Ling 566
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Auxiliaries

I

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.

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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.
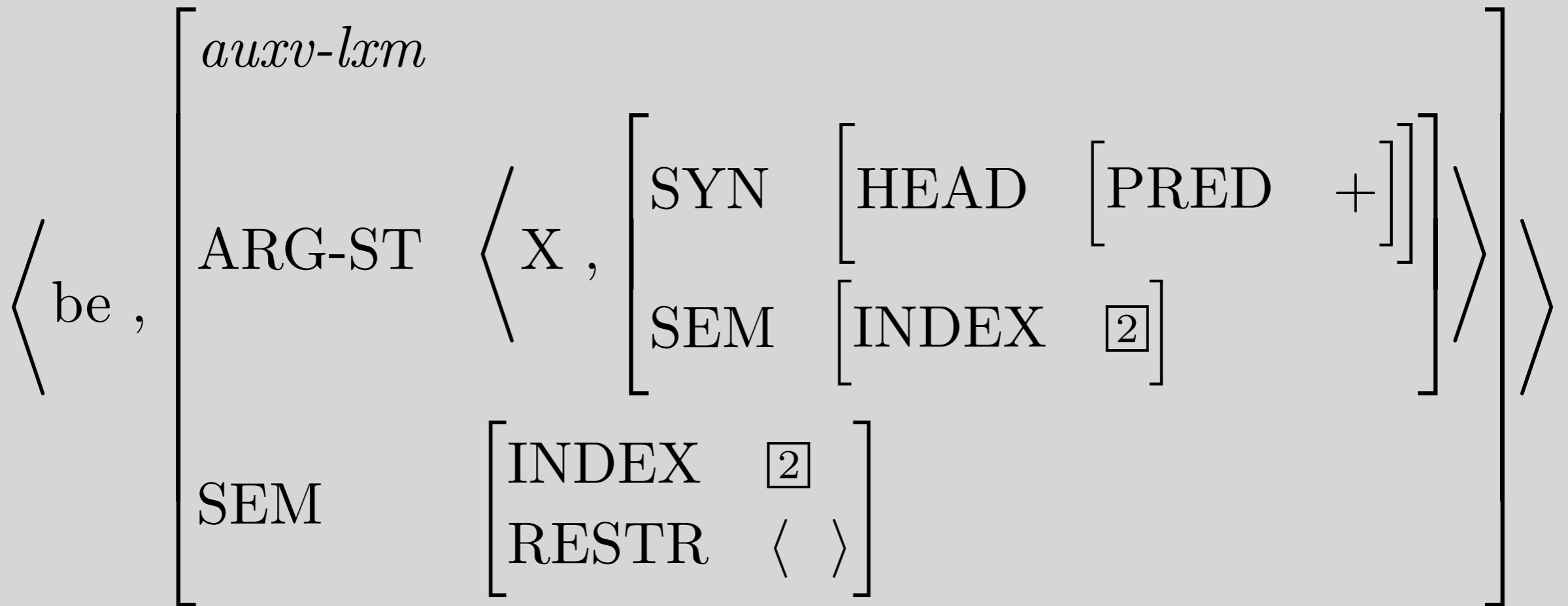
What's special about auxiliaries?

