



Ling 566
Nov 19, 2020
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.

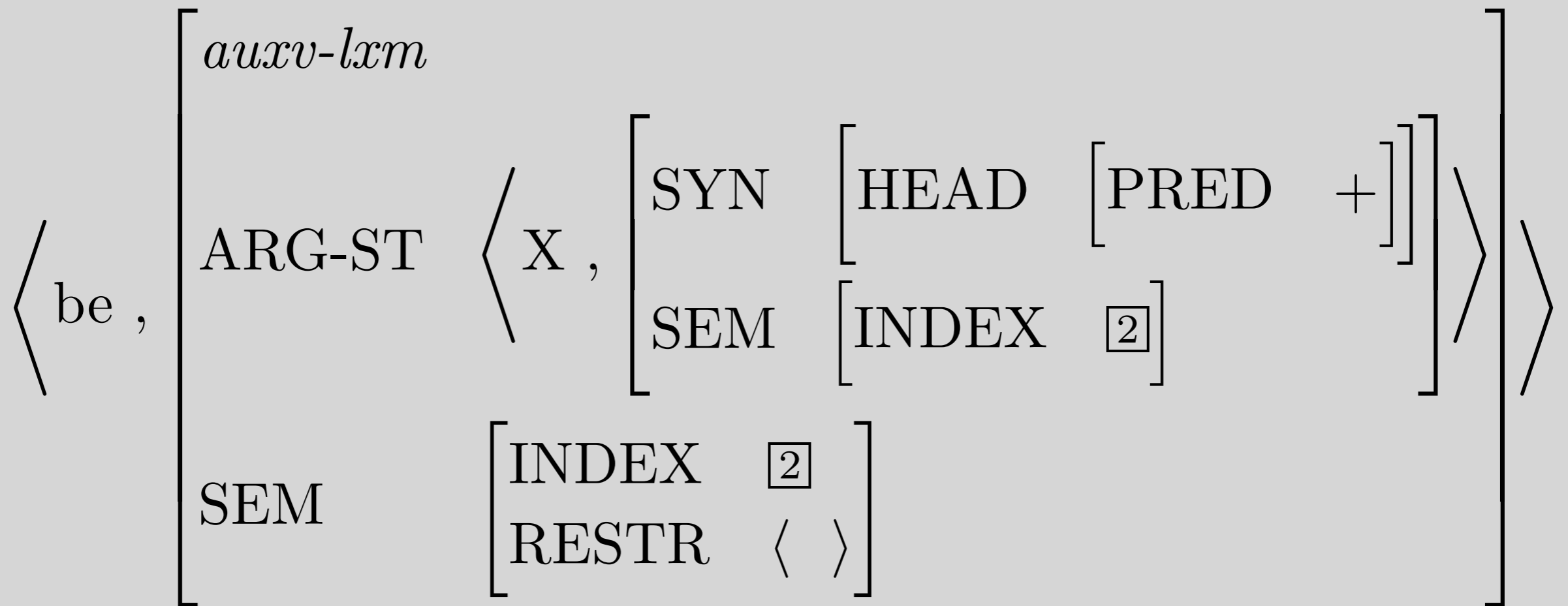
What's special about auxiliaries?

- 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.

