Ling 566
Nov 14, 2019

Auxiliaries

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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

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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*

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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.
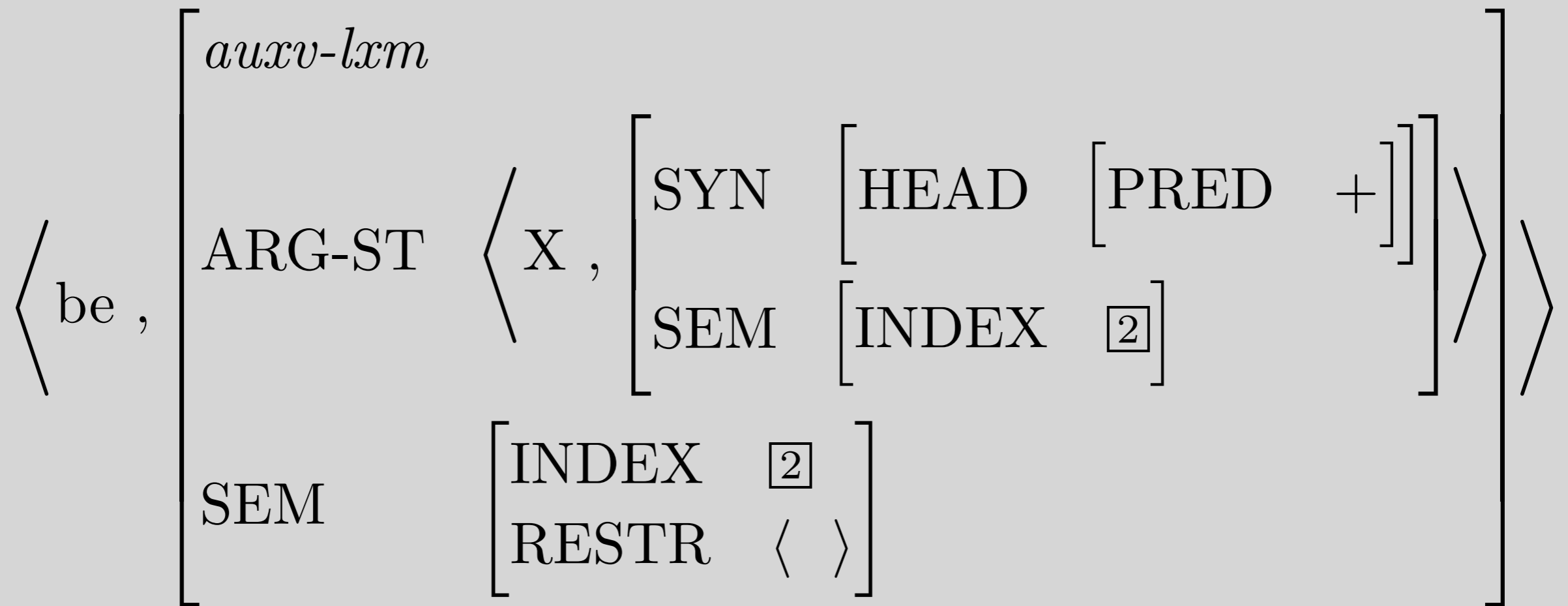
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What's special about auxiliaries?