- 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.
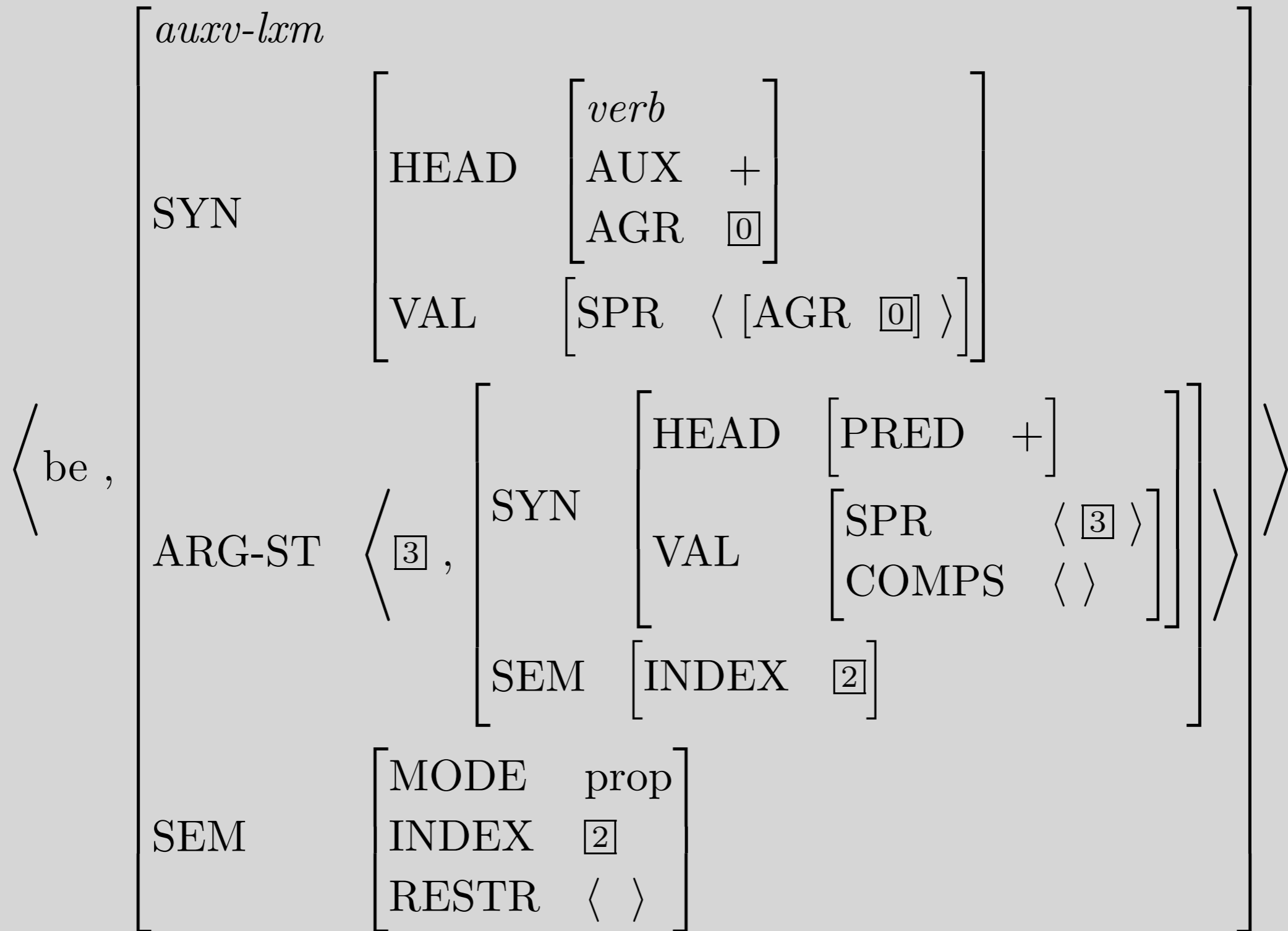
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Some Type Constraints

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

A Lexical Entry for *be*

$$\left\langle \text{be} \, , \, \begin{bmatrix} \textit{auxv-lxm} \\ \\ \text{ARG-ST} \quad \left\langle \text{X} \, , \, \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{PRED} & + \end{bmatrix} \end{bmatrix} \\ \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle \\ \\ \text{SEM} \quad \begin{bmatrix} \text{INDEX} & \boxed{2} \\ \text{RESTR} & \langle \ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