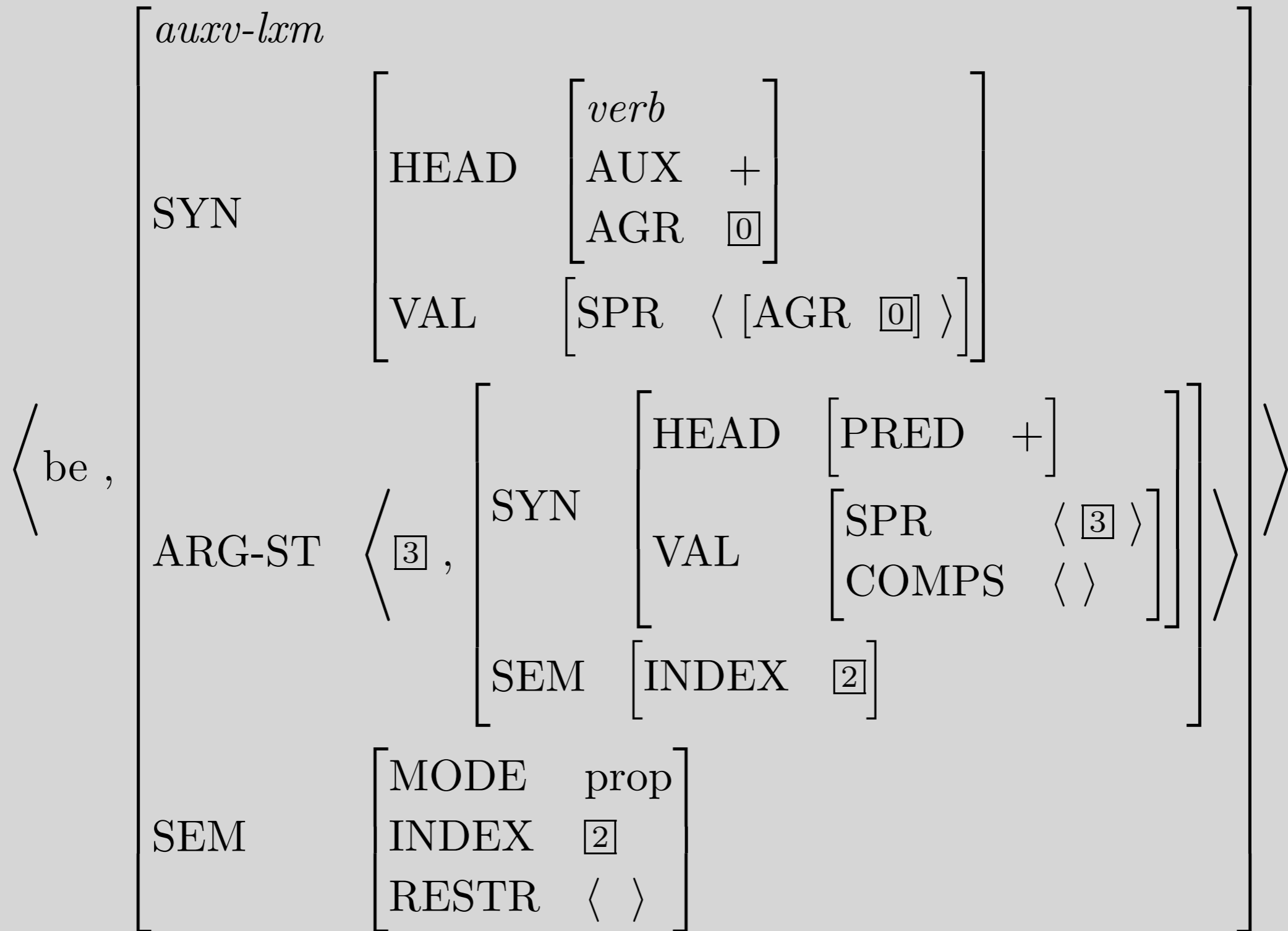
Some Type Constraints

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>

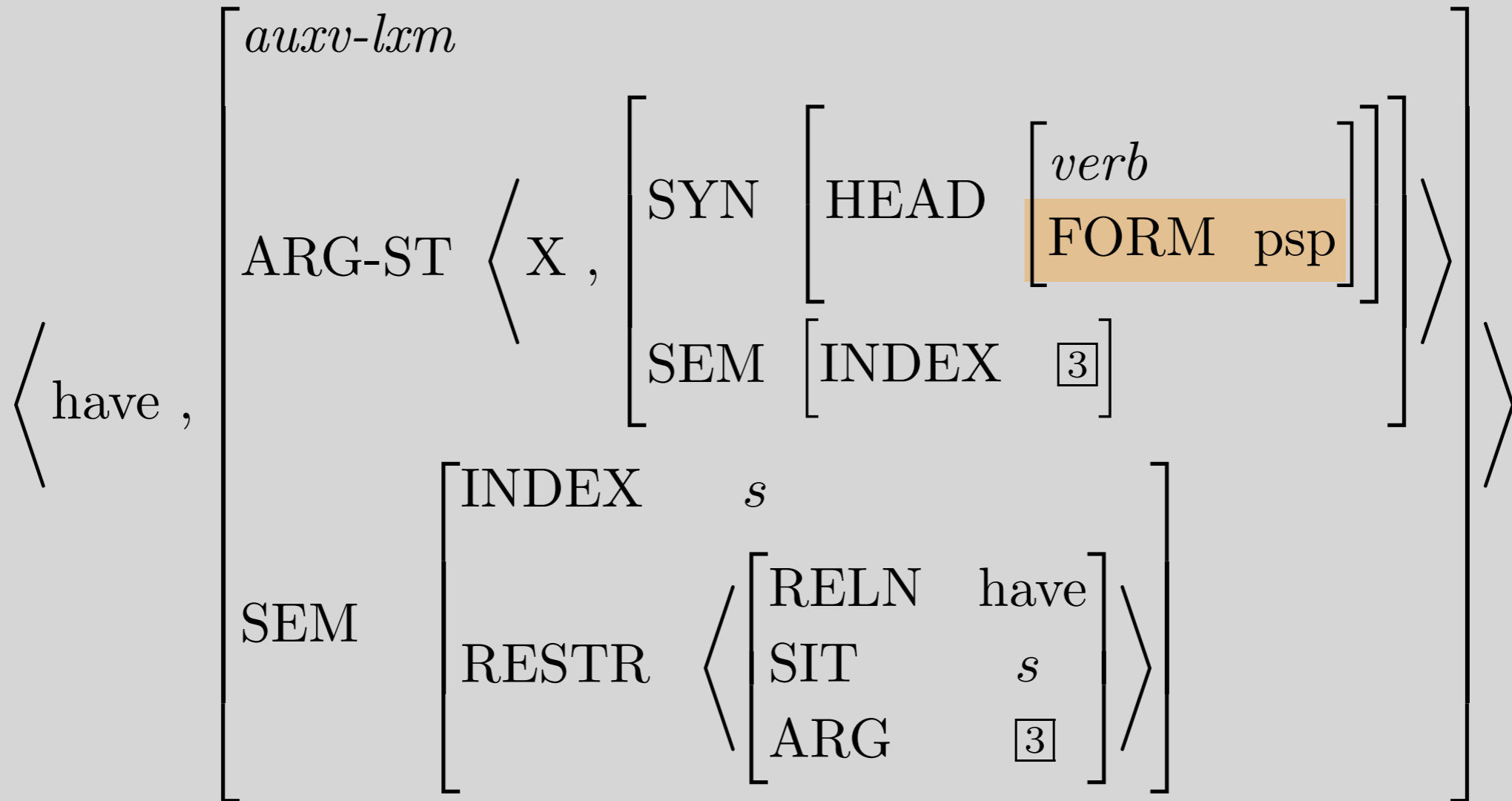
A Lexical Entry for *be*