- 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

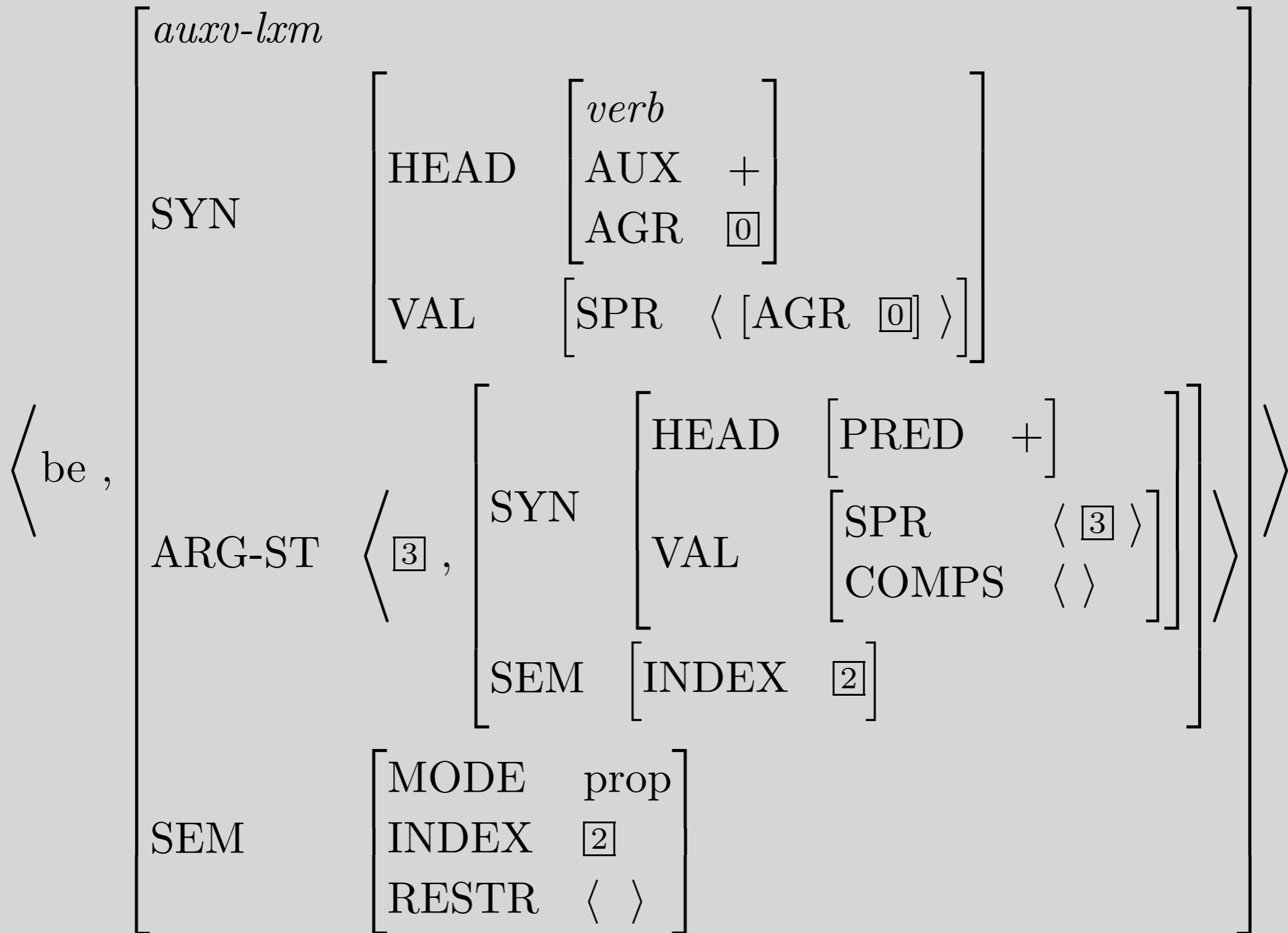- They have a set of special characteristics known as the NICE properties.

Some Type Constraints

TYPE	FEATURES/CONSTRAINTS	IST
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	$$\begin{bmatrix} \text{ARG-ST} & \left\langle\, \text{X}\,, \begin{bmatrix} \text{VP} \\ \text{INF} & + \\ \text{INDEX} & s \end{bmatrix} \right\rangle \\ \text{SEM} & \begin{bmatrix} \text{RESTR} & \left\langle\, \begin{bmatrix} \text{ARG} & s \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$	*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*

$$\left\langle \text{be} ,\begin{bmatrix} \textit{auxv-lxm} \\[2ex] \text{ARG-ST} \quad \left\langle \text{X} , \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{PRED} & + \end{bmatrix} \end{bmatrix} \\[2ex] \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle \\[4ex] \text{SEM} \quad \begin{bmatrix} \text{INDEX} & \boxed{2} \\ \text{RESTR} & \langle \; \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