The Entry for *be*, with Inherited Information

$$
\left\langle \text{be} \,,\; \begin{bmatrix} \textit{auxv-lxm} \\[4pt] \text{SYN} \quad \begin{bmatrix} \text{HEAD} \quad \begin{bmatrix} \textit{verb} \\ \text{AUX} \quad + \\ \text{AGR} \quad \boxed{0} \end{bmatrix} \\[10pt] \text{VAL} \quad \begin{bmatrix} \text{SPR} \quad \langle\, [\text{AGR} \;\; \boxed{0}] \,\rangle \end{bmatrix} \end{bmatrix} \\[30pt] \text{ARG-ST} \quad \left\langle \boxed{3} \,,\; \begin{bmatrix} \text{SYN} \quad \begin{bmatrix} \text{HEAD} \quad [\text{PRED} \quad +] \\[8pt] \text{VAL} \quad \begin{bmatrix} \text{SPR} \quad \langle\, \boxed{3} \,\rangle \\ \text{COMPS} \quad \langle\, \rangle \end{bmatrix} \end{bmatrix} \\[14pt] \text{SEM} \quad [\text{INDEX} \quad \boxed{2}] \end{bmatrix} \right\rangle \\[30pt] \text{SEM} \quad \begin{bmatrix} \text{MODE} \quad \text{prop} \\ \text{INDEX} \quad \boxed{2} \\ \text{RESTR} \quad \langle\, \rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

Entry for *have*

$$
\left\langle \text{have} , \begin{bmatrix} \textit{auxv-lxm} \\ \text{ARG-ST} \left\langle X , \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM} & \text{psp} \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{3} \end{bmatrix} \end{bmatrix} \right\rangle \\ \text{SEM} \begin{bmatrix} \text{INDEX} & s \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{have} \\ \text{SIT} & s \\ \text{ARG} & \boxed{3} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