The Entry for *be*, with Inherited Information

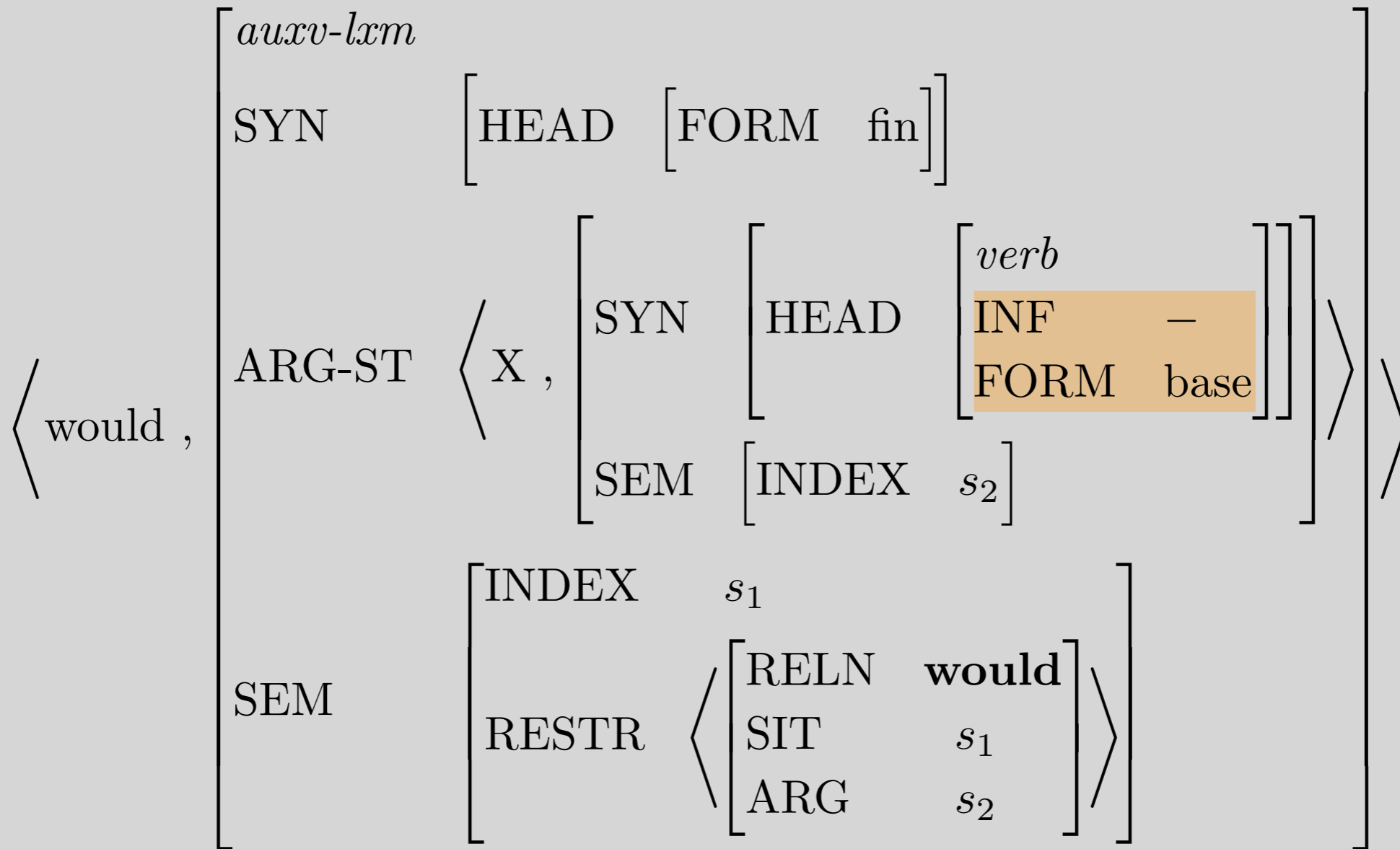


Entry for *have*



- 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.