The Entry for *be*, with Inherited Information

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

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Entry for *have*

$$
\left\langle \text{have}, \begin{bmatrix} \textit{auxv-lxm} \\[4pt] \text{ARG-ST} \left\langle \text{X}, \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \boxed{\text{FORM} \quad \text{psp}} \end{bmatrix} \end{bmatrix} \\[10pt] \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{3} \end{bmatrix} \end{bmatrix} \right\rangle \\[20pt] \text{SEM} \quad \begin{bmatrix} \text{INDEX} & s \\[6pt] \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{have} \\ \text{SIT} & s \\ \text{ARG} & \boxed{3} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
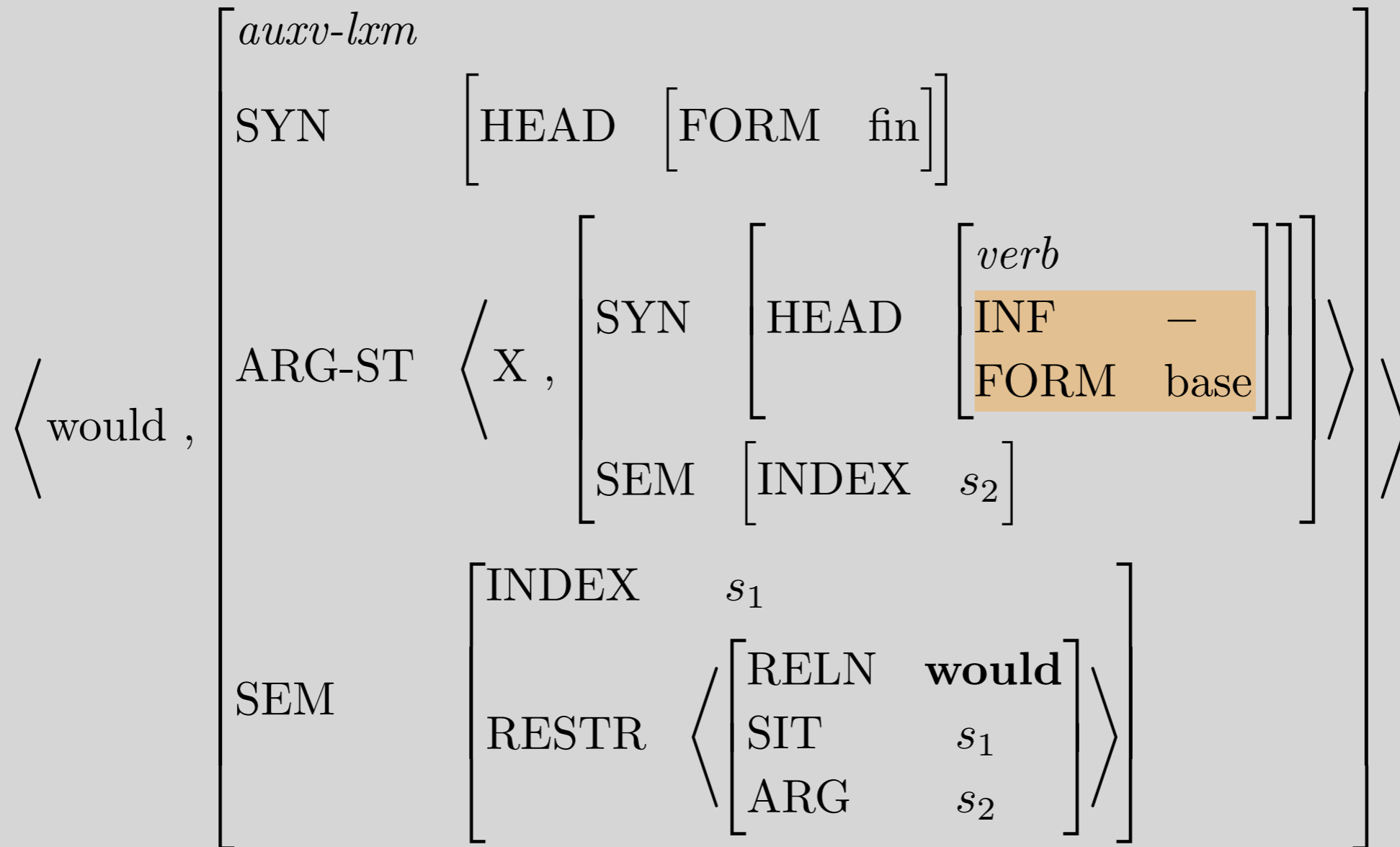$$

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

RQ

What does [RELN have] mean?