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

Lexical Entry for a Modal

$$
\left\langle \text{would} \;,\; \begin{bmatrix} \textit{auxv-lxm} \\[4pt] \text{SYN} \quad \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{FORM} & \text{fin} \end{bmatrix} \end{bmatrix} \\[20pt] \text{ARG-ST} \quad \left\langle \text{X}\;,\; \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{INF} & - \\ \text{FORM} & \text{base} \end{bmatrix} \end{bmatrix} \\[6pt] \text{SEM} & \begin{bmatrix} \text{INDEX} & s_2 \end{bmatrix} \end{bmatrix} \right\rangle \\[40pt] \text{SEM} \quad \begin{bmatrix} \text{INDEX} & s_1 \\[6pt] \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \textbf{would} \\ \text{SIT} & s_1 \\ \text{ARG} & s_2 \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$
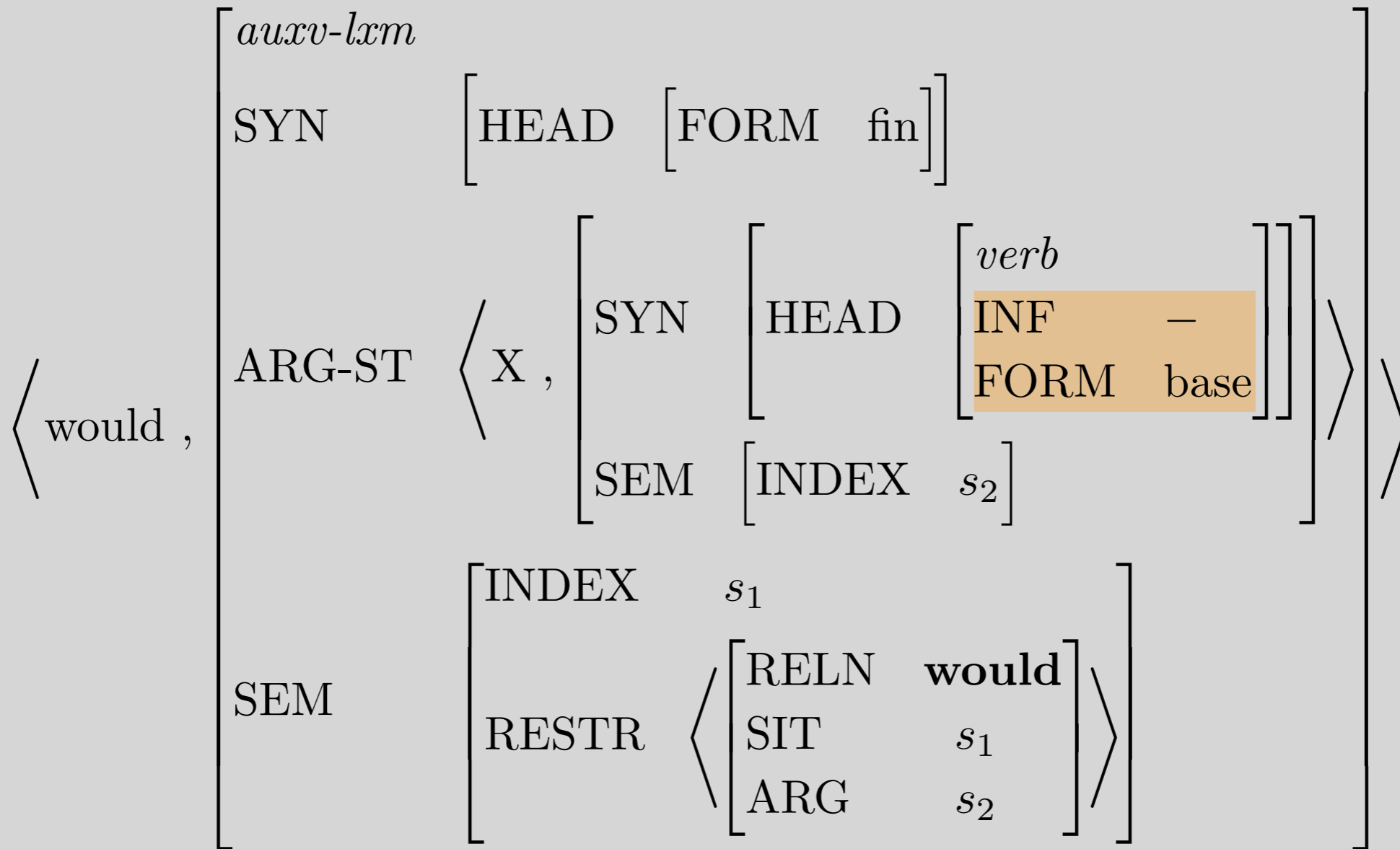
- Note the restriction on the form of the complement VP
- What inflectional lexical rules apply to this lexeme?

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.

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

Total Results: 0

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Sketch of Chomsky's Old Analysis

