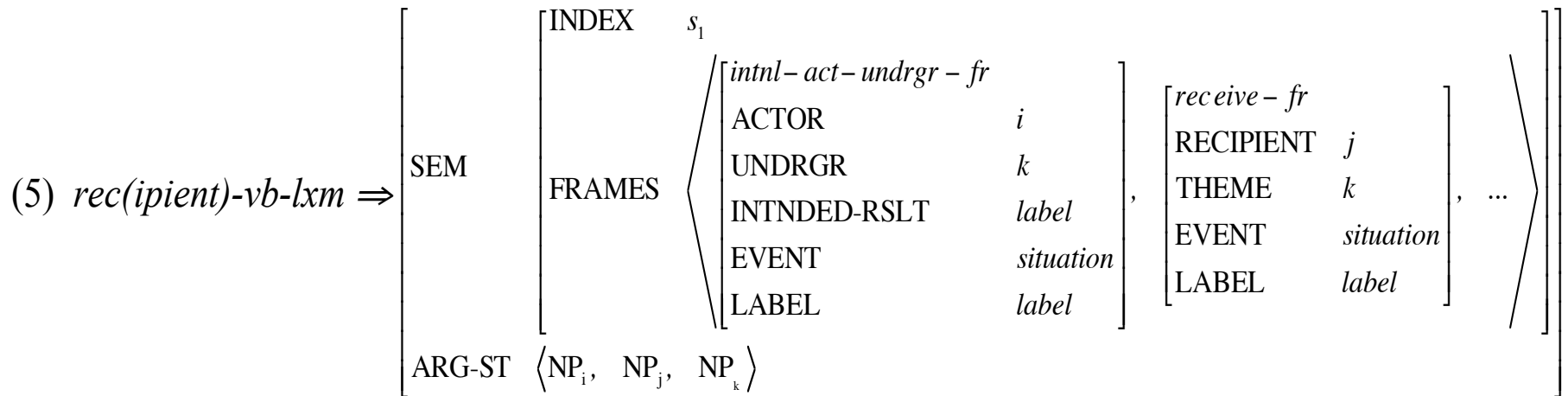


Okay, now we're ready for the three subtypes of recipient lexemes, and then an example of a lexical entry that fits with one of them.

$$(5) \text{ rec(ipient)-vb-lxm} \Rightarrow \left[\begin{array}{l} \text{SEM} \\ \text{ARG-ST } \langle \text{NP}_i, \text{NP}_j, \text{NP}_k \rangle \end{array} \left[\begin{array}{l} \text{INDEX } s_1 \\ \text{FRAMES} \left\langle \begin{array}{l} \text{intnl-act-undrgr-fr} \\ \text{ACTOR } i \\ \text{UNDRGR } k \\ \text{INTNDED-RSLT } \textit{label} \\ \text{EVENT } \textit{situation} \\ \text{LABEL } \textit{label} \end{array} \right\rangle, \left[\begin{array}{l} \text{receive-fr} \\ \text{RECIPIENT } j \\ \text{THEME } k \\ \text{EVENT } \textit{situation} \\ \text{LABEL } \textit{label} \end{array} \right], \dots \right] \end{array} \right]$$

$$(6) \text{ dir(ect)-rec-vb-lxm} \Rightarrow \left[\text{SEM|FRAMES} \left\langle \left[\begin{array}{l} \text{intnl-act-undrgr-fr} \\ \text{EVENT } s_1 \\ \text{INTENDED-RESULT } h_1 \end{array} \right], \left[\begin{array}{l} \text{receive-fr} \\ \text{EVENT } s_1 \\ \text{LABEL } h_1 \end{array} \right] \right\rangle \right]$$

