Ling 566
Oct 12, 2021

Valence, Agreement

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Announcements

- No Canvas answers from staff evenings/ weekends (but feel free to discuss amongst yourselves!)
- HW1 all turned on time!
- HW1 answer key available
- HW2 Ch 5, problem 3 is worth getting an early start on

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Overview

- Review: pizza, feature structures, well-formed trees, HFP
- A problem with the Chapter 3 grammar
- Generalize COMPS and SPR
- The Valence Principle
- Agreement
- The SHAC
- Reading Questions

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Pizza review

- Unification is an operation for combing constraints from different sources.
- What are those sources in the pizza example?
- Why do we need to combine information from different sources in our grammars?

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Reminder: Where We Are

- Attempting to model English with CFG led to problems with the granularity of categories, e.g.
  - Need to distinguish various subtypes of verbs
  - Need to identify properties common to all verbs
- So we broke categories down into feature structures and began constructing a hierarchy of types of feature structures.
- This allows us to schematize rules and state cross-categorial generalizations, while still making fine distinctions.

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A Tree is Well-Formed if …

- It and each subtree are licensed by a grammar rule or lexical entry
- All general principles (like the HFP) are satisfied.
- NB: Trees are part of our model of the language, so all their features have values (even though we will often be lazy and leave out the values irrelevant to our current point).

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The Head Feature Principle

- Intuitive idea: Key properties of phrases are shared with their heads
- The HFP: In any headed phrase, the HEAD value of the mother and the head daughter must be identical.
- Sometimes described in terms of properties "percolating up" or "filtering down", but this is just metaphorical talk

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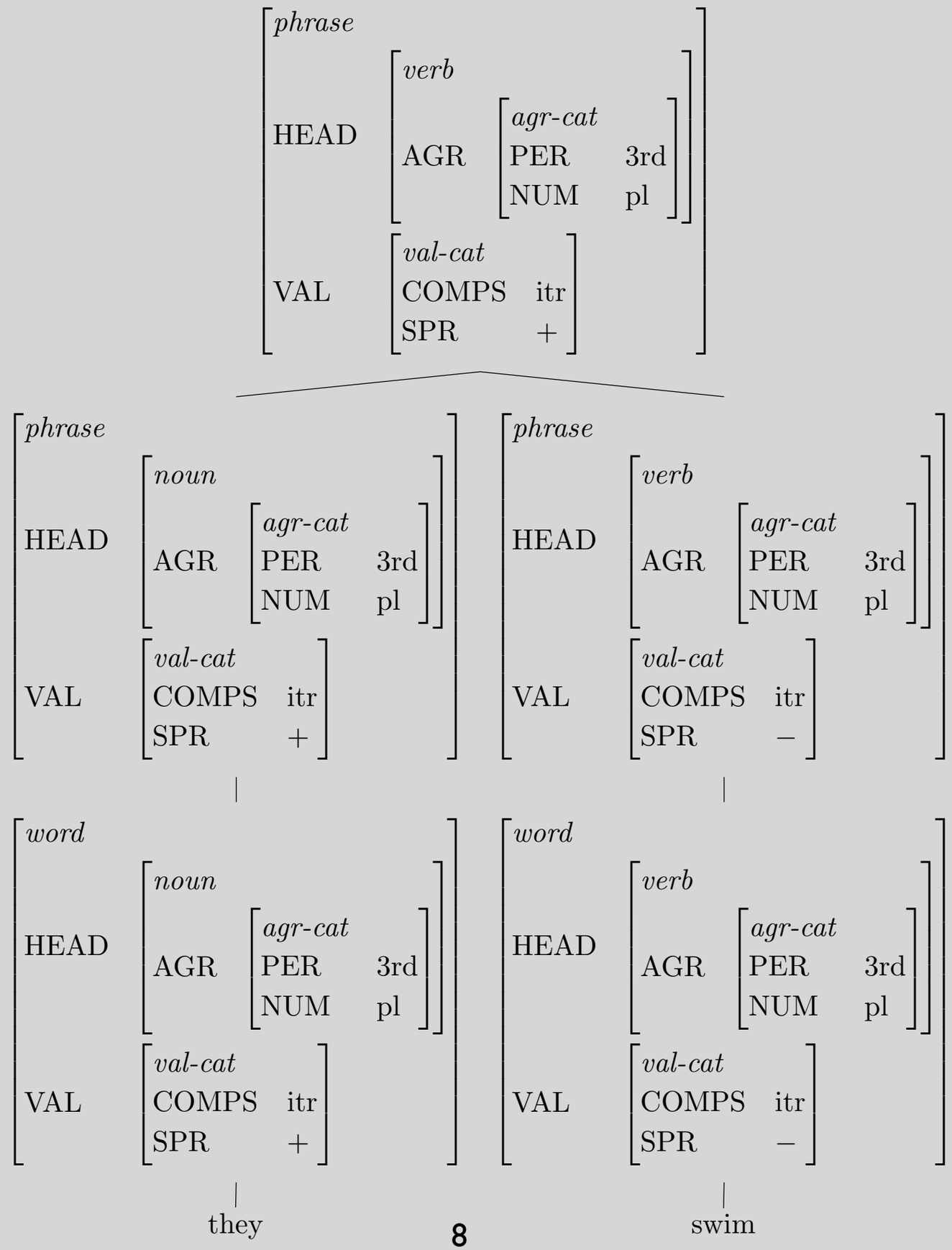