$$S \rightarrow NP \ AUX \ VP$$
$$AUX \rightarrow T(M)(PERF)(PROG)$$
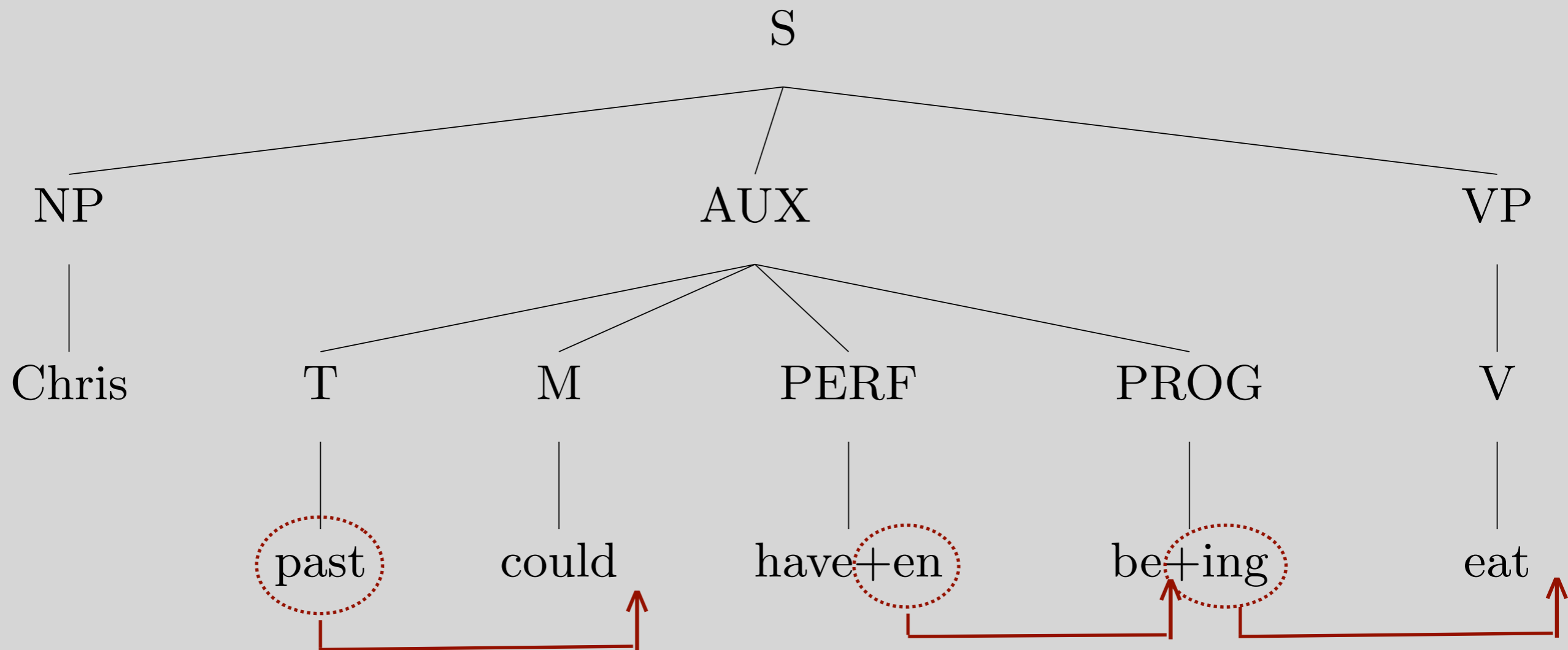
How this Analysis Handles the Basic Facts

- 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

S
NP   VP
       V   VP
       could V   VP
              have V   VP
                    been