Fido_i gave Fifi_j a pizza_k



Fifi_i stole Fido_j a pizza_k

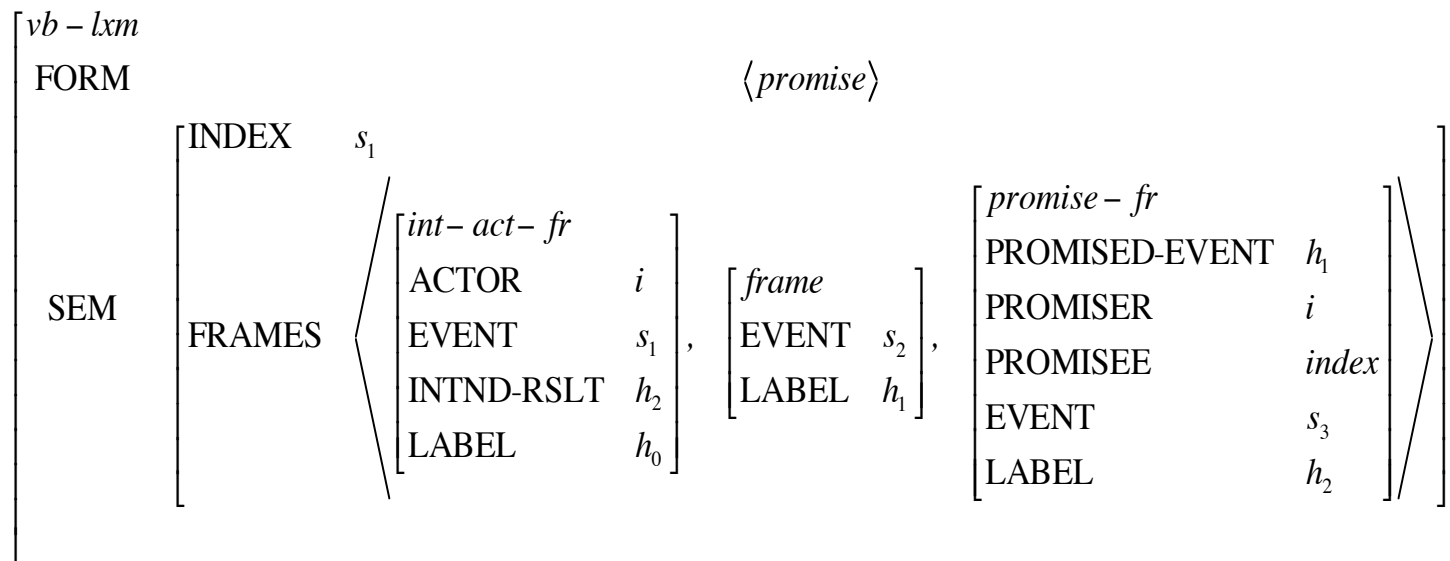
Identity of labels, as in the case of the receive and benefit frames in (7), is interpreted as conjunction. The reception and benefit are both part of the intended result, although they must be separate events, since one of them is not asserted in an utterance, but instead regarded as part of the contextual background of the utterance.

$$(5) \text{ rec(ipient)-vb-lxm} \Rightarrow \left[\begin{array}{l} \text{SEM} \\ \text{ARG-ST } \langle \text{NP}_i, \text{NP}_j, \text{NP}_k \rangle \end{array} \left[\begin{array}{l} \text{INDEX } s_1 \\ \text{FRAMES} \left[\begin{array}{l} \text{intnl-act-undrgr-fr} \\ \text{ACTOR } i \\ \text{UNDRGR } k \\ \text{INTNDED-RSLT } \textit{label} \\ \text{EVENT } \textit{situation} \\ \text{LABEL } \textit{label} \end{array} \right] \\ \text{receive-fr} \\ \text{RECIPIENT } j \\ \text{THEME } k \\ \text{EVENT } \textit{situation} \\ \text{LABEL } h_1 \end{array} \right] \dots \right]$$

