



Ling 566
Nov 17, 2022
Auxiliaries

Overview

- What are auxiliaries?
- General properties of auxiliaries
- Lexical type/lexical entries for auxiliaries
- Reading questions
- Next time: NICE properties (lexical rules)

What Auxiliaries Are

- Sometimes called “helping verbs,” (English) auxiliaries are little words that come before the main verb of a sentence, including forms of *be*, *have*, *do*, *can*, *could*, *may*, *might*, *must*, *shall*, *should*, *will*, and *would*
- Cross-linguistically, they tend to be involved in the expression of time, necessity, possibility, permission, and obligation, as well as such things as negation, affirmation, and questioning

Some Basic Facts about Eng. Auxiliaries

- They are optional
Pat tapdanced. Pat can tapdance. Pat is tapdancing.
- They precede any non-auxiliary verbs
**Pat tapdance can. *Pat tapdancing is.*
- They determine the form of the following verb
**Pat can tapdancing. *Pat is tapdance.*
- When they co-occur, their order is fixed
*Pat must be tapdancing. *Pat is musting tapdance.*
- Auxiliaries of any given type cannot iterate
**Pat could should tapdance.*

A Little History

- Chomsky's first book, *Syntactic Structures* (1957), contained a detailed analysis of the English system of auxiliary verbs
- It showed how formal analysis could reveal subtle generalizations
- The power of Chomsky's analysis of auxiliaries was one of the early selling points for transformational grammar
 - Especially, his unified treatment of auxiliary *do*
- So it's a challenge to any theory of grammar to deal with the same phenomena

Two Approaches to Analyzing Auxiliaries

- Treat auxiliaries as a special category, and formulate specialized transformations sensitive to their presence
- Assimilate their properties to existing types as much as possible, and elaborate the lexicon to handle what is special about them
- We adopt the latter, treating auxiliaries as a subtype of *srv-lxm*

Consequences of making *auxv-lxm* a Subtype of *srv-lxm*

- Auxiliaries should express one-place predicates
- Auxiliaries should allow non-referential subjects (dummy *there*, *it*, and idiom chunks)
- Passivization of the main verb (the auxiliary's complement) should preserve truth conditions
- Are these borne out?

Why call auxiliaries verbs?

- *be*, *have*, and *do* exhibit verbal inflections (tense, agreement)
- *be*, *have*, and *do* can all appear as main verbs (that is, as the only verb in a sentence)
 - Their inflections are the same in main and auxiliary uses
 - *be* exhibits auxiliary behavior, even in its main verb uses
- Modals (*can*, *might*, *will*, etc.) don't inflect, but they occur in environments requiring a finite verb with no (other) finite verb around.

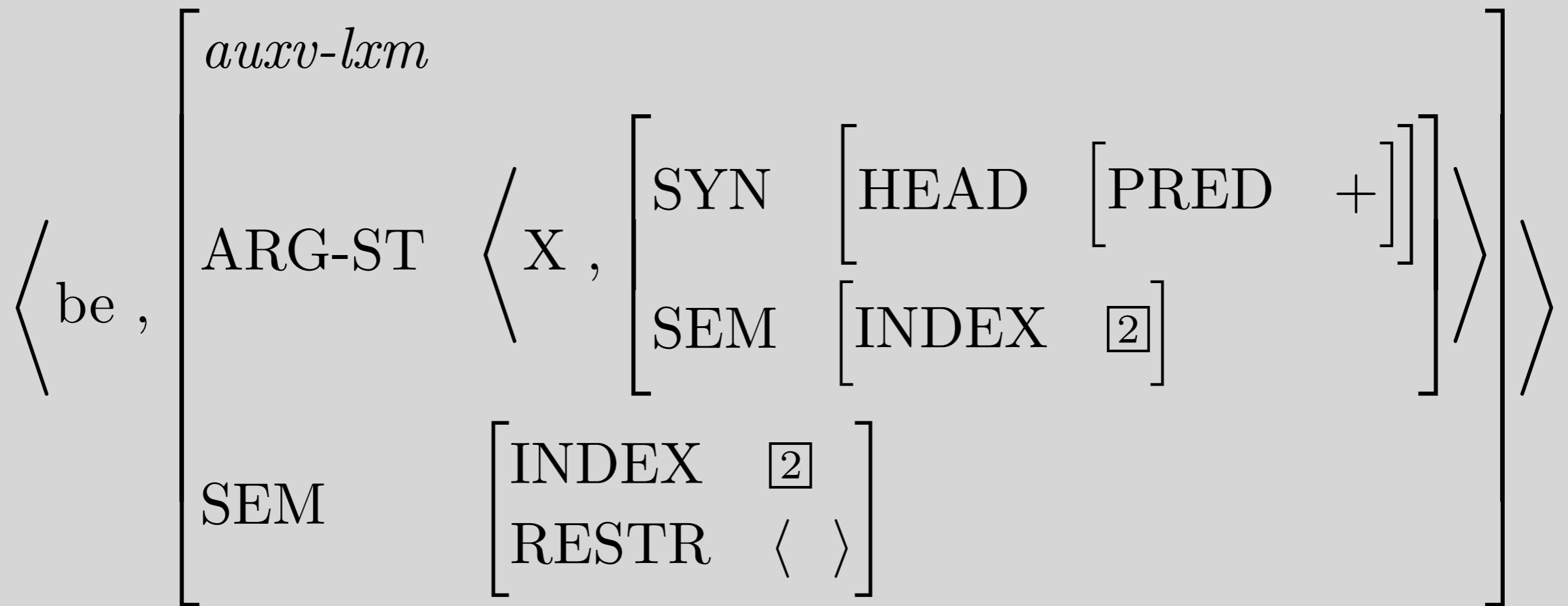
What's special about auxiliaries?