$$
\left\langle \text{have} , \begin{bmatrix} \textit{auxv-lxm} \\[2pt] \text{ARG-ST} \left\langle \text{X} , \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{FORM} & \text{psp} \end{bmatrix} \end{bmatrix} \\[10pt] \text{SEM} & \begin{bmatrix} \text{INDEX} & \boxed{3} \end{bmatrix} \end{bmatrix} \right\rangle \\[20pt] \text{SEM} \begin{bmatrix} \text{INDEX} & s \\[6pt] \text{RESTR} \left\langle \begin{bmatrix} \text{RELN} & \text{have} \\ \text{SIT} & s \\ \text{ARG} & \boxed{3} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

Lexical Entry for a Modal

$$
\left\langle \text{would}, \begin{bmatrix} \textit{auxv-lxm} \\[4pt] \text{SYN} \quad \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{FORM} & \text{fin} \end{bmatrix} \end{bmatrix} \\[10pt] \text{ARG-ST} \quad \left\langle \text{X}, \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{INF} & - \\ \text{FORM} & \text{base} \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & s_2 \end{bmatrix} \end{bmatrix} \right\rangle \\[16pt] \text{SEM} \quad \begin{bmatrix} \text{INDEX} & s_1 \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \textbf{would} \\ \text{SIT} & s_1 \\ \text{ARG} & s_2 \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

- 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.

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Sketch of Chomsky's Old Analysis

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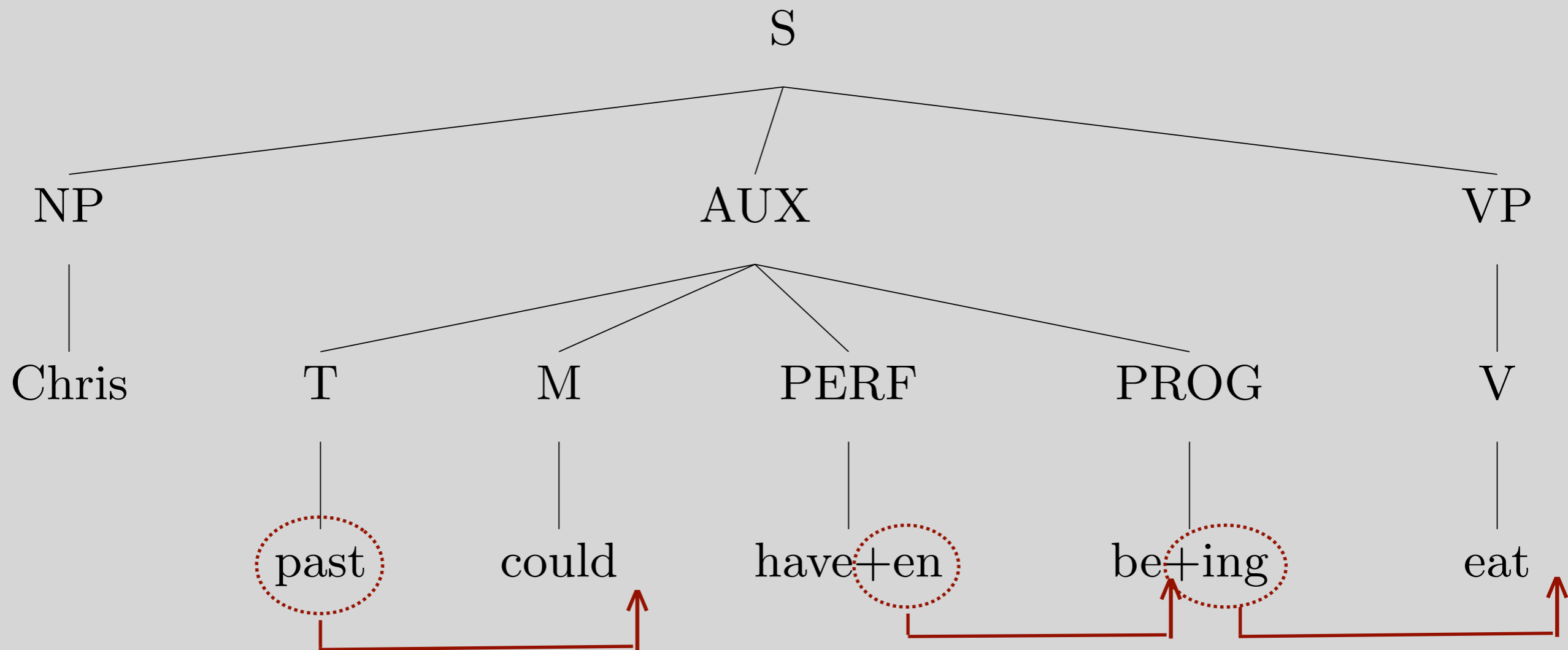
How this Analysis Handles the Basic Facts