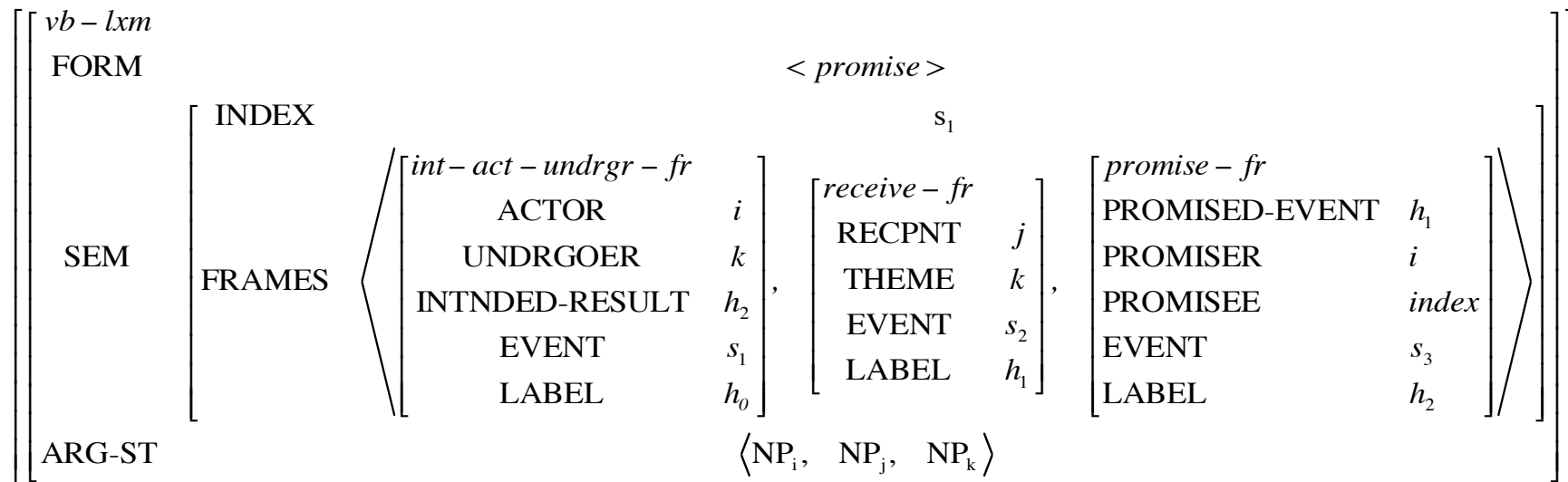
$$(8) \text{ mod(al)-rec-vb-lxm} \Rightarrow \left[\text{SEMIFRAMES} \left[\begin{array}{l} \text{intnl-act-undrgr-fr} \\ \text{EVENT } s_1 \\ \text{INTNDED-RSLT } h_2 \\ \text{LABEL } h_0 \end{array} \right], \left[\begin{array}{l} \text{receive-fr} \\ \text{EVENT } s_2 \\ \text{LABEL } h_1 \end{array} \right], \left[\begin{array}{l} \text{modality-fr} \\ \text{MDLZED-EVENT } h_1 \\ \text{EVENT } s_3 \\ \text{LABEL } h_2 \end{array} \right] \right]$$

Kim_i promised Fido_j a pizza_k

(9) Lexical entry for *promise*:



10. *promise* as a *mod-rec-vb-lxm*



Fifi_i promised Fido_j a pizza_k.

Note 1: Under all but the most unusual circumstances, the recipient *j* will be interpreted as identical with the promisee. We assume, however, that this identification is a matter of pragmatic construal rather than grammatical convention.