S
NP   AUX   VP
      M   PERF   PROG
      could have   been
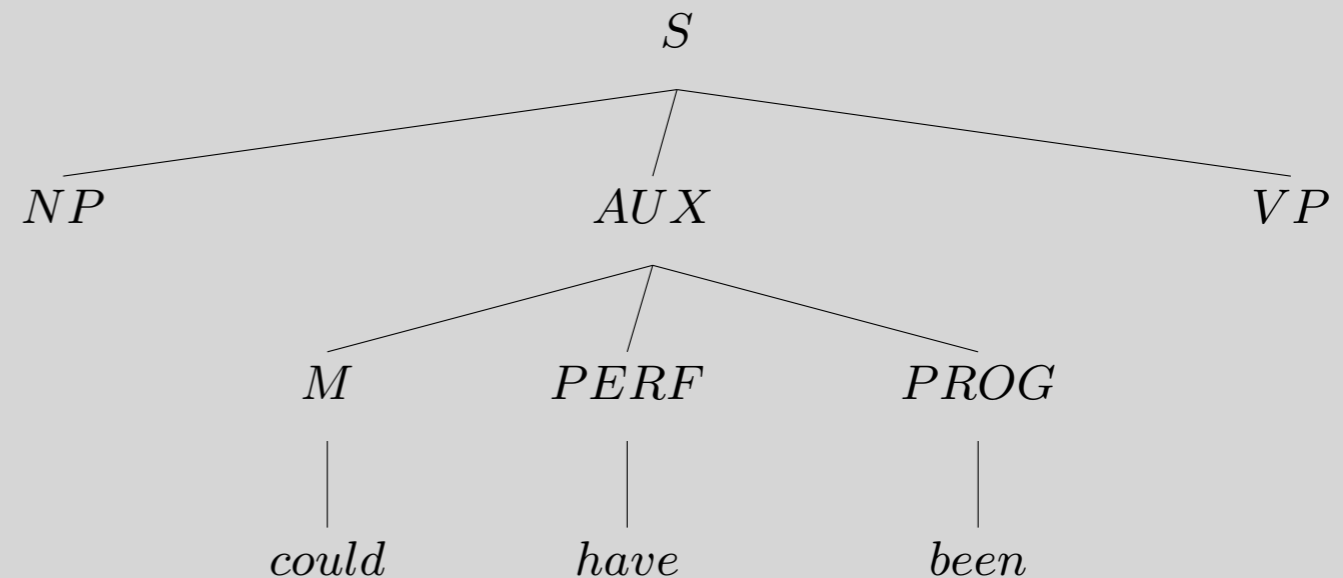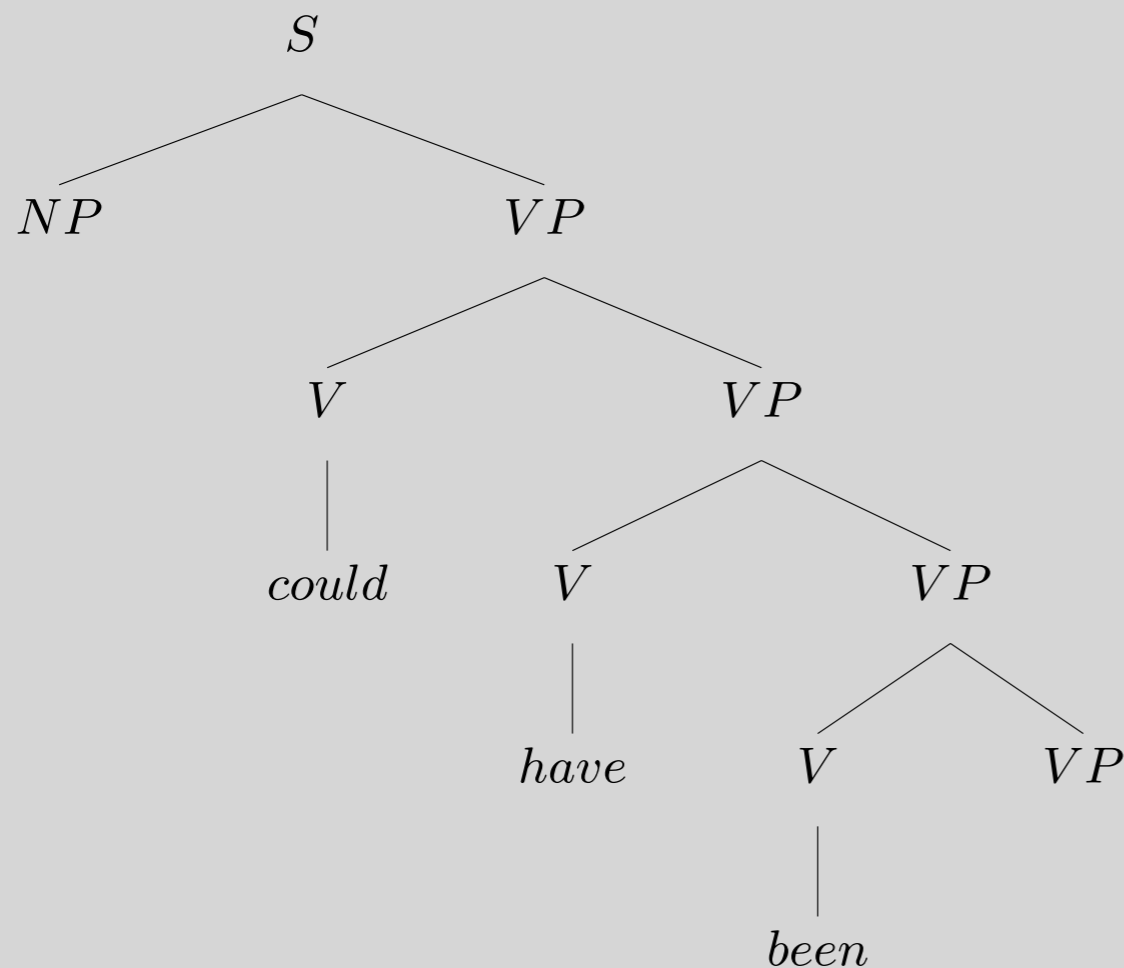
- *could have been* VP, *have been* VP, and *been* VP are all constituents