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But it's still not quite right…

- There's still too much redundancy in the rules.
- The rules and features encode the same information in different ways.

Head-Complement Rule 1:

$$\begin{bmatrix} \textit{phrase} \\ \text{VAL} \quad \begin{bmatrix} \text{COMPS} & \text{itr} \\ \text{SPR} & - \end{bmatrix} \end{bmatrix} \rightarrow \mathbf{H} \begin{bmatrix} \textit{word} \\ \text{VAL} \quad \begin{bmatrix} \text{COMPS} & \text{itr} \\ \text{SPR} & - \end{bmatrix} \end{bmatrix}$$

Head Complement Rule 2:

$$\begin{bmatrix} \textit{phrase} \\ \text{VAL} \quad \begin{bmatrix} \text{COMPS} & \text{itr} \\ \text{SPR} & - \end{bmatrix} \end{bmatrix} \rightarrow \mathbf{H} \begin{bmatrix} \textit{word} \\ \text{VAL} \quad \begin{bmatrix} \text{COMPS} & \text{str} \\ \text{SPR} & - \end{bmatrix} \end{bmatrix} \text{ NP}$$

Head Complement Rule 3:

$$\begin{bmatrix} \textit{phrase} \\ \text{VAL} \quad \begin{bmatrix} \text{COMPS} & \text{itr} \\ \text{SPR} & - \end{bmatrix} \end{bmatrix} \rightarrow \mathbf{H} \begin{bmatrix} \textit{word} \\ \text{VAL} \quad \begin{bmatrix} \text{COMPS} & \text{dtr} \\ \text{SPR} & - \end{bmatrix} \end{bmatrix} \text{ NP NP}$$

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Solution:
More Elaborate Valence Feature Values

- The rules just say that heads combine with whatever their lexical entries say they can (or must) combine with.
- The information about what a word can or must combine with is encoded in list-valued valence features.
  - The elements of the lists are themselves feature structures
  - The elements are "cancelled" off the lists once heads combine with their complements and specifiers.

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Complements

Head-Complement Rule:

$$\begin{bmatrix} phrase \\ \text{VAL} \quad \begin{bmatrix} \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \rightarrow \mathbf{H} \begin{bmatrix} word \\ \text{VAL} \quad \begin{bmatrix} \text{COMPS} & \langle \boxed{1}, \ldots, \boxed{n} \rangle \end{bmatrix} \end{bmatrix} \boxed{1}, \ldots, \boxed{n}$$

- This allows for arbitrary numbers of complements, but only applies when there is at least one.
  - Heads in English probably never have more than 3 or 4 complements
  - This doesn't apply where Head-Complement Rule 1 would. (Why?)
- This covers lots of cases not covered by the old Head-Complement Rules 1-3. (Examples?)