- Unlike other subject-raising verbs we have looked at, their complements aren't introduced by *to*
- The modals and *do* have defective paradigms
- There are restrictions on the ordering and iterability of auxiliaries
- They have a set of special characteristics known as the NICE properties.

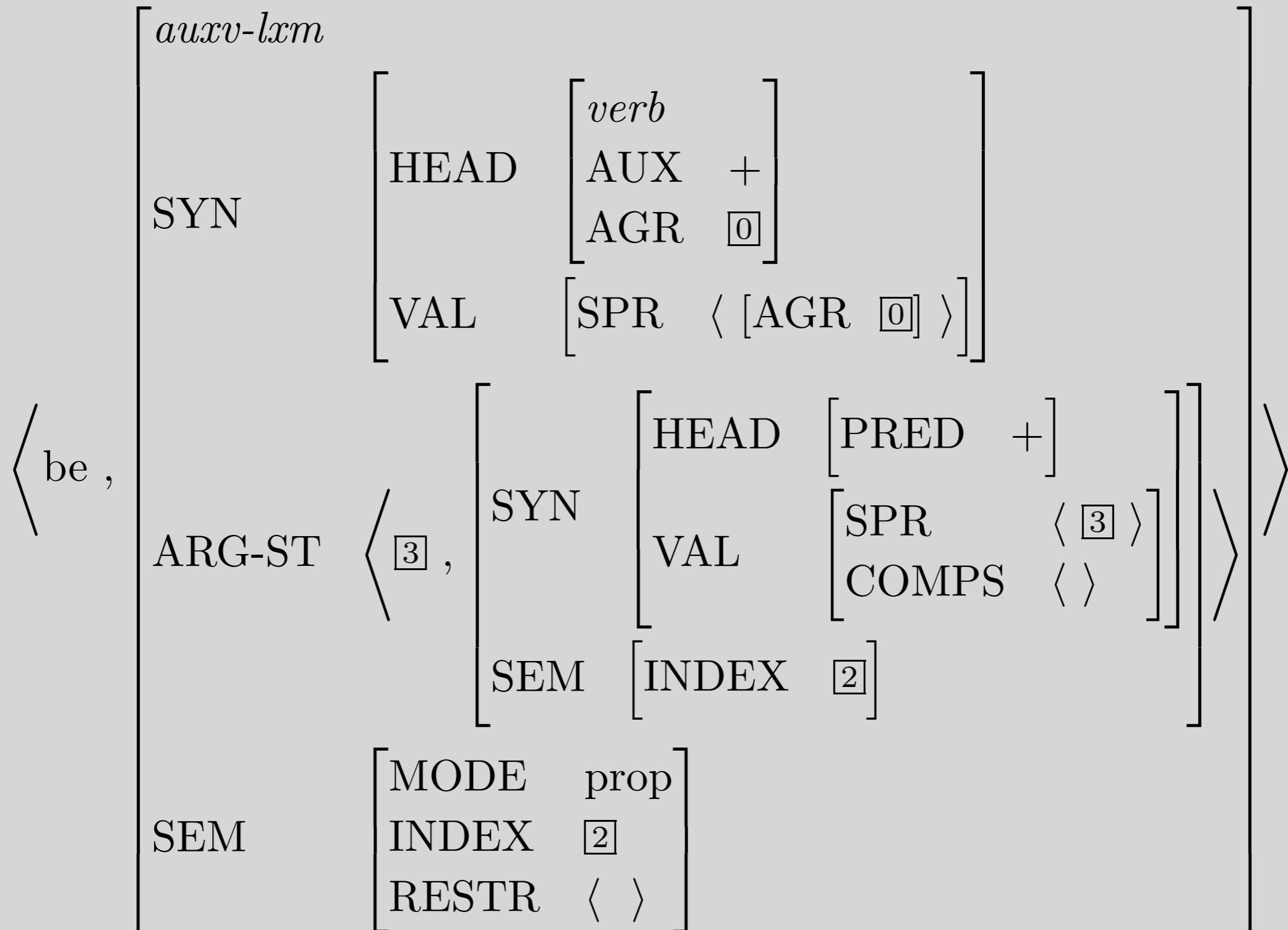
Some Type Constraints

TYPE	FEATURES/CONSTRAINTS	IST
<i>verb-lxm</i>	$\left[\begin{array}{l} \text{SYN} \quad \left[\text{HEAD} \quad \left[\begin{array}{l} \textit{verb} \\ \text{AUX} \quad / \quad - \end{array} \right] \right] \\ \text{ARG-ST} \quad \langle [\text{HEAD} \textit{nominal}] , \dots \rangle \\ \text{SEM} \quad \left[\text{MODE} \quad \textit{prop} \right] \end{array} \right]$	<i>infl-lxm</i>
<i>srv-lxm</i>	$\left[\text{ARG-ST} \quad \left\langle \boxed{1} , \left[\begin{array}{l} \text{SPR} \quad \langle \boxed{1} \rangle \\ \text{COMPS} \quad \langle \rangle \end{array} \right] \right\rangle \right]$	<i>verb-lxm</i>
<i>ic-srv-lxm</i>	$\left[\begin{array}{l} \text{ARG-ST} \quad \left\langle \text{X} , \left[\begin{array}{l} \text{VP} \\ \text{INF} \quad + \\ \text{INDEX} \quad s \end{array} \right] \right\rangle \\ \text{SEM} \quad \left[\text{RESTR} \quad \left\langle [\text{ARG} \quad s] \right\rangle \right] \end{array} \right]$	<i>srv-lxm</i>
<i>auxv-lxm</i>	$\left[\text{SYN} \quad \left[\text{HEAD} \quad \left[\text{AUX} \quad + \right] \right] \right]$	<i>srv-lxm</i>