- *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

Tree practice

- Kim will be expecting Sandy to have been surprised
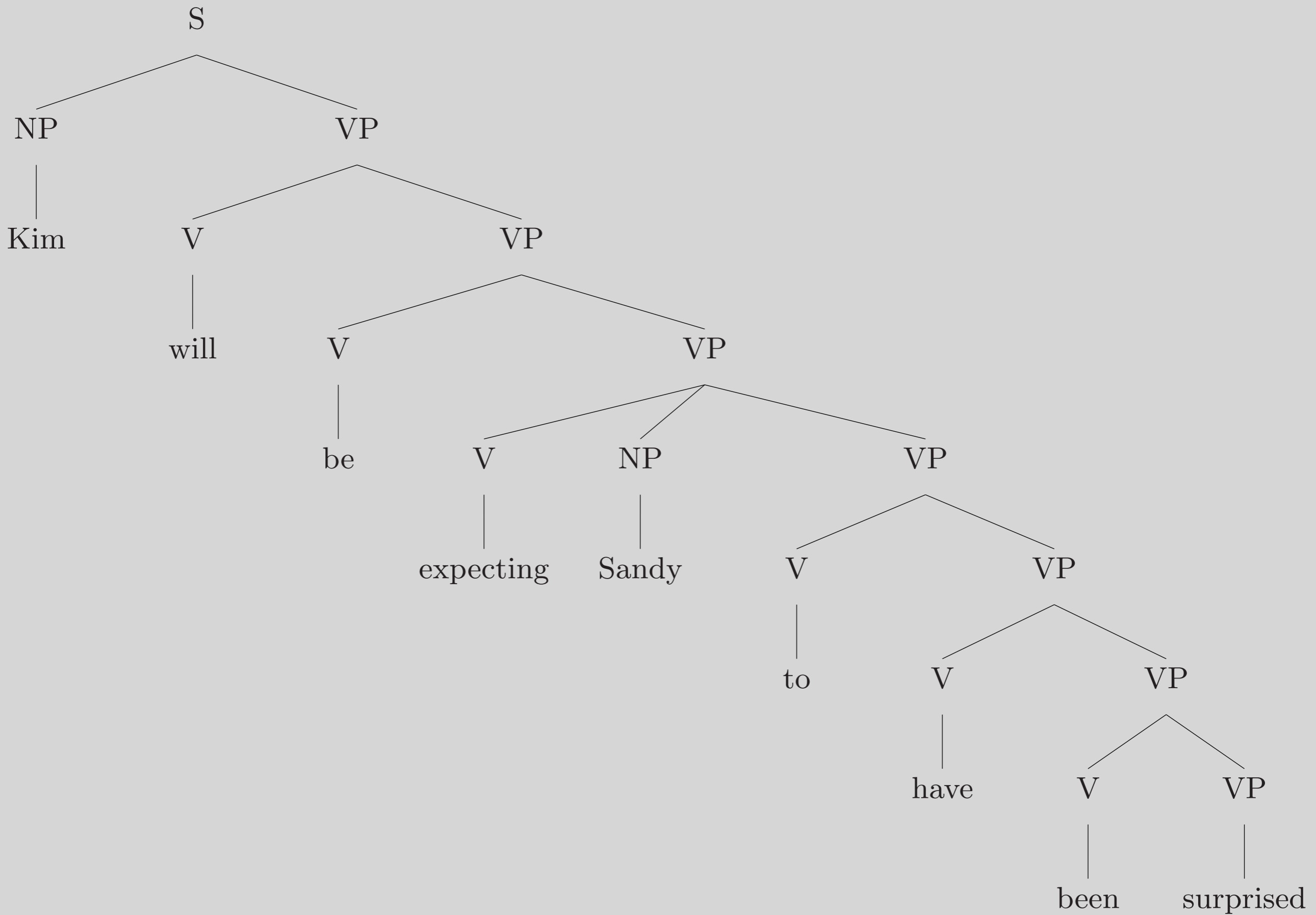
W How do you feel atop HPSG mountain?