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Specifiers

Head-Specifier Rule (Version I)

$$\begin{bmatrix} phrase \\ \text{VAL} \quad \begin{bmatrix} \text{COMPS} & \langle\ \rangle \\ \text{SPR} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \rightarrow \boxed{2} \quad \mathbf{H}\begin{bmatrix} \text{VAL} \quad \begin{bmatrix} \text{COMPS} & \langle\ \rangle \\ \text{SPR} & \langle\ \boxed{2}\ \rangle \end{bmatrix} \end{bmatrix}$$

- Combines the rules expanding S and NP.
- In principle also generalizes to other categories.
- Question: Why is SPR list-valued?

Poll!

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When poll is active, respond at **pollev.com/emb**

Text **EMB** to **22333** once to join

SPR as a list

Love the symmetry with COMPS

Lists that max out at 1 item are weird

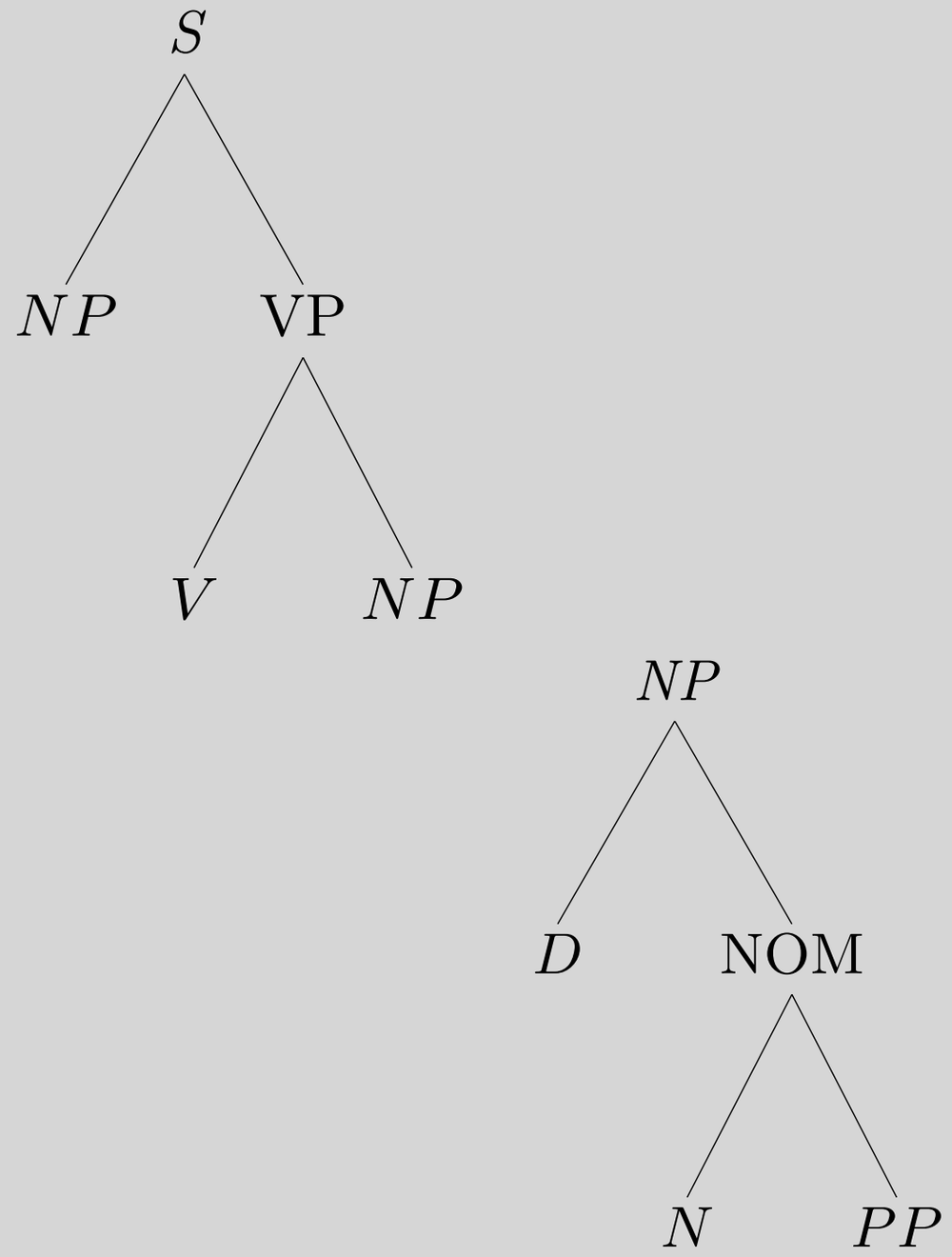
I prefered +/-

None of the above

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Question:

Why are these right-branching? That is, what formal property of our grammar forces the COMPS to be lower in the tree than the SPR?



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Another Question…

What determines the VAL value of phrasal nodes?

ANSWER: The Valence Principle

Unless the rule says otherwise, the mother's values for the VAL features (SPR and COMPS) are identical to those of the head daughter.

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More on the Valence Principle

- Intuitively, the VAL features list the contextual requirements that haven't yet been found.
- This way of thinking about it (like talk of "cancellation") is bottom-up and procedural.
- But formally, the Valence Principle (like the rest of our grammar) is just a well-formedness constraint on trees, without inherent directionality.

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So far, we have:

- Replaced atomic-valued VAL features with list-valued ones.
- Generalized Head-Complement and Head-Specifier rules, to say that heads combine with whatever their lexical entries say they should combine with.
- Introduced the Valence Principle to carry up what's not "canceled".

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The Parallelism between S and NP

- Motivation:
  - pairs like *Chris lectured about syntax* and *Chris's lecture about syntax*.
  - both S and NP exhibit agreement

    *The bird sings/*sing* vs. *The birds sing/*sings*

    *this/*these bird* vs. *these/*this birds*
- So we treat NP as the saturated category of type *noun* and S as the saturated category of type *verb*.

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Question: Is there any other reason to treat V as the head of S?

- In mainstream American English, sentences must have verbs. (How about other varieties of English or other languages?)
- Verbs taking S complements can influence the form of the verb in the complement:

  *I insist/*recall (that) you be here on time*.
- Making V the head of S helps us state such restrictions formally

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A possible formalization of the restriction on *insist*

$$\left[\begin{array}{ll}\text{HEAD} & \textit{verb} \\ \text{VAL} & \left[\begin{array}{ll}\text{SPR} & \left\langle \text{NP} \right\rangle \\ \text{COMPS} & \left\langle \left[\begin{array}{ll}\text{HEAD} & \left[\begin{array}{ll}\textit{verb} \\ \text{MOOD} & \textit{subjunctive}\end{array}\right] \\ \text{VAL} & \left[\begin{array}{ll}\text{COMPS} & \left\langle\ \right\rangle \\ \text{SPR} & \left\langle\ \right\rangle\end{array}\right]\end{array}\right] \right\rangle \backslash \end{array}\right]\end{array}\right]$$

Note that this requires that the verb be the head of the complement. We don't have access to the features of the other constituents of the complement.

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An Overlooked Topic: Complements *vs*. Modifiers

- Intuitive idea: Complements introduce essential participants in the situation denoted; modifiers refine the description.
- Generally accepted distinction, but disputes over individual cases.
- Linguists rely on heuristics to decide how to analyze questionable cases (usually PPs).

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Heuristics for Complements vs. Modifiers

- Obligatory PPs are usually complements.
- Temporal & locative PPs are usually modifiers.
- An entailment test: If **X Ved (NP) PP** does not entail **X did something PP**, then the PP is a complement.