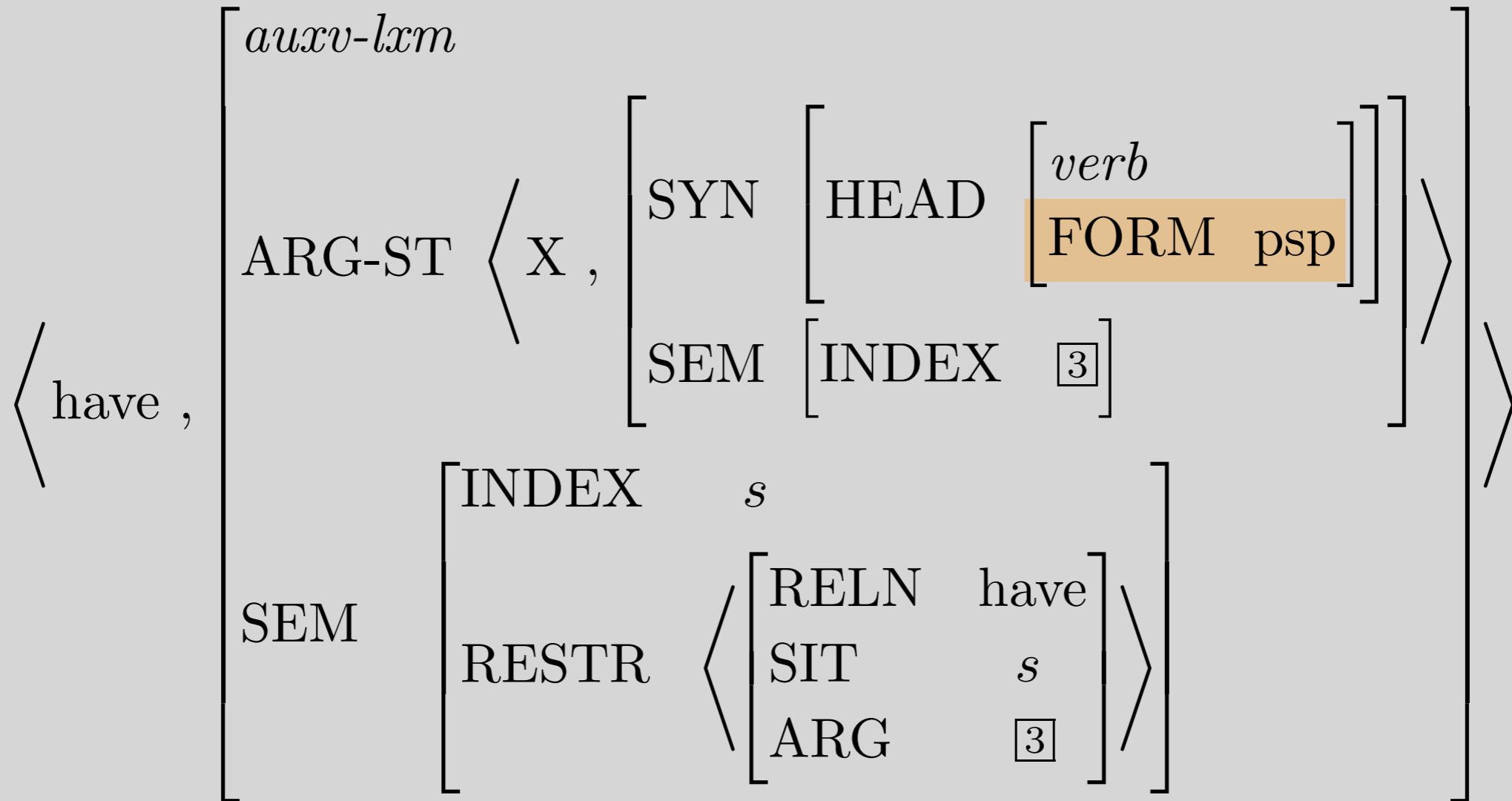
A Lexical Entry for *be*



The Entry for *be*, with Inherited Information

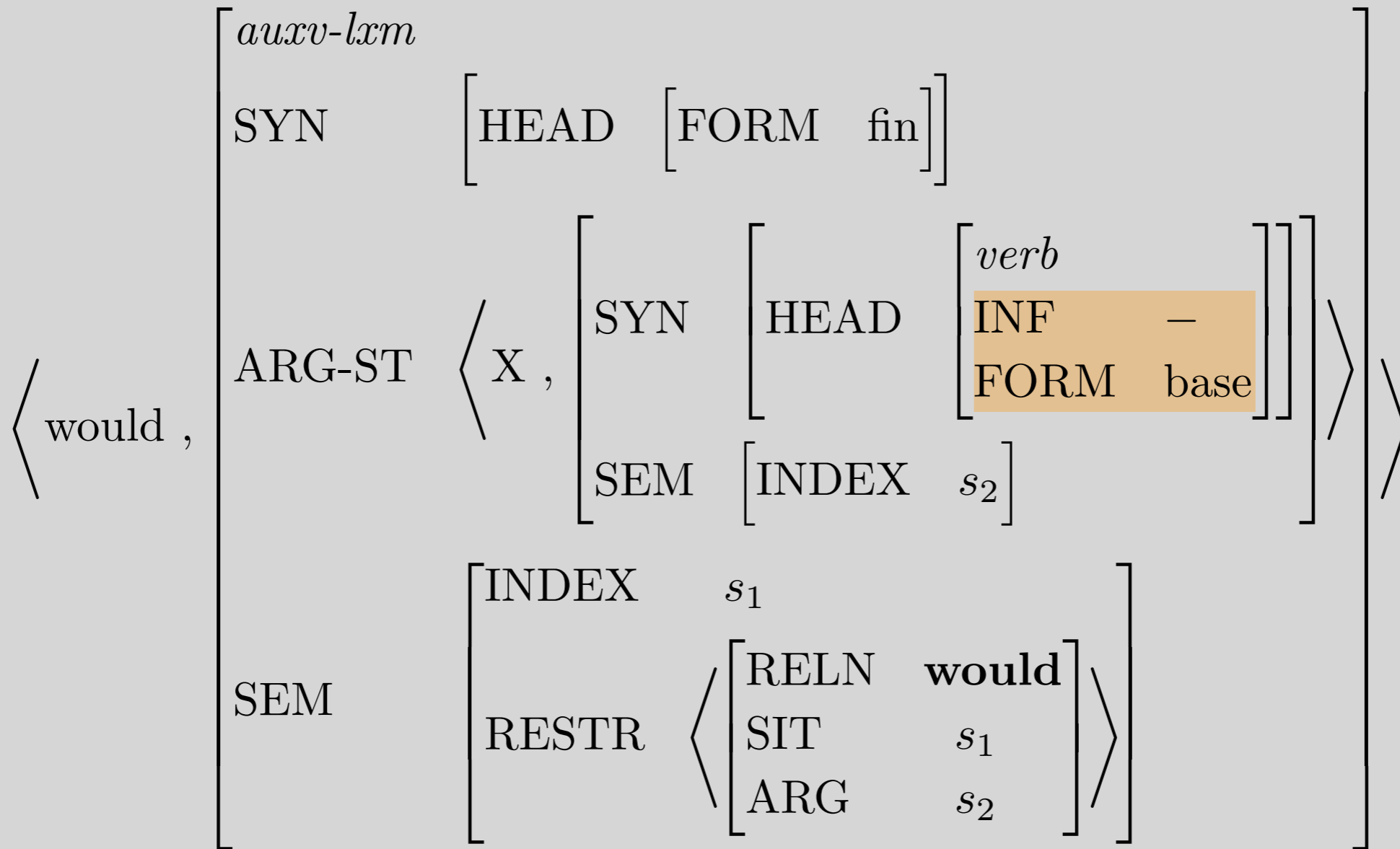


Entry for *have*



- Note the FORM restriction on the complement VP
- What accounts for the analogous FORM restriction on verbs following *be*?

Lexical Entry for a Modal



- Note the restriction on the form of the complement VP
- What inflectional lexical rules apply to this lexeme?

Accounting for the Basic Facts Cited Earlier

- **Optionality of auxiliaries:**
As raising verbs, their subjects and complements go together.
- **Auxiliaries precede non-auxiliary verbs:**
Auxiliaries are heads, and complements follow heads in English.
- **Auxiliaries determine the form of the following verb:**
This is built into their lexical entries.
- **When auxiliaries co-occur, their order is fixed:**
Different explanations for different combinations; see next slide.
- **Non-iterability of auxiliaries:**
Ditto.

Accounting for Restrictions on Order and Iterability

- **Order**

- Modals are finite, and all auxiliaries take non-finite complements. Hence, modals must come first.
- Stative verbs (like *own*) don't have present participles, and auxiliary *have* is stative. Hence, **Pat is having tapdanced*.

- **Iterability**

- Auxiliary *be* is also stative, so **Pat is being tapdancing*.
- Modals must be finite, and their complements must be base, so **Pat can should tapdance*.
- **Pat has had tapdanced* can be ruled out in various ways, e.g. stipulating that auxiliary *have* has no past participle.

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W Using semantics to explain lack of iterability:

Seems iffy; would rather call it syntax

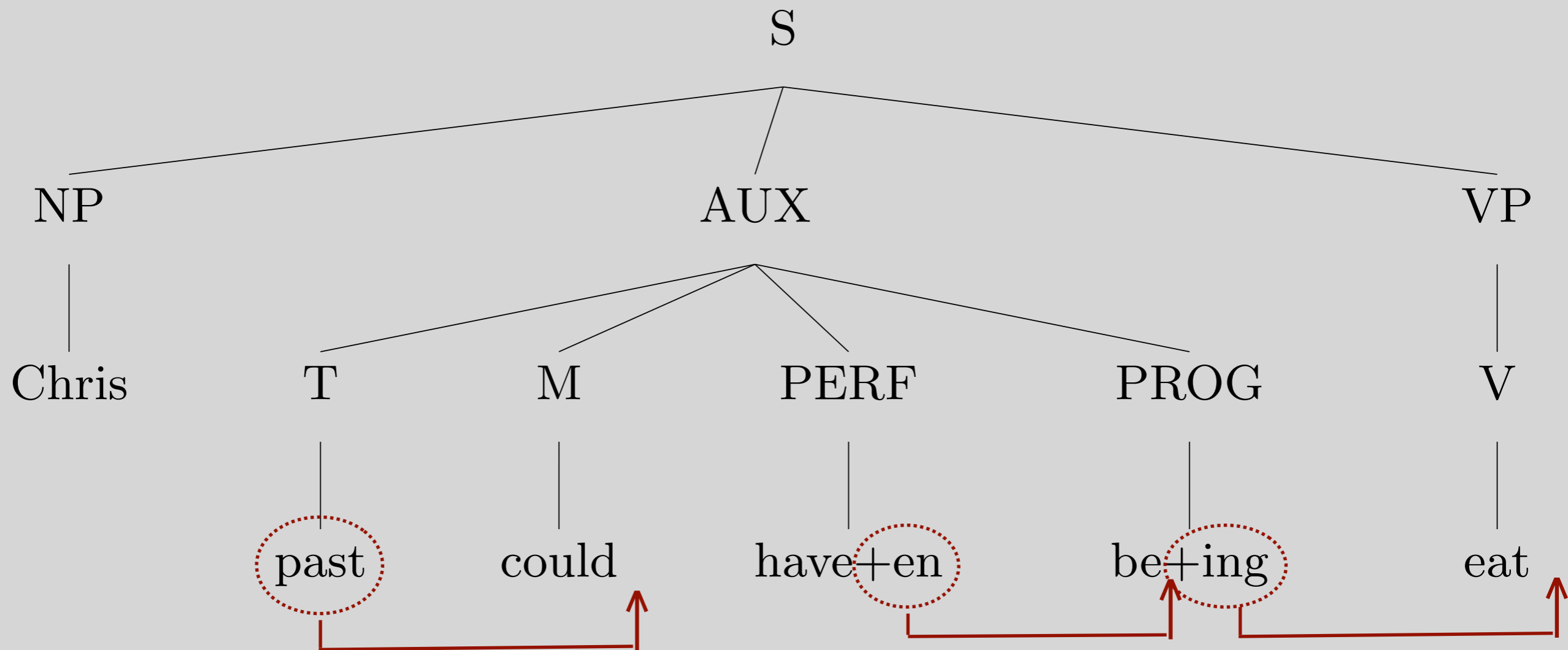
Seems squishy; but so is that data

Seems about right

None of the above

Sketch of Chomsky's Old Analysis

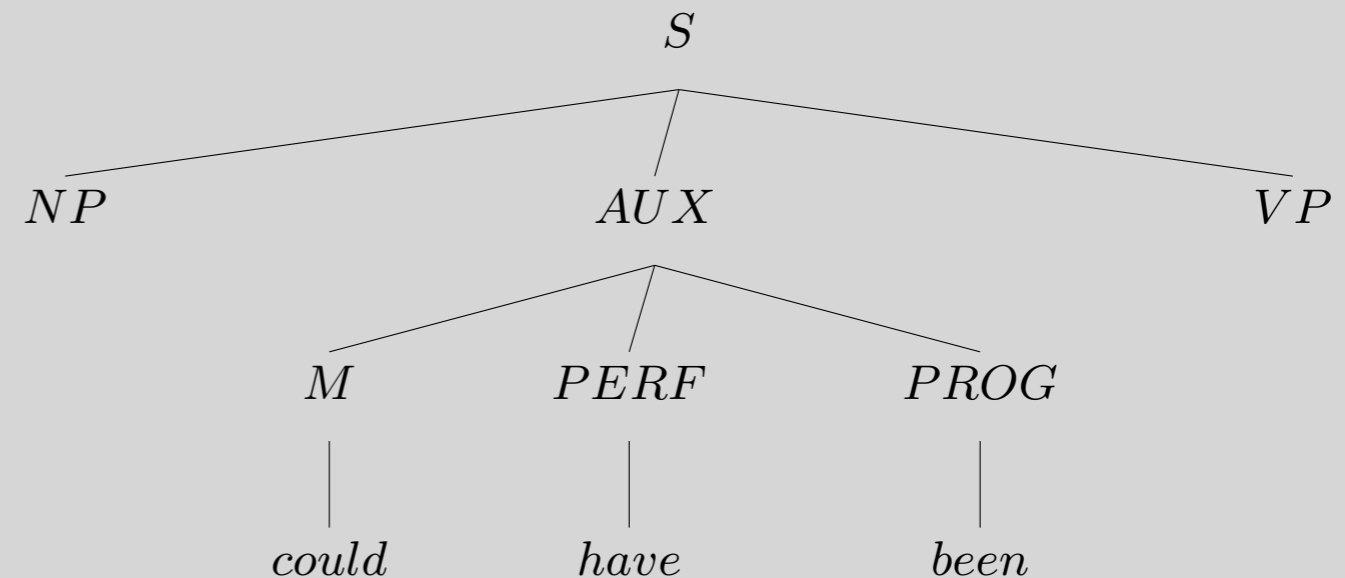
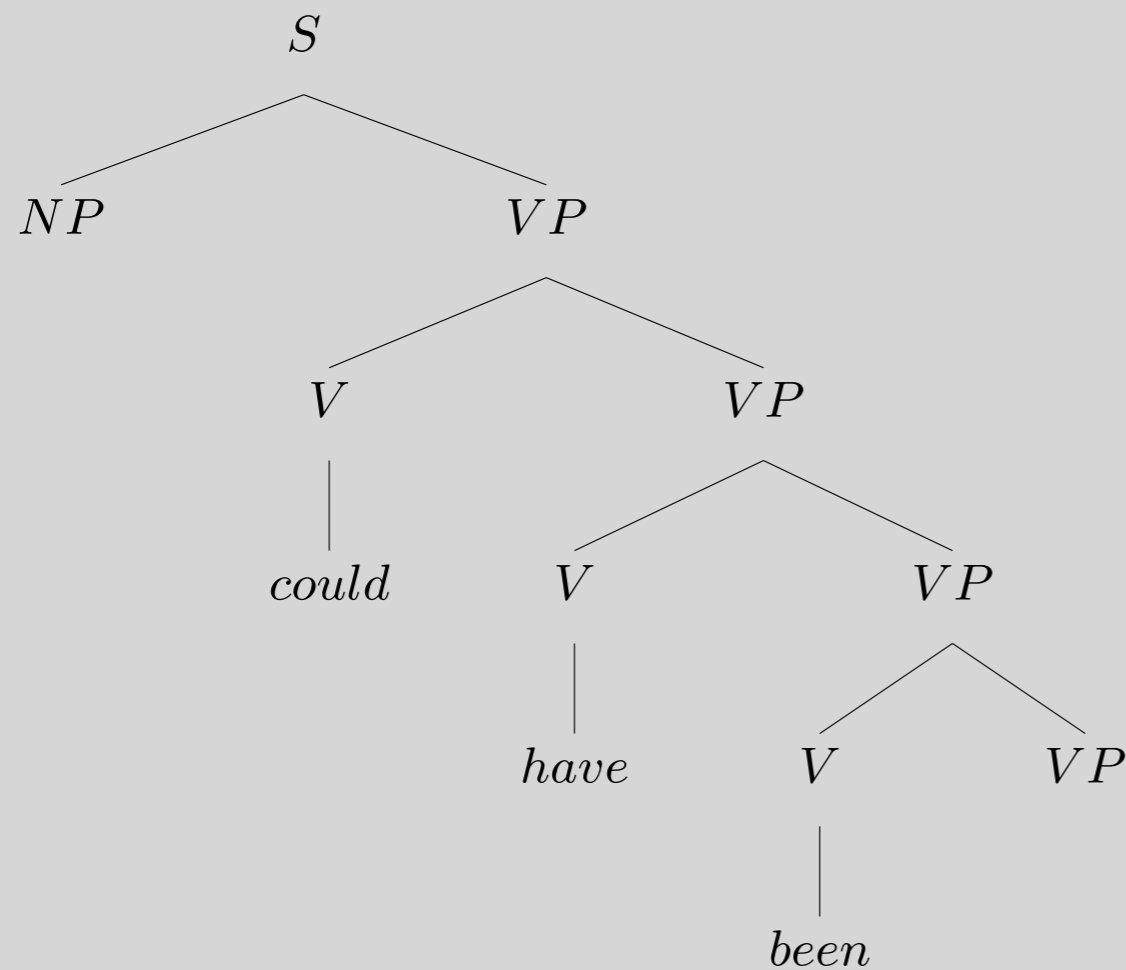
$S \rightarrow NP \text{ AUX } VP$
 $AUX \rightarrow T(M)(PERF)(PROG)$



How this Analysis Handles the Basic Facts

- **Optionality of auxiliaries:**
Stipulated in the phrase structure rule (with parentheses)
- **Auxiliaries precede non-auxiliary verbs:**
Built into the phrase structure rule, with AUX before VP
- **Auxiliaries determine the form of the following verb:**
Inflections are inserted with the auxiliaries and moved onto the following verb transformationally.
- **When auxiliaries co-occur, their order is fixed:**
Stipulated in the phrase structure rule for AUX
- **Non-iterability of auxiliaries:**
Ditto.

The two analyses assign very different trees



- *could have been* VP, *have been* VP, and *been* VP are all constituents
- *could have been* is not a constituent

- *could have been* VP, *have been* VP, and *been* VP are not constituents
- *could have been* is a constituent

Ellipsis and Constituency

- Consider:

Pat couldn't have been eating garlic, but Chris could have been

Pat couldn't have been eating garlic, but Chris could have

Pat couldn't have been eating garlic, but Chris could

- On the nested analysis, the missing material is a (VP) constituent in each case
- On the flat analysis, the missing material is never a constituent
- This argues for our analysis over the old transformational one.