- 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
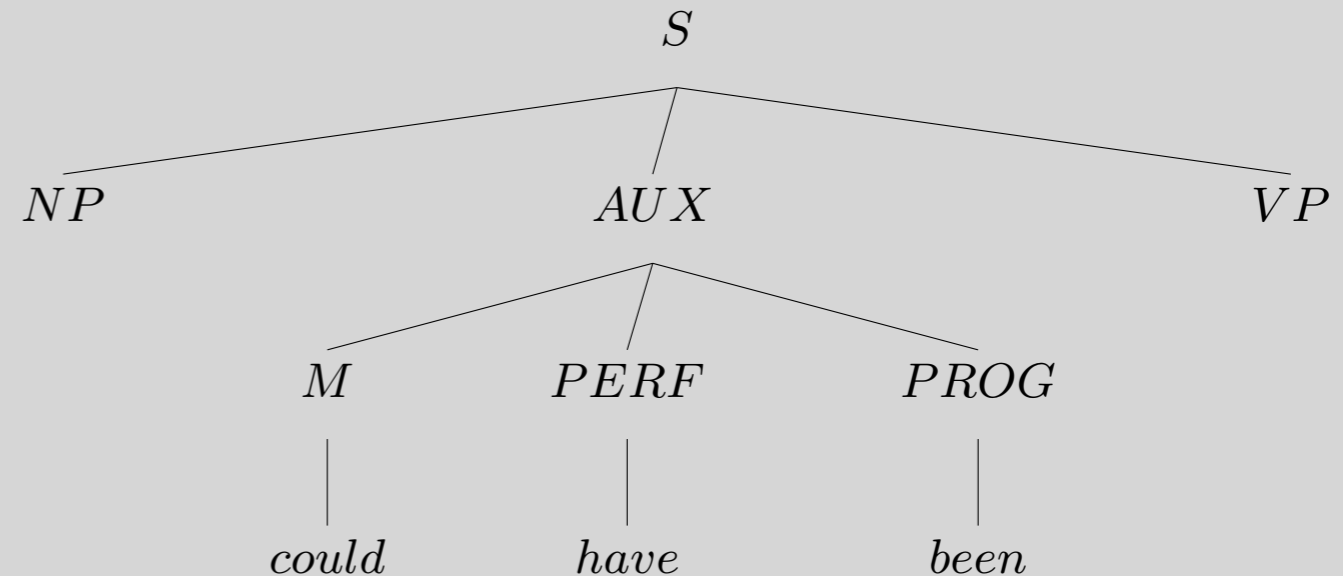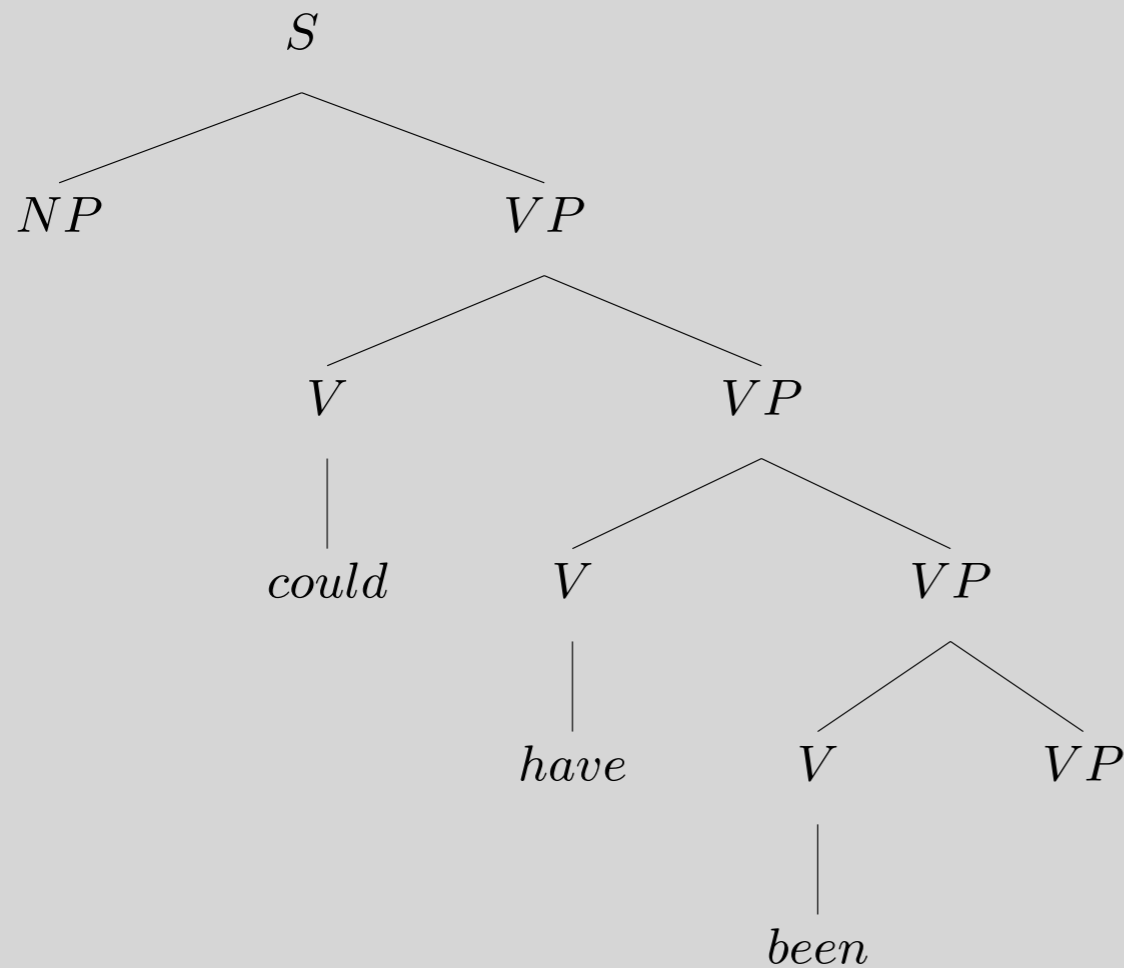
- *could have been* VP, *have been* VP, and *been* VP are all constituents