Examples

– *Pat relied on Chris* **does not entail** *Pat did something on Chris*
– *Pat put nuts in a cup* **does not entail** *Pat did something in a cup*
– *Pat slept until noon* **does entail** *Pat did something until noon*
– *Pat ate lunch at Bytes* **does entail** *Pat did something at Bytes*

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Agreement

- Two kinds so far (namely?)
- Both initially handled via stipulation in the Head-Specifier Rule
- But if we want to use this rule for categories that don't have the AGR feature (such as PPs and APs, in English), we can't build it into the rule.

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The Specifier-Head Agreement Constraint (SHAC)

Verbs and nouns must be specified as:

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{AGR} & \boxed{1} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \left\langle \begin{bmatrix} \text{AGR} & \boxed{1} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$

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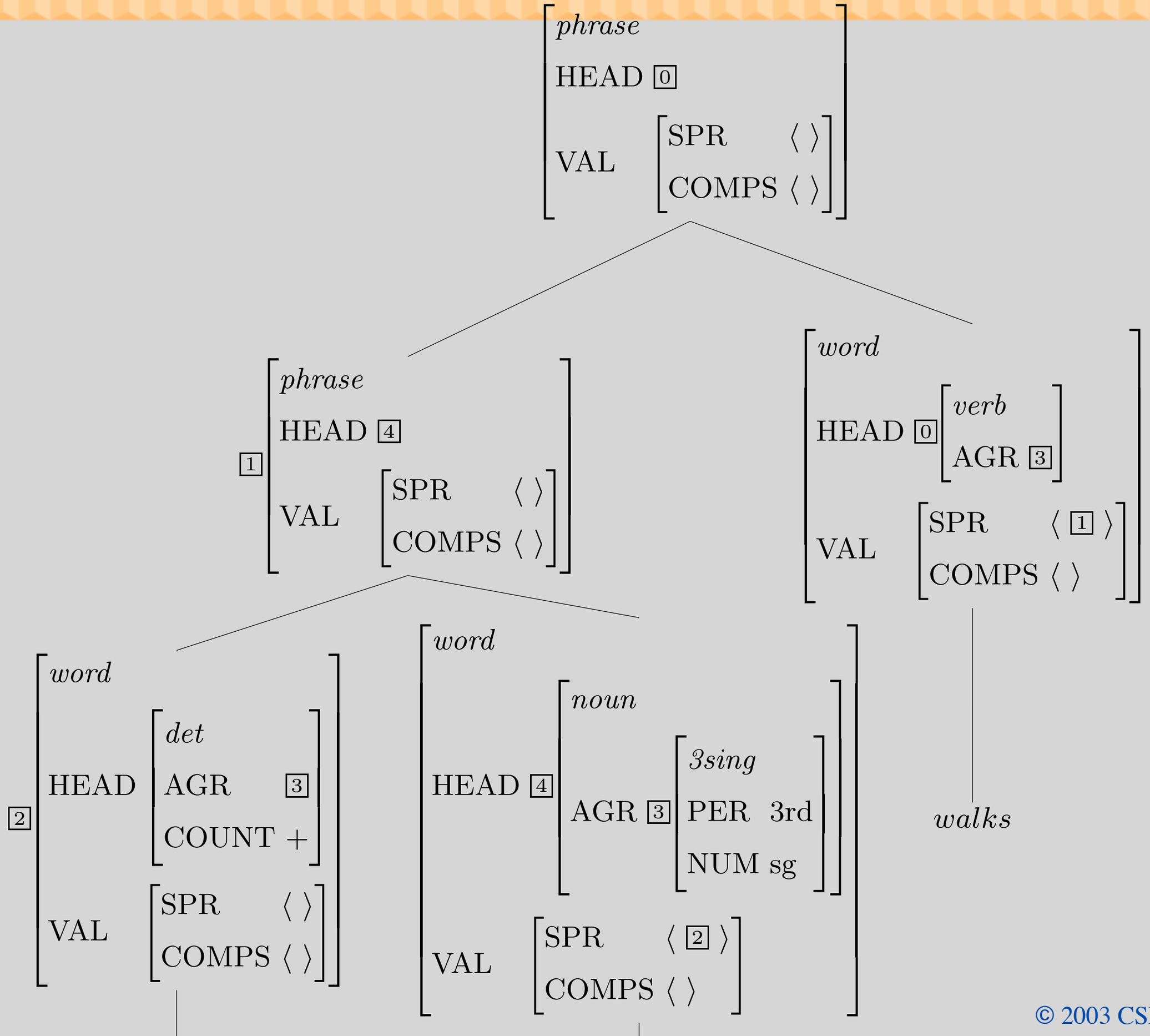