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

Total Results: 0

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Overview

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RQs: Type hierarchy

- What is the advantage of positing ic-srv-lxm subtype under srv-lxm, constrastive to auxv-lxm? Are there other ways of handling this type?

- Given that they are both are subtypes of srv-lxm, I can see the similarities auxb-lxm and ic-srv-lxm share regarding their ARG-ST structure, but it is still not very intuitive to me how they are related beyond this--in contrast, for other subtypes of verb-lxm, the classification seemed more natural. Is there any other property that could make their closeness clearer? Or are we grouping them for the convenience of avoiding adding more subtypes for verb-lxm?

RQs: Semantically empty aux

- I noticed that have and can have semantic information, but on page 397 it says that "the semantics of auxiliary have, unlike that of be, is not vacuous." I'm not sure I understand why be and do don't have semantic information.

RQs: Semantically empty aux

- I'm having some trouble getting the intuition on why have has a semantic argument but be doesn't. The way I see it, sentences like:

  - I have walked for two hours

  - I have been walking for two hours

- Have slightly different meanings (the first one meaning I started walking two hours ago and have recently finished doing so, and the second one meaning I started walking and I'm still doing it), so it seems to me that be does add a semantic component. Or is it that the semantics of "still doing the action" are added through the present participle d-rule to the verb?

RQs: Constraints on forms of *have* and *be*

- How would we deal with a sentence like 'With pat having slept, we were now ready to leave' where 'having' is a non-finite verb?

- It is said that stative verbs generally sound bad in the progressive. However, sentences like "I am being lenient!" are acceptable. Why is that?

RQs: Imperative *do*

- In the imperatives like "Do be careful!", what is the syntactic role of "do"? how is it combined with "be"?

RQs: Modals and FORM

- Aside from rules like the Present Participle Lexical Rule, what other rules prevent us from changing the value of FORM for modals?

RQs: Modals and tense

- On page 399, it says that we can make certain assumptions about the morphological function F_3SG in order for modal lexemes to undergo the 3rd-Singular Verb Lexical Rule. Given this, why do we simply assume that the function F_PAST is undefined for will, shall, and the other modals, instead of making similar assumptions about the function F_PAST?

RQs: Modals and tense

- Modals are undefined for the F_PAST function. How is this actually implemented? In the function definition, do modal inputs result in undefined outputs, or is there some other constraint that prevents the rule from applying?

RQs: NICE

- Are NICE Properties a sufficient and necessary condition for an auxiliary verb?

RQs: Contractions

- In English we have a lot of contractions for words like "dont", "isn't", or even "couldn't've"(even though there is definitely some debate on this is believe it to be spoken" are these legal in trees? Do we split them up like we do apostrophe S like "is not"?

RQs: Discovery procedure

- It boggles my mind that we know such complex grammar rules without being taught them - certainly no one taught me the NICE properties of auxiliary verb lexemes in primary school. Do rules like these come purely from observation of natural text, or is there some other explanation for their discovery (cross-linguistic, history, psycholinguistics)?