- *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

Overview

- What are auxiliaries?

- General properties of auxiliaries

- Lexical type/lexical entries for auxiliaries

- Reading questions

- Next time: NICE properties (lexical rules)

Reading Questions

- What is meant by the statement "Auxiliaries cannot iterate"?

- I don't quite understand what "modals don't iterate" means, as well as how it is related to their obligatory finiteness

- Is there a formalized way to describe what kinds of auxiliaries can combine? Would it work as a series of lexical rules that are applied?

Reading Questions

- Can you reiterate what the difference is between [FORM fin] and [FORM base], and how this distinction helps us maintain the co-occurrence restraints?

- Auxiliary verbs like 'did/do' do not seem optional as they seem to bring some semantics. Aren't we defining something "optional" based on whether or not they are contributing to the semantics?

Reading Questions

- Why is the order of auxiliaries fixed in this way?

- For the lexical entry *can* in (17; pg.398), why do we want to write the [INF -] on the last element of its ARG-ST? I thought we will assume the INF will be negative if we do not write it out explicitly.

Lexical Entry for a Modal
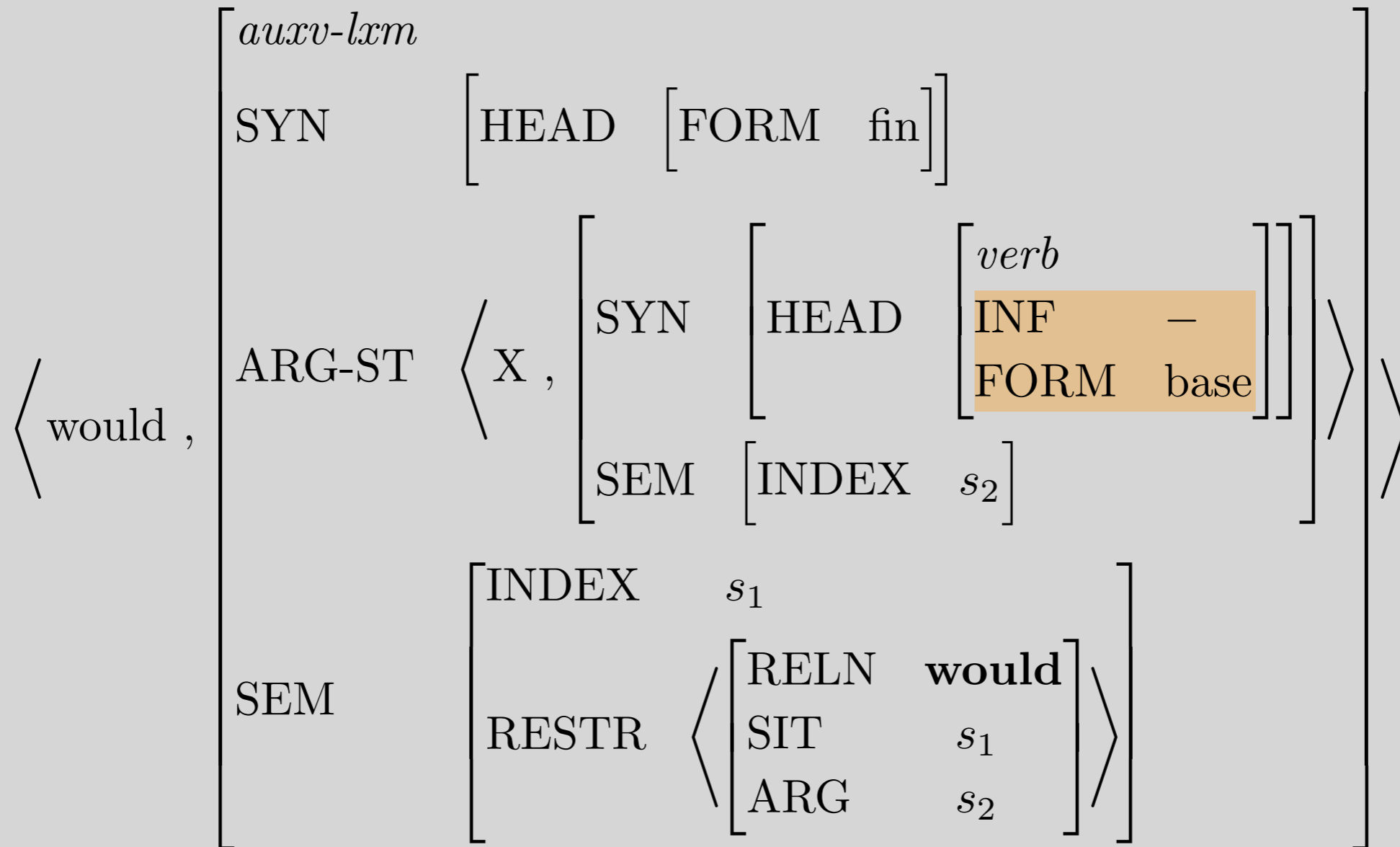
$$
\left\langle \text{would} , \begin{bmatrix} \textit{auxv-lxm} \\[2pt] \text{SYN} \quad \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{FORM} & \text{fin} \end{bmatrix} \end{bmatrix} \\[10pt] \text{ARG-ST} \quad \left\langle \text{X} , \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{INF} & - \\ \text{FORM} & \text{base} \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & s_2 \end{bmatrix} \end{bmatrix} \right\rangle \\[12pt] \text{SEM} \quad \begin{bmatrix} \text{INDEX} & s_1 \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \textbf{would} \\ \text{SIT} & s_1 \\ \text{ARG} & s_2 \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

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

Reading Questions

- I'm confused about the feature PRED in the lexical entry of be. It seems only to distinguish predicative phrases in be. And other modal verbs seem to only allow "verby" complment. What if we divide be into two lexemes, one with "verby" complement(which complies with other modal verbs) and the other with other phrases, and not use the feature PRED?

Reading Questions

- How exactly does the analysis of do as an *auxv-lxm* predict that it will allow dummies and idiom chunks as subjects?

- *continue* is listed as *ic-srv-lxm* (in the appendix), which means its complement has [INF +], so is *continue* a different type of lexeme in *Kim continues walking*?

Reading Questions

- I'm confused on why the past tense verb lexical rule is undefined for modals. What's the reason behind the assumption that such pairs of forms are unrelated in the grammar of modern english as mentioned in the footnote?

Reading Questions

- Does our grammar account for the evidence that modals seem to come in past/non-past pairs like can/could or will/would.

    I think they can do it.

    ?I thought they can do it.