Our Analysis of Auxiliaries So Far

- Auxiliaries are subject-raising verbs
- Most basic distributional facts about them can be handled through selectional restrictions between auxiliaries and their complements (that is, as ARG-ST constraints)
- Auxiliaries are identified via a HEAD feature AUX, which we have not yet put to use

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W How do you feel atop HPSG mountain?

Beautiful view, so glad to
be up here

Satisfying hike, but
hiking around up here is
hard too

Can only see the trees in
front of my face

Too tired to know

Other

Reading Questions

- Why isn't auxiliary have considered to be semantically vacuous? Doesn't the Past Participle Lexical rule already account (at least through the addition of the ...) for the differences in meaning between sentences with and without auxiliary have?

Reading Questions

- "The (non-finite) do that is found in imperatives like Do sit down! is not the same do, as evidenced by the fact that it can co-occur with be, as in Do be careful!" Do you mind re-explaining how these two are different from each other?

Reading Questions

- I'm a bit unclear on the semantic distinction between stative and active verbs. For instance, owns might describe a state but may also sound like an activity. People sometimes claim "I own that" and it seems to roughly mean "actively taking responsibility for." I might think of sleep as a stative verb, but I am sleeping sounds fine. Is sleep an active verb?
- I am also wondering why stative verbs could not be modeled as a stand-alone FORM feature or lexeme type.

Reading Questions

- In Japanese, both dynamic and stative verbs may have the present participle (te-iru) form, although there are semantic differences between the two: a dynamic verb in present participle form is essentially in present progressive tense (action in progress), but a stative verb in present participle form instead indicates that a state change occurred and that state has not changed since. For instance, shinu (to die) is stative, rather than dynamic as in English, so shinde-iru does not mean "is dying" but rather "died and is still dead." Could we model this behavior with HPSG?

Reading Questions

- We assume that F_{past} is undefined for "will", "shall" and other modals, but then footnote 5 (page 399) mentions that "would" and "should" are derived from the past tense forms of "will" and "shall" and states that we are going to ignore this relation in our grammar. This doesn't sit well. Has there been any alternative analysis that allows for past tense forms of "will" and "shall" (but maybe places some sort of restriction on those lexical entries so that they can't show up as words) that can then be used to derive "would" and "should"?

Reading Questions

- One difference between using "can, will, may" and "could, would, might" is that the latter ones is more polite or tactful (also, according to the dictionary, the later ones can express conditional possibility). Do we differ this on the semantic level or do we ignore it as a pragmatic issue?

Reading Questions

- fn1 on page 392 mentions that certain dialects of English allow different sequences of modals than others and explains that variations of this type should be handled in the lexical entries. I'm wondering if the majority of dialect differences are best handled by changes to the lexicon, or if those differences are equally likely to show up in all parts of the grammar?
- fn1 suggests that dialect variation could be handled with different lexical entries. How would that be marked in the lexical entry in an efficient way? Is that often how dialects are noted in HPSG?

Reading Questions

- Do auxiliaries all need to co-occur with a main verb cross linguistically ?
- Crosslinguistically, are co-occurring auxiliaries typologically rare/frequent?

Reading Questions

- Are the generalizations about auxiliary verbs in (5) cross-linguistic, and to what extent? In particular, I'm thinking about the fourth, that auxiliary verbs co-occur but only in fixed order. Are there any languages that allow more flexible orderings of co-occurring auxiliaries? And for the second (auxiliary verbs come before non-auxiliary verbs), which seems English-specific, is there a broader generalization for it relating to head-directionality and distance between the auxiliary and non-auxiliary verbs?

Reading Questions

- Chomsky's treatment of the AUX category reminded me of some patterns in German about modifiers. TeKaMoLo is an anagram describing the order of modifiers in a German phrase. Te = temporal, Ka = causal, Mo = modal, and loc = locative. German modifiers generally follow this order. How would HPSG control or track this ordering? For aux orders we use FORM values, would we do the same for these modifiers and copy the TeKaMoLo values into FORM values? To capture apparently similar ordering distributions for auxiliaries we define modal FORM values as fin in their lexical entries. But prepositions seem a bit more flexible- a single preposition could head a causal, temporal, etc. PP. So would we use a derivational or pi rule instead?