Poll!

Accounting for Restrictions on Order and Iterability

- **Order**

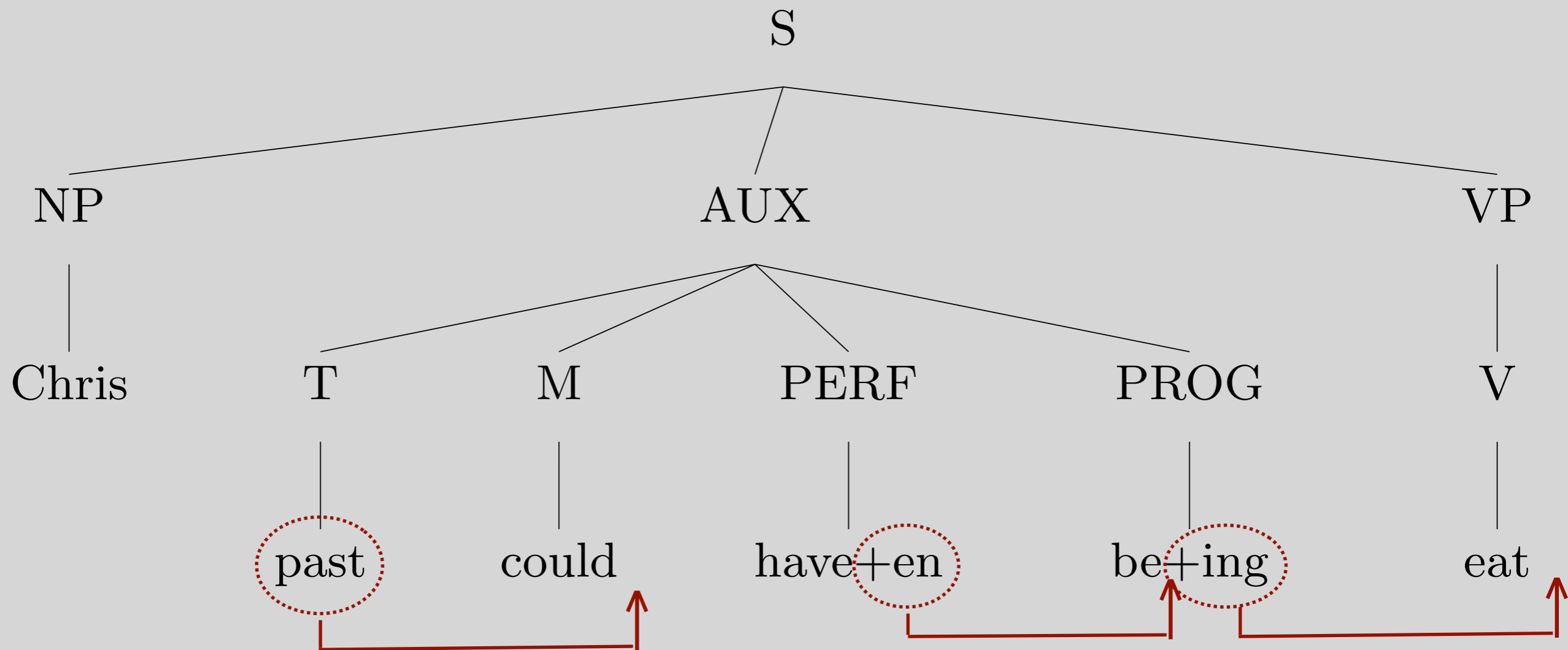
- Modals are finite, and all auxiliaries take non-finite complements. Hence, modals must come first.
- Stative verbs (like *own*) don't have present participles, and auxiliary *have* is stative. Hence, **Pat is having tapdanced*.