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The Count/Mass Distinction

- Partially semantically motivated
  - mass terms tend to refer to undifferentiated substances (*air, butter, courtesy, information*)
  - count nouns tend to refer to individuatable entities (*bird, cookie, insult, fact*)
- But there are exceptions:
  - *succotash* (mass) denotes a mix of corn & lima beans, so it's not undifferentiated.
  - *furniture, footwear, cutlery*, etc. refer to individuatable artifacts with mass terms
  - *cabbage* can be either count or mass, but many speakers get *lettuce* only as mass.
  - borderline case: *data*

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Our Formalization of the Count/Mass Distinction

- Determiners are:
  - [COUNT –] (*much* and, in some dialects, *less*),
  - [COUNT +] (*a, six, many*, etc.), or
  - lexically underspecified (*the, all, some, no*, etc.)
- Nouns select appropriate determiners
  - "count nouns" say SPR <[COUNT +]>
  - "mass nouns" say SPR <[COUNT –]>
- Nouns themselves aren't marked for the feature COUNT
- So the SHAC plays no role in count/mass marking.

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Reading Questions

- In the introduction to the chapter, a claim is made that "lexical head daughters in English uniformly occur at the left edge of their phrases." This makes sense to me in the context of PPs (after all, we say prepositions, not post-positions) and in the context of VPs, but I'm not seeing how NOM allows us to generalize this observation to nouns. For example, any NOM that includes adjective modifiers on the noun will almost certainly not follow the pattern described above. What am I missing?

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Reading Questions

- Can I roughly say that SPR defines what should be before the word/phrase, and COMPS defines what should be after the word/phrase?
- On page 105, it is stated that "the rules are written so that head- complement phrases are embedded within head-specifier phrases, and not vice versa", by virtue of the types specifications from the Head-Complement Rule and of the Head-Specifier rules. Could it be the case that the type specifications of these rules where reversed? I am confused as to what extent specifiers differ from complements.

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Reading Questions

- I'm not sure I understand why a head phrase's VAL needs to have the same values as the head daughter. (In particular, the justification for the mother and daughter having the same SPR on page 102.) More generally, why do we want this information to travel up or down the tree?

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Reading Questions

- What is the difference between Head-Specifier Rule and SHAC? I think both of them are saying some kind of relationship between head and specifier. What I am thinking is that Head-Specifier Rule is telling us the relationship between different constituents, like the head and its specifier, but SHAC is giving constraints within one constituents --- it shows the agreement within its own HEAD value (ARG specifically) and its SPR's HEAD value(ARG).

- Another question I have is with SHAC. Would this constraint only be applied when Head-Specifier Rule is applied?

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Reading Questions

- How will one distinguish between VP and V in that case since both are under-specified?
- P.101: words and phrases are different in their "degree of saturation". Is it implying that words have more possible feature values than phrases?

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Reading Questions

- Why is COUNT only constrained on the SPR (and not the AGR) of nouns? Do NPs have COUNT values?

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Reading Questions

- On page 96, the footnote discusses a Hypothetical Alternative HCR that required "neither that the head daughter to not be of type word nor that the mother have an empty COMPS list. I was wondering how the Alternative HCR could have been less or more useful in this grammar? In other words, why was it not chosen over the current HCR where we require an empty COMPS for mother and only word type non-head daughters?

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Reading Questions

- How universal is the grammar in the book supposed to be? Some of this seems pretty English specific.

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