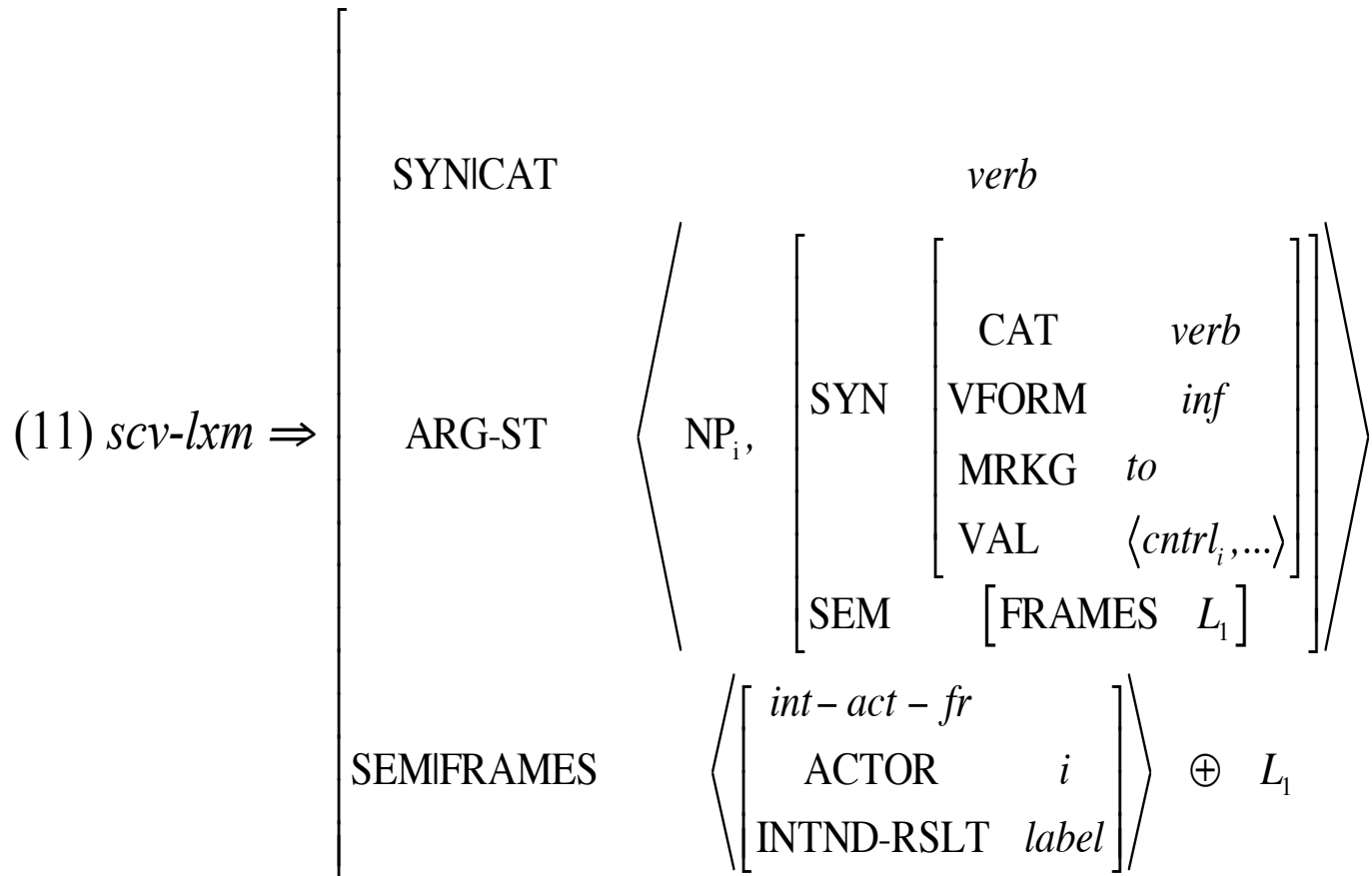
Note 2: We consider here only sentences in which there is no overt realization of the promisee. We do not describe the grammatical mechanism according to which this semantic requirement is satisfied and the referent of the promisee index recovered from the context.

Promise, of course has other valence incarnations, as, for example, a subject control lexeme, in a sentence like

Fifi promised to drink all her cream.