- **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.

Sketch of Chomsky's Old Analysis

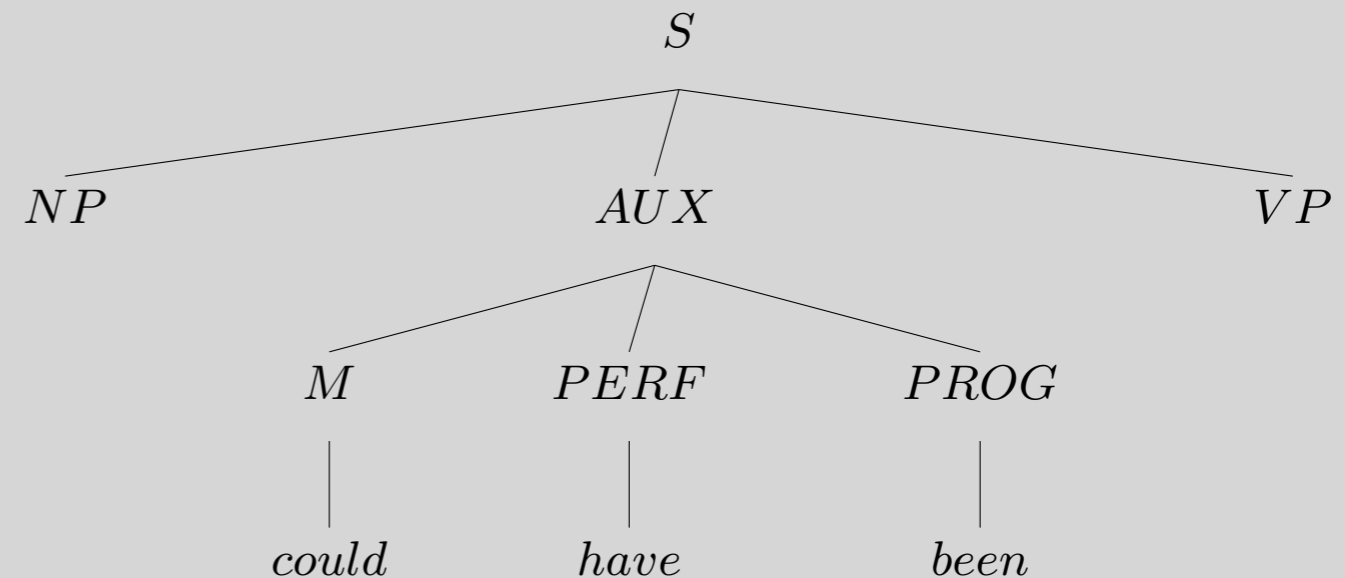
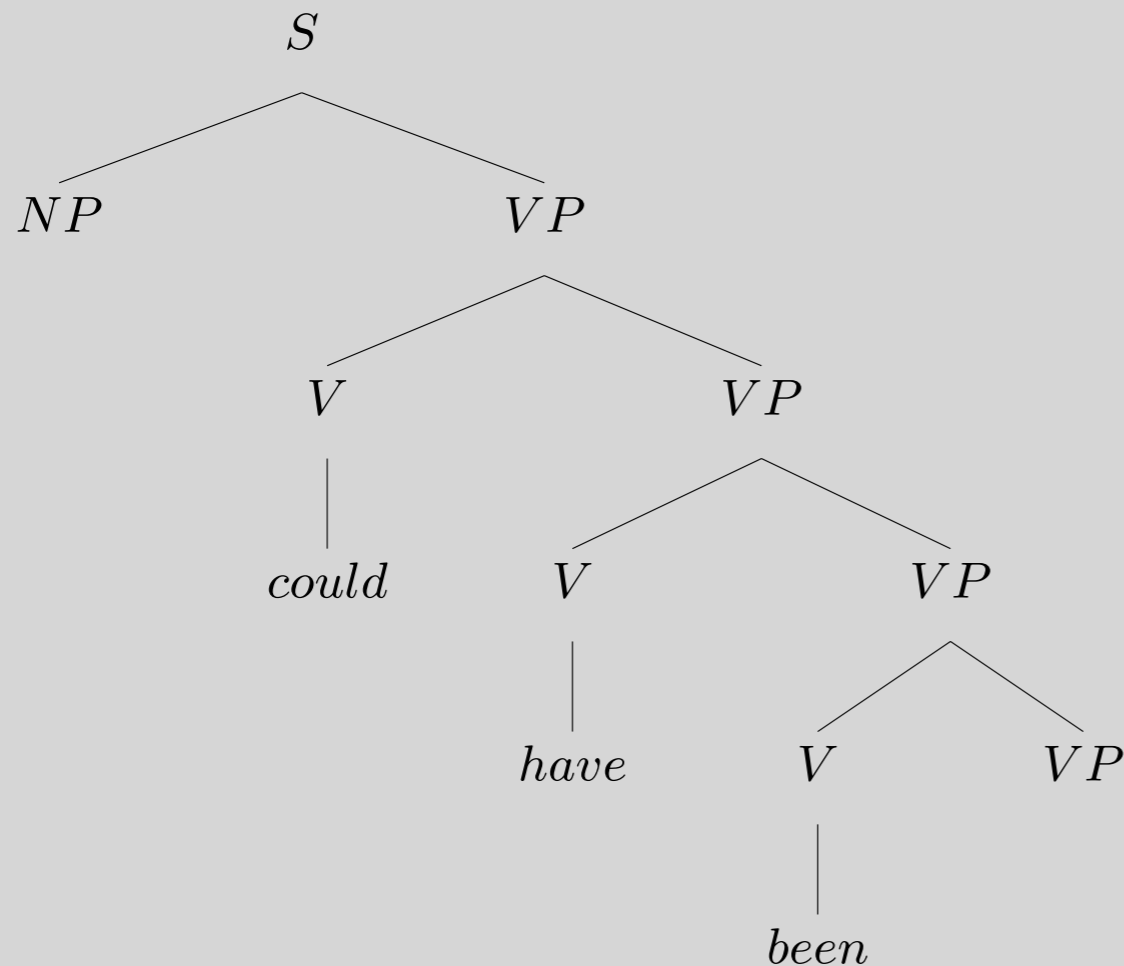
$S \rightarrow NP \text{ AUX } VP$
 $AUX \rightarrow T(M)(PERF)(PROG)$