    I thought they could do it.

    I believe they will go.

    ?I believed they will go.

    I believed they would go.

Reading Questions

- I reviewed relevant lexical rules but I am still a little confused about why do we allow modals subject to 3rd-Singular Verb Lexical Rule but not to Past-Tense Verb Lexical Rule? Can't we consistently make F3SG(x) undefined for modals as well?

Reading Questions

- "Finally, to prevent past-tense modal forms, we can simply assume that the function FPAST, introduced by the Past-Tense Verb Lexical Rule, is undefined for will, shall, and the other modals." (page 399) This seems a little hand-wavy to me. Is the reason for not addressing this lexically simply because we choose to ignore/not-focus-on morphological changes introduced by our lexical rules?

Reading Questions

- I didn't find the way that we restrict past tense modals particularly satisfying. The book says we can assume that the function FPast is undefined for these modals. However, up until now we've talked about those orthographic functions as being out of scope of our grammar. In practice, would this phenomenon be handled by the semantics, or is there some other way to analyze this? Or is this really the best way to handle this?

Reading Questions

- While modals are inflectional in other languages, they aren't in English, as shown in example (18). Could the grammar be implemented where auxiliary verbs are instead treated as a constant lexeme type?

Reading Questions

- Could you clarify what is meant by "unlike 'be', the semantics of auxiliary 'have' is not vacuous? And how does this differ when overall sentence meanings are understood as in the following?

    1. Rhubarb is dancing.

    2. Rhubarb has danced.

- It seems like both the forms of 'be' and 'have' require only certain FORM values...

Reading Questions

- The perfective *have* that follows modal
  auxiliaries followed by *n't*, such as the one
  in the phrase *shouldn't have* remains largely
  unaccounted for in the examples. What
  would the semantic explanation for that use
  case entail?

Reading Questions

- On page 401, the author claims that "it would be incorrect to formulate this problem in terms of why being can't head the VP complement of be. The issue involves a semantic problem of far greater scope" which seems to me that this issue (stative verbs whose semantics involves a state rather than an action or an activity) is more of a semantic problem rather than a syntax problem. Does this mean that we cannot approach address this issue from the perspective of syntax? What semantic roles and perspective that are needed here in order to explain this issue?

Reading Questions

- The idea that *have* cannot appear in the progressive is posited as the reason that *have* does not appear after *be*, producing things like: **Pat is having slept* (pg. 400). This immediately made me think of something like *Having slept, Pat is well-rested*, or *Pat is well-rested (after) having slept*. Is this *having* not the progressive, but something else?

Reading Questions

- Are we unable to include information about stative verbs in their own lexical entries or in the lexical entries of AUX verbs that cannot modify them?

Reading Questions

- Is there another reason besides convenience that we chose this method of dealing with auxiliary verbs over the Chomsky method? What modifications would've been needed to adapt it to suit our grammar?

Reading Questions

- I was wondering the explanation of *have to* with our rules, is it similar to modal or we need to separate them, making *to* as a part of PP and assign *have* a new entry?

Reading Questions

- The lexical entry for do as introduced in this chapter is semantically empty, but there are cases where it arguably changes the meaning (or at least the nuance) of sentences. For example in sentences like "I do run." or the provided example "There does seem to be [an error in this proof].", the presence of "do" emphasizes the statement being made in the sentence. I think this is particularly common as a response when someone else tries to negate something, like:

- "You don't exercise, that's your problem!"

- "Actually, I do exercise"

- where "I do exercise" is a stronger (and maybe more natural?) rebuttal than "I exercise". Is this a matter of pragmatics and not semantics? Is this just semantics beyond the scope of our grammar? What's going on here?

Reading Questions

- Are NICE properties specific to only English or can they be generalized cross-linguistically as well? If these properties can be seen cross-linguistically, could we use what we see in other languages to inform how we should formulate our analysis in our framework for English?

Reading Questions

- I am curious more about how our analysis of auxiliaries and the NICE properties might be treated in languages other than English since this chapter is quite English-specific. I could imagine some properties maybe being similar in some European languages and was wondering if you could give (if possible) any interesting changes that would have to happen in our analysis that would come from looking at another language with auxiliaries.

Reading Questions

- What kind of systems in other languages are similar to auxiliaries? Are they all verb-related? It feels like they might be a problem for the grammar when trying to model them with the system we have now.

-