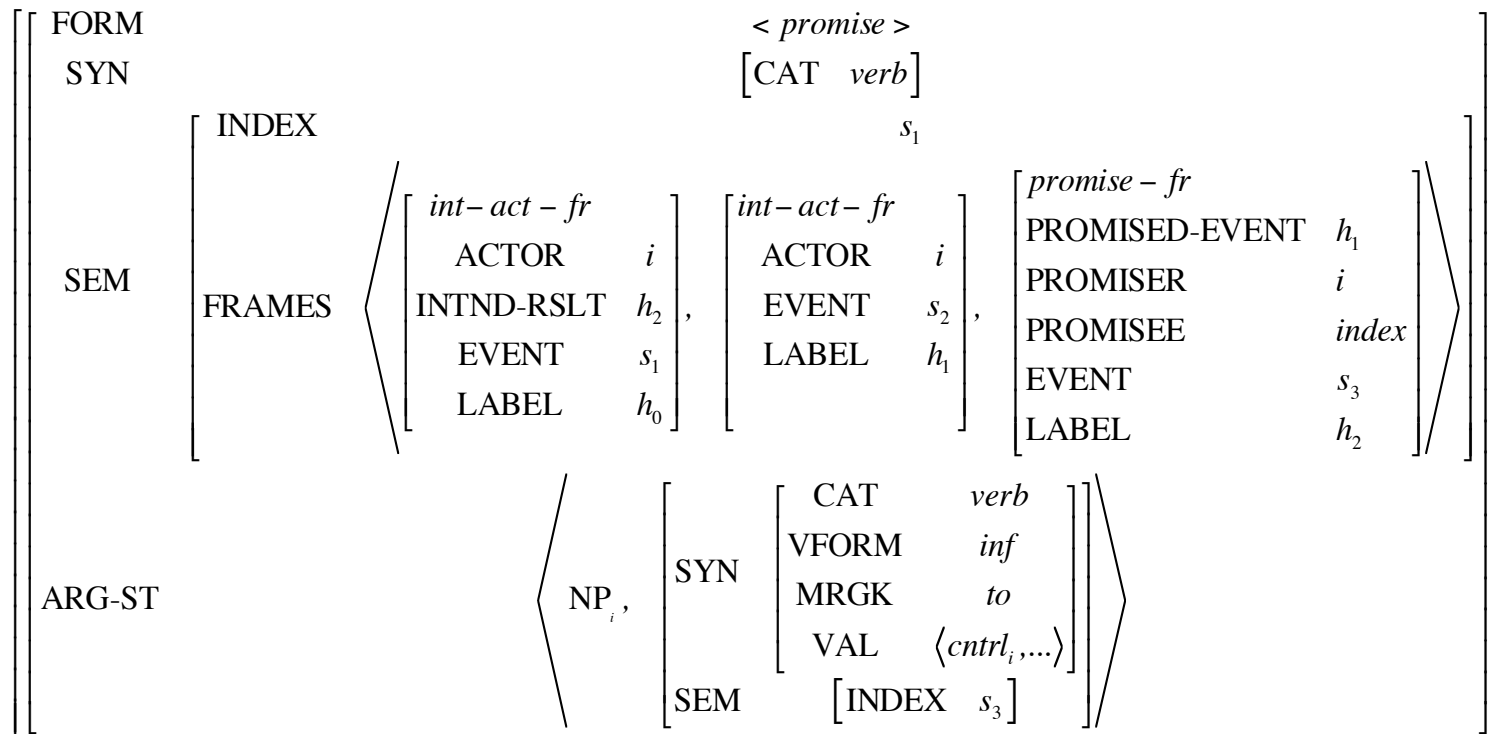
So we'll need a subject control verbal lexeme type, *scv-lxm*, for verbs like *promise*, *try*, *intend*, ...

11. The subject control verbal lexeme type (*svc-lxm*), a subtype of intrans-verb-lxm



Note: *cntrl* denotes a type of null element that corresponds in distribution to controlled PRO in the transformational tradition. In SBSG null elements appear as parts of Argument Structure, but not as syntactically realized but phonologically empty categories. That is, they carry semantic indices, but lack syntax, morphology and phonology.

12. Promise as a *scv-lxm*



Fido promised to sing.

Note: "*cntrl*" is explained on previous slide.

Promise also appears with *that*-marked
finite

Complements:

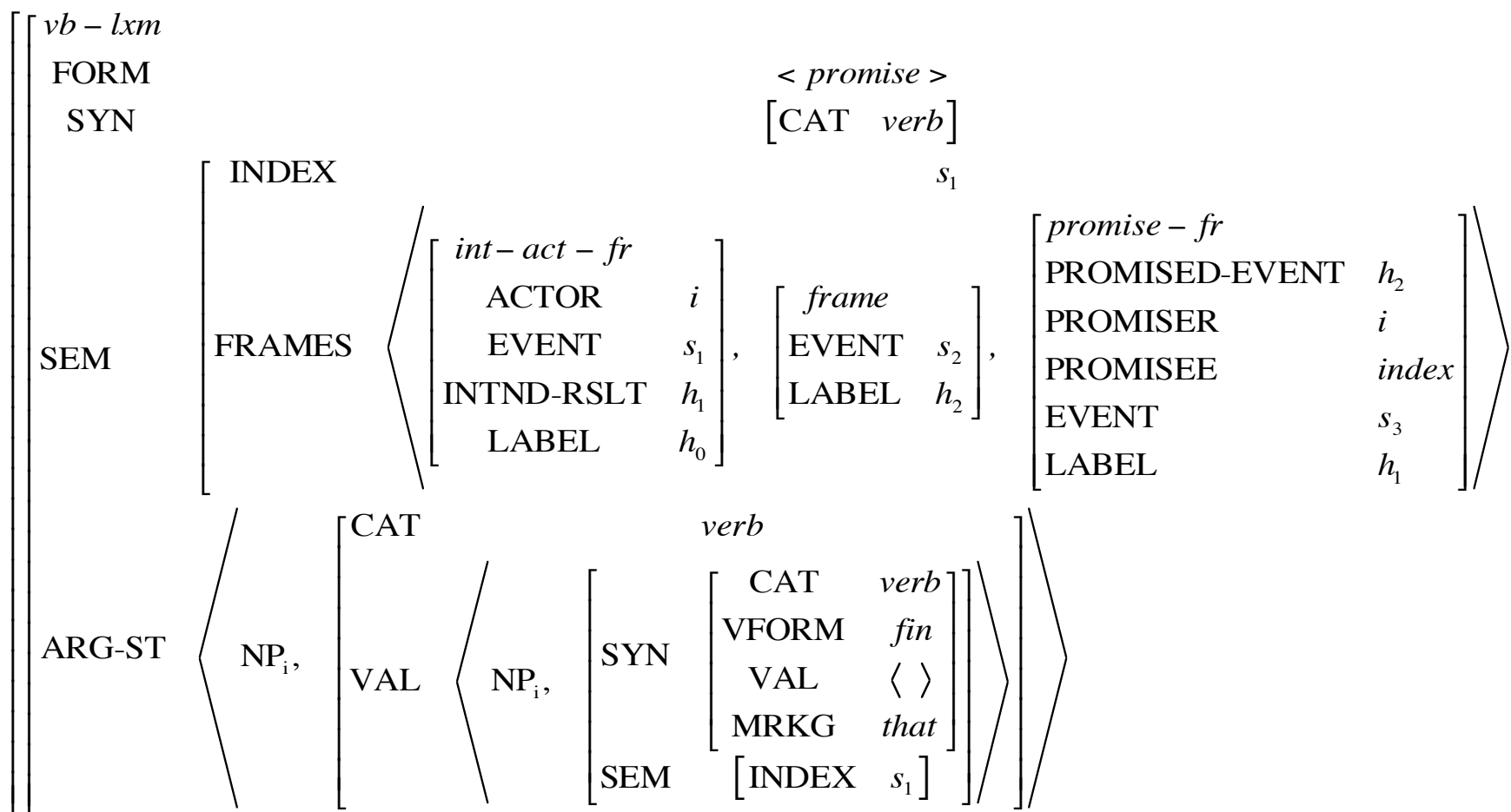
Fido promised that there'd be lots of cream.

So we need a bare finite complement
(*bfc-vb-lxm*) lexeme type .

13. Marked finite complement verb lexeme (*mfc-vb-lxm*), subtype of *intrans-verb-lxm*

$$(13) \quad mfc\text{-}vb\text{-}lxm \Rightarrow \left[\begin{array}{c} \text{SYN} \\ \text{ARG-ST} \end{array} \left[\begin{array}{c} \text{NP,} \\ \left[\begin{array}{c} \text{CAT} \\ \text{VAL} \\ \text{MRKG} \end{array} \left[\begin{array}{c} \left[\begin{array}{c} \text{verb} \\ \text{VFORM } fin \end{array} \right] \\ \langle \rangle \\ that \end{array} \right] \end{array} \right] \end{array} \right] \right]$$

14. *Promise* as a *mfc-vb-lxm*.



Fido promised that he would sing.

15. **Bare finite complement verb lexeme (bfc-lxm).** (*Fido promised he wouldn't eat all the pizza.*) Just like (14) except for [MRKG *none*].

16. **For fun:** *Promise* appears in several other valence configurations: *Fido promised Fifi he would sing*; *Fido promised Fifi to sing*; *Fido promised it wouldn't rain*. For a home exercise, you might try to work out how to extend the analysis to include some of these other valence patterns for *promise*.