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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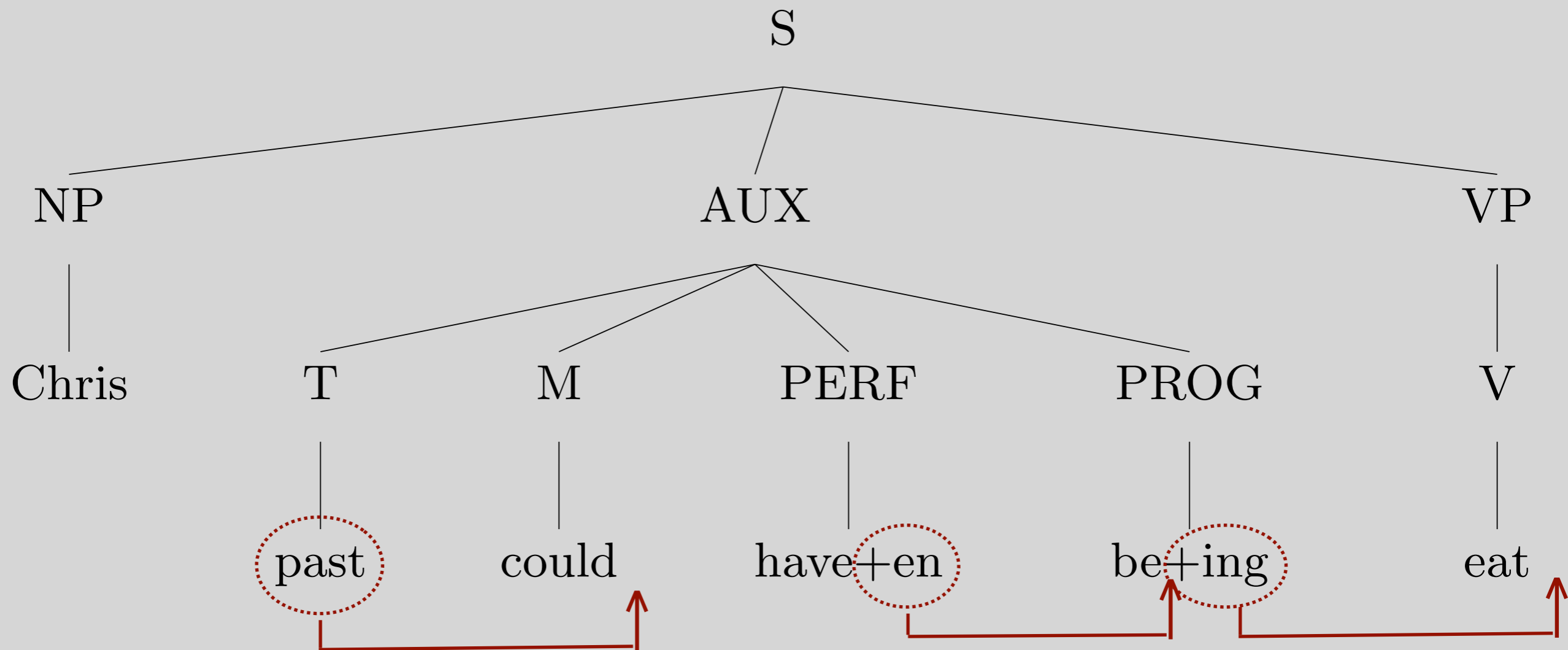
Poll!

Reading questions

- In the first analysis of auxiliary verbs the book mentions that there would be an AUX constituent that has M, PERF, and PROG children. On page 393 it says that AUX doesn't seem to have a head, I'm wondering why this is? Is it because the M, PERF, and PROG elements would be optional to satisfy constraint (5a) on page 392?

Sketch of Chomsky's Old Analysis

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



Reading questions

- For the analysis of chained have, how does the current grammar prevent have from undergoing the Past Participle Lexical Rule? A new subrule for have, a new feature on have, or something else?
- "To prevent past-tense modal forms, we can simply assume that the F_PAST [...] is undefined for will, shall, and the other modals." I'm curious what this means in implementation. Like, if we are looking at a table like (18), there are entries for X=will->F_PAST(will)=undef, or is it more like will does not exist in the table for X?

Reading questions

- I am a little bit confused about the semantic restriction on P400. On that page, sentences like "Pat is owning a house" is blocked by semantic restriction, but is it possible to elaborate more like what part of SEM does the block and how?
- If I am thinking this right, when referring to a temporary trait or state, a stative verb can become the complement to another occurrence of progressive (is being). So how is the stative verb be treated to not get constrained and incorrectly ruled out in a sentence like "You are being ridiculous!"?
- In regards to the co-occurrence constraints on auxiliaries, why would a sentence like "She left the party after having had the worst time." (where the perfective have iterates) not be considered unacceptable? I think I am confusing the multiple constraints.

Reading questions

- When introducing modals, it states that the "lexeme can is [FORM fin] so it cannot serve as the input to any lexical rule that introduces another FORM value, since the output FORM value is identified with that of the input (by the constraint on the type i-rule that identifies the SYN value of the INPUT and the OUTPUT). For example, the Present Participle Lexical Rule will only accept inputs that are compatible with the specification [FORM prp]." But Present Participle Lexical Rule is a d-rule and not an i-rule, so I don't see how its [FORM] feature is relevant, esp since we see that the definition of d-rule has the SYN agreement between INPUT and OUTPUT as a defeasible constraint? In fact, in the definition of the Present Participle Lexical Rule it has the FORM of the INPUT underspecified?

Reading questions

- Why not just analyze the FORM value of something like "must" as [FORM must] like we did with "it"?

Reading questions

- Does the restriction of what form the verb has to be in for auxiliaries come from their lexical entries? Ex: been can only take [prp], have takes [psp], can takes [base], etc. If so, how do we determine what form these auxiliaries take besides just looking at where they can occur in sentences (like I'm thinking in terms of someone who doesn't know English that well).

Reading questions

- The chapter says that to prevent past-tense modal forms, we'll stipulate that the F_{past} function in the Past-Tense Verb Lexical Rule is undefined for the modals. This doesn't feel very explanatory to me -- isn't there some feature relevant to them being modals that we could write into the rule to prevent it applying?
- On page 399, the footnote (5) says that historically "would" evolved from the past tense form of "will" and "should" is the past tense form of "shall", etc. What does Modern English say about where "would" and "should" evolved from then? I believe I was taught that "would" was a past tense of "will" in grammar textbooks.

Reading questions

- It's mentioned that "have" is not semantically vacuous, unlike "be" for example. What makes the auxiliary "have" different from other auxiliary verbs?
- Why does the auxiliary "do" not have a semantic contribution?

Reading questions

- On page 392 (5), the text talks about the generalization of auxiliaries; and one of the generalizations is that auxiliaries are optional. However, apart from in sentences where auxiliary 'do' is used for emphasis purposes, I don't see auxiliaries being optional in English. Is this generalization based on the emphasis marking 'do'?

Reading questions

- I am curious about the interface between semantics/pragmatics and syntax for auxiliary verbs.
- For instance, these four questions have almost identical syntactic structure but the semantics/pragmatics are totally different.
 - 1. Can my friend play the piano? (asking for permission)
 - 2. Can she play the piano? (most likely asking about ability)
 - 3. Can I play the piano? (asking for permission)
 - 4. Can you play the piano? (asking about ability/permission)
- How are such differences resolved?

Reading questions

- At this point I'm starting to get mixed up between the use cases for a few different features relating to verbs - namely MODE, FORM, PRED, INF, AUX - since they all seemed to be used in some way or another to restrict possible verb combinations. Could we maybe go over those again in contrast with one another?
- Auxiliary verbs are denoted with the constraint [AUX +] in the head feature, while still being a regular verb type. Why can't there be a new subtype of verb, say aux-verb?

Reading questions

- The constraints on ic-srv-lxms show that they can only take [INF +] complements. How do we account for sentences where continue takes a progressive complement, like *Aram continues reading the book*? My first thought is that we could have multiple lexemes for continue, but the above example seems like a paraphrase of *Aram continues to read the book*, so that doesn't feel right.

Reading questions

- I'm not sure I understand exactly what the X means in lexical entries. For can (p.398), does the X in lexical entry mean that the first arg is defeasible or optional? I'm trying to account for sentences using question words other than does/do as the first word of the sentence --> "Can I sit here?"

Reading questions

- Why do lexical entries have to specify maximal types for their feature structures? After introducing `auxv-lxm` in the type hierarchy we have to also include `ic-srv-lxm` to provide a maximal type for non-auxiliary subject-raising verbs. What problems would arise if we didn't include `ic-srv-lxm` and just specified non-auxiliary subject-raising verbs as `srv-lxm`?

Reading questions

- The foot note about "might could" dialects made me laugh, because just two years ago I learned that I speak a variant that uses this construction, and that it is not common outside the South!
- The footnote mentions that these idiosyncracies should be handled in lexical entries or perhaps with the FORM value. How is that done? Do we treat "might could" and "might would" as one entry, or would it make more sense to have a rule which allows "might" to act as an AUX for "could" and "would?"
- In my mind, these constructions have different semantic predications from plain "could" and "would," in that it gives the contrafactual an uncertain aspect, which most people would probably denote with just "might." For example:
 - I would have eaten, if there had been food.
 - I might (would) have eaten, if there had been food.
 - To me, the "might would" makes it clearer that it's an uncertain contrafactual, but I get mocked relentlessly for this construction!

Reading questions

- For real-world applications, is it fair to say that licensing and parsing a sentence is more important than rejecting an invalid sentence?